



Medical

Surgical-Nursing I

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**MEDICAL
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Cerdas, Bahagia, Mulia, Lintas Generasi.

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PREFACE

This teaching material for *Medical-Surgical Nursing I* was prepared to refer to the Indonesian National Qualifications Framework (KKNI) and the 2022 Curriculum of Higher Education Applied Undergraduate Study Program, Health Polytechnic, Ministry of Health.

The material presented in this teaching material refers to the Learning Outcomes in the Medical-Surgical Nursing Course I which includes: 1). Medical surgical nursing concepts and perspectives, 2). The role of medical surgical nurses in health service policy, 3). The concept of nursing care in patients with tropical diseases: 4). The concept of nursing care in patients with endemic infectious diseases, 5). The concept of nursing care for patients with HIV/AIDS, 6). The concept of nursing care for patients with pathological oxygen disorders of the respiratory and cardiovascular systems: 7). The concept of nursing care in patients with impaired fluid needs, 8). The concept of nursing care in patients with disorders of pathological nutritional needs of the digestive system and endocrine metabolism, 9). The concept of nursing care in patients with disorders of the need for pathological elimination of digestive and urinary systems

This teaching material is organized into nine chapters, where you must start reading this teaching material sequentially from chapter 1 to chapter 9. Chapter 1 will be your basis for studying the next chapter. In each chapter, the material that should be known to students will be described, which is described in the learning objectives. To make sure you understand the material, this teaching material provides practice questions.

The systematics of writing in each chapter consists of 1) Introduction, 2) Keywords, 3) Learning Objectives, 4) Material Description, 5) Summary, 6) Exercises, and 7) References used. This teaching material is also equipped with tables, pictures, or illustrations that are useful to clarify the material presented. This is intended so that this teaching material becomes an interesting learning resource for students.

To further deepen your understanding of *Medical-Surgical Nursing I* material, you can access references in the form of reading materials or YouTube links which you can access based on suggestions that will be conveyed in each chapter in this teaching material.

You can also use this teaching material as the main learning resource when the lecturer is not present face to face in delivering Medical Surgical Nursing I material. This teaching material is a comprehensive series of *Medical-Surgical Nursing I* courses, which is one of the courses that students must take to achieve a Bachelor of Applied Science degree.

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CHAPTER I

CONCEPTS AND PERSPECTIVES OF MEDICAL-SURGICAL NURSING

Introduction

The purpose of this book is to provide an overview of concepts and perspectives of medical-surgical nursing focusing on: key concepts of medical-surgical nursing such as definition, objective and core function, a review of nursing knowledge that is critical to the understanding of medical-surgical nursing practices such as the definition of nursing, scope of medical-surgical nursing, components of medical-surgical nursing, trends and issues in medical-surgical nursing, a discussion of medical-surgical nursing, The concepts and perspectives of medical-surgical nursing chapter ends with a discussion of nursing framework of the core function of medical-surgical nursing, scope, component and trends and issues in medical-surgical nursing.

Key Term

- Medical-surgical nursing
- Scope of medical-surgical nursing
- Components of medical-surgical nursing
- Trends and issues

Learning Objectives

After the completion of the learning book, you will be able to:

- 1) Define the science of medical-surgical nursing
- 2) Describe the core function of medical-surgical nursing
- 3) Explain how professionally provide nursing care in accordance with the standards of the nursing profession, including in medical-surgical nursing
- 4) Define professional nursing practice
- 5) Define The scope of practice of medical-surgical nursing
- 6) Describe the key component of medical-surgical nursing
- 7) Describe trends and issues of medical-surgical nursing

Definition of Medical-Surgical Nursing

Medical-surgical Nursing is a professional service based on medical-surgical nursing science and medical-surgical nursing techniques in the form of Bio-psycho-socio-spiritual services, the main role of the nurse is to provide nursing care to humans as the main object of study of the philosophy of nursing: ontological (Brunner & Suddarth's, 2021).

In every action, nurses are required to provide nursing care in a professional manner by the standards of the nursing profession, including in medical-surgical Nursing. In its concept, medical-surgical nursing is a professional service based on the knowledge and techniques of medical-surgical nursing in the form of bio-psycho-socio-spiritual services for adult clients to meet basic human needs in the form of increasing existing abilities in individuals, preventing, repairing, and carry out rehabilitation from an illness by the individual (Wilma, 1999).

The scope of practice of medical-surgical nursing is the provision of nursing care to adult clients who experience physiological disorders due to illness, trauma, or disability. Nursing care includes treating individuals to obtain comfort, assisting individuals in improving and maintaining their health conditions, preventing, detecting, and overcoming conditions

related to disease, seeking recovery until clients can reach their highest productive capacity, and helping clients deal with death with dignity (Catalano, 2020).

Medical-surgical nursing is the science of nursing that focuses on the concepts and principles of medical-surgical nursing which are the background for the application of nursing science and technology in meeting the needs of adult clients who experience physiological changes with or without structural disorders, for example, the respiratory system, cardiovascular system, digestive system, urinary system, endocrine system, immune system, and chronic disease problems (AMSN, 2019).

Medical-surgical nursing is the single largest nursing specialty in the United States and beyond. Medical-surgical nurses provide care to adults with a variety of medical issues or who are preparing for/recovering from surgery. They have a broad knowledge base and are experts in their practice. Medical-surgical nurses have advanced organizational, prioritization, assessment, and communication skills and are leaders in coordinating care among the interprofessional healthcare team (Wilma, 1999).

Medical-surgical nursing is practiced in several settings across the healthcare industry, including hospitals, outpatient settings, in homes, via telemedicine and other non-traditional settings. The specialty of medical-surgical nursing happens in almost every care environment because medical-surgical nursing is what you practice, not where (AMSN, 2019)

The definition of medical-surgical nursing contains 3 things namely:

1. Develop yourself continuously to improve your professional abilities in medical surgery by: a). Applying nursing concepts in carrying out nursing activities, b). Carrying out nursing activities using a scientific approach, c). Playing role as a reformer in every nursing activity in various nursing service settings, d) Continuously following the development of science and technology through supporting activities, e). Developing nursing science and technology by the needs of society and the development of science, f). Playing an active role in every scientific activity relevant to nursing (Roymond, 2009).

2. Carry out research and development activities in medical-surgical nursing by: a). Identifying health problems by analyzing and synthesizing relevant information from various sources and paying attention to cross-cultural perspectives, b). Planning and carrying out research in the field of medical-surgical nursing, c). Applying the principles and techniques of proper reasoning in thinking logically, critically, and independently (Roymond, 2009).
3. Function as creative, productive, open-to-receive members of society change, and future-oriented by: a). Exploring and developing the potential that exists in him to help solve community problems related to medical-surgical nursing, b). Helping to improve the welfare of society by utilizing and managing available resources (Roymond, 2009).

Scope of Medical-Surgical Nursing Practice

According to the scope of medical-surgical nursing practice, it is a form of nursing care for adult clients who experience physiological disorders, either real or predicted to experience disturbances either due to disease, trauma, or disability. Nursing care includes treatment of individuals to obtain comfort; help individuals in improving and maintaining their healthy condition; performing prevention, detection, and overcoming conditions related to disease: striving for recovery until the client can reach its highest productive capacity; and helping clients deal with death with dignity. The medical surgical nursing practice uses scientific assessment, planning, implementation, and evaluation steps, taking into account the interrelationships of the patient's bio-psycho-social components in responding to physiological disturbances as a result of illness, trauma, or disability (AMSN, 2019).

Scope of medical-surgical nursing

1. Scope of research problems, development of nursing concepts and theories. Research problems are focused on studying existing theories to convince the public that nursing is a science that is

different from other health professions and the appropriateness of the application of this knowledge in the nursing field.

2. The scope of the research problem of basic human needs includes the identification of causes and efforts to meet needs.
3. Scope of nursing education research problems Scope of nursing management research problems: a). Medical-surgical nursing care model, b). Nurse's performance role, c). Recording and reporting system model
4. The scope of medical-surgical nursing research problems is focused on nursing care through the nursing process approach. The topic of the problem is based on body system disorders that are common in adult clients. medical-surgical nursing science: a). the immune system, b). the respiratory and oxygen systems, c). the cardiovascular system, d). the digestive system, e). the endocrine system, f). the urinary system (Doengoes & Mary, F, 2013)

Components of Medical-Surgical Nursing

There are 5 main objects in nursing science: 1). humans (individuals who receive nursing care), 2). nursing, 3). the concept of health and illness, 4). environmental concept, 5). the application of nursing actions.

1. Human

Recipients of nursing care are human, individual, group, community, or social. each is treated by the nurse as a holistic and open adaptation system.

2. Nursing

The form of professional services is in the form of fulfilling basic needs provided to individuals who are healthy or sick and who experience physical, psychological, and social disorders to achieve optimal health status.

3. The concept of health and illness

The WHO definition of health has the following characteristics which enhance the positive concept of health: a). Paying attention to the individual as a whole system, b). Look healthy by identifying the internal and external environment, c). Appreciation of the important role of the individual in life. Pain is a condition where the body's health is weak. (Webster's New Collegiate Dictionary). Pain is a condition caused by various things, it can be an event, an abnormality that can cause disturbances in the composition of the body's tissues, from the function of the tissue itself and overall function.

4. Environmental concept

The environment is all conditions that come from both internal and external, which affect and result in the development and behavior of a person and group. The external environment can be physical, chemical, or psychological that is received by the individual and perceived as a threat, while the internal environment is a state of mental processes in the individual's body (in the form of experiences, emotional abilities, personality) and biological stressor processes (cells and molecules) that originate from in an individual's body

5. The application to nursing care which includes: a). The nursing process, b). Formulation of nursing diagnoses, c). Nursing interventions, d). Implementation, e). Evaluation (Nursalam, 2015).

Trends and Issues in Medical-Surgical Nursing

Nursing as a profession is required to develop its knowledge as a form of concern in improving human welfare both at the preclinical and clinical levels. To be able to develop their knowledge, nurses are required to be sensitive to changes that occur in their environment at any time. medical-surgical nursing as a branch of nursing is also inseparable from these changes, such as medical device technology, variations in types of diseases and nursing intervention techniques. The existence of various

changes that occur will lead to various trends and issues that demand an increase in medical-surgical nursing care services (AMSN, 2019).

1. Trends in Medical-Surgical Nursing

Trends in medical-surgical nursing Trends are meant to be the changes that take place and become vogue. Such changes in professional practices require constant updating in knowledge, attitudes, and skills. It is a debatable topic whether all trends are to be followed or not. The common consensus of a member of a professional team is a must for following the trends. Trends in nursing largely depend upon the changing health needs of the people, changing health delivery systems, and scientific and technical advancement (Cherry & Jacob, 1999).

Some of the trends in nursing are as follows: reduction in distance through speedy communication: mobiles, E-line, and video conference have made it possible for nurses to reach patients, doctors, and other professionals whenever the need arise. It is possible to get on-the-spot consultation either from individuals or from periodicals and books. Along with verbal and non-verbal communication skills, nurses also need to get competencies in using information and technology (Cherry & Jacob, 1999).

Computerization for patient care management makes it easier to search for references on directions for patient care, record keeping, reporting, compilation of information, stock monitoring, auditing are some of the functions which computers have taken over. Therefore, the ability to use computer for patient care management has become essential (Catalano, 2000).

Advances in nursing and research: Based on the results of the author's study, many nurses do not understand the scope of nursing research. The topics chosen are more general in nature, so the results obtained don't make a significant contribution to being applied in nursing practice (Cherry & Jacob, 1999).

Current Trends in Medical-Surgical Nursing:

a. Specialization and advance practice:

Like any other field of nursing medical surgical nursing also witnessed tremendous changes. To keep in line with the advancements in medical field specialization nurses have to undergo specialization courses.

In India, post basic diploma in specialty areas like Critical Care Nursing, nursing, oncology nursing, surgical nursing, emergency disaster nursing, and operating room nursing are provided with the approval from the Indian Nursing Council. After post-graduate program in medical surgical nursing, nurses take up roles like nurse researcher, nurse administrator, nurse educators and clinical nurse specialist. In many countries what is role in various facilities for well received by the public (AMSN, 1999).

b. Evidence based Practice: -

As per the AMSN ponds practice standards, nexus advance preparation in a specialty area are expected to be actively involved in research and creation of empirical (AMSN, 1999).

Nursing has been called the arts and science of the profession. It is also known as the oldest art and the youngest of the profession. Art stating nurses learn more knowledge, idea, and concept related to actual life” but science stated with a systematic process with principles, ethics, and rules to follow the concept of knowledge. There is rapid development in society. There are changes in technology, knowledge explosion, and the increased and complex healthcare demands that challenge the nurse’s knowledge, technical competence interpersonal skills, and commitment. In ancient times, when medicine was associated with good or evil spirits, the sick were usually cared at temples and houses of worship (Brunner & Suddarth’s, 2021).

But now the trend analysis and future scenarios provide a basis for good decision making many good, reputed hospital, primary health center, sub center camping were set up and many of the health

awareness programs has also services to the public. The most essential aim of the nurses is the promotion of health prevention of disease. The WHO has been considering the future and predicts that by 2000 the world experiences growth and development in the nursing profession (Lois, et al., 2019).

2. Medical-surgical Nursing Issues

- a. Antithetical to the development of nursing science
Due to the low level of professional education and the lack of professional nursing education, nurses tend to carry out their roles routinely and wait for orders from doctors. They tend to resist change or something new in carrying out their roles professionally.
- b. Low self-confidence/self-esteem (low self-confidence)
Many nurses do not see themselves as a source of information from clients. This feeling of inferiority/lack of self-confidence arises due to inadequate mastery of science and technology and the Indonesian service system which places nurses as second-class citizens. This stigma causes nurses to be seen as not having adequate skills and authority in making decisions in the field of health services.
- c. Lack of understanding and attitude to carry out nursing research
Based on research that has been done, more than 90% of nurses do not carry out their role in carrying out research. This is more due to: very insufficient research knowledge/skills, limited time, and no budget due to policies that do not support research implementation. It was only in the 2000s that Pusdiknakes provided opportunities for nurses to carry out research, and even then, the results were still questionable because many of the results were more towards health research in general. Nursing research is almost untouched. Another factor that is very concerning is that the final assignment given to nursing students is not scientific research steps, but rather emphasizes case-by-case reports.

- d. Nursing education is only focused on narrow health services. Nursing coaching is felt to be lacking in meeting the demands of the times. Nursing education is considered as an object for certain interests and is not managed professionally. The applied curriculum directs nurses more about how to work and apply, not how to think and do critically.
- e. The standard salary for nurses is low. Nurse salaries, especially those working in government agencies, are felt to be very low compared to other countries, Asia and America. This situation has an impact on the performance of nurses in carrying out professional nursing care.
- f. Very few nurses occupy leadership positions in health institutions. This problem is very crucial for the development of the nursing profession because the system is very influential on the quality of good service. This will certainly affect the development of nursing in Indonesia because the impact of all existing policies is usually not in favor of nursing needs (Nursalam, 2015).

Summary

Medical-surgical Nursing is a professional service based on medical-surgical nursing knowledge and medical-surgical nursing techniques in the form of Bio-psycho-socio-spiritual services that focus on the concepts and principles of medical-surgical nursing that focus on the concepts and principles of medical-surgical nursing that focus concepts and principle of medical-surgical nursing in meeting needs particularly for Adult clients who experience physiological changes with or without structural disorders, such as the respiratory system, cardiovascular system, digestive system, urinary system, endocrine system, immune system and chronic disease problems. Medical-surgical nursing is practiced in several settings across the health care industry, including hospitals, outpatient settings. The scope of practice of medical-surgical Nursing is the provision of nursing care to adult clients who experience physiological disorders due

to illness, trauma or disability. Nursing care includes treating individuals to obtain comfort, assisting individuals in improving and maintaining their health conditions, preventing, detecting and overcoming conditions related to disease, seeking recovery until clients can reach their highest productive capacity, and helping clients deal with death with dignity.

Review Questions

1. What is meant by the concept and perspective of medical-surgical nursing?
2. Explain the definition of medical-surgical nursing?
3. Explain the definition of medical-surgical nursing issue?

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CHAPTER 2

THE ROLE OF MEDICAL-SURGICAL NURSES IN HEALTH SERVICE POLICY

Introduction

Nursing Service Standards in Special Hospitals aim to improve the quality of nursing services in special hospitals and general hospitals that have specialized nursing services that are arranged based on the competence and authority of nurses with due regard to safety, security, health, the environment, developments in science and technology, and experiences, current and future developments (Kemenkes, 2014).

Nursing service is a form of professional service that is an integral part of health services based on nursing knowledge and tips aimed at individuals, families, groups, or communities, both healthy and sick (Kemenkes, 2019).

A Medical-Surgical Nurse has many responsibilities, such as administering medications, starting IVs, and discharging patients with their healthcare team. A good Medical-Surgical Nurse must have excellent problem-solving skills since they need to be able to assess the medical needs of a patient and find a solution to ensure their health and wellbeing (Brunner & Suddarth's, 2021).

The role and function of nurses, especially in hospitals, is to provide nursing services or care through various processes or stages that must be carried out either directly or indirectly to patients. The steps taken are of course based on standards recognized by the government and the nursing profession. One part that plays an important role in improving the quality of health services is nursing services. Nursing

services in hospitals are the largest component of an integrated health care system (Lois, et al., 2019).

Key Term

- Role of Medical surgical nursing
- The function of medical surgical nursing
- Director of Care
- Caregiver
- Educator
- Client Advocate
- Characteristics of medical surgical nursing
- Prioritization and Organization Skills
- Critical Thinker
- Innovative Problem Solver

Learning Objectives

After the completion of the learning book, you will be able to:

1. Define the role and function of nurses
2. Describe the function of medical-surgical nursing
3. Define a nurse as a Director of Care
4. Define a nurse as a Care Giver
5. Define a nurse as an Educator
6. Define a nurse as a Client Advocate
7. Describe characteristics of medical-surgical nursing
8. Describe the prioritization and organization skills of medical-surgical nursing
9. Define a nurse as a critical thinker

A. The Role of Medical-Surgical Nurses

Medical-surgical nurses are afforded experiences that include interacting with clients with diverse clinical conditions. Clients on medical-surgical units are commonly recovering from surgery, were hospitalized for an acute condition, or may be in the final stages of a progressive or chronic disease process, such as cancer. Some health care organizations have designated medical and surgical units dedicated to caring for clients with oncological, orthopaedic, and neurological needs (Susan C. et al., 2019).

Additional facilities may blend medical and surgical clients together on the same unit. Nurses on medical and surgical units collaborate with a multidisciplinary health care team for the development and implementation of individualized plans of care, client and family education, and discharge planning (Susan C. et al., 2019).

Various roles of the medical-surgical nurse include director of care, caregiver, educator, and client advocate. Nurses need to be knowledgeable regarding evidence-based practice, quality and safety competencies, informatics, and genetics to be able to function in the changing health care delivery system. As health care continues to change, so does the role of the medical-surgical nurse in carrying out nursing practice, medical-surgical nursing served as:

a) Director of Care

Nurses collaborate with members of the health care team in an effort to smoothly coordinate care for the client to properly coordinate the patient's care. Good leadership skills are essential. The ability to properly delegate and evaluate the quality of care provided to clients is very important for nurses. As director of care, the nurse ensures safe client delivery and family-centered care. Treatment must be empathetic, evidence-based, and of the highest quality to meet the challenges of the diverse and changing healthcare environment. Additional duties of the director of care include creativity, autonomy, proactive application of

nursing skills, critical thinking, effective leadership, and management skills to ensure quality care. Nurses must develop basic skills through participation in quality control activities. As director of care, the nurse must demonstrate effective time management (Lewis et al. 2019).

b) Care Giver

The patients is the center of attention of the nurse. The role of the nurse as a caregiver is collaborative and autonomous. Nurses collect data and perform physical assessments on patients based on knowledge, skills, and level of nursing education. Patients data assessment is the basis for making patient nursing care plans. Patients assessment includes gathering information about the patient's health, analyzing and synthesizing the information, making judgments about nursing interventions based on data, and evaluating the patient. Through collaboration with other members of the healthcare team, treatments for patients are implemented and evaluated. Characteristics of nurses as caregivers must include compassion, skills, knowledge, and critical thinking. Critical thinking is the basis for independent and interdependent nurse decision-making. Critical thinking while providing nursing care must include questioning, analysis, synthesis, interpretation, reasoning, application, and creativity (Lewis et al. 2019).

c) Educator

Patient education is an important nursing role. Education is very important in the recovery of patient health and for health promotion. During a nurse's shift, there are often opportunities to conduct health education for patients. Nurses teach patients and their families about illness and recovery and how to lead a healthy lifestyle. In addition, patients may benefit from education on topics such as diet, therapeutic regimens, and exercise activities for patients for example in patients diagnosed with diabetes mellitus, or cast care for orthopedic patients. One of the main areas of patient education involves discharge planning (Lewis et al. 2019).

Discharge planning should begin when the patient enters the nursing care facility. Discharge planning includes identifying the patient's resources and arranging the equipment, supplies, and resources needed once the patient is home. The patient needs to be well-prepared for discharge. Health education is carried out during the patient's stay in the hospital. Because health education is an important element of nursing care for patients, the process that nurses can use to organize and deliver health education is the ASSURE model, which incorporates nine events of Robert Gagne's teachings (Northern Illinois University, 2020)

The nurse will analyze the patient or family for acceptance. Stating goals by providing clear goals for the learning that needs to be done. The selection of appropriate methods, media, and learning materials is especially important if students have physical limitations including visual, hearing, or language impairments. Nurses must be prepared and creative in using various media and materials. Having knowledge and skills in demonstrating for example teaching insulin self-injection to patients newly diagnosed with diabetes, helps nurses to evaluate whether appropriate health education and learning is being achieved. Evaluation is also to identify whether the health education being carried out needs to be revised or not (Lewis et al. 2019).

MEMORY TRICK

ASSURE

Nurses can use the ASSURE memory trick to organize and deliver education to clients.

The ASSURE acronym represents:

A Analyze the learner

S State the objectives

S Select instructional methods, media, and materials

U Utilize media and materials

R Require learner performance

E Evaluate and revise

Adapted from Robert Gagne's "The Nine Events of Instruction,"

Figure 1 **ASSURE** (Northern Illinois University, 2020)

d) Client Advocate

As patient advocates, nurses assist patients and families in making decisions about treatment options. Advocacy is a fundamental foundation of nursing. The patient depends on the nurse to ensure that appropriate nursing care is being provided. The role of the nurse as an advocate for the patient is actively to obtain the patient's right to autonomy. Sometimes, the nurse may act as a mediator between the patient and others to protect the patient's rights. The American Nurses Association Nurse Ethics Code (2020), states that the role of the nurse is to promote, advocate for, and strive to protect the health, safety, and rights of patients. The nurse protects the patient's right to privacy and confidentiality and acts in the best interest of the patient. Nurses need to know practice standards and ethical codes (ANA, 2020).

Critical thinking skills, real-life patient case studies, and practical clinical activities help integrate nursing theory into the practice of professionally licensed nursing (LVN) professional nursing services. Provides thoroughly researched and in-depth information about medical conditions and best practices of nursing care. Medical-Surgical Nursing has a respected history of educating and preparing nursing students to become successful professional LPN/LVN nurses. competent decisions, accurate, and time-saving. It also includes all the medical-surgical nursing information needed by a nursing student to become a successful nurse (Lois et al., 2019).

Characteristics of the Medical-Surgical Nurse

Medical-surgical nursing has evolved from an entry-level position to become a specialty in adult nursing. Medical-surgical nursing requires important characteristics in prioritizing problems, innovative problem-solving, and critical thinking. These characteristics assist a nurse in caring for clients with various medical conditions and surgical procedures (Northern Illinois University, 2020).

Prioritization and Organization Skills

Prioritizing care and managing workloads go hand in hand and present challenges for novice medical-surgical nurses. Novice nurses can collaborate with experienced nurses on how to prioritize patient care. When a nurse is just starting her first clinical experience, nurses often experience difficulties in deciding and prioritizing which patients will be treated first. Collaborating with experienced nurses can help guide novice nurses in learning methods for prioritizing nursing services to patients. Such methods may include following CAB rules (circulation, airway, breathing). Another method that can be used in the hierarchy of basic human needs from Abraham Maslow and asking yourself which patient has the greatest needs that must be met first, according to the priority of the problems encountered (Lois, et al., 2019).

Experienced nurses also have their own unique method of managing their workload for the shift. New nurses should consult with experienced nurses and ask how they are managing their shift workload. Typically, experienced nurses use organizational sheets or tools. A useful tool for beginning nurses and students that can be used to manage medication administration, patient care, laboratory and testing, and treatment. Various names for this tool include “Med Minder,” “Brain Sheet,” or “Shift Organizer.” Beginning nurses can bring the Brain Sheet tool into clinical settings and use it to manage their patient assignments. Nurses will find it easier to prioritize care if they have an organized plan for managing their workload. Communication skills, both oral and written, are essential for patient safety (Lois, et al., 2019).

The standard communication format used in nursing services and nursing education to improve patient safety uses the SBAR technique (situation, background, assessment, and recommendations). Nurses utilize SBAR (situation, background, assessment, and recommendations) to organize and prioritize important patient data when calling or updating healthcare providers about a patient’s condition. Nurses also use the SBAR (situation, background, assessment, and recommendations) when

providing end-of-shift reports. Utilizing SBAR to improve patient safety and continuity of care proposes a reformulation of SBAR to I-SBAR-R (self and patient identification, situation, background, assessment, recommendations, and readback). They suggested this change because they found several important components, such as the nurse identifying herself and the patient when calling the health care provider, then there is also something added to the SBAR, namely readback, where the nurse reads back the orders given by the health care provider for clarity before ending communication. For more information about I-SBAR-R (Grbach, Vincent, and Struth, 2014) (visit <http://www.qsen.org>).

MEMORY TRICK

I-SBAR-R

To promote client safety and continuity of care, an excellent practice is for the nurse to use I-SBAR-R when contacting a health care provider for an order. Using I-SBAR-R aids in organizing and prioritizing important client data.

I Identification of self and client

S Situation

B Background

A Assessment

R Recommendation

R Readback

Figure 2 I-SBAR-R (Grbach, Vincent, and Struth, 2014)

Critical Thinker

The nursing profession requires critical thinking and problem-solving skills to provide safe practice of nursing care and quality patient care. Someone must “reprogram” the mind to think as a nurse so that patients get the best results from nursing services. As a nursing student, caring for a patient or two requires critical thinking to begin the journey toward developing problem-solving skills. Nursing students need to

understand that critical thinking cannot be memorized but must be learned during daily patient care. (Susan C. deWit, 2019).

Critical thinking skills, in real-life patient case studies, and practical clinical activities help integrate nursing theory into licensed professional nursing (LPN) licensed nursing practice. Provides thoroughly researched and in-depth information about medical conditions and best nursing practices. Medical-Surgical Nursing has a respected history of educating and preparing nursing students to become licensed professional nurses (LPN) in vocational nursing (LVN). competent decisions, accurate, and time-saving. It also includes all the medical-surgical nursing information needed by a nursing student to become a successful professional nurse (Doenges, 2021).

Innovative Problem Solver

Problem solving is the process of taking information that has been revealed and clarified and processing it systematically to find a good and acceptable solution to the problem. To solve problems, data must be collected, organized, analyzed, and conclusions drawn. When solving a problem, the individual keeps asking questions throughout the process. Asking questions in clarifying data to get accurate information. For example, if a client states a morphine allergy on admission, the nurse should not take this for granted and write it down as an allergy on the patient's status. On the other hand, if the patient denies other signs or symptoms, there is no true allergy felt by the patient (Lewis, et al., 2019).

Summary

The role and function of nurses, especially in hospitals, is to provide nursing services or care through various processes or stages that must be carried out either directly or indirectly to patients. The steps taken are of course based on standards recognized by the government and the nursing profession. One part that plays an important role in improving the quality

of health services is nursing services. Nursing services in hospitals are the largest component of an integrated healthcare system.

Medical-surgical nurses are on the forefront of the adult healthcare industry. This specialty area in nursing requires the essential characteristics of prioritization and organization, critical thinking, and innovative problem solving. The roles of the medical-surgical nurse include director of care, caregiver, educator, and client advocate. Nurses need to be knowledgeable regarding evidence-based practice, quality and safety competencies, informatics, and genetics to be able to function in the changing health care delivery system. As health care continues to change, so does the role of the medical-surgical nurse.

Medical-surgical nurses are afforded experiences that include interacting with clients with diverse clinical conditions. Clients on medical-surgical units are commonly recovering from surgery, were hospitalized for an acute condition, or maybe in the final stages of a progressive or chronic disease process, such as cancer.

Prioritization of care and organization of workload go hand in-hand and often present a challenge to the novice medical-surgical nurse. Novice nurses can collaborate with experienced nurses on how to prioritize client care. The nursing profession requires critical thinking and problem-solving skills to provide safe nursing practice and quality client care. One must “reprogram” the mind to think as a nurse so the client achieves the best outcome. *Problem-solving* is the process of taking information that has been uncovered and clarified and systematically processing it to find an acceptable resolution to problems. To problem solve, data must be gathered, organized, analyzed, and conclusions drawn. When problem solving, the individual continues to ask questions throughout the process.

Review Questions

1. Explain the role and function of medical-surgical nursing?
2. Explain the characteristics of medical-surgical nursing?
3. Explain the prioritization and organization skills of medical-surgical nursing?

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CHAPTER 3

THE CONCEPT OF NURSING CARE FOR PATIENTS WITH TROPICAL DISEASES

Introduction

Tropical diseases are diseases that are often found in tropical areas. Climate change and environmental factors greatly influence disease vectors to spread to non-endemic countries. Tropical diseases classified as communicable and non-communicable diseases can occur mainly in tropical areas such as Africa, Asia, South and Central America. Tropical diseases can spread globally due to increased travel accessibility, climate change, and environmental factors that affect disease vectors (Rupali, 2019).

The high prevalence of tropical disease morbidity and mortality causes a very significant economic burden in developing countries, especially due to malaria, dengue fever, typhoid, and filariasis (sleeping sickness). Tropical diseases have a low mortality prevalence in affluent countries, their high morbidity rates can have a negative impact on people's lives and work productivity. Social factors, low care, and knowledge about health, treatment, or treatment of disease which is also low can increase mortality or morbidity (Rupali, 2019).

Government policies in various health sectors manage tropical diseases by implementing disease prevention, control, and treatment strategies. Health workers (HCW) are at the forefront of dealing with tropical diseases to identify, intervene, and refer patients to health services (World Health Organization, 2018). The nurse is the most significant health worker worldwide having a responsibility that has a

direct impact on public health in overcoming tropical diseases in countries and endemic tropical diseases. Nurses can more easily identify, treat, carry out interventions, control, and carry out disease management in serving the community. In contrast to non-endemic countries such as the United States and Europe, nurses must be very vigilant in identifying, diagnosing, and treating patients with conditions they may not have encountered before (Hay & Asiedu, 2019).

Each type of tropical disease has special conditions and needs for handling it. For example, during the rainy season, there will be a lot of dengue fever and there will be a spike in cases every 4 years. Even though the cases are rare, nurses need to know the patterns of occurrence of risk factors, for example through evaluations of tourists and others in the community who are at risk. Nurses play an important role in most tropical disease interventions (Yayu & Haryani, 2022).

This chapter will discuss in more detail related to nursing care for patients with tropical diseases that many people experience, namely: Malaria, Dengue Hemorrhagic Fever, Typhoid, and Filariasis.

Key Term

- Tropical diseases
- Malaria
- Dengue Hemorrhagic Fever
- Typhoid
- Filariasis

Learning Objective

1. Identify the etiology of Malaria medical conditions and emergencies and Nursing Process
2. Identify the etiology of Dengue Hemorrhagic Fever, medical conditions and emergencies, and the nursing process

3. Identify the etiology of Typhoid, medical conditions, and emergencies and Nursing Process
4. Identify the etiology of lymphatic filariasis medical conditions and emergencies, and the Nursing Process
5. Outline the appropriate history, physical, and evaluation of Malaria
6. Outline the appropriate history, physical, and evaluation of Dengue Hemorrhagic Fever
7. Outline the appropriate history, physical, and evaluation of Typhoid
8. Outline the appropriate history, physical, and evaluation of lymphatic filariasis

A. Nursing Care Plan in Patients With Malaria

DEFINITION

Malaria is an acute febrile disease caused by the Plasmodium parasite, which is spread to humans through the bite of an infected female Anopheles mosquito. This disease is preventable and curable. Malaria is one of the most common infectious diseases known by the public and is one of the main causes of increased morbidity and mortality rates in the world. This disease mainly occurs in tropical and subtropical areas such as in sub-Saharan Africa, Asia, and Latin America where mosquitoes carrying the parasite live. In Indonesia, the locations with the most malaria sufferers are Papua and several other areas (WHO, 2023).

‘What is Malaria?’

Malaria is a potentially life-threatening disease caused by infection with the protozoan Plasmodium which is transmitted by an infective female Anopheles mosquito vector. Malaria is a serious and sometimes fatal disease caused by a parasite, usually infecting certain types of mosquitoes that bite humans. People affected by malaria are usually characterized by high fever, chills, and flu-like illness. The 5 Plasmodium species known to cause malaria in humans are 1). *P. falciparum*, 2). *P. vivax*, 3). *P. ovale*, 4). *P. malaria*, and 5). *P. knowlesi*.

Prompt and precise identification is essential because *P. falciparum* infection can be fatal and is often resistant to standard chloroquine treatment. *Plasmodium falciparum* can be distinguished from other plasmodium by its high level of parasitemia and banana-shaped gametocytes (Belleza, 2021).

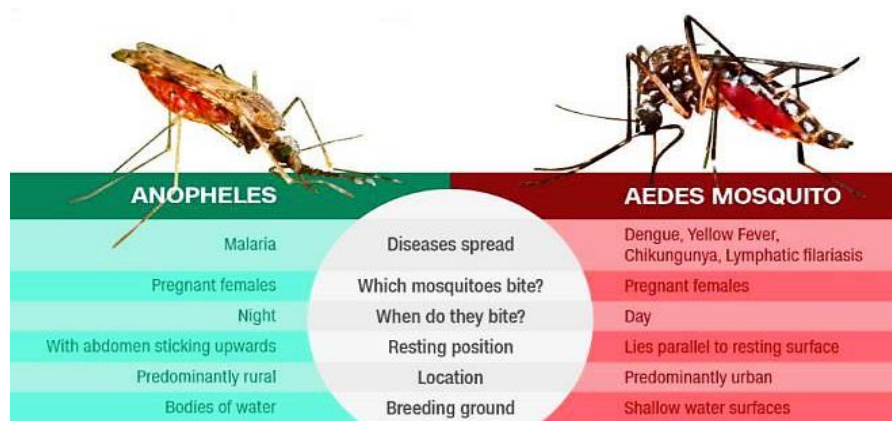


Figure 3. Malaria Mosquito–Medicastore

How is it Transmitted?

Malaria is a life-threatening disease mainly found in tropical countries. This disease can be prevented and cured. However, without prompt diagnosis and effective treatment, cases of uncomplicated malaria can develop into more severe disease, and can be fatal without treatment (WHO, 2023).

Malaria is not contagious and cannot be spread from one person to another; This disease is transmitted through the bite of a female Anopheles mosquito. Five species of parasites can cause malaria in humans and 2 of these species are *Plasmodium falciparum* and *Plasmodium vivax* which can pose the greatest threat. There are more than 400 different species of Anopheles mosquitoes and about 40, known vector species, that can transmit disease. Factors The risk of infection is higher in some areas than others depending on many factors, including the local mosquito species. This disease can also vary according to season,

the highest risk factors occur during the rainy season in tropical countries (WHO, 2020).

Who is at Risk of Malaria

Nearly half of the world's population is at risk of contracting malaria. By 2021, an estimated 247 million people will be infected with malaria in 85 countries. In the same year, this disease claimed about 619,000 lives. Some people are more susceptible to severe malaria than others. Infants and children under 5 years of age, pregnant women, and patients with HIV/AIDS are particular risk factors. Other vulnerable groups also include people entering areas of intense malaria transmission who have not acquired partial immunity from prolonged exposure to the disease, or who are not on preventive chemotherapy, such as migrants, mobile populations, and travelers (WHO, 2020).

Some people in areas where malaria occurs will develop partial immunity. Although it does not provide complete protection, partial immunity reduces the risk that a malaria infection will cause the disease to become more severe. Most deaths from malaria in Africa occur in young children, whereas in areas of low transmission and low immunity, all age groups are at risk (WHO, 2020).

Types of Malaria

The type (species) of Anopheles present in an area at a certain time will affect the intensity of malaria transmission. Among the types are as follows: 1). *Plasmodium falciparum*, the most virulent type of malaria. *P. falciparum* can infect red blood cells of all ages, and can result in high levels of parasitemia; sequestration is a specific property of *P. falciparum*; as it progresses through a 48-hour life cycle, the organism exhibits attachment properties, which may result in sequestration of the parasite in the postcapillary vessels.2). *Plasmodium vivax*. If this type of infectious disease is not treated, it usually lasts for 2-3 months with decreasing

frequency and intensity of paroxysms; of some patients infected with *P. vivax*, 50% experience a relapse within a few weeks to 5 years after the onset of the disease; *P. vivax* only infects immature red blood cells, causing parasitemia. 3). *Plasmodium ovale*. This disease is similar to *P. vivax* infection, although usually less severe; *P. ovale* infections often clear up without needing treatment; similar to *P. vivax*, *P. ovale* only infects immature red blood cells, and parasitemia is usually lower than that of *P. falciparum*. 4). *Plasmodium malariae*. Patients infected with these types of *Plasmodium* species remain asymptomatic for a longer time than patients infected with *P. vivax* or *P. ovale*; Recurrence is common in patients infected with *P. malariae* (WHO, 2023).

Knowledge of *Plasmodium* indicates that genuine cases have been documented in Borneo, Malaysia, Thailand, Myanmar, Singapore, the Philippines, and other neighboring countries; simian malaria cases are also suspected to occur in Central America and South America; Patients infected with this disease, or other simian species, must be treated quickly because those infected with *falciparum* malaria can cause a fatal condition (WHO, 2023).

Pathophysiology

The natural history of malaria involves cycles between humans and female *Anopheles* mosquitoes: 1). In humans, the parasite grows and multiplies first in liver cells and then into red blood cells. 2) In the blood, progeny multiply inside red blood cells and destroy them, releasing daughter parasites (“merozoites”) which then continue the cycle with attack other red blood cells, 3). Parasites in the blood vessels will cause symptoms of malaria; when parasites at the blood-invading stage (gametocytes, which occur in male and female forms) are ingested during a blood-sucking female *Anopheles* mosquito, they mate in the mosquito’s gut and begin the mosquito’s growth and multiplication cycle, 4). After 10-18 days, parasitic forms called sporozoites migrate to the mosquito’s salivary glands, 5). When an *Anopheles* mosquito bites a human,

anticoagulant saliva is injected along with the sporozoites, which migrate to the liver, thereby starting a new cycle, 5). Infected mosquitoes carry the disease from one human to another (act as a “vector”), while infected humans transmit parasites to mosquitoes, 6). Unlike human hosts, mosquito vectors do not suffer from parasites (Bayisenge, 2020).

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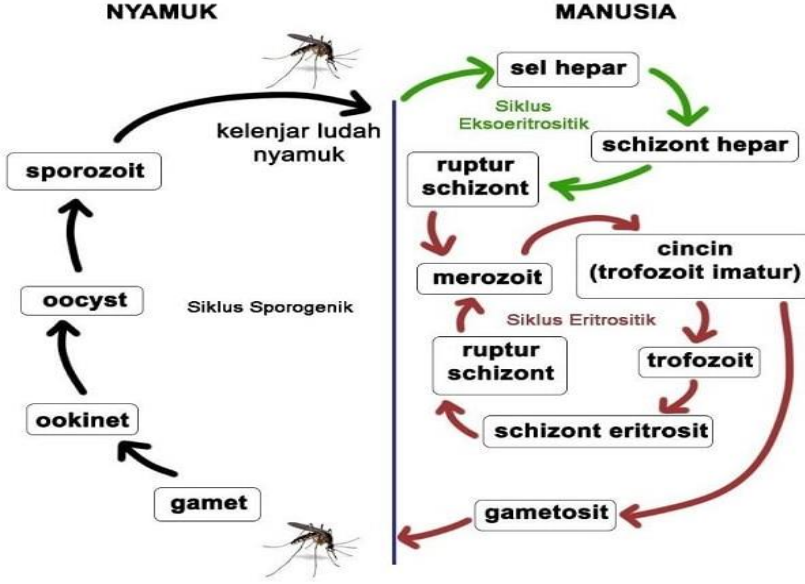


Figure 4. Pathophysiology of Malaria–Alomedica

Statistics and Incidences

Malaria is a serious public health problem worldwide: Nearly all cases of malaria in the US are acquired by patients traveling from endemic areas. Outbreaks of locally transmitted malaria cases in the United States are small and relatively isolated, but have the potential to re-emerge due to the abundance of competent vectors, especially in the southern states. In 2016, an estimated 445,000 people died from malaria—most of them young children in sub-Saharan Africa. Malaria control efforts were carried out quickly. Improved treatment interventions have saved millions of lives globally and reduced malaria mortality by 25% from 2010 to 2016 by eliminating the source of transmission. In areas with high transmission, the most vulnerable groups are children, who do not yet have an immune system against malaria, as well as pregnant women whose immunity has decreased due to pregnancy. Nearly half of the world's population lives in areas at risk of malaria transmission in 91 countries and territories. In 2016, malaria caused an estimated 216 million clinical episodes or increased morbidity, and 445,000 deaths; an estimated 90% of deaths in 2016 occurred in the African Region (WHO, 2000).

Causes of Malaria

The most common causes of malaria are as follows: a). endemic area. Malaria usually acquires infection in endemic areas after being bitten by a mosquito. b) Blood Transfusion. Cases of secondary infection due to infected blood transfusions are very rare, but they do not rule out c). Bad immunity. infection occurs usually depends on the immunity of the affected individual; because the immune system greatly influences the development of parasites in the body d). Climate. Climate may also be a major determinant of the geographic and seasonal distribution of malaria; without sufficient rainfall, mosquitoes cannot survive and

reproduce, and if it is not warm enough, parasites cannot survive in the mosquito's body (Yayu & Haryani, 2022).

Clinical Manifestations

Classic malaria attack lasts for approximately 6-10 hours. Which consists of: a). Cold stage. The patient will feel the sensation of cold and chills, b). Hot stage. The patient usually develops fever, headache, vomiting; and seizures in young children, c) Sweating stage. The patient experiences sweating, returns to normal temperature, and fatigue (Bayisenge, 2020).

Assessment and Diagnostic Findings

Diagnosing malaria quickly and accurately is an integral part of appropriate treatment for affected patients. Ways to prevent further spread of infection in the community are as follows: a). Blood smears. One way to diagnose malaria is by identifying the parasite on a thin or thick blood smear; thick smears are 20 times more sensitive than thin smears, but specification may be more difficult; Thin smears are less sensitive than thick smears, but allow identification of different species. B). Quick diagnostic test. Immunochromatographic tests based on antibodies to histidine-rich protein-2 (PfHRP2), parasitic LDH (pLDH), or Plasmodium aldolase appear to be highly sensitive and specific; some RDTs may be able to detect *P. falciparum* in parasitemias that are below the threshold of reliable microscopic species identification; only one RDT (BinaxNOW) has been approved to date to diagnose malaria in the United States. C). Another test. In addition to the RDTs listed above, new molecular techniques, such as PCR assays and nucleic acid sequence-based amplification (NASBA), are also available for diagnosing; they are more sensitive than thick smears but are expensive and not available in most developing countries (Belleza, 2021).

Medical Management

The treatment of malaria depends on many factors including the severity of the disease, the species of malaria parasite causing the infection, and what part of the world the malaria infection was acquired:

a). Inpatient. Patients who have increased parasitemia (>5% of infected RBCs), central nervous system infection, or more severe symptoms in patients with *P. falciparum* infection should be considered for inpatient hospitalization to ensure that the drug is tolerated and received. blood smears every day to get results or response to treatment

b). Prevention. Avoid mosquitoes by limiting exposure to typical mosquito bites (i.e., dawn, dusk); wearing long sleeves and using mosquito repellent can also prevent infection.

C). Consultation. Consider consulting with an infectious disease specialist to get help making the diagnosis, treatment, and management of malaria (Belleza, 2021).

Pharmacologic Management

There are 4 main classes of drugs currently used in treating malaria including quinoline compounds, antifolates, artemisinin derivatives, and antimicrobials; There is no single drug that can eradicate all existing forms of the parasite's life cycle. Antimalarial. is an agent that functions to inhibit the growth of parasites in parasitic acid vesicles, and can increase the internal pH of the organism; this agent can also inhibit the utilization of hemoglobin and the metabolism of parasites (Belleza, 2021).

Nursing Management

The nursing management of a patient with malaria may include the following:

Nursing Assessment

Studies conducted on malaria sufferers include: a). History. In patients with suspected malaria, the possibility of having a history of travel to endemic areas is very important to know; ask explicitly whether they have traveled to the tropics to find out high suspicion in patients who show symptoms of malaria and have a history of travel to endemic areas, b). Demographic data. Studies were also carried out to look at the patient's immune status, age, and pregnancy status; history of allergies or other medical conditions he may have; and what drugs she may have used (Belleza, 2021).

Nursing Diagnosis

Based on data at the time of patient assessment, the main nursing diagnoses for patients with malaria may include: 1). The risk of infection related to the weakening of the immune system, 2). Hyperthermia is associated with increased metabolic rate and dehydration, 3). Impaired tissue perfusion is related to decreased cellular components needed for the delivery of oxygen and nutrients in the body, 4). Fluid volume deficit related to excessive sweating and dehydration, 5). Knowledge deficit related to a lack of knowledge and information about the disease process, treatment, and prognosis (Doenges, 2021).

Nursing Care Planning and Goals

The objectives of the nursing care plan for malaria patients are: a). Prevent infection, b). Reduce the increase in body temperature and restore normal body temperature, c). Increase tissue perfusion, d). Increase the volume of body fluids, e). Get information about the process, treatment, and prognosis of malaria. (Doenges, 2021)

Nursing Interventions

Nursing interventions in patients with malaria include: 1). Increases body temperature. Warm compresses on the forehead and both armpits (no more than 15 minutes at a time); keeping the

environment warm by using warm blankets, and adequate clothing); the patient may experience excessive sweating, be sure not to let the patient wear wet clothes; administration of antipyretic drugs according to the dose, 2). Increase tissue perfusion. Possible Patient may require supplemental oxygen if the condition is severe; maintain good room ventilation; head of the bed at 30°; reduce activities that require a lot of energy, 3). Increase fluid volume. Because a lot of fluid comes out through sweat; fluid replacement; increased intake of oral fluids; or give parenteral fluids as recommended, 4). Patient and family education. about the importance of adhering to therapy; discuss treatment, purpose, frequency, dosage, and side effects; encourage family members or trusted people to listen to and understand the treatment guidelines according to the patient's choice (Doenges, 2021).

Evaluation

Evaluation of nursing in patients with malaria includes the following: 1). Prevention of infection, 2). Reduced increase in body temperature, 3). Increased tissue perfusion, 4). Increased volume of body fluids, 5). Increased knowledge about the process of malaria, treatment, and prognosis. (Belleza, 2021)

Documentation Guidelines

Nursing documentation for malaria patients includes: 1). Individuals, namely influencing factors, interactions, social exchanges, and specific individual behavior, 2). Culture, religion, and hope, 3). Nursing care plans, 4). Teaching plans for health education to individuals, 5). Responses to interventions, teaching, and actions taken, 6). Achievement or progress toward the desired result (Brunner and Suddarth, 2021).

Nursing Care for Patients with Dengue Hemorrhagic Fever (DHF)

A. What is Dengue Hemorrhagic Fever?

Definition

Some of the patients who experience dengue fever develop Dengue Hemorrhagic Fever (DHF), which is a disease that is categorized as severe and can sometimes be fatal. A). Dengue fever is an acute febrile illness caused by infection with one of the dengue virus serotypes. This disease is transmitted by mosquitoes from the genus *Aedes*, b). Dengue is also known as Breakbone Fever, Hemorrhagic Fever, Dandy Fever, Infectious Thrombocytopenic Purpura, c). Dengue hemorrhagic fever is a fatal manifestation of the dengue virus which is manifested by hemorrhagic diathesis and hypovolemic shock, d). This virus is related to the viruses that cause West Nile infection and yellow fever (Willis, 2019).

B. Pathophysiology

Pathophysiology of Dengue Hemorrhagic Fever (DHF) includes among others: a). Early stage. The initial phase of Dengue Hemorrhagic Fever (DHF) is similar to that of dengue fever and other febrile viral illnesses. The virus is deposited on the skin by the vector, and within a few days viremia occurs, lasting until the 5th day when symptoms appear, b). Hemorrhagic symptoms. After the fever has subsided or within the previous 24 hours, signs of plasma leakage coexist with the development of hemorrhagic symptoms, c). Vascular leak. Vascular leaks in patients can cause hemoconcentration and serous effusion causing a collapse of the circulatory system, d). Progress. If left untreated, Dengue Hemorrhagic Fever (DHF) is likely to develop into dengue shock syndrome (Yayu & Haryani, 2022).

C. Statistics and Incidences

Dengue Fever (DHF) is a reported disease in the United States; known or suspected cases must be reported to the public health center, including: a). Overall, 2.5 to 3 billion people live in around 112 countries that experience dengue transmission, b). Every year, around 50-100 million people are infected, c). Dengue fever has a mortality rate of less than 1%, d). If treated, Dengue Hemorrhagic Fever (DHF) has a mortality rate of 2-5%, but if left untreated the mortality rate reaches 50%, e). Dengue fever occurs at all ages but is most common in children (Ahmed, 2021).

D. Causes

The etiology of DHF is as follows: 1). Flaviviruses. It is caused by infection with one of the four dengue virus serotypes, namely Flavivirus, a genus of single-stranded nonsegmental RNA virus, 2). *Aedes aegypti*. Dengue virus is transmitted by mosquitoes of the genus *Aedes* which breed in stagnant aid and usually bite during the day. It has white dots at the base of its wings, with white bands on its legs, 3). Incubation period. the incubation period of this virus is three to ten days (Services, W.D. of H., 2020).



Figure 5. *Aedes aegypti*–Kemenkes RI

E. Clinical Manifestations

Symptoms of disease are usually found 4 to 6 days after infection and, 2). Severe headache., 3). Damage to lymph nodes and blood vessels. As the virus slowly spreads, even lymph nodes and blood vessels are affected, 4). Bloody. Bleeding from the nose and gums is a feature of Dengue Hemorrhagic Fever (DHF), 5). Heart enlargement. The dengue virus can also penetrate the liver, causing fatal damage, 6). Vascular system failure. The vascular system eventually fails if the disease is not treated immediately (Belleza, 2022)

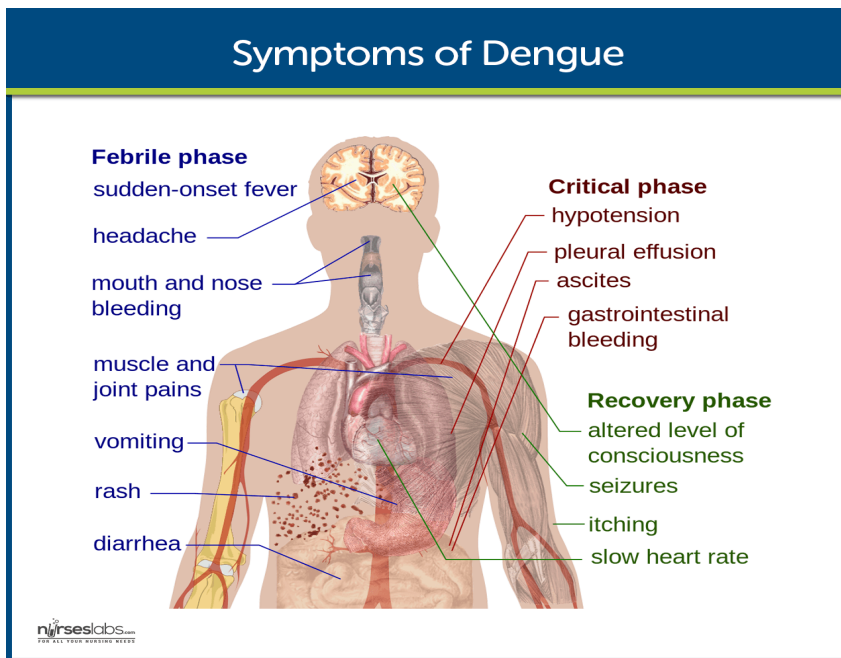


Figure 6. Symptoms of Dengue (nursesabs)

F. Prevention

There are many ways to prevent dengue but there is no vaccine available for this disease yet, some ways to prevent it include: 1). Avoid crowded places. avoid densely populated settlements, 2). Mosquito

repellent. Use mosquito repellent that is mild for the skin, and also indoors, 3). Wear appropriate clothing. When outdoors, wear long sleeves and long pants tucked into socks, 3). Mosquito-free environment. Ensure window and door screens are secure and free of holes or use mosquito nets, 4). Stagnant water. Clean the surrounding environment by covering bottles, cans, and any containers that can be stagnant with water because they can become breeding grounds for mosquitoes (Belleza, 2022).

G. Complications

Cases of dengue fever may be rarely known in the United States, as a result, many cases often end in complications, namely dengue shock syndrome. Common symptoms of shock include abdominal pain, vomiting and restlessness (Belleza, 2022).

H. Assessment and Diagnostic Findings

Laboratory criteria for diagnosing dengue virus are as follows: a). Dengue virus isolation. Isolation of dengue virus from serum, plasma, leukocytes, or autopsy samples, b). Immunoglobulin titers. Demonstration of a four-fold or greater change in reciprocal immunoglobulin or IgM antibody titer to one or more dengue virus antigens in paired serum samples, c). Immunohistochemistry. Demonstration of dengue virus antigen in autopsy tissue by immunohistochemistry or immunofluorescence, d). Polymerase chain reaction. Detection of viral genomic sequences in autopsy tissue, serum, or cerebrospinal fluid samples via PCR, e). Complete blood count. In Dengue Hemorrhagic Fever (DHF), there may be an increase in secondary hematocrit levels due to plasma extravasation or fluid loss, f). Decreased platelet count. This test confirms dengue fever. G). Guaiac test. Guaiac testing in blood and occult in the stool should be performed on all patients suspected of being infected with the dengue virus (WHO, 2000).

I. Medical Management

Management of patients with Dengue Hemorrhagic Fever (DHF) is simple as long as it can be detected early, namely by: 1). Oral rehydration therapy. Oral rehydration therapy is recommended for patients who are moderately dehydrated caused by high fever and vomiting, 2). IV fluids. IVF administration is indicated for patients with dehydration, 3). Transfusions of blood and blood products. Given to patients with internal or gastrointestinal bleeding may require transfusion, and patients with coagulopathy may require fresh frozen plasma, 4). Oral fluids. Increasing oral fluids is helpful. 5). Avoid aspirin. Aspirin can thin the blood. Warn patients to avoid aspirin and other NSAIDs as they may increase the risk of bleeding (WHO, 2023).

J. Nursing Management

Nursing management of patients with Dengue Hemorrhagic Fever (DHF) is essential in achieving complete recovery.

Nursing Assessment

Assessment of a patient with Dengue Hemorrhagic Fever (DHF) must include the following: a). Evaluate vital signs such as the patient's heart rate, temperature, and blood pressure, b). Evaluation of capillary refill (CRT), skin color, and pulse pressure, c). Assessment of evidence of bleeding in the skin and elsewhere, d). Assessment of increased capillary permeability, e). Measurement and assessment of urine output (Doenges, 2021).

Nursing Diagnosis

Based on patient assessment data, the main nursing diagnoses for Dengue Hemorrhagic Fever (DHF) patients are as follows: a). Risk of bleeding related to the possibility of impaired liver function, b). Deficiency of fluid volume related to vascular leakage, c). Pain associated with abdominal pain and severe headaches, d). Risk for impaired tissue perfusion related to a failure of the circulatory system, e). The risk of

shock is related to the dysfunction of the circulatory system (Doenges, 2021).

Nursing Care Planning and Goals

Based on patient assessment data, the main nursing diagnoses for Dengue Hemorrhagic Fever (DHF) patients are as follows: a). Risk of bleeding related to the possibility of impaired liver function, b). Deficiency of fluid volume related to vascular leakage, c). Pain associated with abdominal pain and severe headaches, d). Risk for impaired tissue perfusion related to a failure of the circulatory system, e). The risk of shock is related to the dysfunction of the circulatory system (Doenges, 2021).

Nursing Interventions

Appropriate nursing interventions for Dengue Hemorrhagic Fever (DHF) patients include: a). Monitoring the patient's vital signs: Measure blood pressure as indicated, b). Monitor pain. Note the client's reports of pain in a specific area, whether the pain is increasing, spreading, or localized, c). Vascular access. Maintain patent vascular access for fluid administration or patient blood replacement as indicated, d). Therapeutic regimen. There should be periodic monitoring of the client's therapeutic regimen to identify drugs that might exacerbate bleeding, f). Fluid replacement. Determine the need for fluid replacement within 24 hours, g). Managing nose bleeding. Elevate the patient's position and attach the ice bag to the bridge of the nose and the forehead, h). Trendelenburg position. Place the patient in the Trendelenburg position to restore blood volume to the head (Belleza, 2022).

Evaluation

Evaluation of the successful implementation of nursing care should achieve the following: a). Absence of signs of bleeding, b). The patient's laboratory results show values within normal limits, c). Maintain fluid volume at normal levels, d). The pain reported reduced or controlled,

e). Follow the therapeutic regimen according to the prescribed dose, f). Adequate tissue perfusion, g). Stable hemodynamics, h). Fever Does not occur and is free from other signs of infection (Brunner and Suddarth's, 2021)

Risk for Deficient Fluid Volume

Risk for deficient fluid volume related to (indicates one or more of the following associated factors: migration of intravascular fluid to the extravascular space, bleeding, etc.) secondary to a diagnosis of dengue fever as evidenced by (note: a nursing diagnosis of risk usually does not require evidence, but the following may be included if seen during the assessment: a). Output recorded higher than input, b). Bleeding, c). Capillary refill time (CRT) is more than 3 seconds, d). Changes in vital signs (increased BP, heart rate, and respiratory rate) (Belleza, 2022).

Desired Outcomes

After nursing interventions, the patient is expected to: 1). Manifest a balanced fluid input and output, 2). Reduced risk of fluid volume deficit (Belleza, 2022).

Nursing Action	Rationale
Assess the patient's knowledge of food intake and recommended diet	Knowing the types of food eaten by patients allows nurses to better plan nursing care.
allow the patient to select foods from a list of foods approved for their condition	Allowing the patient to choose his menu based on an approved list encourages him to think about food and can increase the patient's appetite
Encourage the patient to have small frequent feedings, eating at least once every 3-4 hours.	Eating smaller meals spaced throughout the day encourages the patient to eat according to the recommended caloric intake without overwhelming him.
Present the food in a visually attractive and palatable manner.	Presenting food in a visually appealing way allows the patient to think that it tastes good, thereby stimulating appetite and increasing food intake

Nursing Action	Rationale
Include supplements in the patient's dietary intake as prescribed.	Some patients may need to supplement their recommended allowance with food supplements to help meet their daily needs.
Administer anti-emetics as prescribed.	Patients with severe nausea and vomiting should be given antiemetics to prevent regurgitation of swallowed food.
Instruct the patient to brush teeth regularly.	Cleaning the teeth helps to stimulate the patient's appetite by removing plaque and the unpleasant taste and sensation felt by the patient in the mouth due to drug intake or after vomiting. Remind the patient not to use strong mouthwash solutions.

(Brunner and Suddarth's, 2021)

Imbalanced Nutrition: Less than Body Requirements

Imbalanced Nutrition: less than body requirements related to (indicate one or more of the following related factors: inability to swallow; anorexia; nausea and vomiting, etc.) secondary to a diagnosis of dengue fever as evidenced by (symptoms may include but are not limited to the following during the assessment: 1). aversion to food, 2). Inability to take oral fluids/oral food, 3). Complaints of nausea and/or vomiting, 4). Weight loss, 5). Not feeling well (Brunner and Suddarth's, 2021).

Desired Outcomes

After the nursing intervention is carried out, the patient is expected to be able to: 1). There is an increase in body weight, 2). Eat according to your will and nutritional needs, 3). Revealing the importance of consuming food and nutrition according to the body's needs (Brunner and Suddarth, 2021).

Nursing Action	Rationale
Assess the patient's perceptions about food intake and food preferences.	Knowing the types of food eaten by patients allows nurses to better plan nursing care.
Allow the patient to select foods from a menu that are approved for his or her health condition	Allowing the patient to select his menu based on the approved list encourages him to think about food and eat more since he chooses from options that are palatable to him.
Encourage the patient to have small frequent feedings, eating at least once every 3-4 hours.	Eating small but frequent meals will encourage the patient's appetite to eat according to the recommended caloric intake
Present the food in a visually attractive and palatable manner.	Serving food to attract patients will think that it tastes good, thereby stimulating appetite and increasing nutrient intake.
Include supplements in the patient's dietary intake as prescribed.	Some patients may need to supplement their recommended allowance with food supplements to help meet their daily needs.

(Brunner and Suddarth's, 2021)

Discharge and Home Care Guidelines

Patients with Dengue Hemorrhagic Fever (DHF) who have been treated and then leave the health care facility must be instructed to: 1). avoid diuretics. Avoid caffeine and alcohol according to indications to reduce the diuresis effect, 2). informed consent or agreement to comply with recommended medical and laboratory follow-up, 3). Oral Hygiene by using a soft toothbrush to reduce the risk of injury to the oral mucosa, 4). Diet. It is recommended to consume foods rich in vitamin K to increase blood clotting, 5). Education by providing information to patients about the use of mosquito nets and insecticides (Brunner and Suddarth, 2021).

K. Documentation Guidelines

The focus of documenting nursing care for Dengue Hemorrhagic Fever (DHF) patients includes: a). Data relating to potential or risk factors

for blood loss, b). Assessment of vital signs, mental, urine output, and other assessments, c). Data from laboratory and diagnostic tests, d) Level or degree of fluid deficiency and current source of fluid intake, e). I&O and body fluid balance, f). Description of the client's response to pain and acceptable levels of pain, g). Nursing care plan, h). Teaching plan, j). Data on achievement or progress according to the expected goals, k). Modifications to nursing care plans (American Nurses Association, 2021).

Nursing Care for Patients with Typhoid

A. Definition

Typhoid fever is a bacterial infection caused by *Salmonella typhi* bacteria, which is transmitted through food and water contaminated by *Salmonella typhi* bacteria. Typhoid fever sufferers usually experience symptoms such as fever, abdominal pain, and diarrhea. In severe cases, the infection can cause life-threatening complications in the digestive tract (Bilgehan, 2022).

B. Causes Typhoid Fever

Typhoid fever is caused by the bacterium *Salmonella enterica* serotype Typhi. This bacterium is usually spread through food or water contaminated with this bacterium; it can also be transmitted through close contact with an infected person. Once the bacteria enters the body, it travels to the intestines and then into the bloodstream, causing symptoms such as stomach pain, fever, headache, fatigue, and diarrhea or constipation. If left untreated, typhoid fever can cause serious complications, such as bleeding or perforation of the intestine, or even death (Bilgehan, 2022).

C. Typhoid Fever Symptoms

The symptoms of Typhoid fever typically develop within 1 to 3 weeks after exposure to the bacteria and can vary in severity. Some common symptoms of Typhoid fever include: 1). Fever, which can

gradually increase over time, 2). Headache, 3). Muscle aches and weakness, 4). Fatigue and weakness, 5). Abdominal pain and discomfort, 6). Diarrhea or constipation, 7). Loss of appetite, 8). Nausea and vomiting, 9. Skin rash with rose-colored spots (Ahmed, 2021).

In severe cases, Typhoid fever can lead to serious complications such as internal bleeding, perforation of the intestines, and even death. It is important to seek medical attention if you are experiencing any of these symptoms or if you suspect you have been exposed to the bacteria (Ahmed, 2021).

D. Nursing Care for Patients With Typhoid Fever

In this article, we will discuss the development of a nursing care plan for patients with Typhoid fever, including assessment, diagnosis, planning, implementation, and evaluation (Carpenito, 2021).

Assessment of Typhoid Fever

The first step in developing a nursing care plan for patients with Typhoid fever is to conduct a thorough assessment of the patient's condition. This includes obtaining a detailed medical history, conducting a physical examination, and performing laboratory tests to confirm the diagnosis (Black, 2019).

During the assessment, the nurse should pay close attention to the patient's vital signs, such as temperature, blood pressure, and heart rate. The nurse should also assess the patient's fluid and electrolyte balance, as patients with Typhoid fever are at risk of dehydration and electrolyte imbalances due to vomiting and diarrhea (Black, 2019).

Nursing Diagnosis of Typhoid Fever

Based on the assessment findings, the nurse can formulate nursing diagnoses that will guide the development of the care plan. Common nursing diagnoses for patients with Typhoid fever include: 1). Risk for fluid volume deficit related to vomiting and diarrhea, 2). Impaired skin integrity related to fever and diaphoresis, 3). Risk for infection

related to the compromised immune system, 4). Imbalanced nutrition: less than body requirements related to anorexia and malabsorption, 5). Fatigue related to fever and decreased energy levels (Black, 2019).

Planning

Once the nursing diagnoses have been established, the nurse can begin to develop a plan of care. This includes identifying specific interventions that will address the patient's needs and promote recovery. Some common interventions for patients with Typhoid fever include: 1). Administering intravenous fluids and electrolytes to maintain fluid and electrolyte balance, 2). Administering antibiotics as prescribed by the physician, 3). Providing skin care to prevent breakdown and infection, 4). Providing oral hygiene to prevent mouth sores and infections, 5). Providing small, frequent meals to meet nutritional needs and prevent further gastrointestinal irritation, 6). Encouraging rest and relaxation to conserve energy and promote healing (Belleza, 2022).

Implementation

The implementation phase involves carrying out the interventions identified in the care plan. The nurse should closely monitor the patient's response to the interventions and adjust the plan as necessary based on the patient's condition. For example, if the patient's fluid and electrolyte balance is not improving despite intravenous fluid administration, the nurse may need to consult with the physician about adjusting the fluid and electrolyte regimen. Similarly, if the patient is experiencing persistent fever despite antibiotic therapy, the nurse may need to consult with the physician about modifying the treatment plan (Doenges, 2021).

E. Evaluation

The final step in developing a nursing care plan for patients with Typhoid fever is evaluation. This involves assessing the patient's response to the interventions and determining the effectiveness of the care plan. If the patient's condition is improving, the nurse can continue to implement

the care plan as prescribed. However, if the patient's condition is not improving or is deteriorating, the nurse may need to re-evaluate the nursing diagnoses and interventions and consult with the physician about modifying the treatment plan (Doenges, 2021).

Nursing Care for Patients with Filariasis

A. Definition

Filariasis is a disease caused by a chronic mosquito-borne parasitic infection. Chronic infection can lead to swelling of the extremities, hydroceles, and testicular masses. It is the second-largest cause of permanent deformity and disability behind leprosy worldwide. Lymphatic filariasis (LF) is currently considered a neglected tropical disease. The Global Programme to Eliminate Lymphatic Filariasis is providing mass drug administrations (MDA) to populations in endemic areas in a push to eradicate this disease. Several programs exist to encourage participation with MDA (WHO, 2020).

Filariasis or sometimes known as filariae is an infectious tropical disease that is most likely associated by microscopic worms known as *Wuchereria bancrofti*, *Brugia malayi*, and *Brugia timori*. Although this condition is not really a life-threatening disease, it can permanently damage and dysfunction a person's lymphatic system. It is widely considered as a major cause of disability and deformity in people who are living in endemic areas (WHO, 2020).

Lymphatic filariasis is a neglected tropical disease that causes significant morbidity in the developing world. This activity reviews the evaluation, treatment, management of lymphatic filariasis and reviews the role of the interprofessional team in managing patients with this condition (WHO, 2020).

B. Etiology

Filariasis is caused by at least three species of nematode parasites (*Wuchereria bancrofti*, *Brugia malayi*, and *Brugia timori*) and is transmitted to 5 genera of mosquitoes including *Aedes*, *Anopheles*, *Culex*, *Mansonia*, and *Ochlerotatus* (WHO, 2020).

C. Epidemiology

It affects 120 million people in 72 countries worldwide, mostly in the tropics and subtropical climates of Asia, Africa, the Western Pacific, South America, and the Caribbean. Four countries in America are endemic: Haiti, Dominican Republic, Guyana, and Brazil. One-third of children in endemic regions are asymptotically infected with *W. bancrofti*. Half of the patients infected are in their 30s or 40s, and there is a 10:1 predilection for men to women (Belleza, 2022).

D. Pathophysiology

Humans are the primary reservoir for this parasitic disease, and mosquitoes are the vector. The mosquito deposits larvae into the bloodstream. They take up residence in the lymph nodes and grow into adult worms. The larvae have a predilection to deposit in femoral lymph nodes. They undergo sexual reproduction, and females give birth to countless microfilariae, which are dumped into circulation in a diurnal pattern. Females can give off eggs for approximately 5 years, and adults can live up to 9 years. With the proliferation of adult worms, the lymphatics become occluded, which disrupts the lymphatic drainage and increases the susceptibility to repeated infections—most notably streptococcal and fungal infections. This acute-on-chronic inflammation leads to fibrosis and remodeling of the lymphatics, further perpetuating contractile dysfunction and leading to the dermal skin changes seen with elephantiasis (J.Mag, RN, USRN, 2020).

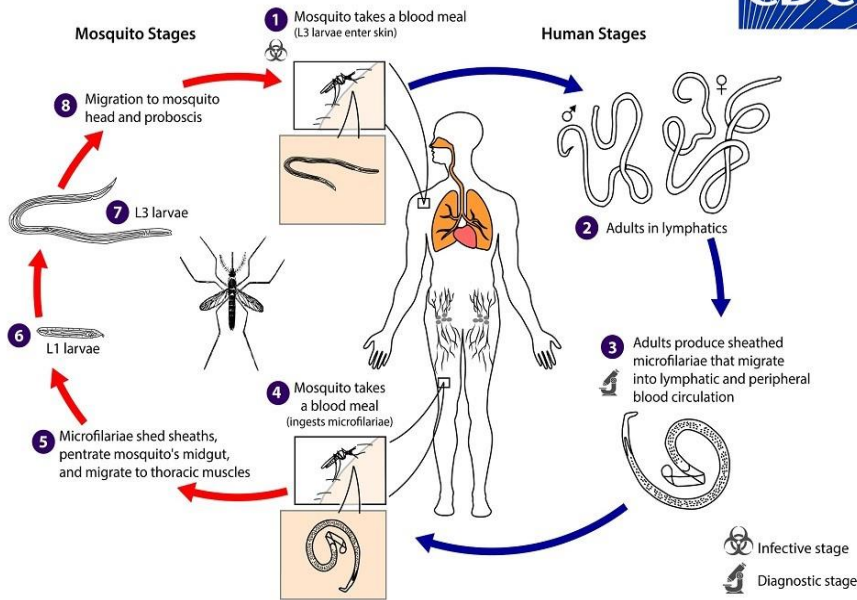


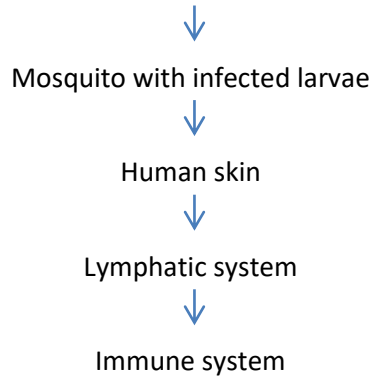
Figure 7 Filariasis (Wikipedia)

E. Classifications of Filariasis

Filariasis is classified depending on the area of the body which the worms mainly affect. Its classifications include: 1) Lymphatic Filariasis: a). affects the lymphatic system, b). can result to a more serious complication such as enlargement of body parts, c). can cause pain and permanent disability, 2). Subcutaneous Filariasis: Affects the subcutaneous area of the skin, 3). Serous Cavity Filariasis: Affects the abdomen's serous cavity.

F. Transmission of Filariasis

How filariasis is develop inside the human's body:



G. Signs and Symptoms

People who are affected by Filariasis generally do not experience any external symptoms during the earlier stages. This may mean that they do not recognize that they are already having it. However, as this condition lasts for over several months and years, affected people will start to experience characteristic signs and symptoms which include the following: 1). Fever that lasts for days, 2). Lymphoedema or tissue swelling, 3). Elephantiasis or thickening of the body's tissues, 4). Scarring.



Figure 8 Elephantiasis (img.medscapestatic.com)

H. Diagnostic Tests

1). Circulating filarial antigen (CFA): This diagnostic examination determines the presence of *W. bancrofti* that is released by infected mosquitos. It can be performed any time of the day. 2). Polymerase chain reaction (PCR): This diagnostic exam detects whether the body is already infected by Filariasis. This test is not usually available in the market. 3). Blood smears: This test can also be helpful in identifying roundworms and any infection that takes place inside the body. It can be conducted during selected times of the day, particularly during at night since roundworms are nocturnal. 4). Antifilarial body tests: This diagnostic exam determines the rise of IgG levels and IgG4. Although this test is essential in determining Filarial entry, it cannot detect the presence of infection and past infections. 5). Ultrasound and Lymphoscintigraphic techniques: These tests distinguish any presence of worms in the lymphatic system. 6). Skin test: This test can also determine the presence of filarial infection. Clients who undergo this test may experience pain since medical professionals will use a tiny razor blade to cut a small portion of the skin.

I. Treatment

The treatment given includes: 1). Ivermectine—drug of choice for *W. bancrofti*, 2). Doxycycline—used to reduce tissue swelling, 3). Suramin—effective against adult roundworms, Monitor the client’s vital signs, particularly the temperature, 4). Assess skin color and integrity. Note for wounds, bleeding, or any skin changes, 5). Assess for any discomfort and pain, 6). Provide wound care, 7). Elevate the affected body area to reduce swelling, 8). Administer medications if ordered and discuss them to the client, 9). Assess for reactions to the drug therapy, 10). Provide support to perform basic activities, 11). Encourage range of motion and simple exercises of the affected extremities to stimulate lymphatic flow, 12). Recognize client’s self-esteem needs, 13). Monitor for any alteration in respiratory function since tropical pulmonary eosinophilia is a rare but potentially serious complication of lymphatic filariasis, 14). Provide health teaching and information for continuity of care, 15). Teach patient about

prevention methods: a). Checking themselves to the health of the possibility of clinical symptoms of the disease. b). Trying to avoid mosquito bites by: Using sleep-wear mosquito nets, Covering the holes/ventilation houses with fine mesh wire, Not letting the mosquitoes nest in or around the home.d). Killing mosquitoes with mosquito sprays: Washing water or sewer plants to eliminate mosquito breeding places, emphasize on regular periodic follow-up screening, with repeated treatment as and when indicated since there is no reliable diagnostic test to positively establish that the adult worm has been killed (J.Mag, RN, USRN, 2020).

Summary

Tropical diseases are associated with tropical regions, but global access travel, climate change, and environmental factors affecting disease vectors may spread to non-endemic countries. Tropical diseases are classified as communicable and non-communicable diseases and occur mainly in the tropics, Africa, Asia, and South and Central America (Rupali, 2019). Tropical diseases can spread globally due to increased travel accessibility, climate change, and environmental factors affecting disease vectors. Tropical diseases' high prevalence of morbidity and mortality causes a significant economic burden on developing countries, most notably through malaria, dengue fever, and Human African Trypanosomiasis (sleeping sickness). While tropical diseases have a low mortality prevalence in affluent countries, their high morbidity can negatively impact life and productivity

Malaria is a life-threatening disease primarily found in tropical countries. It is both preventable and curable. However, without prompt diagnosis and effective treatment, a case of uncomplicated malaria can progress to a severe form of the disease, which is often fatal without treatment. Malaria is not contagious and cannot spread from one person to another; the disease is transmitted through the bites of female Anopheles mosquitoes. Five species of parasites can cause malaria in

humans and 2 of these species—*Plasmodium falciparum* and *Plasmodium vivax*—pose the greatest threat. There are over 400 different species of Anopheles mosquitoes and around 40, known as vector species, can transmit the disease.

Dengue fever is an acute febrile disease caused by infection with one of the serotypes of the dengue virus. It is a mosquito-borne disease caused by the genus *Aedes*. Dengue is also known as Breakbone Fever, Hemorrhagic Fever, Dandy Fever, Infectious Thrombocytopenic Purpura. Dengue hemorrhagic fever is a fatal manifestation of the dengue virus that manifests with bleeding diathesis and hypovolemic shock. These viruses are related to the viruses that cause the West Nile infection and yellow fever.

Developing a nursing care plan for patients with Typhoid fever is essential for promoting recovery and preventing complications. By conducting a thorough assessment, formulating nursing diagnoses, planning interventions, implementing the plan, and evaluating the patient's response, nurses can ensure that patients with Typhoid fever receive high-quality, individualized care that meets their unique needs.

Filariasis is a disease caused by a chronic mosquito-borne parasitic infection. Chronic infection can lead to swelling of the extremities, hydroceles, and testicular masses. It is the second-largest cause of permanent deformity and disability behind leprosy worldwide. Lymphatic filariasis (LF) is currently considered a neglected tropical disease

Review Questions

- 1. The infectious agent that causes malaria is known as which of the following?**
 - A. Viral parasite
 - B. Fungal parasite
 - C. Bacterial parasite
 - D. Protozoan parasite**

2. **Which one of the following are NOT antimalarial compounds?**
 - A. Quinine
 - B. Penicillin**
 - C. Artemisinin
 - D. Chloroquine

3. **Signs of plasma leakage usually appear after how many hours?**
 - A. 24 hours.**
 - B. 25 hours.
 - C. 26 hours.
 - D. 27 hours.

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CHAPTER 4

THE CONCEPT OF NURSING CARE FOR PATIENTS WITH ENDEMIC INFECTIOUS DISEASES

Introduction

Infectious diseases are one of the serious disease groups that have been continuing from the past to the present, negatively affecting the life of the society and the individual, and at the same time posing a life risk with complications that may develop. Factors such as bacteria, viruses, fungi, and parasites that cause infectious diseases can be transmitted from a sick individual to a healthy individual in a short time, have a mild or severe course, result in death, recovery, or develop life-long immunity. These factors can be transmitted because of droplet route, contact route, body fluids, and sharps injuries. Health personnel, especially nurses, are faced with traumas, physical, chemical, and biological factors during their work, and in many countries, unsuitable working conditions cause work-related infections and occupational injuries. Unlike other workers, healthcare workers are at high risk for infectious disease agents such as needle (WHO, 2020)

Coronavirus Disease 2019 (COVID-19) was identified as the cause of an outbreak first discovered at a local seafood/wild animal market in Wuhan, China. COVID-19 has been declared by the World Health Organization (WHO) as a pandemic and it is reported that around 5,000,000 people are affected in more than 200 countries around the world (WHO, 2019).

Coronavirus was first identified in December 2019 in a group of patients who presented pneumonia of unknown etiology in the city of Wuhan City, province of Hubei, China. Subsequently, due to the spread of similar cases, the virus strain that caused morbidity was successfully isolated by researchers, enabling the association of that clinical condition with the etiological agent responsible for the coronavirus outbreak, related to the severe acute respiratory syndrome (SARS-CoV), in 2003. Thus, the International Virus Taxonomy Committee named the new severe acute respiratory syndrome virus SARS-CoV-2 on February 11th, 2020. Concomitantly, the World Health Organization (WHO) proclaimed the official name of the disease caused by the new virus as coronavirus disease (COVID-19) (WHO, 2019).

Key Term

- Infection Disease
- Coronavirus 2019 (COVID-19)

Learning Objectives

- Identify the etiology, epidemiology, and pathophysiology of Covid-19
- Recall, analyze, and select appropriate history, physical, and evaluation of Covid-19
- Explain the treatment and management options available for Covid-19

NURSING CARE FOR PATIENTS WITH COVID-19

A. Definition

Coronavirus 2019 (COVID-19) is a disease caused by a new strain of coronavirus called *severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)* that can cause symptoms from common cold to more severe disease such as pneumonia and eventually it may lead to death especially those in vulnerable groups such as the elderly, the very young, and people with an underlying chronic health condition.

- Limited information is available to characterize the spectrum of clinical illness associated with COVID-19.
- The CDC clinical criteria for a COVID-19 patient under investigation (PUI) have been developed based on what is known about MERS-CoV and SARS-CoV and are subject to change as additional information becomes available.
- Early on, many of the patients in the outbreak in Wuhan, China reportedly had some link to a large seafood and animal market, suggesting animal-to-person spread.
- However, a growing number of patients reportedly have not had exposure to animal markets, indicating person-to-person spread is occurring (Ehrenberg, et al., 2020)

Pathophysiology

Coronaviruses are common in many different species of animals, including bats, camels, cats, and cattle: 1). COVID-19 is a beta coronavirus, like MERS and SARS, all of which have their origins in batsm, 2). The sequences from US patients are similar to the one that China initially posted, suggesting a likely single, recent emergence of this virus from an animal reservoir, 3). When person-to-person spread has occurred with MERS and SARS, it is thought to have happened mainly via respiratory droplets produced when an infected person sneezes, similar to how

influenza and other respiratory pathogens spread, 4). Most coronaviruses infect animals, but not people; in the future, one or more of these other coronaviruses could potentially evolve and spread to humans, as has happened in the past, 5). Many of the patients have direct or indirect contact with the Wuhan Huanan Seafood Wholesale Market that is believed to be the original place of the outbreak of COVID-19., 6). However, the transmission of COVID-19 from fish to humans is unlikely, 7). The COVID-19 and fish coronaviruses such as Beluga Whale CoV/SW1 belong to different genera and apparently have different host ranges, 9). As the Wuhan market seafood market also sells other animals, the natural host of COVID-19 awaits to be identified (Ehrenberg, et al. 2020), 10). Due to the possibility of transmission from animal to human, CoVs in livestock and other animals including bats and wild animals sold on the market should be constantly monitored, 11). In addition, more and more evidence indicates the new virus COVID-19 is spread via the route of human-to-human transmission because there are infections of people who did not visit Wuhan but had close contact with family members who had visited Wuhan and got infected (WHO, 2019)

Causes

Corona viruses are named for the crown-like spikes on their surface: 1). There are four main sub-groupings of coronaviruses, known as alpha, beta, gamma, and delta. 2). Human coronaviruses were first identified in the mid-1960s. 3). The seven coronaviruses that can infect people are 229E (alpha coronavirus), NL63 (alpha coronavirus), OC43 (beta coronavirus), and HKU1 (beta coronavirus), 4). Other human coronaviruses are MERS-CoV, SARS-CoV, and COVID-19 (WHO, 2019).

Statistics and Incidences

An outbreak of pneumonia of unknown etiology in Wuhan City was initially reported to WHO on December 31, 2019: 1). Chinese health

authorities have confirmed more than 40 infections with a novel coronavirus as the cause of the outbreak. 2). Reportedly, most patients had epidemiological links to a large seafood and animal market; the market was closed on January 1, 2020 3). Globally, there are 5,030,914 confirmed cases and 326,182 deaths confirmed as of May 21, 2020, 4). The United States has the highest number of coronavirus cases in the world with more than 1.5 million cases (New York City being the most affected), 5). Most countries have declared nationwide lockdowns and have restricted travel, 6). International conveyance cases identified on the Diamond Princess cruise ship currently in Japanese territorial waters have reached 712 (Bilgehan & Habip, 2022).

Clinical Manifestations

For confirmed COVID-19 infections, reported illnesses have ranged from people being mildly sick to people being severely ill and dying; these symptoms may appear in as few as 2 days or as long as 14 after exposure based on what has been seen previously as the incubation period of MERS viruses exp: Fever, dry cough, shortness of breath. and other symptoms may include: sore throat, runny nose, diarrhea, fatigue/tiredness, difficulty of breathing (in severe cases) (Gomes et al., 2021)

Assessment and Diagnostic Findings

At this time, diagnostic testing for COVID-19 can be conducted only at CDC: 1). To increase the likelihood of detecting infection, CDC recommends collection of three specimen types: *lower respiratory, upper respiratory, and serum specimens* for testing.2). CDC has deployed multidisciplinary teams to Washington, Illinois, California, and Arizona to assist health departments with clinical management, contact tracing, and communications, 3). CDC has developed a real-time Reverse Transcription-Polymerase Chain Reaction (rRT-PCR) test that can diagnose

COVID-19 in respiratory serum samples from clinical specimens, 4). Currently, testing for this virus must take place at CDC, but in the coming days and weeks, CDC will share these tests with domestic and international partners, 5). CDC uploaded the entire genome of the virus from all five reported cases in the United States to GenBank, 6). CDC is also growing the virus in cell culture, which is necessary for further studies, including for additional genetic characterization (Gomes et al., 2021).

Medical Management

The best way to prevent infection is to avoid being exposed to this coronavirus: 1). **Hand hygiene.** Wash hands often with soap and water for at least 20 seconds; if water and soap are not available, use an alcohol-based hand sanitizer, 2). **Keep hands off your face.** Avoid touching the eyes, nose, and mouth with unwashed hands.,3). **Maintain social distancing.** Avoid close contact with people at least 3 feet (1 meter) who are sick, and stay at home when you are sick, 4). **Proper cough and sneeze etiquette.** Cover your cough or sneeze with a tissue, then throw the tissue in the trash, 5). **Supportive care.** People infected with COVID-19 should receive supportive care to help relieve symptoms, 6). **Severe cases.** For severe cases, treatment should include care to support vital organ functions (Bilgehan & Habip, 2022).

For Health Care Workers

Healthcare workers are the very people who will be working day-and-night to treat and assist coronavirus patients are among the most exposed population for becoming infected. The protection of vulnerable members is one of the priorities for the response to COVID19 outbreaks. Occupational health services in healthcare facilities play a vital role in helping, supporting, and ensuring that workplaces are safe and healthy and addressing health problems when they arise. WHO emphasizes the

rights and responsibilities of health workers, including explicit criteria required to preserve occupational safety and health.

Pharmacologic Management

There is no specific antiviral medication yet recommended for COVID-19 infection, and no current vaccine to prevent it (WHO, 2019)

Nursing Management

Nursing management for patients with COVID-19 infection includes the following:

Nursing Assessment

Assessment of a patient suspected of COVID-19 should include: 1). Travel history. Healthcare providers should obtain a detailed travel history for patients being evaluated with fever and acute respiratory illness, 2). Physical examination. Patients who have fever, cough, and shortness of breath and who have traveled to Wuhan, China recently must be placed under isolation immediately (Black & Hawks, 2019).

Nursing Diagnosis

Based on the assessment data, the major nursing diagnosis for a patient with COVID-19 are: 1). Infection-related to failure to avoid pathogen secondary to exposure to COVID-19, 2). Deficient knowledge related to unfamiliarity with disease transmission information, 3). Hyperthermia is related to an increase in metabolic rate, 4). Impaired breathing pattern related to shortness of breath, 5). Anxiety related to the unknown etiology of the disease (Black & Hawks, 2019).

Nursing Care Planning and Goals

The following are the major nursing care planning goals for COVID-19: 1). Prevent the spread of infection, 2). Learn more about the

disease and its management. Improve body temperature levels, restore breathing pattern back to normal, Reduce anxiety (Black & Hawks, 2019).

Nursing Interventions

Listed below are the nursing interventions for a patient diagnosed with COVID-19: 1). Monitor vital signs. Monitor the patient's temperature; the infection usually begins with a high temperature; monitor the respiratory rate of the patient as shortness of breath is another common symptom, 2). Monitor O2 saturation. Monitor the patient's O2 saturation because respiratory compromise results in hypoxia, 3). Maintain respiratory isolation. Keep tissues at the patient's bedside; dispose of secretions properly; instruct the patient to cover mouth when coughing or sneezing; use masks, and advise those entering the room to wear masks as well; place respiratory stickers on chart, linens, and so on, 4). Enforce strict hand hygiene. Teach the patient and folks to wash hands after coughing to reduce or prevent the transmission of the virus, 5). Manage hyperthermia. Use appropriate therapy for the elevated temperature to maintain normothermia and reduce metabolic needs, 6). Educate the patient and folks. Provide information on disease transmission, diagnostic testing, disease process, complications, and protection from the virus (Gomes et al., 2021).

Evaluation

Nursing goals are met as evidenced by: 1). The patient was able to prevent the spread of infection, 2). The patient was able to learn more about the disease and its management, 3). The patient was able to improve body temperature levels, 4). The patient was able to restore his/her breathing pattern back to normal, 5). The patient was able to reduce anxiety (Gomes et al., 2021).

Documentation Guidelines

Documentation guidelines for a patient with COVID-19 include the following: 1). Individual findings, include factors affecting, interactions, the nature of social exchanges, and specifics of individual behavior, 2). Cultural and religious beliefs, and expectations, 3). Plan of care, 4). Teaching plan, 5). Responses to interventions, teaching, and actions performed, 6). Attainment or progress toward the desired outcome (Gomes et al., 2021).

Summary

Infectious diseases are one of the serious disease groups that have been continuing from the past to the present, negatively affecting the life of the society and the individual, and at the same time posing a life risk with complications that may develop. Factors such as bacteria, viruses, fungi, and parasites that cause infectious diseases can be transmitted from a sick individual to a healthy individual in a short time, have a mild or severe course, result in death, recovery, or develop life-long immunity. (COVID-19) is a disease caused by a new strain of coronavirus called *severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)* that can cause symptoms from common cold to more severe disease such as pneumonia and eventually it may lead to death especially those in vulnerable groups such as the elderly, the very young, and people with an underlying chronic health condition. Limited information is available to characterize the spectrum of clinical illness associated with COVID-19 (WHO, 2019).

These factors can be transmitted as a result of droplet route, contact route, body fluids, and sharps injuries -considered a public health emergency of international concern, the COVID-19 outbreak was declared a global pandemic and has mobilized researchers in the search for information that can guide health care. Regarding the symptoms, the infected patients can present fever, high temperature (> 37.3°C), cough,

myalgia, headache, hemoptysis, diarrhea, dyspnea and, in some more severe cases, acute respiratory distress syndrome (ARDS), acute cardiac injury or secondary infection (Gomes, et al., 2021).

Review Questions

1. A client who has recently traveled to China comes to the emergency department (ED) with increasing shortness of breath and is strongly suspected of having a COVID-19. Which of these prescribed actions will you take first?
A. Place the client on contact and airborne precautions
B. Obtain blood, urine, and sputum for cultures
C. Administer methylprednisolone (Solu-Medrol) 1 gram/IV
D. Infuse normal saline at 100ml/hr
2. What is the vector of the dengue virus?
A. Male *Aedes aegypti* mosquito.
B. Female *Aedes aegypti* mosquito.
C. Any *Aedes aegypti* mosquito.
D. All of the above.
3. A 10-year-old client contracted COVID-19 when traveling abroad with her parents. The nurse knows she must put on personal protective equipment to protect herself while providing care. Based on the mode of transmission, which personal protective should the nurse wear?
A. Gloves
B. Gown and gloves
C. Gown, gloves, and mask
D. Gown, gloves, mask, and eye goggles or eye shield

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WHO's guidelines for health workers here

CHAPTER 5

NURSING CARE CONCEPTS

FOR PATIENTS WITH HIV/AIDS

Introduction

The human immunodeficiency virus (HIV) is an enveloped retrovirus that contains 2 copies of a single-stranded RNA genome. It causes the acquired immunodeficiency syndrome (AIDS) which is the last stage of HIV disease. Two to four weeks after HIV enters the body, the patient may complain of symptoms of primary infection. After that, a long chronic HIV infection occurs, which can last for Coronary Artery Disease (CAD). AIDS is mainly characterized by opportunistic infections and tumors, which are usually fatal without treatment (CDC, 2019).

Acquired immunodeficiency syndrome (AIDS) is a serious secondary immunodeficiency disorder caused by the retrovirus, the human immunodeficiency virus (HIV). Both diseases are characterized by the progressive destruction of cell-mediated (T-cell) immunity with subsequent effects on humoral (B-cell) immunity because of the pivotal role of the CD4+helper T cells in immune reactions. Immunodeficiency makes the patient susceptible to opportunistic infections, unusual cancers, and other abnormalities.

AIDS results from the infection of HIV which has two forms: HIV-1 and HIV-2. Both forms have the same model of transmission and similar opportunistic infections associated with AIDS, but studies indicate that HIV-2 develops more slowly and presents with milder symptoms than HIV-1. Transmission occurs through contact with infected blood or body fluids and is associated with identifiable high-risk behaviors.

Persons with HIV/AIDS have been found to fall into five general categories: (1) homosexual or bisexual men, (2) injection drug users, (3) recipients of infected blood or blood products, (4) heterosexual partners of a person with HIV infection, and (5) children born to an infected mother. The rate of infection is most rapidly increasing among minority women and is increasingly a disease of persons of color.

There is no cure yet for either HIV or AIDS. However, significant advances have been made to help patients control signs and symptoms and delay disease progression.

Key Term

- Human Immunodeficiency Virus (HIV)
- Acquired Immunodeficiency Syndrome (AIDS)
- Nursing Care

Learning Objectives

- Identify the etiology, epidemiology, and pathophysiology of HIV/AIDS
- Recall, analyze, and select appropriate history, physical, and evaluation of HIV/AIDS
- Explain the treatment and management options available for HIV/AIDS

A. Definition

HIV is the human immunodeficiency virus. It is the virus that can lead to acquired immune deficiency syndrome or AIDS.

- **H–Human**–This particular virus can only infect human beings.
- **I–Immunodeficiency**–HIV weakens your immune system by destroying important cells that fight disease and infection. A “deficient” immune system can’t protect you.

- **V–Virus**–A virus can only reproduce itself by taking over a cell in the body of its host.
 - Human Immunodeficiency Virus is a lot like other viruses, including those that cause the “flu” or the common cold. But there is an important difference–over time, your immune system can clear most viruses out of your body. That isn’t the case with HIV–the human immune system can’t seem to get rid of it. Scientists are still trying to figure out why.
 - We know that HIV can hide for long periods of time in the cells of your body and that it attacks a key part of your immune system–your T-cells or CD4 cells. Your body has to have these cells to fight infections and disease, but HIV invades them, uses them to make more copies of itself, and then destroys them.
 - Over time, HIV can destroy so many of your CD4 cells that your body can’t fight infections and diseases anymore. When that happens, HIV infection can lead to AIDS.
- To understand what AIDS is, let’s break it down:*
- **A–Acquired**–AIDS is not something you inherit from your parents. You acquire AIDS after birth.
 - **I–Immuno**–Your body’s immune system includes all the organs and cells that work to fight off infection or disease.
 - **D–Deficiency**–You get AIDS when your immune system is “deficient,” or isn’t working the way it should.
 - **S–Syn`drome**–A syndrome is a collection of symptoms and signs of disease. AIDS is a syndrome, rather than a single disease, because it is a complex illness with a wide range of complications and symptoms.
 - Acquired Immunodeficiency Syndrome is the final stage of HIV infection. People at this stage of HIV disease have badly damaged immune systems, which put them at risk for opportunistic infections (OIs).
 - You will be diagnosed with AIDS if you have one or more specific OIs, certain cancers, or a very low number of CD4 cells. If you

have AIDS, you will need medical intervention and treatment to prevent death.

Acquired immunodeficiency syndrome (AIDS) as the most severe form of a continuum of illnesses associated with human immunodeficiency virus (HIV) infection. HIV belongs to a group of viruses known as retroviruses. These viruses carry their genetic material in the form of ribonucleic acid (RNA) rather than deoxyribonucleic acid (DNA). Infection with HIV occurs when it enters the host CD4 (T) cell and causes this cell to replicate viral RNA and viral proteins, which in turn invade other CD4 cells. The stage of HIV disease is based on clinical history, physical examination, laboratory evidence of immune dysfunction, signs and symptoms, and infections and malignancies. The Centers for Disease Control and Prevention (CDC) standard case definition of AIDS categorizes HIV infection and AIDS in adults and adolescents on the basis of clinical conditions associated with HIV infection and CD4 T-cell counts. Four categories of infected states have been denoted: 1. Primary infection (acute/recent HIV infection, acute HIV syndrome: dramatic drops in CD4 T-cell counts, which are normally between 500 and 1,500 cells/mm³), 2). HIV asymptomatic (Centers for Disease Control and Prevention (CDC) Category A: more than 500 CD4 T lymphocytes/mm³), 3). HIV symptomatic (Centers for Disease Control and Prevention (CDC) Category B: 200 to 499 CD4 T lymphocytes/mm³), 4). AIDS (Centers for Disease Control and Prevention (CDC) Category C: fewer than 200 CD4 T lymphocytes/mm

Causes

- HIV causes AIDS. Two HIV strains have been identified: HIV-1 and HIV-2. HIV-1 is the prototype virus and is responsible for most cases of AIDS in the United States. HIV-2 is found chiefly in West Africa, appears to be less easily transmitted, and has a longer incubation period.

- Susceptibility to infection is unclear. The presence of sexually transmitted infections (STIs) with open lesions, such as herpes and syphilis, may increase the patient's susceptibility to viral entry.
- People with cytomegalovirus and Epstein-Barr virus infections may also be more susceptible because of an increased number of target cells. Routes of transmission are through sexual contact (male to male, male to female, female to male, and female to female); by blood to blood or transfusion contact (generally blood products given between 1977 and 1985); through the use of needles contaminated by an HIV-infected person; by blood or other HIV-infected fluids coming in contact with open lesions or mucous membranes; and by mother to child during the in utero period, during delivery, or by breastfeeding.
- The time from the onset of HIV transmission to the development of AIDS varies from a few months to years. The median incubation period is 10 years.

Pathophysiology

1. Human beings produce antibodies against specific infections.
2. When HIV infection takes place, anti-HIV antibodies are produced but they do not appear immediately. This is called the "window effect".
3. In some cases, antibodies to HIV become detectable 4 to 6 weeks after infection.
4. When HIV is in circulation, it invades several types of cells—the lymphocytes, macrophages, the Langerhans cells, and neurons within the CNS.
5. HIV attacks the body's immune system.
6. The organism attaches to a protein molecule called CD4 which is found in the surface of T4 cells.
7. Once the virus enters the T4, it inserts its genetic materials into the T4 cell's nucleus taking over the cell to replicate itself.

8. Eventually the T4 cell dies after having been used to replicate HIV.
9. The virus mutates rapidly making it more difficult for the body's immune system to 'recognize' the invaders.
10. HIV infection progresses through several stages.
11. The clinical course of HIV infection begins when a person becomes infected with HIV through:
 - sexual contact with infected person
 - injection of infected blood or blood products
 - perinatal or vertical transmission.

Clinical Manifestations

HIV has four categories with specific manifestations for each stage.

- This is experienced during the early infection stages.
- People who are acutely infected with HIV infection experiences this symptom.
- This symptom is mostly present in category B wherein the patient has already entered the chronic stage.
- **Constitutional symptoms.** Fever more than 38.5°C or diarrhea exceeding 1 month in duration may also indicate presence of HIV infection.
- Patients with HIV category C experience wasting syndrome or severe wasting of the muscles.

Prevention

Until an effective vaccine is developed, nurses need to prevent HIV infection by teaching patients how to eliminate or reduce risky behaviors.

- **Safe sex.** Other than abstinence, consistent and correct use of condoms is the only effective method to decrease the risk of sexual transmission of HIV infection.

- In March 2007, based on the results of three clinical trials, the WHO and UNAIDS recommended that circumcision be recognized as an effective strategy to reduce the risk of HIV acquisition in men.
- **Sex partners.** Avoid sexual contact with multiple partners or people who are known to be HIV positive or IV/injection drug users.
- **Blood and blood components.** People who are HIV positive or who use injection drugs should be instructed not to donate blood or share drug equipment with others.

Complications

The patient should be monitored for presence of complications and should be managed appropriately.

- **Opportunistic infections.** Patients who are **immunosuppressed** are at risk for opportunistic infections such as pneumocystis pneumonia which can affect 80% of all people infected with HIV.
- **Respiratory failure. Impaired breathing** is a major complication that increases the patient's discomfort and anxiety and may lead to respiratory and cardiac failure.
- **Cachexia and wasting.** Wasting syndrome occurs when there is profound involuntary weight loss exceeding 10% of the baseline body weight and it is a common complication of HIV infection and AIDS.

Assessment and Diagnostic Findings

Several screening tests are used to diagnose HIV infection.

- **Confirming Diagnosis:** Signs and symptoms may occur at any time after infection, but AIDS isn't officially diagnosed until the patient's CD4+ T-cell count falls below 200 cells/mcl or associated clinical conditions or disease.
- **CBC:** Anemia and idiopathic thrombocytopenia (anemia occurs in up to 85% of patients with AIDS and may be profound). Leukopenia may

be present; differential shift to the left suggests infectious process (PCP), although shift to the right may be noted.

- **PPD:** Determines exposure and/or active TB disease. Of AIDS patients, 100% of those exposed to active *Mycobacterium tuberculosis* will develop the disease.
- **Serologic:** Serum antibody test: HIV screen by ELISA. A positive test result may be indicative of exposure to HIV but is not diagnostic because false-positives may occur.
- **Western blot test:** Confirms diagnosis of HIV in blood and urine.
- **Viral load test:**
- **STD screening tests:** Hepatitis B envelope and core antibodies, syphilis, and other common STDs may be positive.
- **Cultures:** Histologic, cytologic studies of urine, blood, stool, spinal fluid, lesions, sputum, and secretions may be done to identify the opportunistic infection. Some of the most commonly identified are the following:
 - **Neurological studies, e.g., electroencephalogram (EEG), magnetic resonance imaging (MRI), computed tomography (CT) scans of the brain; electromyography (EMG)/nerve conduction studies:** Indicated for changes in mentation, fever of undetermined origin, and/or changes in sensory/motor function to determine effects of HIV infection/opportunistic infections.
- **Chest x-ray:** May initially be normal or may reveal progressive interstitial infiltrates secondary to advancing PCP (most common opportunistic disease) or other pulmonary complications/disease processes such as TB.
- **Pulmonary function tests:** Useful in early detection of interstitial pneumonias.
- **Gallium scan:** Diffuse pulmonary uptake occurs in PCP and other forms of pneumonia.
- **Biopsies:** May be done for differential diagnosis of Kaposi's sarcoma (KS) or other neoplastic lesions.

- **Bronchoscopy/tracheobronchial washings:** May be done with biopsy when PCP or lung malignancies are suspected (diagnostic confirming test for PCP).
- **Barium swallow, endoscopy, colonoscopy:** May be done to identify opportunistic infection (e.g., Candida, CMV) or to stage KS in the GI system.

Medical Management

Medical management focuses on the elimination of opportunistic infections.

- **Treatment of opportunistic infections.** For *Pneumocystis pneumonia*, **TMP-SMZ** is the treatment of choice; for mycobacterium avian complex, **azithromycin** or **clarithromycin** are preferred prophylactic agents; for cryptococcal *meningitis*, the current primary treatment is **IV amphotericin B**.
- **Prevention of opportunistic infections.** TMP-SMZ is an antibacterial agent used to treat various organisms causing infection.
- **Antidiarrheal therapy.** Therapy with **octreotide acetate** (Sandostatin), a synthetic analog of somatostatin, has been shown to be effective in managing severe chronic *diarrhea*.
- **Antidepressant therapy.** Treatment for *depression* in patients with HIV infection involves psychotherapy integrated with **imipramine**, desipramine or fluoxetine.
- **Nutrition therapy.** For all AIDS patients who experience unexplained weight loss, calorie counts should be obtained, and appetite stimulants and oral supplements are also appropriate (Avert, 2020).

Acute Infection

As early as 2-4 weeks after exposure to HIV (but up to 3 months later), people can experience an acute illness, often described as “the worst flu ever.” This is called acute retroviral syndrome (ARS), or primary

HIV infection, and it's the body's natural response to HIV infection. During primary HIV infection, there are higher levels of virus circulating in the blood, which means that people can more easily transmit the virus to others.

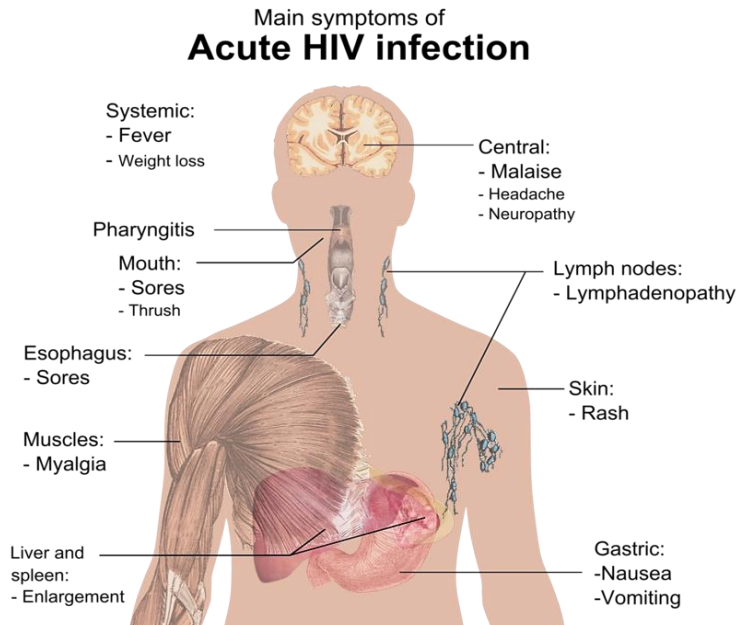


Figure 9 Main Symptom of Acute HIV (Wikipedia, 2009)

Symptoms can include: a). Fever, b). Chills, c). Rash, d). Night sweats, e). Muscle aches, f). Sore throat, g). Swollen lymph nodes, h). Ulcers in the mouth

Clinical Latency

After the initial infection and seroconversion, the virus becomes less active in the body, although it is still present. During this period, many people do not have any symptoms of HIV infection. This period is called the “chronic” or “latency” phase. This period can last up to 10 years—sometimes longer.

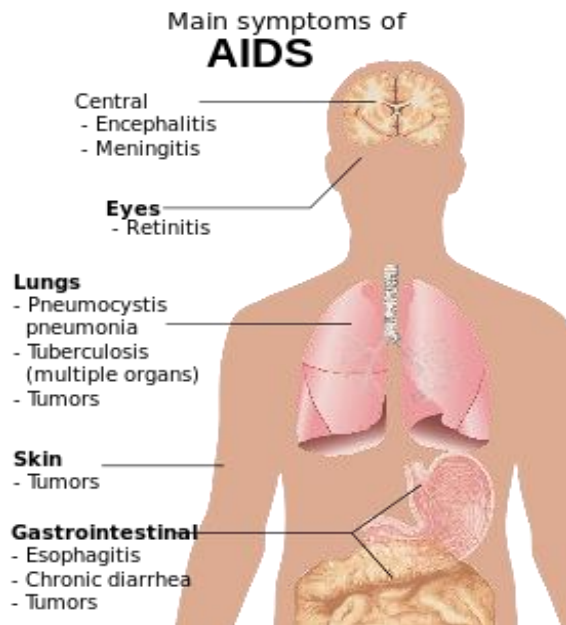


Figure 10 Main Symptom of AIDS (Wikipedia, 2009)

HIV-Positive without Symptoms

- Many people who are HIV-positive do not have symptoms of HIV infection. *Often people only begin to feel sick when they progress toward AIDS (Acquired Immunodeficiency Syndrome).* Sometimes people living with HIV go through periods of being sick and then feel fine.
- While the virus itself can sometimes cause people to feel sick, most of the severe symptoms and illnesses of HIV disease come from the opportunistic infections that attack a damaged immune system. It is important to remember that some symptoms of HIV infection are similar to symptoms of many other common illnesses, such as the flu, or respiratory or gastrointestinal infections.

Common Opportunistic Infections

Most common opportunistic infections: 1). Pneumocystis carinii pneumonia, 2). Oral candidiasis o opportunistic infection, 3). Toxoplasmosis of the CNS, 4). Chronic diarrhea/wasting syndrome, 5). Pulmonary/extra-pulmonary tuberculosis, 6). Cancers: a). **Kaposi's sarcoma**—affects small blood vessels and internal organs, b). **Cervical dysplasia** and cancer. Researchers found out that women with HIV have higher rates of this type of cancer. Cervical carcinoma is associated with Human Papilloma Virus (HPV), c). **Non-Hodgkin's lymphoma**—cancerous tumor of the lymph nodes. This is usually a late manifestation of HIV infection.

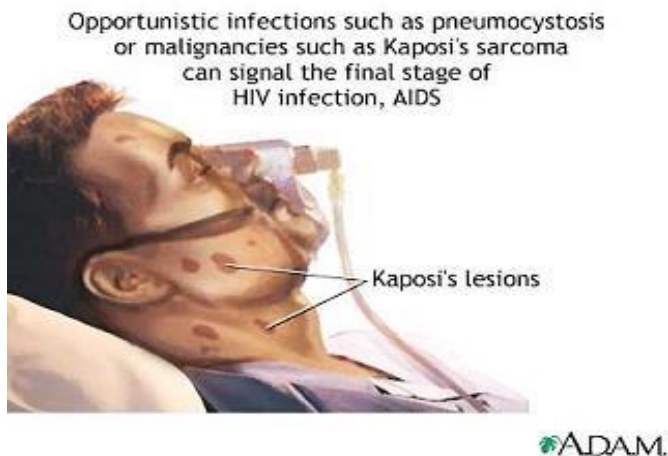


Figure 11 Opportunistic Infections (ADAM)

Primary Nursing Diagnosis

Risk for infection related to immune deficiency

- OUTCOMES. Immune status; Respiratory status: Gas exchange; Respiratory status: Ventilation; Thermoregulation
- INTERVENTIONS. Infection control; Infection protection; Respiratory monitoring; Temperature regulation

Nursing Management

Nursing Care for Patients With Hiv/Aids is challenging because of the potential for any organ system to be the target of infections or cancer:
1). Health education–The healthcare worker must: a). Know the patient, b). Avoid fear tactics, c). Avoid judgmental and moralistic messages, d). Be consistent and concise, e). Use positive statement, f). Give practical advice, 2). Practice universal/standard precaution: a). here is a need for thorough medical handwashing after every contact with the patient and after removing the gown and gloves, and before leaving the room of an AIDS suspect or known AIDS patient, b). Use of a universal barrier or Personal Protective Equipment (PPE) e.g., cap, mask, gloves, CD gown, face shield/goggles is very necessary, 3). Prevention: a. Care should be taken to avoid accidental pricks from sharp instruments contaminated with potentially infectious materials from AIDS patients, c). Gloves should be worn when handling blood specimens and other body secretions as well as surfaces, materials, and objects exposed to them, d). Blood and other specimens should be labeled with the special warning “AIDS Precaution”, e). Blood spills should be cleaned immediately using common household disinfectants, like “Clorox”.: a). Needles should not be bent after use but should be disposed into a puncture-resistant container, b). Personal articles like razor or razor blades, and toothbrush should not be shared with other members of the family. Razor blades may be disposed of in the same manner as needles are disposed of, c). Patients with active AIDS should be isolated. (Belleza, R.N., 2023)

The Four C in the Management of HIV/AIDS

1. Compliance–giving of information and counseling the client which results to the client’s successful treatment, prevention and recommendation.
2. Counseling/Education: Giving instructions about the treatment, Disseminating information about the disease, Providing guidance on

how to avoid contracting STD again., Sharing facts about HIV and AIDS

3. Contact tracing: Tracing out and providing treatment or partners
4. Condoms: Promoting the use of condoms, giving instructions about their use, and giving away available condoms

Nursing Assessment

Nursing assessment includes the identification of potential risk factors, including a history of risky sexual practices or IV/injection drug use.

- **Nutritional status.** Nutritional status is assessed by obtaining a **diet history** and identifying factors that may affect the oral intake.
- **Skin integrity.** The skin and mucous membranes are inspected daily for evidence of breakdown, ulceration, or infection.
- **Respiratory status.** Respiratory status is assessed by monitoring the patient for cough, sputum production, shortness of breath, orthopnea, tachypnea, and chest pain.
- **Neurologic status.** Neurologic status is determined by assessing the level of consciousness; orientation to person, place, and time; and memory lapses.
- **Fluid and electrolyte balance.** F&E status is assessed by examining the skin and mucous membranes for turgor and dryness.
- **Knowledge level.** The patient's level of knowledge about the disease and the modes of disease transmission is evaluated.

DIAGNOSIS

The list of potential nursing diagnoses is extensive because of the complex nature of the disease.

- Impaired skin integrity related to cutaneous manifestations of HIV infection, excoriation, and diarrhea.
- **Diarrhea** related to enteric pathogens of HIV infection.
- Risk for infection related to immunodeficiency.

- **Activity intolerance** related weakness, fatigue, malnutrition, impaired F&E balance, and hypoxia associated with pulmonary infections.
- Disturbed thought processes related to shortened attention span, impaired memory, confusion, and disorientation associated with HIV encephalopathy.
- Ineffective airway clearance related to PCP, increased bronchial secretions, and decreased ability to cough related to weakness and fatigue.
- **Pain** related to impaired perianal skin integrity secondary to diarrhea, KS, and peripheral neuropathy.
- **Imbalanced nutrition, less than body requirements** related to decreased oral intake.

Planning & Goals

Nursing Care Plans

Goals for a patient with HIV/AIDS may include: 1). Achievement and maintenance of skin integrity, 2). Resumption of usual bowel pattern, 3). Absence of infection, 4). Improve activity intolerance, 5). Improve thought processes, 6). Improve airway clearance, 7). Increase comfort, 8). Improve nutritional status, 9). Increase socialization, 10). Absence of complications, 11). Prevent/minimize development of new infections, 12). Maintain homeostasis, 13). Promote comfort, 14). Support psychosocial adjustment, 15). Provide information about disease process/prognosis and treatment needs.

Nursing Interventions

The plan of care for a patient with AIDS is individualized to meet the needs of the patient may include: 1). **Promote skin integrity.** Patients are encouraged to avoid scratching; to use **nonabrasive, nondrying soaps** and apply **nonperfumed moisturizers**; to perform regular oral care; and to clean the perianal area after each bowel movement with nonabrasive soap and water, 2). **Promote usual bowel patterns.** The nurse should

monitor for frequency and consistency of stools and the patient's reports of abdominal pain or cramping, 3). **Prevent infection.** The patient and the caregivers should monitor for signs of infection and laboratory test results that indicate infection, 4). **Improve activity intolerance.** Assist the patient in planning daily routines that maintain a balance between activity and rest, 5). **Maintain thought processes.** Family and support network members are instructed to speak to the patient in simple, clear language and give the patient sufficient time to respond to questions, 6). **Improve airway clearance.** Coughing, deep breathing, postural drainage, percussion and vibration is provided for as often as every 2 hours to prevent stasis of secretions and to promote airway clearance, 7). **Relieve pain and discomfort.** Use of soft cushions and foam pads may increase comfort as well as administration of NSAIDS and **opioids**, 8). **Improve nutritional status.** The patient is encouraged to eat foods that are easy to swallow and to avoid rough, spicy, and sticky food items.

Evaluation

Expected patient outcomes may include: 1). Achieved and maintained of skin integrity, 2). Resumption of usual bowel pattern., 3). Absence of infection, 4). Improved activity intolerance, 5). Improved thought processes, 6). Improved airway clearance, 7). Increased comfort., 8). Improved nutritional status, 9). Increased socialization, 10). Absence of complications (Marianne Belleza, R.N.,2023).

Documentation Guidelines

The focus of documentation in a patient with HIV/AIDS should include: Characteristics of lesions or condition, Impact of condition in personal image and lifestyle, Assessment findings including characteristics and pattern of elimination, Individual risk factors including recent or current antibiotic therapy, Signs and symptoms of infectious process, Breath sounds, presence and character of secretions, use of accessory

muscles for breathing, Caloric intake, Individual cultural or religious restrictions and personal preferences.

- Plan of care.
- Teaching plan.
- Response to interventions, teaching, and actions performed.
- Attainment or progress toward desired outcomes.
- Modifications to plan of care.
- Long term needs.

Summary

AIDS results from the infection of HIV which has two forms: HIV-1 and HIV-2. Both forms have the same model of transmission and similar opportunistic infections associated with AIDS, but studies indicate that HIV-2 develops more slowly and presents with milder symptoms than HIV-1. Transmission occurs through contact with infected blood or body fluids and is associated with identifiable high-risk behaviors.

Persons with HIV/AIDS have been found to fall into five general categories: (1) homosexual or bisexual men, (2) injection drug users, (3) recipients of infected blood or blood products, (4) heterosexual partners of a person with HIV infection, and (5) children born to an infected mother. The rate of infection is most rapidly increasing among minority women and is increasingly a disease of persons of color. There is no cure yet for either HIV or AIDS. However, significant advances have been made to help patients control signs and symptoms and delay disease progression.

Nursing Management for Patients with HIV/AIDS (!)Health education–The healthcare worker must: Know the patient, Avoid fear tactics, and Avoid judgmental and moralistic messages. Be consistent and concise, Use positive statement, Give practical advice. (2) Practice universal/standard precaution: There is a need for a thorough medical handwashing after every contact with the patient and after removing the gown and gloves, and before leaving the room of an AIDS suspect or

known AIDS patient. Use of a universal barrier or Personal Protective Equipment (PPE) e.g., cap, mask, gloves, CD gown, face shield/goggles is very necessary. Prevention: Care should be taken to avoid accidental pricks from sharp instruments contaminated with potentially infectious materials from AIDS patient, Gloves should be worn when handling blood specimens and other body secretions as well as surfaces, materials, and objects exposed to them., Blood and other specimens should be labeled with a special warning "AIDS Precaution"., Blood spills should be cleaned immediately using common household disinfectants, like "Clorox"., Needles should not be bent after use, but should be disposed into a puncture-resistant container., Personal articles like razor or razor blades, toothbrushes should not be shared with other members of the family. Razor blades may be disposed of in the same manner as needles are disposed of., Patients with active AIDS should be isolated.

The Four C in the Management of HIV/AIDS: (1) Compliance—giving of information and counseling the client which results in the client's successful treatment, prevention, and recommendation, (2) Counseling/education: Giving instruction about the treatment, Disseminating information about the disease, Providing guidance on how to avoid contracting STD again, Sharing facts about HIV and AIDS. (3) Contact tracing: Tracing out and providing treatment or partners. (4) Condoms: Promoting the use of condoms: giving instructions about their use, and giving away available condoms

Review Questions

1. A widely used laboratory test that measures HIV-RNA levels and tracks the body's response to HIV infection is the:
 - A. CD4/CD8 ratio.
 - B. EIA test.
 - C. Viral load test.**
 - D. Western blot.

2. The most debilitating gastrointestinal condition found in up to 90% of all AIDS patients is:
- A. Anorexia.
 - B. Chronic diarrhea.**
 - C. Nausea.
 - D. Vomiting.
3. Abnormal laboratory findings seen with AIDS include:
- A. Decreased CD4 and T cell count.
 - B. P24 antigen.
 - C. Positive EIA test.
 - D. All of the above.**

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CHAPTER 6

NURSING CARE CONCEPTS FOR PATIENTS WITH PATHOLOGICAL OXYGEN DISORDERS OF THE RESPIRATORY AND CARDIOVASCULAR SYSTEM

Introduction

Abnormalities of gas exchange in patients are present in not only those with lung disease but also others, both during the surgical procedure and in the post-operative period. Pulmonary complications especially infection, atelectasis, and thromboembolism are frequent in postoperative patients. This is especially so in patients who are smokers, obese, aged (over 60 years), and/or with pre-existing lung disease. Hypoxemia with or without CO₂ retention may occur because of the problems of the ventilation-perfusion relationship and/or hypoventilation. Oxygen, along with other forms of treatment is required in all such patients with complications. When assessing a patient's oxygenation status, it is important for the nurse to have an understanding of the underlying structures of the respiratory system to best understand their assessment findings.

A patient's oxygenation status is routinely assessed using pulse oximetry, referred to as SpO₂ is an estimated oxygenation level based on the saturation of hemoglobin measured by a pulse oximeter. Because most of the oxygen carried in the blood is attached to hemoglobin within the red blood cell, SpO₂ estimates how much hemoglobin is "saturated" with oxygen. The target range of SpO₂ for an adult is 94-98%. For patients with chronic respiratory conditions, such as COPD, the target range for

SpO₂ is often lower at 88% to 92%. Although SpO₂ is an efficient, noninvasive method to assess a patient's oxygenation status, it is an estimate and not always accurate. For example, if a patient is severely anemic and has a decreased level of hemoglobin in the blood, the SpO₂ reading is affected. Decreased peripheral circulation can also cause a misleading low SpO₂ level. A patient's oxygenation status is routinely assessed using pulse oximetry.

When everything is working as it should, you have what is considered a normal presentation, or an assessment that is WDL (within defined limits.) In a healthy adult with healthy lungs this looks like a patient who is breathing without any signs of distress. Their breathing is unlabored at around 12-20 breaths per minute. You don't see any abnormal signs of increased respiratory effort such as nasal flaring or accessory muscle use. Their skin is a normal color for their race with no signs of pallor or cyanosis (blue-ish tinge to the skin). They are calm, not showing signs of anxiety, confusion or restlessness. When you listen to their lungs, their lung sounds are clear. Their voice is clear without signs of hoarseness and they are able to cough and swallow effectively. In other words, you don't see any imminent risk for airway occlusion due to airway edema or dysphagia.

SpO₂ is an estimated oxygenation level based on the saturation of hemoglobin measured by a pulse oximeter. Because the majority of oxygen carried in the blood is attached to hemoglobin within the red blood cell, SpO₂ estimates how much hemoglobin is "saturated" with oxygen. The target range of SpO₂ for an adult is 94-98%. For patients with chronic respiratory conditions, such as COPD, the target range for SpO₂ is often lower at 88% to 92%. Although SpO₂ is an efficient, noninvasive method to assess a patient's oxygenation status, it is an estimate and not always accurate. For example, if a patient is severely anemic and has a decreased level of hemoglobin in the blood, the SpO₂ reading is affected. Decreased peripheral circulation can also cause a misleading low SpO₂ level. A more specific measurement of oxygen and carbon dioxide in the blood is obtained through an Arteri Blood Gas results are often obtained

for patients who have deteriorating or unstable respiratory status requiring urgent and emergency treatment. An Arteri Blood Gas is a blood sample that is typically drawn from the radial artery by a respiratory therapist, emergency or critical care nurse, or health care provider. Arteri Blood Gas results evaluate oxygen, carbon dioxide, pH, and bicarbonate levels. The partial pressure of oxygen in the blood is referred to as.

Key Term

- Pathological Oxygen Disorders
- Respiratory System
- Cardiovascular System
- Upper Respiratory Tract Infections
- Chronic Obstructive Pulmonary Disease (COPD)
- Cor Pulmonale
- Pleural effusion
- Pulmonary Tuberculosis
- Coronary Artery Disease (CAD)
- Decompensatio Cordis
- Hypertension
- Anemia
- Peripheral vascular disease

Learning Objectives

- Identify the etiology, epidemiology, and pathophysiology of Upper Respiratory Tract Infections.
- Recall, analyze, and select appropriate history, physical, and evaluation of Upper Respiratory Tract Infections.
- Explain the treatment and management options available for Upper Respiratory Tract Infections.

- Identify the etiology, epidemiology, and pathophysiology of chronic obstructive pulmonary disease (Chronic Obstructive Pulmonary Disease (COPD)).
- Recall, analyze, and select appropriate history, physical, and evaluation of chronic obstructive pulmonary disease (Chronic Obstructive Pulmonary Disease (COPD)).
- Explain the treatment and management options available for chronic obstructive pulmonary disease (Chronic Obstructive Pulmonary Disease (COPD)).
- Identify the etiology, epidemiology, and pathophysiology of Cor Pulmonale.
- Recall, analyze, and select appropriate history, physical, and evaluation of Cor Pulmonale.
- Explain the treatment and management options available for Cor Pulmonale.
- Identify the etiology, epidemiology, and pathophysiology of Pleural effusion.
- Recall, analyze, and select appropriate history, physical, and evaluation of Pleural effusion.
- Explain the treatment and management options available for Pleural effusion.
- Identify the etiology, epidemiology, and pathophysiology of Pulmonary Tuberculosis.
- Recall, analyze, and select appropriate history, physical, and evaluation of Pulmonary Tuberculosis.
- Explain the treatment and management options available for Pulmonary Tuberculosis.
- Identify the etiology, epidemiology, and pathophysiology of Coronary Artery Disease (CAD)
- Recall, analyze, and select appropriate history, physical, and evaluation of Coronary Artery Disease (CAD).

- Explain the treatment and management options available for Coronary Artery Disease (CAD)
- Identify the etiology, epidemiology, and pathophysiology of Decompensatio Cordis.
- Recall, analyze, and select appropriate history, physical, and evaluation of Decompensatio Cordis.
- Explain the treatment and management options available for Decompensatio Cordis.
- Identify the etiology, epidemiology, and pathophysiology of Hypertension.
- Recall, analyze, and select appropriate history, physical, and evaluation of Hypertension.
- Explain the treatment and management options available for Hypertension.
- Identify the etiology, epidemiology, and pathophysiology of Anemia.
- Recall, analyze, and select appropriate history, physical, and evaluation of Anemia.
- Explain the treatment and management options available for Anemia.
- Identify the etiology, epidemiology, and pathophysiology of Peripheral vascular disorders.
- Recall, analyze, and select appropriate history, physical, and evaluation of Peripheral vascular disorders.
- Explain the treatment and management options available for Peripheral vascular disorders.

A. Nursing Care for Patients with Upper Respiratory Tract Infections

A. DEFINITION

Influenza(also known as flu, or grippe) is an acute inflammation of the nasopharynx, trachea, and bronchioles, with congestion, edema, and the possibility of necrosis of these respiratory structures. Influenza is a highly contagious airborne disease of the respiratory tract caused by three different types of *Myxovirus influenzae*. It occurs sporadically or in

epidemics which peaks usually during colder months. In tropical areas, influenza occurs throughout the year. The WHO estimates that 1 billion influenza cases, 3 to 5 million severe cases, and 290,000 to 650,000 influenza-related respiratory deaths occur each year worldwide (Nguyen & Stuart, 2022).

The presentation of influenza virus infection varies, but it usually overlaps with those of many other viral upper respiratory tract infections (URTI). Typical signs and symptoms include cough, fever, sore throat, myalgias, headache, nasal discharge, weakness and severe fatigue, tachycardia, and red, watery eyes. Influenza has been diagnosed traditionally on the basis of clinical criteria, but rapid diagnostic tests are becoming more widely used. The gold standard for diagnosing influenza A and B is a viral culture of nasopharyngeal samples or throat samples (Nguyen & Stuart, 2022).

B. NURSING MANAGEMENT

Nursing Care Plans

Unless complications occur, influenza doesn't require hospitalization and nursing care usually focuses on the prevention of the disease and relief of symptoms.

Here are six (6) nursing care plans (NCP) and nursing diagnosis (NDx) for Influenza (Flu):

1. Ineffective Airway Clearance
2. Ineffective Breathing Pattern
3. Hyperthermia
4. Acute Pain
5. Deficient Knowledge
6. Risk for Deficient Fluid Volume

Ineffective Airway Clearance

Viral respiratory tract infections are among the most common illnesses worldwide, and their severity widely varies from the common cold to severe respiratory tract infections. Influenza A virus causes seasonal respiratory infections, leading to half a million deaths annually. Only a few clinically effective vaccines or specific antiviral drugs are available for the prevention and treatment of viral respiratory infections. Thus, the mechanisms by which viruses are removed from the respiratory tract are indispensable for effective viral clearance and airway host defense. Mucociliary clearance is an important defense mechanism that requires coordinated ciliary activity and proper mucus production to propel airway surface liquids that trap pathogens and pollutants (Kamiya et al., 2020).

Nursing Diagnosis

- Ineffective Airway Clearance

May be related to

- Tracheobronchial and nasal secretions
- Increased peripheral airway resistance caused by drug therapy
- Pneumonia

Possibly evidenced by

- Rhinorrhea or “runny nose”
- Changes in respiratory rate and depth
- Irritating nonproductive cough
- Decreased breath sounds
- Adventitious breath sounds
- Production of sputum
- Restlessness
- Orthopnea

Desired Outcomes

- The client will achieve the return of and ability to maintain patent airways and respiratory status baselines.
- The client will have clear breath sounds to auscultation and will have respiratory status parameters with optimal air exchange.
- The client will be compliant and be able to accurately administer medications on a daily basis, preventing exacerbations of the disease process.
- The client will be able to cough up secretions and perform coughing and deep-breathing exercises.

Nursing Assessment and Rationales

1. Assess respiratory status for rate, depth, ease, use of accessory muscles, and work of breathing

Changes may vary from minimal to extreme caused by bronchial swelling, increased mucus secretions caused by over secretion of goblet cells and tracheobronchial infection, narrowing of air passageways, and the presence of other disease states complicate the current condition. Tachypnea, shallow respirations, and asymmetric chest movement are frequently present because of the discomfort of moving chest walls or secretions in the lung.

2. Auscultate the lung fields for the presence of wheezes, crackles (rales), rhonchi, or decreased breath sounds

Wheezing is caused by the squeezing of air past the narrowed airways during expiration which is caused by bronchospasms, edema, and secretions obstructing the airways. Crackles or rales, result from the consolidation of leukocytes and fibrin in the lung causing an infection or fluid accumulation in the lungs. Decreased breath sounds may indicate alveolar collapse with little to no air exchange in the lung area being auscultated and usually results in poor ventilation.

3. Monitor oxygen saturation by pulse oximetry and notify the healthcare provider of readings <90% or as prescribed

High-level oxygen can cause severe damage to tissues, oxygen toxicity, increases in A-a gradients, micro atelectasis, and ARDS. Oximetry readings of 90% are associated with increased morbidity and mortality and correlate with PaO₂ of 60 mmHg and levels below 60 mmHg, which indicate hypoxemia (Majumdar et al., 2011).

4. Assess the client for pallor or cyanosis, especially to nail beds and around the mouth

Although not a reliable indicator of the loss of airway patency, this may indicate hypoxemia. Oxygen might not reach hemoglobin in adequate or in sufficient amounts as a result of conditions affecting the respiratory system such as influenza (Adeyinka & Kondamudi, 2022). Cyanosis does not occur until a level of 5 grams of reduced hemoglobin/100 ml of blood in the superficial capillaries is reached.

5. Monitor the client for cough and production of sputum, noting amount, color, character, and the client's ability to expectorate secretions, and the ability to cough

Mucus color from yellow to green may indicate the presence of infection. Tenacious, thick secretions require more effort and energy to expectorate through coughing, and may actually create an obstruction stasis that leads to infection and respiratory changes. Cough and other respiratory symptoms initially may be minimal but frequently progress as the infection evolves. The client may report a nonproductive cough, or cough-related pleuritic chest pain, and dyspnea (Nguyen & Stuart, 2022).

6. Monitor the client's vital signs

Fever may vary widely among clients, with some having low fevers (in the 100°F [37.7°C]) and others developing fevers as high as 104°F. Some clients report feeling feverish and feeling chills. Tachycardia

may occur, which most likely results from hypoxia, fever, or both (Nguyen & Stuart, 2022).

7. Assess skin and mucous membrane changes

The skin may be warm to hot, depending on the core temperature status. A client who has been febrile with poor fluid intake may show signs of mild volume depletion with dry skin (Nguyen & Stuart, 2022).

8. Observe the client's general appearance and strength

Some clients appear acutely ill, with some weakness and respiratory findings, whereas others appear only mildly ill. The client's eyes may be red and watery. Weakness and severe fatigue may prevent the client from performing their normal activities or work. The client may also report needing additional sleep. In some cases, clients diagnosed with influenza may be bedridden (Nguyen & Stuart, 2022).

Nursing Interventions and Rationales

1. Position the client in a high Fowler or semi-Fowler position, if possible

One of the main goals of positioning, and specifically the use of upright positions, is to improve lung function in clients with respiratory disorders. A study found that forced expiratory volume in 1 second (FEV1) is higher in erect positions. Recumbent positions limit expiratory volumes and flow, which may reflect an increase in airway resistance, a decrease in elastic recoil of the lung, or decreased mechanical advantage of forced expiration, presumably affecting large airways (Katz et al., 2018).

2. Turn the client in every two hours and as needed

Repositioning promotes drainage of pulmonary secretions and enhances ventilation to decrease the potential for atelectasis. In side-lying positions, when the bed is flat, the abdominal contents fall forward. The dependent hemidiaphragm is stretched to a good

length for tension generation, while the non-dependent hemidiaphragm is more flattened. Changes in lung volumes may thus balance themselves out due to a better diaphragmatic contraction but decreased space in the thorax (Katz et al., 2018).

3. Encourage early ambulation and aerobic exercises as indicated

Early and protocol-based mobilization is important for functional recovery and shortening the length of hospital stay. Mobilization generally includes sitting on the edge of the bed, moving from the bed to the chair, standing next to the bed, walking on the spot, and walking with or without ambulatory assisting devices (Katz et al., 2018).

4. Perform postural drainage and percussion, as ordered

Postural drainage utilizes gravity to help raise secretions and clear sputum. Percussion and/or vibration may assist with the movement of secretions away from bronchial walls and enable the client to cough them up and increase the force of expiration. Some positions utilized during chest physiotherapy may be contraindicated in older adults as they may not tolerate intense percussion because of the fragility of bones and skin (Sereearuno et al., 2020).

5. Encourage fluids, up to three to four liters/day unless contraindicated

This provides hydration and helps to thin secretions for easier mobilization and removal. Fluids, especially warm fluids, aid in the mobilization and expectoration of secretions. The client must avoid extremely hot, or cold, beverages, however, because they may predispose the client to cough spells, leading to dyspnea or bronchospasms.

- 6. Encourage deep breathing exercises and coughing exercises every two hours. Instruct the client to splint the chest when performing coughing exercises.**

Deep breathing facilitates the maximum expansion of the lungs and smaller airways. This can restore atelectasis, improve oxygenation and lung recruitment, increase functional residual capacity and tidal volume, and potentially help clear secretions (Shin, 2019). Coughing is a natural self-cleaning mechanism, assisting the cilia to maintain patent airways. Splinting reduces chest discomfort, and an upright position favors deeper, more forceful cough effort.

- 7. Suction the client if needed, or if oxygen desaturation is present**

The client may be too weak or fatigued to remove their own secretions. Suctioning may also stimulate coughing or mechanically clear the airway in a client who is unable to do so because of an ineffective cough or decreased level of consciousness.

- 8. Instruct the client on alternative types of coughing exercises, such as quad thrusts or mechanical insufflation-exsufflation (MIE), if the client has difficulty during coughing**

This minimizes fatigue by assisting the client in increasing expiratory pressure and facilitating cough. MIE is a commonly used method to remove excessive sputum from clients who cannot effectively expectorate sputum due to an impaired cough. Manual techniques such as assistant cough or thoracoabdominal thrusts may be applied to facilitate sputum release (Shin, 2019).

- 9. Instruct the client on the use of incentive spirometry**

Incentive spirometry has been widely used to prevent pulmonary complications and to improve lung function in non-ambulatory clients. Deep breathing exercises can more effectively induce maximal inspiration when clients receive visual feedback through incentive spirometry. Generally, the client performs five to ten repetitions of a

sequence of performing deep breathing slowly, holding the breath for two to three seconds, and then exhaling slowly. If sputum needs to be released, it is expectorated by coughing at the end of the session (Shin, 2019).

10. Encourage the client to join smoking cessation programs

Smoking causes increased mucus production, vasoconstriction, increased blood pressure, inflammation of the lung lining, and decreased numbers of macrophages in the airways and mucociliary blanket.

11. Instruct the client to avoid crowds and persons with upper respiratory infections when possible

This prevents possible transmission of infection to the client who already is immunocompromised. Influenza A is generally more pathogenic than influenza B. Epidemics of influenza C have been reported, especially in young children (Nguyen & Stuart, 2022).

12. Place the client in droplet precaution interventions

Droplet precautions should be implemented for clients with suspected or confirmed influenza for seven days after illness onset or until 24 hours after the resolution of fever and respiratory symptoms, whichever is longer, while the client is admitted. The healthcare personnel entering the client's room must strictly wear a facemask and remove it when leaving the room (Centers for Disease Control and Prevention, 2021).

13. Administer antivirals as ordered

Antiviral treatment is recommended as soon as possible for clients with confirmed or suspected influenza who have severe, complicated, or progressive illnesses or who require hospitalization. For outpatient clients, antivirals are recommended if there is a confirmed or suspected risk for influenza complications on the basis of age or underlying medical conditions. Currently recommended

antiviral medications include oseltamivir, zanamivir, peramivir, and baloxavir marboxil (Nguyen & Stuart, 2022).

14. Administer influenza vaccine as prescribed

The influenza vaccine provides reasonable protection against immunized strains. The vaccination becomes effective 10 to 14 days after administration. It has a 50 to 60% efficacy against influenza B viruses and 70% efficacy against influenza A viruses. Vaccines against seasonal influenza are reformulated annually to contain the most recently circulating strains (Nguyen & Stuart, 2022).

Nursing Care for Patients with Chronic Obstructive Pulmonary Disease (COPD)

A. Definition

Chronic Obstructive Pulmonary Disease (Chronic Obstructive Pulmonary Disease (COPD) is a common and treatable disease characterized by progressive airflow limitation and tissue destruction. It is associated with structural lung changes due to chronic inflammation from prolonged exposure to noxious particles or gases most commonly cigarette smoke. Chronic inflammation causes airway narrowing and decreased lung recoil. The disease often presents with symptoms of cough, dyspnea, and sputum production. Symptoms can range from being asymptomatic to respiratory failure.

Chronic Obstructive Pulmonary Disease (COPD) is a disease characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lung to noxious particles or gases, resulting in narrowing of airways, hypersecretion of mucus, and changes in the pulmonary vasculature. Other diseases such as cystic fibrosis, bronchiectasis, and asthma that were previously classified as types of Chronic Obstructive Pulmonary Disease (COPD) are now classified as chronic pulmonary disorders, although symptoms may overlap with those

of Chronic Obstructive Pulmonary Disease (COPD). Cigarette smoking, air pollution, and occupational exposure (coal, cotton, grain) are important risk factors that contribute to Chronic Obstructive Pulmonary Disease (COPD) development, which may occur over a 20- to 30-year span. Complications of Chronic Obstructive Pulmonary Disease (COPD) vary but include respiratory insufficiency and failure (major complications) as well as pneumonia, atelectasis, and pneumothorax.

B. Etiology

Chronic Obstructive Pulmonary Disease (COPD) is caused by prolonged exposure to harmful particles or gases. Cigarette smoking is the most common cause of Chronic Obstructive Pulmonary Disease (COPD) worldwide. Other causes may include second-hand smoke, environmental and occupational exposures, and alpha-1 antitrypsin deficiency Alpha-1 Antitrypsin Deficiency (AATD).

C. Epidemiology

Chronic Obstructive Pulmonary Disease (COPD) is primarily present in smokers and those greater than age 40. Prevalence increases with age and it is currently the third most common cause of morbidity and mortality worldwide. In 2015, the prevalence of Chronic Obstructive Pulmonary Disease (COPD) was 174 million and there were approximately 3.2 million deaths due to Chronic Obstructive Pulmonary Disease (COPD) worldwide. However, the prevalence is likely to be underestimated due to the underdiagnosis of Chronic Obstructive Pulmonary Disease (COPD).

D. Pathophysiology

Chronic Obstructive Pulmonary Disease (COPD) is an inflammatory condition involving the airways, lung parenchyma, and pulmonary vasculature. The process is thought to involve oxidative stress and protease-antiprotease imbalances. Emphysema describes one of the structural changes seen in Chronic Obstructive Pulmonary Disease (COPD) where there is destruction of the alveolar air sacs (gas-exchanging

surfaces of the lungs) leading to obstructive physiology. In emphysema, an irritant (e.g., smoking) causes an inflammatory response. Neutrophils and macrophages are recruited and release multiple inflammatory mediators. Oxidants and excess proteases leading to the destruction of the air sacs. The protease-mediated destruction of elastin leads to a loss of elastic recoil and results in airway collapse during exhalation.

Alpha-1 antitrypsin deficiency is a rare cause of emphysema which involves a lack of antiproteases and the imbalance leaves the lung parenchyma at risk for protease-mediated damage. alpha-1 antitrypsin deficiency (Alpha-1 Antitrypsin Deficiency (AATD)) is caused by misfolding of the mutated protein which can accumulate in the liver. Alpha-1 Antitrypsin Deficiency (AATD) should be suspected in Chronic Obstructive Pulmonary Disease (COPD) patients who present with liver damage. As opposed to smoking-related emphysema, Alpha-1 Antitrypsin Deficiency (AATD) primarily involves the lower lobes.

The inflammatory response and obstruction of the airways cause a decrease in the forced expiratory volume (FEV1) and tissue destruction leads to airflow limitation and impaired gas exchange. Hyperinflation of the lungs is often seen on imaging studies and occurs due to air trapping from airway collapse during exhalation. The inability to fully exhale also causes elevations in carbon dioxide (CO₂) levels. As the disease progresses, impairment of gas exchange is often seen. The reduction in ventilation or increase in physiologic dead space leads to CO₂ retention. Pulmonary hypertension may occur due to diffuse vasoconstriction from hypoxemia.

Acute exacerbations of Chronic Obstructive Pulmonary Disease (COPD) are common and usually occur due to a trigger (e.g., bacterial or viral pneumonia, environmental irritants). There is an increase in inflammation and air trapping often requiring corticosteroid and bronchodilator treatment.

E. Clinical Manifestations

- Chronic Obstructive Pulmonary Disease (COPD) is characterized by chronic cough, sputum production, and dyspnea on exertion; often worsen over time.
- Weight loss is common.
- Symptoms are specific to the disease. See “Clinical Manifestations” under “Asthma,” “Bronchiectasis,” “Bronchitis,” and “Emphysema.”

Gerontologic Considerations

Chronic Obstructive Pulmonary Disease (COPD) accentuates many of the physiologic changes associated with aging and is manifested in airway obstruction (in bronchitis) and excessive loss of elastic lung recoil (in emphysema).

Additional changes in ventilation–perfusion ratios occur.

F. Medical Management

- Smoking cessation, if appropriate.
- Bronchodilators, corticosteroids, and other drugs (e.g., alpha1-antitrypsin augmentation therapy, antibiotic agents, mucolytic agents, antitussive agents, vasodilators, narcotics). Vaccines may also be effective.
- Oxygen therapy, including nighttime oxygen.
- Varied treatments are specific to the disease. See “Medical Management” under “Asthma,” “Bronchiectasis,” “Bronchitis,” and “Emphysema.”
- Surgery: bullectomy to reduce dyspnea; lung volume reduction to improve lobar elasticity and function; lung transplantation.

G. Nursing Management

Assessment

Obtain information about current symptoms as well as previous disease manifestations. In addition to the history, nurses review the results of available diagnostic tests.

Achieving Airway Clearance

- Monitor the patient for dyspnea and hypoxemia.
- If bronchodilators or corticosteroids are prescribed, administer the medications properly and be alert for potential side effects.
- Confirm relief of bronchospasm by measuring improvement in expiratory flow rates and volumes (the force of expiration, how long it takes to exhale, and the amount of air exhaled) as well as by assessing the dyspnea and making sure that it has lessened.
- Encourage patients to eliminate or reduce all pulmonary irritants, particularly cigarette smoking.
- Instruct the patient in directed or controlled coughing.
- Chest physiotherapy with postural drainage, intermittent positive pressure breathing, increased fluid intake, and bland aerosol mists (with normal saline solution or water) may be useful for some patients with Chronic Obstructive Pulmonary Disease (COPD).

Improving Breathing Patterns

- Inspiratory muscle training and breathing retraining may help improve breathing patterns. Chronic Obstructive Pulmonary Disease (Chronic Obstructive Pulmonary Disease (COPD))
- Training in diaphragmatic breathing reduces the respiratory rate, increases alveolar ventilation, and sometimes helps expel as much air as possible during expiration.
- Pursed-lip breathing helps slow expiration, prevent collapse of small airways, and control the rate and depth of respiration; it also promotes relaxation.

Improving Activity Tolerance

- Evaluate the patient's activity tolerance and limitations and use teaching strategies to promote independent activities of daily living.
- Determine if patient is a candidate for exercise training to strengthen the muscles of the upper and lower extremities and to improve exercise tolerance and endurance.

- Recommend use of walking aids, if appropriate, to improve activity levels and ambulation.
- Consult with other health care professionals (rehabilitation therapist, occupational therapist, physical therapist) as needed.

H. MONITORING AND MANAGING COMPLICATIONS

- Assess patient for complications (respiratory insufficiency and failure, respiratory infection, and atelectasis).
- Monitor for cognitive changes, increasing dyspnea, tachypnea, and tachycardia.
- Monitor pulse oximetry values and administer oxygen as prescribed.
- Instruct patient and family about signs and symptoms of infection or other complications and to report changes in physical or cognitive status.
- Encourage patient to be immunized against influenza and *Streptococcus pneumoniae*.
- Caution patient to avoid going outdoors if the pollen count is high or if there is significant air pollution and to avoid exposure to high outdoor temperatures with high humidity.
- If a rapid onset of shortness of breath occurs, quickly evaluate the patient for potential pneumothorax by assessing the symmetry of chest movement, differences in breath sounds, and pulse oximetry.

Nursing Care for Patients with Cor Pulmonale

A. Definition

Heart Failure (Cor Pulmonale)

Heart failure (HF), sometimes referred to as congestive Heart Failure, is the inability of the heart to pump sufficient blood to meet the needs of the tissues for oxygen and nutrients. Heart Failure is a clinical syndrome characterized by signs and symptoms of fluid overload or inadequate tissue perfusion. The underlying mechanism of Heart Failure involves impaired contractile properties of the heart (systolic dysfunction)

or filling of the heart (diastolic) that leads to a lower-than-normal cardiac output. The low cardiac output can lead to compensatory mechanisms that cause increased workload on the heart and eventual resistance to the filling of the heart. Heart Failure is a progressive, life-long condition that is managed with lifestyle changes and medications to prevent episodes of acute decompensated Heart Failure, which are characterized by an increase in symptoms, decreased CO, and low perfusion. Heart Failure results from a variety of cardiovascular conditions, including chronic hypertension, coronary artery disease, and valvular disease. These conditions can result in systolic failure, diastolic failure, or both. Several systemic conditions (e.g., progressive renal failure and uncontrolled hypertension) can contribute to the development and severity of the cardiac failure.

B. Clinical Manifestations

The signs and symptoms of Heart Failure can be related to which ventricle is affected. Left-sided Heart Failure (left ventricular failure) causes different manifestations than right-sided Heart Failure (right ventricular failure). In chronic Heart Failure, patients may have signs and symptoms of both left and right ventricular failure.

Left-Sided Heart Failure

Most often precedes right-sided cardiac failure.

- Pulmonary congestion: dyspnea, cough, pulmonary crackles, and low oxygen saturation levels; an extra heart sound, the S3, or “ventricular gallop,” may be detected on auscultation.
- Dyspnea on exertion (DOE), orthopnea, paroxysmal nocturnal dyspnea (PND).
- Cough is initially dry and nonproductive; may become moist over time.
- Large quantities of frothy sputum, which is sometimes pink (blood-tinged).
- Bibasilar crackles advance to crackles in all lung fields.

- Inadequate tissue perfusion.
- Oliguria and nocturia.
- With the progression of HF: altered digestion; dizziness, lightheadedness, confusion, restlessness, and anxiety; pale or ashen and cool and clammy skin.
- Tachycardia, weak, thready pulse; fatigue.

Right-Sided Heart Failure

- Congestion of the viscera and peripheral tissues
- Edema of the lower extremities (dependent edema), hepatomegaly (enlargement of the liver), ascites (accumulation of fluid in the peritoneal cavity), anorexia and nausea, and weakness and weight gain due to retention of fluid

Assessment and Diagnostic Methods

- Assessment of ventricular function
- Echocardiogram, chest x-ray, electrocardiogram (ECG)
- Laboratory studies: serum electrolytes, blood urea nitrogen (BUN), creatinine, thyroid-stimulating hormone (TSH), CBC count, brain natriuretic peptide (BNP), and routine urinalysis
- Cardiac stress testing, cardiac catheterization

C. Medical Management

The overall goals of the management of Heart Failure are to relieve patient symptoms, improve functional status and quality of life, and extend survival. Treatment options vary according to the severity of the patient's condition and may include oral and IV medications, major lifestyle changes, supplemental oxygen, implantation of assistive devices, and surgical approaches, including cardiac transplantation. Lifestyle recommendations include restriction of dietary sodium; avoidance of excessive fluid intake, alcohol, and smoking; weight reduction when indicated; and regular exercise.

D. Pharmacologic Therapy

- Alone or in combination: vasodilator therapy (angiotensin-converting enzyme [ACE] inhibitors), angiotensin II receptor blockers (ARBs), select beta-blockers, calcium channel blockers, diuretic therapy, cardiac glycosides (digitalis), and others
- IV infusions: nesiritide, milrinone, dobutamine
- Medications for diastolic dysfunction
- Possibly anticoagulants, medications that manage hyperlipidemia (statins)

E. Surgical Management

Coronary bypass surgery, percutaneous transluminal coronary angioplasty (PTCA), other innovative therapies as indicated (e.g., mechanical assist devices, transplantation)

F. Nursing Process the Patient with Heart Failure (Cor Pulmonale)

Assessment

The nursing assessment for the patient with Heart Failure focuses on observing the effectiveness of therapy and for the patient's ability to understand and implement self-management strategies. Signs and symptoms of pulmonary and systemic fluid overload are recorded and reported immediately.

- Note report of sleep disturbance due to shortness of breath, and number of pillows used for sleep.
- Ask the patient about edema, abdominal symptoms, altered mental status, activities of daily living, and the activities that cause fatigue.
- Respiratory: Auscultate lungs to detect crackles and wheezes. Note the rate and depth of respirations.
- Cardiac: Auscultate for S3 heart sound (sign heart beginning to fail); document heart rate and rhythm.
- Assess sensorium and LOC.

- Periphery: Assess dependent parts of the body for perfusion and edema and the liver for hepatjugular reflux; assess jugular venous distention.
- Measure intake and output to detect oliguria or anuria; weigh patient daily.

Diagnosis

Nursing Diagnoses

- Activity intolerance and fatigue related to decreased CO
- Excess fluid volume related to the Heart Failure syndrome
- Anxiety related to breathlessness from inadequate oxygenation
- Powerlessness related to chronic illness and hospitalizations
- Ineffective therapeutic regimen management related to lack of knowledge

Collaborative Problems/Potential Complications

- Hypotension, poor perfusion, and cardiogenic shock
- Dysrhythmias
- Thromboembolism
- Pericardial effusion and cardiac tamponade

G. Planning and Goals

Major goals for the patient may include promoting activity and reducing fatigue, relieving fluid overload symptoms, decreasing anxiety or increasing the patient's ability to manage anxiety, encouraging the patient to verbalize his or her ability to make decisions and influence outcomes, and teaching the patient about the self-care program.

Nursing Interventions

Promoting Activity Tolerance

- Monitor the patient's response to activities. Instruct patient to avoid prolonged bed rest; the patient should rest if symptoms are severe but otherwise should assume regular activity.

- Encourage the patient to perform an activity more slowly than usual, for a shorter duration, or with assistance initially.
- Identify barriers that could limit the patient's ability to perform an activity, and discuss methods of pacing an activity (e.g., chop or peel vegetables while sitting at the kitchen table rather than standing at the kitchen counter).
- Take vital signs, especially pulse, before, during, and immediately after an activity to identify whether they are within the predetermined range; heart rate should return to baseline within 3 minutes. If patient tolerates the activity, develop short-term and long-term goals to increase gradually the intensity, duration, or frequency of activity.
- Refer to a cardiac rehabilitation program as needed, especially for patients with a recent myocardial infarction, recent open-heart surgery, or increased anxiety.

Reducing Fatigue

- Collaborate with patients to develop a schedule that promotes pacing and prioritization of activities. Encourage the patient to alternate activities with periods of rest and avoid having two significant energy-consuming activities occur on the same day or in immediate succession.
- Explain that small, frequent meals tend to decrease the amount of energy needed for digestion while providing adequate nutrition.
- Help the patient develop a positive outlook focused on strengths, abilities, and interests.

Managing Fluid Volume

- Administer diuretics early in the morning so that diuresis does not disturb nighttime rest.
- Monitor fluid status closely: Auscultate lungs, compare daily body weights and monitor intake and output.

- Teach the patient to adhere to a low-sodium diet by reading food labels and avoiding commercially prepared convenience foods.
- Assist the patient to adhere to any fluid restriction by planning the fluid distribution throughout the day while maintaining dietary preferences.
- Monitor IV fluids closely; contact the physician or pharmacist about the possibility of double-concentrating any medications.
- Position the patient, or teach the patient how to assume a position, that facilitates breathing (increase the number of pillows, elevate the head of bed), or the patient may prefer to sit in a comfortable armchair to sleep.
- Assess for skin breakdown, and institute preventive measures (frequent changes of position, positioning to avoid pressure, leg exercises).

Controlling Anxiety

- Decrease anxiety so that the patient's cardiac work is also decreased.
- Administer oxygen during the acute stage to diminish the work of breathing and to increase comfort.
- When a patient exhibits anxiety, promote physical comfort and psychological support; a family member's presence may provide reassurance; pet visitation or animal-assisted therapy can also be beneficial.
- When a patient is comfortable, teach ways to control anxiety and avoid anxiety-provoking situations (relaxation techniques).
- Assist in identifying factors that contribute to anxiety.
- Screen for depression, which often accompanies or results from anxiety.

Monitoring and Managing Potential Complications

Many potential problems associated with Heart Failure therapy relate to the use of diuretics: 1). Monitor for hypokalemia caused by diuresis (potassium depletion). Signs are ventricular dysrhythmias,

hypotension, muscle weakness, and generalized weakness, 2). Monitor for hyperkalemia, especially with the use of ACE inhibitors, ARBs, or spironolactone, 3). Hyponatremia (deficiency of sodium in the blood) can occur, which results in disorientation, apprehension, weakness, fatigue, malaise, and muscle cramps, 4). Volume depletion from excessive fluid loss may lead to dehydration and hypotension (ACE inhibitors and beta blockers may contribute to the hypotension), 5). Other problems associated with diuretics include increased serum creatinine and hyperuricemia (excessive uric acid in the blood) that leads to gout.

H. Promoting Home-and Community-Based Care

Teaching Patients Self-Care

- Provide patient education, and involve the patient in implementing the therapeutic regimen to promote understanding and compliance.
- Support patient and family, and encourage them to ask questions so that information can be clarified and understanding enhanced.
- Adapt the teaching plan according to cultural factors.
- Teach patients and families how the progression of the disease is influenced by compliance with the treatment plan.

I. Evaluation

Expected Patient Outcomes

- Demonstrates tolerance for increased activity.
- Maintains fluid balance.
- Experiences less anxiety.
- Makes sound decisions regarding care and treatment.
- Adheres to self-care regimen.

A. Definition

It is a collection of fluid in the pleural space of the lungs. Fluid normally resides in the pleural space and acts as a lubricant for the pleural membranes to slide across one another when we breathe. Fluid is constantly being added and reabsorbed by capillaries and lymph vessels in the pleura. When this recycling process is interrupted, pleural effusion can result.

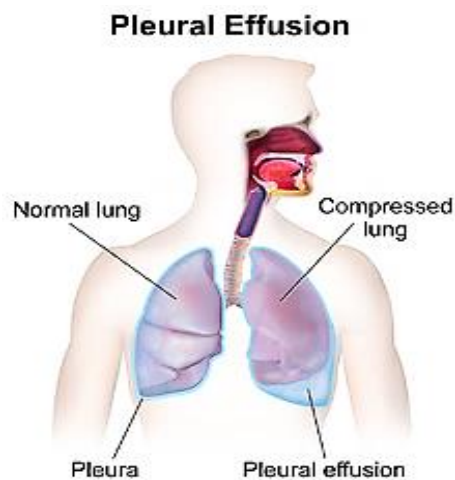


Figure 12 Pleural Effusion (Wikipedia)

Pleural effusion is characterized by the accumulation of excess fluid between the lining of the chest wall and the lining of the lungs, known as the pleural space. Normally, there is a minimal amount of fluid in the pleural space that acts as lubrication to facilitate breathing.

The seriousness of the condition will depend on the cause and symptoms. Common causes of pleural effusion include infection, pneumonia, congestive heart failure, cancer, and diseases of the kidneys or liver.

Symptoms of pleural effusion include shortness of breath, chest pain and tightness, dry cough, activity intolerance, and orthopnea. A chest x-ray or CT scan can help diagnose pleural effusion and treatment depends on the underlying cause and the severity of symptoms.

B. Causes

Physicians determine the cause of the effusion based on the type of fluid that is *accumulating*.: 1). **Transudative (watery fluid) effusions**: Heart failure, pulmonary embolism, cirrhosis, post open heart surgery, trauma, 2). **Exudative (protein-rich fluid) effusions**: Pneumonia, cancers, pulmonary embolism, kidney disease, inflammatory diseases.

Pleural fluid may be bloody (hemorrhagic), chylous (thick and white), rich in cholesterol, or purulent.

C. Signs and Symptoms

(Small effusions may not present with symptoms and may only be found via chest X-ray. Larger effusions can cause symptoms such as:1). Decreased lung expansion, 2). Dyspnea, 3). Dry, non-productive cough, 4). Tactile fremitus, 5). Orthopnea, 6). Tachycardia

D. Diagnostic Procedures

- Chest x-ray
- CT scan of the chest
- Ultrasound of the chest
- Thoracentesis
- Pleural fluid analysis via thoracentesis

E. Medical Management

- Thoracentesis
- Pleurectomy—consists of surgically stripping the parietal pleura from the visceral pleura. This produces an inflammatory reaction that causes adhesion formation between the two layers as they heal.

- Pleurodesis—involves the instillation of a sclerosing agent (talc, doxycycline, or tetracycline) into the pleural space via a thoracotomy tube. These agents cause the pleura to sclerose together.

F. Nursing Interventions for Pleural Effusions

1. Identify and treat the underlying cause.
2. Monitor breath sounds.
3. Place the client in a high Fowler's position.
4. Encourage coughing and deep breathing.
5. Prepare the client for thoracentesis.
6. If pleural effusion is recurrent, prepare the client for pleurectomy or pleurodesis as prescribed.

G. The Nursing Process

Treatment may come in the form of antibiotics for infection or diuretics for congestive heart failure which the nurse will administer.

For more severe respiratory distress, procedures that help drain excess fluid may be indicated. Such procedures include thoracentesis, tube thoracostomy (chest tube), pleurodesis, or pleural drains. Nurses are responsible for the assessment and monitoring of the patient before and after these procedures.

Nurses can support patients through education by teaching infection prevention measures, how to manage chronic conditions, when to seek emergency support for symptoms, and how to take their medications.

H. Nursing Care Plans Related to Pleural Effusion

Ineffective Breathing Pattern Care Plan

An ineffective breathing pattern occurs when the lungs are not able to expand effectively during inspiration and/or expiration to provide adequate ventilation. This often happens to patients with pleural effusion as there is increased pressure in the lungs due to the excess fluid buildup

in the pleural space, making breathing difficult. With an ineffective breathing pattern, the body will not get adequate oxygen.

Nursing Diagnosis: Ineffective Breathing Pattern

Related to:

- Exudative pleural effusion
- Compromised lung expansion
- Excess fluid buildup in the pleura secondary to infection, inflammation, cardiac disease, or pulmonary disease

As evidenced by: Labored breathing, Dyspnea, increased pain upon inhalation, Oxygen saturation of less than 90%, Tachypnea

Expected Outcomes: a). The patient will achieve an effective breathing pattern as evidenced by a respiratory rate of 12-20 bpm and oxygen saturation above 95%, b). The patient will verbalize ease of breathing

Ineffective Breathing Pattern Assessment

1. Assess the patient's respiration characteristics and vital signs.
Assessing the rate and depth of breathing along with O₂ saturation, pulse, and blood pressure are necessary to monitor for changes or worsening in respiratory status.
2. Review the patient's underlying condition.
Understanding the patient's underlying condition is essential to providing appropriate interventions.

Ineffective Breathing Pattern Interventions

1. Administer medications as prescribed.
The patient may be prescribed antibiotics to treat pneumonia or diuretics for congestive heart failure.

2. Administer oxygen therapy as prescribed.

Providing supplemental oxygen is essential to prevent cellular hypoxia caused by low oxygen secondary to ineffective breathing patterns.

3. Elevate the patient's HOB.

Elevating the head of the bed can improve lung expansion and help open up the airways enabling air to pass through with less obstruction making it easier to breathe.

4. Prepare for surgery/procedure as ordered.

Depending on the cause, pleural effusion may require placing a pleural drain or chest tube or performing procedures like pleurodesis. Nurses may perform some of these skills or may monitor the patient post-procedure for complications.

Acute Pain Care Plan

Acute pain in pleural effusion is caused by pleural inflammation of the parietal pleura which results from the movement-related friction between the two pleural surfaces. This type of pain is also referred to as pleuritic chest pain.

The pain is often characterized as sharp and is exacerbated by movement of the pleural spaces, as with coughing, sneezing, and deep inspiration.

Nursing Diagnosis: Acute Pain

Related to: Inflammation and swelling of the pleura

As evidenced by: a). Reports of sharpness or burning in the chest, b). Guarding the chest, c). Worsening pain upon inhalation, d). Shallow breathing

Expected Outcomes: a). The patient will report a decrease in pain when breathing as evidenced by a pain rating of 2 or less and a relaxed, unlabored respiratory rhythm, b). The patient will complete activities of daily living without complaints of respiratory discomfort.

Acute Pain Assessment

1. Assess the patient's pain level, characteristics, and location.
Pleuritic pain must be differentiated from other types of chest pain to provide appropriate treatment. Assessing pain on a 0-10 numeric scale will provide information on the effectiveness of interventions.
2. Observe nonverbal cues and pain behaviors.
Pleuritic pain may cause patients to position themselves a certain way, decrease movement or ambulation, and restrict breathing, all of which cause deconditioning. The nurse should monitor for pain behaviors and intervene to prevent worsening complications.

Acute Pain Interventions

1. Administer prescribed pain medications.
Nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen may decrease inflammation causing pleuritic chest pain.
2. Provide nonpharmacologic methods of pain relief.
Nonpharmacologic interventions like repositioning, guided imagery, and splinting the chest when coughing help manage pain and reduce stress. Also, this will help lower the dose of pain medication needed with decreased side effects.
3. Provide rest and simplify ADLs.
Pain may worsen when moving or performing tasks that take great effort. Rest frequently and do not overdo activities that will increase the work of breathing.
4. Educate the patient on deep breathing exercises.
Deep breathing exercises can help avoid ineffective shallow breathing, which is a natural response when experiencing pleuritic pain. Deep breathing can strengthen the lungs and improve oxygenation.

Impaired Gas Exchange Care Plan

The respiratory system is responsible for gas exchange—supplying oxygen to tissues and removing carbon dioxide. Pleural effusion affects the cardiorespiratory system and alters the ventilation-perfusion mechanism, causing reduced efficiency of the inspiratory muscles, restrictive ventilatory effect, and abnormal gas exchange.

Nursing Diagnosis: Impaired Gas Exchange

Related to: a). Altered oxygen supply, b). Decreased function of lung tissue.

As evidenced by: Lethargy, Dyspnea, Abnormal ABGs, Restlessness, Changes in mental status, Tachycardia

Expected Outcomes: a). The patient will exhibit improved gas exchange as evidenced by ABGs within normal limits, b). The patient will be able to maintain optimal gas exchange as evidenced by unlabored breathing and respiratory rate within normal limits.

Impaired Gas Exchange Assessment

1. Auscultate lung sounds.

An initial assessment will help provide baseline information and ongoing assessments will determine changes in the patient's condition. Gas exchange is affected by shallow and rapid breathing patterns. Note areas of diminished breath sounds or fremitus.

2. Review laboratory values and imaging results.

Arterial blood gases (ABGs) measure oxygenation and acid-base balance in the blood which can help assess the patient's respiratory status and prevent respiratory distress. Chest x-rays can help determine the size and location of the pleural effusion.

3. Assess and monitor the patient's oxygen saturation.

A drop in oxygen saturation indicates respiratory insufficiency. For most individuals, oxygen saturation should be kept at 95% or greater.

Impaired Gas Exchange Interventions

1. Consider lateral positioning.

Elevating the head of the bed to 45 degrees and positioning the patient in a lateral position has been shown to increase O₂ saturation and decrease respiratory rate in those with unilateral pleural effusions.

2. Provide supplemental oxygen as ordered.

Supplemental oxygen therapy may be necessary to maintain adequate oxygenation. Do not over-oxygenate.

3. Encourage ambulation.

Ambulation significantly improves chest expansion and the mobilization and drainage of secretions. Do not overexert to the point of dyspnea.

4. Provide support to reduce anxiety.

Dyspnea can cause anxiety and panic. These feelings can exacerbate shortness of breath. Provide a calming, supportive environment and reassure the patient.

5. Prepare the patient for indicated procedures.

Surgical interventions like thoracentesis, pleurodesis, or chest tube insertion may be indicated if the patient's condition worsens. The nurse can educate the patient on what to expect with these treatments and how they alleviate symptoms.

Nursing Care for Patients with Pulmonary Tuberculosis

A. Definition

- Tuberculosis is an infectious disease that primarily affects the lung parenchyma.
- Pulmonary tuberculosis (PTB) is an acute or chronic infection caused by *Mycobacterium tuberculosis*. PTB is characterized by pulmonary

infiltrates, the formation of granulomas with caseation, fibrosis, and cavitation. The lungs are the most common site for the development of TB; 85% of clients diagnosed with TB present with pulmonary symptoms. The World Health Organization has estimated that 2 billion people have latent TB and that globally, in 2009, the disease killed 1.7 million people (Herchline & Stuart, 2020).

Humans are the only known reservoir for *M. tuberculosis*. The organism is spread primarily as an airborne aerosol from an individual who is in the infectious stage of TB. People living in crowded and poorly ventilated conditions and who are immunocompromised are most likely to become infected. In the United States, the incidence is higher among the homeless, drug-addicted, and impoverished populations, as well as among immigrants from or visitors to countries in which TB is endemic. In addition, persons at the highest risk include those who may have been exposed to the bacillus in the past and those who are debilitated or have lowered immunity because of chronic conditions such as AIDS, cancer, advanced age, and malnutrition. When the immune system weakens, dormant TB organisms can reactivate and multiply.

Classic clinical features associated with active pulmonary TB include cough, weight loss or anorexia, fever, night sweats, hemoptysis, chest pain, and fatigue. Additionally, clients diagnosed with PTB have abnormal breath sounds, especially over the upper lobes or involved areas. Rales or bronchial breath signs may be noted, indicating lung consolidation (Herchline & Stuart, 2020).

When this latent infection develops into an active disease, it is known as reactivation TB, which is often drug resistant. Multidrug-resistant tuberculosis (MDR-TB) is also on the rise, especially in large cities, in those previously treated with antitubercular drugs, or in those who failed to follow or complete a drug regimen. It can progress from diagnosis to death in as little as 4–6 weeks. MDR tuberculosis can be primary or secondary. Primary is caused by person-to-person

transmission of a drug-resistant organism; secondary is usually the result of nonadherence to therapy or inappropriate treatment.

Pulmonary tuberculosis (PTB) is a chronic respiratory disease common among crowded and poorly ventilated areas.

- An acute or chronic infection caused by *Mycobacterium tuberculosis*, tuberculosis is characterized by pulmonary infiltrates, formation of granulomas with caseation, fibrosis, and cavitation.
- Tuberculosis is an infectious disease that primarily affects the lung parenchyma.
- It also may be transmitted to other parts of the body, including the meninges, kidneys, bones, and lymph nodes.
- The primary infectious agent, *M. tuberculosis*, is an acid-fast aerobic rod that grows slowly and is sensitive to heat and ultraviolet light.

B. Pathophysiology

Tuberculosis is a highly infectious, airborne disease.

- Inhalation. Tuberculosis begins when a susceptible person inhales mycobacteria and becomes infected.
- Transmission. The bacteria are transmitted through the airways to the alveoli, and are also transported via lymph system and bloodstream to other parts of the body.
- Defense. The body's immune system responds by initiating an inflammatory reaction and phagocytes engulf many of the bacteria, and TB-specific lymphocytes lyse the bacilli and normal tissue.
- Protection. Granulomas new tissue masses of live and dead bacilli, are surrounded by macrophages, which form a protective wall.
- Ghon's tubercle. They are then transformed to a fibrous tissue mass, the central portion of which is called a Ghon tubercle.

- Scarring. The bacteria and macrophages turns into a cheesy mass that may become calcified and form a collagenous scar.
- Dormancy. At this point, the bacteria become dormant, and there is no further progression of active disease.
- Activation. After initial exposure and infection, active disease may develop because of a compromised or inadequate immune system response.
- Pathophysiology and Schematic Diagram for Pulmonary Tuberculosis

C. Classification

Data from the history, physical examination, TB test, chest x-ray, and microbiologic studies are used to classify TB into one of five classes.

- Class 0. There is no exposure or no infection.
- Class 1. There is an exposure but no evidence of infection.
- Class 2. There is latent infection but no disease.
- Class 3. There is a disease and is clinically active.
- Class 4. There is a disease but not clinically active.
- Class 5. There is a suspected disease but the diagnosis is pending.

D. Statistics and Incidences

Tuberculosis is a worldwide public health problem that is closely associated with poverty, malnutrition, overcrowding, substandard housing, and inadequate health care.

- *M. tuberculosis* infects an estimated one-third of the world's population and remains the leading cause of death from infectious disease in the world.
- According to the WHO, an estimated 1.6 million deaths resulted from TB in 2005.
- In the United States, almost 15,000 cases of TB are reported annually to the CDC.
- After exposure to *M. tuberculosis*, roughly 5% of infected people develop active TB within a year.

E. Causes

Causes of acquiring tuberculosis include the following:

- Close contact. Having close contact with someone who has an active TB.
- Low immunity. Immunocompromised status like those with HIV, cancer, or transplanted organs increases the risk of acquiring tuberculosis.
- Substance abuse. People who are IV/injection drug users and alcoholics have a greater chance of acquiring tuberculosis.
- Inadequate health care. Any person without adequate health care like the homeless, impoverished, and the minorities often develop active TB.
- Immigration. Immigration from countries with a high prevalence of TB could affect the patient.
- Overcrowding. Living in an overcrowded, substandard housing increases the spreading of the infection.

F. Clinical Manifestations

After an incubation period of 4 to 8 weeks, TB is usually asymptomatic in primary infection.

- Nonspecific symptoms. Nonspecific symptoms may be produced such as fatigue, weakness, anorexia, weight loss, night sweats, and low-grade fever, with fever and night sweats as the typical hallmarks of tuberculosis.
- Cough. The patient may experience cough with mucopurulent sputum.
- Hemoptysis. Occasional hemoptysis or blood on the saliva is common in TB patients.
- Chest pains. The patient may also complain of chest pain as a part of discomfort.

G. Prevention

To prevent transmission of tuberculosis, the following should be implemented.

- Identification and treatment. Early identification and treatment of persons with active TB.
- Prevention. Prevention of spread of infectious droplet nuclei by source control methods and by reduction of microbial contamination of indoor air.
- Surveillance. Maintain surveillance for TB infection among health care workers by routine, periodic tuberculin skin testing.

H. Complications

If left untreated or mistreated, pulmonary tuberculosis may lead to:

- Respiratory failure. Respiratory failure is one of the most common complication of pulmonary tuberculosis.
- Pneumothorax. Pneumothorax becomes a complication when tuberculosis is not treated properly.
- Pneumonia. One of the most fatal complications of tuberculosis is pneumonia as it could cause infection all over the lungs.

I. Assessment and Diagnostic Findings

To diagnose tuberculosis, the following tests could be performed:

- Sputum culture: Positive for *Mycobacterium tuberculosis* in the active stage of the disease.
- Ziehl-Neelsen (acid-fast stain applied to a smear of body fluid): Positive for acid-fast bacilli (AFB).
- Skin tests (purified protein derivative [PPD] or Old tuberculin [OT] administered by intradermal injection [Mantoux]): A positive reaction (area of induration 10 mm or greater, occurring 48–72 hr after intradermal injection of the antigen) indicates past infection and the presence of antibodies but is not necessarily indicative of active disease. Factors associated with a decreased response to tuberculin include underlying viral or bacterial infection,

malnutrition, lymphadenopathy, overwhelming TB infection, insufficient antigen injection, and conscious or unconscious bias. A significant reaction in a patient who is clinically ill means that active TB cannot be dismissed as a diagnostic possibility. A significant reaction in healthy persons usually signifies dormant TB or an infection caused by a different mycobacterium.

- Enzyme-linked immunosorbent assay (ELISA)/Western blot: This may reveal the presence of HIV.
- Chest x-ray: May show small, patchy infiltrations of early lesions in the upper-lung field, calcium deposits of healed primary lesions, or fluid of an effusion. Changes indicating more advanced TB may include cavitation, and scar tissue/fibrotic areas.
- CT or MRI scan: Determines degree of lung damage and may confirm a difficult diagnosis.
- Bronchoscopy: Shows inflammation and altered lung tissue. May also be performed to obtain sputum if a patient is unable to produce an adequate specimen.
- Histologic or tissue cultures (including gastric washings; urine and cerebrospinal fluid [CSF]; skin biopsy): Positive for *Mycobacterium tuberculosis* and may indicate extrapulmonary involvement.
- Needle biopsy of lung tissue: Positive for granulomas of TB; the presence of giant cells indicating necrosis.
- Electrolytes: These may be abnormal depending on the location and severity of infection; e.g., hyponatremia caused by abnormal water retention may be found in extensive chronic pulmonary TB.
- ABGs: These may be abnormal depending on location, severity, and residual damage to the lungs.
- Pulmonary function studies: Decreased vital capacity, increased dead space, increased ratio of residual air to total lung capacity, and decreased oxygen saturation are secondary to parenchymal infiltration/fibrosis, loss of lung tissue, and pleural disease (extensive chronic pulmonary TB).

J. Medical Management

Pulmonary tuberculosis is treated primarily with antituberculosis agents for 6 to 12 months.

- First-line treatment. First-line agents for the treatment of tuberculosis are isoniazid (INH), rifampin (RIF), ethambutol (EMB), and pyrazinamide.
- Active TB. For most adults with active TB, the recommended dosing includes the administration of all four drugs daily for 2 months, followed by 4 months of INH and RIF.
- Latent TB. Latent TB is usually treated daily for 9 months.
- Treatment guidelines. Recommended treatment guidelines for newly diagnosed cases of pulmonary TB have two parts: an initial treatment phase and a continuation phase.
- Initial phase. The initial phase consists of a multiple-medication regimen of INH, rifampin, pyrazinamide, and ethambutol and lasts for 8 weeks.
- Continuation phase. The continuation phase of treatment include INH and rifampin or INH and rifapentine, and lasts for an additional 4 or 7 months.
- Prophylactic isoniazid. Prophylactic INH treatment involves taking daily doses for 6 to 12 months.
- DOT. Directly observed therapy may be selected, wherein an assigned caregiver directly observes the administration of the drug.

K. Pharmacologic Therapy

The first line antituberculosis medications include:

- Isoniazid (INH). INH is a bactericidal agent that is used as prophylaxis for neuritis, and has side effects of peripheral neuritis, hepatic enzyme elevation, hepatitis, and hypersensitivity.
- Rifampin (Rifadin). Rifampin is a bactericidal agent that turns the urine and other body secretions into pasiene or red, and has

common side effects of hepatitis, febrile reaction, purpura, nausea, and vomiting.

- Pyrazinamide. Pyrazinamide is a bactericidal agent which increases the uric acid in the blood and has common side effects of hyperuricemia, hepatotoxicity, skin rash, arthralgias, and GI distress.
- Ethambutol (Myambutol). Ethambutol is a bacteriostatic agent that should be used with caution with renal disease, and has common side effects of optic neuritis and skin rash.

L. Nursing Management

Nursing management includes the following:

Nursing Assessment

The nurse may assess the following:

- Complete history. Past and present medical history is assessed as well as both of the parents' histories.
- Physical examination. A TB patient loses weight dramatically and may show the loss in physical appearance.

M. Nursing Diagnosis

Based on the assessment data, the major nursing diagnoses for the patient include:

- Risk for infection related to inadequate primary defenses and lowered resistance.
- Ineffective airway clearance related to thick, viscous, or bloody secretions.
- Risk for impaired gas exchange related to decrease in effective lung surface.
- Activity intolerance related to imbalance between oxygen supply and demand.
- Imbalanced nutrition: less than body requirements related to inability to ingest adequate nutrients.

Nursing Care Planning & Goals

Main Article: [5 Pulmonary Tuberculosis Nursing Care Plans](#)

The major goals for the patient include:

- Promote airway clearance.
- Adhere to treatment regimen.
- Promote activity and adequate nutrition.
- Prevent spread of tuberculosis infection.

Nursing Interventions

Nursing interventions for the patient include:

- Promoting airway clearance. The nurse instructs the patient about correct positioning to facilitate drainage and to increase fluid intake to promote systemic hydration.
- Adherence to the treatment regimen. The nurse should teach the patient that TB is a communicable disease and taking medications is the most effective means of preventing transmission.
- Promoting activity and adequate nutrition. The nurse plans a progressive activity schedule that focuses on increasing activity tolerance and muscle strength and a nutritional plan that allows for small, frequent meals.
- Preventing spreading of tuberculosis infection. The nurse carefully instructs the patient about important hygienic measures including mouth care, covering the mouth and nose when coughing and sneezing, proper disposal of tissues, and handwashing.
- Acid-fast bacillus isolation. Initiate AFB isolation immediately, including the use of a private room with negative pressure in relation to surrounding areas and a minimum of six air changes per hour.
- Disposal. Place a covered trash can nearby or tape a lined bag to the side of the bed to dispose of used tissues.
- Monitor adverse effects. Be alert for adverse effects of medications.

N. Evaluation

Expected patient outcomes include:

- Promoted airway clearance.
- Adhered to treatment regimen.
- Promoted activity and adequate nutrition.
- Prevented spread of tuberculosis infection.

Nursing Care for Patients with Coronary Artery Disease (CAD)

A. Definition

Coronary atherosclerosis is the most common cause of cardiovascular disease in the United States and is characterized by an abnormal accumulation of lipid or fatty substances and fibrous tissue in the vessel wall. These substances block or narrow the vessel, reducing blood flow to the myocardium. Atherosclerosis involves a repetitive inflammatory response to injury of the artery wall and subsequent alteration in the structural and biochemical properties of the arterial walls.

Coronary Artery Disease (CAD) is a term used to describe conditions that affect the arteries that provide nutrients, blood, and oxygen to the heart.

Atherosclerosis, a known cause of Coronary Artery Disease (CAD), is characterized by lipid deposits within the walls of the arteries. These plaques narrow arteries, obstructing blood flow. It increases the risk of angina and myocardial infarction.

Coronary Artery Disease (CAD) is a progressive disease that develops over time. The condition is often advanced before the patient exhibits symptoms like angina, shortness of breath, and fatigue.

When blood flow through the coronary arteries becomes partially or completely blocked, ischemia and infarction in the heart muscles occur. When insufficient blood and oxygen supply (ischemia) to the myocardium, decreased tissue perfusion and necrosis (infarction) will develop, requiring immediate intervention.

B. Risk Factors Modifiable

- High blood cholesterol (hyperlipidemia), Cigarette smoking, tobacco use, Elevated blood pressure, Hyperglycemia (diabetes mellitus), Metabolic syndrome, Obesity, Physical inactivity

C. Not Modifiable

- Positive family history (a first-degree relative with cardiovascular disease at age 55 years or younger for males and at age 65 years or younger for females), Age (more than 45 years for men, more than 55 years for women), Gender (men develop cardiovascular disease at an earlier age than do women), Race (higher incidence in African Americans than in Caucasians)

D. Clinical Manifestations

Symptoms and complications develop according to the location and degree of narrowing of the arterial lumen, thrombus formation, and obstruction of blood flow to the myocardium.

Symptoms include the following:

- Ischemia, Chest pain: angina pectoris, Atypical symptoms of myocardial ischemia (shortness of breath, nausea, and weakness), Myocardial infarction, Dysrhythmias, sudden death

Assessment and Diagnostic Methods

Identification of risk factors for coronary heart disease (CHD) primarily involves taking a thorough history, including family history, physical examination (note blood pressure and weight),

and laboratory work (e.g., cholesterol levels [low-density lipoprotein (LDL) to high-density lipoprotein (HDL)], glucose).

Prevention

The major management goal is prevention of CHD. Four modifiable risk factors—cholesterol abnormalities, tobacco use, hypertension, and diabetes mellitus, Cushing Syndrome as a major risk

factor for Coronary Artery Disease (CAD) and its complications. As a result, they receive much attention in health promotion programs.

E. Medical Management

See “Medical Management” under “Angina Pectoris” and “Myocardial Infarction” for additional information.

F. Nursing Process

The management of Coronary Artery Disease (CAD) involves modifying risk factors to prevent and slow disease progression. Since symptoms may not always be evident, it is important to identify people who are at risk for Coronary Artery Disease (CAD).

Nurses provide health promotion efforts that are directed toward controlling the modifiable risk factors for Coronary Artery Disease (CAD). Patient education about the disease process and progression along with necessary lifestyle changes is important in preventing Coronary Artery Disease (CAD).

For patients who present with symptoms such as chest pain or dyspnea, medications or surgical interventions may be indicated. Medications like aspirin or cholesterol-lowering agents are prescribed to prevent blood clots and heart attacks and reduce plaque buildup in the arteries. Surgical interventions like coronary angioplasty and stent placement may be indicated to remove blockages, widen the artery, and restore blood flow to the heart. Coronary artery bypass grafting (CABG) is indicated for patients who have multiple narrowed arteries.

Nursing Assessment

The first step of nursing care is the nursing assessment, during which the nurse will gather physical, psychosocial, emotional, and diagnostic data. In this section we will cover subjective and objective data related to coronary artery disease.

Subjective Data

Review of health history and complaints

1. Ask the patient about their general symptoms.

Note the patient's complaints and general symptoms, such as:

- Chest pain, Shortness of breath (dyspnea) both at rest and during activity, Rapid breathing (tachypnea), Difficulty of breathing while lying or sitting (orthopnea), Fainting (syncope), Palpitations, Lower extremity edema, Pain in the lower extremity, Difficulty in performing physical activities.

2. Investigate the chest pain further.

Ask the patient to describe the characteristics of chest pain:

- Chest tightness, Feeling of squeezing, Heaviness, Burning sensation, Pain during physical activity, Triggers such as stress or substance use, Pain that radiates to the jaw, neck, left arm, or back.

3. Assess the patient's risk.

Non-modifiable risk factors:

- Age: A damaged and narrowed artery is more likely to develop as people age.
- Gender: Men are at greater risk, but the risk increases for women after menopause.
- Family history of ischemic heart disease: There is a high risk if the immediate male relative (father or brother) had heart disease before age 55 or if the female relative (mother or sister) had it before age 65.
- Race/ethnicity: Minority groups such as Hispanics and Blacks have a higher incidence of Coronary Artery Disease (CAD).

Modifiable risk factors:

- Hypertension: The arteries may become stiff and rigid if high blood pressure is uncontrolled. Blood flow may be slowed by coronary artery narrowing.
- Hyperlipidemia/hypercholesterolemia: The risk of atherosclerosis can rise if there is excessive “bad” cholesterol (low-density lipoprotein–LDL) or decreased “good” cholesterol (high-density lipoprotein–HDL) in the blood.
- Diabetes or insulin resistance: Diabetes or insulin resistance causes hardening of the blood vessels and fatty plaque buildup.
- Kidney disease: Kidney disease impairs the blood pressure regulation function of the kidneys.
- Tobacco use: Firsthand and secondhand smoke increases blood vessel constriction.
- Obesity: Obesity increases cholesterol levels by contributing to plaque buildup in the arteries, narrowing of blood vessels.
- Physical inactivity: Lack of physical activity increases cholesterol in the blood.
- Diet: Food rich in saturated fat raises LDL “bad” cholesterol.
- Stress: Stress increases inflammatory levels causing the narrowing of the blood vessels.
- Alcohol use: Alcohol weakens the heart muscle and affects blood clot formation causing blood vessel obstruction.
- Lack of sleep: Poor sleeping habits and insomnia increase stress levels resulting in blood vessel constriction.

4. Review the patient’s medications and treatment record.

Medications (such as anthracyclines, and anabolic steroids) and previous vascular surgery compromise blood vessel integrity.

Objective Data

Physical assessment

1. Monitor vital signs.

Due to the decreased oxygenated blood supply to the heart, vital signs (especially the pulse rate and blood pressure) are expected to increase or alter.

2. EKG and telemetry monitoring.

An EKG should be completed immediately when a patient reports chest pain to assess for dysrhythmias. Continuous telemetry monitoring is appropriate for a known cardiac history.

3. Systemic assessment approach:

- Neck: distended jugular veins
- CNS: acute distress, dizziness, lightheadedness, syncope, and lethargy
- Cardiovascular: tachycardia, chest pain, abnormal heart sounds (murmur at the apex or bruit on carotid artery) upon auscultation, irregular heartbeats (arrhythmias)
- Circulatory: decreased peripheral pulses
- Respiratory: dyspnea, tachypnea, orthopnea, abnormal sounds (crackles) upon auscultation, activity intolerance
- Gastrointestinal: nausea and vomiting
- Lymphatic: peripheral edema
- Musculoskeletal: neck, arm, back, jaw, and upper body pain, fatigue
- Integumentary: cyanotic and pale skin and excessive sweating

4. Calculate the patient's risk.

Calculate the patient's ASCVD (atherosclerotic cardiovascular disease) risk score. The ideal score is low (<5%). It measures a 10-year risk of Coronary Artery Disease (CAD) and heart diseases objectively, considering the

following: Age, Gender, Race, Blood pressure, Cholesterol, Medications, Diabetes, Smoking

G. Diagnostic Procedures

1. Note for arrhythmias.

Coronary Artery Disease (CAD) is brought on by the buildup of fatty substances obstructing the heart's blood flow. It causes arrhythmias or disruption in the electrical activity of the heart. Look for any ST segment changes, as they may indicate cardiac ischemia. Other arrhythmias, such as atrial fibrillation, bundle branch block, and supraventricular tachycardia, may be present.

2. Obtain samples for blood work.

Analyze the results of the following procedures:

- Complete blood count with differential—a possible underlying infection (WBC), blood clotting response (platelets), and signs of anemia (low RBC levels).
- B-type natriuretic peptides (BNP)—show volume overload with a cardiogenic cause. It can be falsely high in kidney conditions and low with obesity.
- Cardiac enzymes—Troponin and CK levels offer insight into acute ischemia.
- Lipid panels—monitor hypercholesterolemia.
- Ultra-sensitive C-reactive protein (us-CRP), or high-sensitivity CRP—assesses vascular inflammation, which increases the risk of Coronary Artery Disease (CAD).
- Liver function tests (LFT)—evaluate the liver and heart simultaneously, like in hemochromatosis (a Coronary Artery Disease (CAD) complication from a buildup of iron in the body). Also, monitor liver function since it is affected due to the intake of cholesterol medications.

3. Assist the patient in completing a stress test.

Stress testing is useful for the noninvasive evaluation of Coronary Artery Disease (CAD). It evaluates the heart's response to physical activity.

4. Prepare the patient for cardiac catheterization.

Cardiac catheterization or angiogram is the most reliable and precise method of visualizing the heart's blood vessels. Risks are involved since it is an invasive procedure using contrast dye.

5. Investigate further.

- Echocardiogram shows the structure of the heart and how heart valves function. This can assist in diagnosing a heart valve abnormality or underlying conditions like heart failure.
- An exercise treadmill test is used for a patient with a normal resting ECG who is physically competent to exercise.
- A nuclear stress test is the opposite of an exercise stress test. It combines ECG recordings with images of blood flow to the heart muscle at rest and during stress.
- Stress imaging is for patients who have undergone revascularization, have difficult-to-interpret ECGs, or cannot exercise due to physical limitations.
- Cardiac CT scans show calcium buildup and blockages in the heart arteries.
- CT coronary angiogram is similar to a cardiac CT scan but uses dye (contrast) for a more detailed image.

Nursing Interventions

Nursing interventions and care are essential for the patients' recovery. In the following section, you will learn more about possible nursing interventions for a patient with coronary artery disease.

Promote Perfusion

1. Reduce cholesterol plaque buildup.

Cholesterol medications (such as statins, fibrates, niacin, and bile acid sequestrants) can decrease bad cholesterol and lessen plaque formation in the arteries.

2. Prevent blood clots.

Aspirin thins the blood to avoid blood clots. Daily low-dose aspirin therapy is the primary prevention against Coronary Artery Disease (CAD). Anticoagulant medications may be added if the patient is at an increased risk.

3. Fix the blocked artery.

- Coronary angioplasty and stent placement open the clogged heart arteries via a stent (small tube acting as a passageway). It is also known as balloon angioplasty. This procedure may also be called percutaneous coronary intervention (PCI).
- Coronary artery bypass graft surgery (CABG) builds an additional pathway for blood in the heart to bypass the blocked or constricted coronary artery. It is indicated for patients with multiple vessel Coronary Artery Disease (CAD) damage.

4. Monitor the cholesterol levels.

Regular monitoring of cholesterol levels will aid in the early detection of Coronary Artery Disease (CAD) in patients at high risk.

Manage the Symptoms

1. Control blood pressure.

Administer the following medications to control the blood pressure in Coronary Artery Disease (CAD):

- Beta-blockers slow the heart rate and lower blood pressure.
- Calcium channel blockers are given if the patient cannot take beta blockers.

- Angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs) lower blood pressure.

2. Relieve chest pain.

The most prevalent sign of Coronary Artery Disease (CAD) is chest pain (angina) which occurs because arteries are not receiving adequate oxygenated blood. **Nitroglycerin** dilates veins to allow blood flow and relieve chest pain.

3. Know the triggers of angina.

Have the patient track when chest pain is triggered, such as with physical activity, stress, after eating, or at rest. This can help the healthcare team plan interventions.

4. Improve ischemic angina.

Treat chronic and ischemic angina with ranolazine. Typically, ranolazine is combined with:

- Hypertensive medications (such as ACE inhibitors, angiotensin receptor blockers, calcium channel blockers, and beta-blockers)
- Nitrates
- Antiplatelets
- Lipid-lowering medications

5. Maintain the recommended blood pressure.

A significant risk factor for coronary heart disease is hypertension. Patients with Coronary Artery Disease (CAD) should keep their blood pressure under 140/90 mmHg. Caution is suggested with diastolic blood pressure below 60 mmHg. Patients with coronary artery disease may experience angina brought on or worsened by low diastolic blood pressure.

Cardiac Rehabilitation

1. Adhere to the plan.

The support, exercise, and education program in cardiac rehabilitation (cardiac rehab) is designed for each patient's needs. It supports the patients and their families' long-term lifestyle changes.

2. Prevent complications.

Cardiac rehabilitation helps the patient recover after Coronary Artery Disease (CAD). It lowers their risk of developing complications and readmissions to the hospital.

3. Refer to home and community health services.

After being discharged from the hospital, cardiac rehabilitation continues (at home or a community healthcare facility). It typically lasts 6 to 10 weeks, depending on the program and the patient's condition.

4. Motivate the patient to adhere to the plan.

Positive outcomes are highly associated with adherence to the program's interventions. Comprehensive cardiac rehabilitation programs reduce mortality in patients with Coronary Artery Disease (CAD) and enhance exercise capacity, body mass index, lipid profiles, psychological well-being, and quality of life.

Lower the Risk: Prevention Measures

1. Promote ambulation.

The risk of cardiovascular events is significantly lowered by consistent physical activity and exercise. Adults should complete 150 minutes of moderate-intensity exercise per week that includes aerobic and strength training activities.

2. Aim for an ideal BMI.

Fatty deposits can accumulate in the arteries as a result of being overweight. Weight loss enhances blood pressure, cholesterol levels, and metabolic activity.

3. Educate the patient.

Patient education improves adherence to medications and treatments. It also encourages patient-centered care and continuity of care. Effective Coronary Artery Disease (CAD) management and prevention result from increased patient motivation and adherence.

4. Cope with stress.

The heart rate and blood pressure increase during stress. Blood vessels in the body constrict, raising the risk of Coronary Artery Disease (CAD) due to the activation of the inflammatory response. Instruct on stress reduction techniques such as yoga, guided imagery, deep breathing techniques, and meditation.

5. Manage comorbidities.

Controlling comorbidities (such as diabetes and hypertension) results in long-term survival, complication prevention, and effective symptom management in patients with Coronary Artery Disease (CAD).

6. Emphasize when to seek medical attention.

If a heart attack or stroke symptoms are suspected, immediate medical attention is required. Instruct the patient with a history of angina to seek help if their chest pain does not respond to nitroglycerin therapy.

7. Teach the importance of lifestyle modification.

Most of the risk factors of Coronary Artery Disease (CAD) are modifiable. Coronary Artery Disease (CAD) can be prevented and managed when a healthy lifestyle is followed. Patients with Coronary Artery Disease (CAD) can benefit from making lifestyle changes such as:

- Getting regular exercise
- Eating a heart-healthy diet
- Smoking cessation
- Avoiding secondhand smoke
- Low intake of alcohol
- Managing stress
- Treating depression

8. Consider taking omega-3 fatty acids.

Omega-3 fatty acids reduce the inflammatory response in the blood vessels, decreasing the risk of Coronary Artery Disease (CAD). It can be found in fish, flaxseeds, and soybeans or supplemented through fish oil pills.

9. Acknowledge the possible use of alternative medicine.

Always consult your healthcare provider before taking herbal supplements, as they can interfere with prescribed medications. These herbs are known to lower cholesterol and blood pressure levels: Garlic, Barley, Oats, Psyllium

10. Follow up with a cardiologist.

Completing follow-up visits with a cardiologist and routine testing and blood work ensures the treatment plan is effective. It is recommended to see the cardiologist every three to six months for patients diagnosed with Coronary Artery Disease (CAD).

Provide Safety

1. Use blood thinners with caution.

Management of Coronary Artery Disease (CAD) often requires anticoagulant therapy. These medications increase the risk of bleeding by preventing blood clot formation.

2. Implement bleeding precautions.

Lower the risk of severe injury and bleeding by:

- Using a toothbrush with gentle bristles
- Use electric clippers instead of manual razors when shaving
- Avoid blowing the nose too hard
- Prevent bowel straining and constipation
- Avoid contact sports

3. Remind the patient about medical identification.

A medical identification bracelet, necklace, or ID tag lets emergency responders know about the patient's history of Coronary Artery Disease (CAD), the potential risk of heart attack and stroke, and the use of anticoagulant therapy.

H. Nursing Care Plans

Once the nurse identifies nursing diagnoses for coronary artery disease, nursing care plans help prioritize assessments and interventions for both short and long-term goals of care. In the following section you will find nursing care plan examples for coronary artery disease.

Acute Pain

Coronary Artery Disease (CAD) may cause chest pain, known as angina. Pain occurs when there is decreased blood supply to the heart muscles due to blocked arteries. Chest pain in Coronary Artery Disease (CAD) is often described as pressure or tightness and the patient may describe it as something "sitting on my chest."

Nursing Diagnosis: Acute Pain

Related to: 1). Increased cardiac workload, 2). Decreased blood flow to the myocardium

As evidenced by:

- Reports of chest pain or tightness varying in duration, frequency, and intensity, diaphoresis, distraction behavior, facial grimace, guarding or protective behavior, positioning to ease pain, altered physiologic parameters or vital signs

Expected outcomes:

- Patient will demonstrate pain relief as evidenced by the absence of pain behaviors and stable vital signs.
- Patient will verbalize what to do when chest pain occurs and when to seek emergency assistance.

Assessment:**1. Assess and monitor vital signs.**

Vital signs may be altered with the presence of pain. Tachycardia and hypertension may present initially. However, with the progression of poor cardiac output, hypotension, hypoxemia, and bradycardia may develop.

2. Assess pain characteristics.

Rapid pain assessment of a patient reporting or exhibiting chest pain is crucial. It is important to differentiate chest pain from other possible causes such as heartburn or indigestion. Unstable angina is more intense, unpredictable, lasts longer, and is not relieved with rest or sublingual nitroglycerin compared to stable angina.

3. Assess diagnostic studies.

ECG results can identify both the presence and the location of infarction or angina. During angina, ST depression or T-wave inversion may be present. When there is infarction, ECG results will reveal ST-elevation MI, non-ST-elevation MI, and an abnormal Q wave.

Interventions:**1. Provide supplemental oxygen as needed.**

Supplemental oxygen can help maintain arterial oxygen saturation of 90% or higher. Oxygen should only be administered if SpO₂ levels are below normal limits, as it can have a counterproductive effect.

2. Administer medications promptly as indicated.

Nitroglycerin dilates coronary arteries to increase blood flow. Morphine sulfate may be ordered to promote comfort, relax smooth muscles, and decrease myocardial oxygen demand. Beta-blockers reduce the workload of the heart.

3. Raise the head of the bed.

This position promotes comfort and reduces myocardial oxygen demand. Raising the head of the bed will facilitate gas exchange to minimize hypoxia and resultant shortness of breath.

4. Maintain a quiet and comfortable environment.

This can help reduce anxiety and reduce chest pain. Mental and emotional stress can increase myocardial workload and pain.

5. Help the patient recognize triggers.

Chest pain is often precipitated by a stressful or emotional event or exercise. Stopping the activity that is causing the chest pain can help the patient identify if the chest pain requires further assessment.

Anxiety

Anxiety is a normal response to stressful situations like a cardiac event but can be detrimental to the patient's overall health if it is present in excess. Timely and accurate identification, management, and treatment of both anxiety and Coronary Artery Disease (CAD) are essential.

Nursing Diagnosis: Anxiety

Related to:

- Situational crises or stressors, Pain, Underlying pathophysiological response, The threat of change in health status

As evidenced by:

- Expression of distress and insecurity, Awareness of physiological symptoms, Feelings of helplessness, Heart pounding, Nausea, Fear of death as an impending reality, Physiologic manifestations like altered respiratory pattern, facial flushing, increased blood pressure, increased heart rate, and increased sweating.

Expected outcomes:

- The patient will verbalize awareness of feelings of anxiety and healthy ways to cope with them.
- The patient will demonstrate two effective relaxation strategies.
- The patient will report that anxiety has been reduced to a manageable level.

Assessment:

1. Assess stress levels.

Stress can aggravate the patient's condition. It can increase blood pressure levels, which increases cardiac workload.

2. Monitor vital signs.

Attempt to decipher between medical and emotional responses. Both can result in rapid pulse, diaphoresis, and hyperventilation.

Interventions:

1. Encourage the patient to express feelings and fears.

Unexpressed feelings and fears tend to develop into anxiety, affecting the patient's overall health and aggravating existing health conditions like Coronary Artery Disease (CAD).

2. Provide reassurance to the patient.

Reassuring the patient can help relieve anxiety. Reiterate that they are safe. Present a calm presence to invoke a sense of control.

3. Administer medications as indicated.

Benzodiazepines like alprazolam can help the patient relax until physically able to rebuild adequate coping strategies.

4. Provide accurate information about the disease.

Patient education is vital because it allows the patient to understand what is happening and what to expect. It will also allow the patient to actively participate in the treatment regimen.

5. Encourage coping methods for relaxation.

Remind and encourage the patient to practice coping strategies to decrease anxiety such as breathing exercises, meditation, distraction, and positive talk.

Decreased Cardiac Output

Coronary Artery Disease (CAD) can lead to decreased cardiac output which results in inadequate oxygenation and perfusion to meet the demands of the body.

Nursing Diagnosis: Decreased Cardiac Output

Related to:

- a). Inotropic changes like transient or prolonged myocardial ischemia,
- b). Altered heart rate and rhythm.

As evidenced by:

- Tachycardia, EKG changes, Angina, Activity intolerance, Fatigue, Restlessness

Expected outcomes:

- Patient will report decreased episodes of angina, dyspnea, and dysrhythmias.
- Patient will participate in activities that reduce the workload of the heart.

Assessment:**1. Assess heart rate, blood pressure, and cardiac rhythm.**

Tachycardia may be present because of pain, hypoxemia, anxiety, and reduced cardiac output. Changes in blood pressure may also occur because of cardiac response.

2. Assess breath and heart sounds.

Crackles in the lungs can occur with cardiac decompensation. Abnormal heart rhythms or heart sounds such as a gallop or S3 or S4 heart sound signal heart failure.

3. Assess skin color and pulse.

When cardiac output is compromised, peripheral circulation is reduced, manifesting as pallor, cyanosis, and diminished peripheral pulses.

Interventions:**1. Allow adequate rest periods.**

Rest periods decrease oxygen consumption and demand, reduce the risk of decompensation, and minimize myocardial workload.

2. Stress the importance of avoiding bearing down or straining.

Valsalva maneuver can cause vagal stimulation which reduces heart rate and is followed by rebound tachycardia; both can impair cardiac output.

3. Administer medications as indicated.

Inotropic medications like digoxin can raise cardiac output by making heart contractions stronger.

4. Prepare for tests and procedures.

Echocardiograms show how blood moves through the heart and valves and can identify weak areas. Cardiac catheterizations or angiograms use guided catheters and dye to visualize blockages.

Ineffective Tissue Perfusion

Ineffective tissue perfusion associated with coronary artery disease can be caused by plaque formation leading to narrowed or obstructed arteries and decreased perfusion to tissues and organs.

Nursing Diagnosis: Ineffective Tissue Perfusion

Related to:

- Formation of plaque
- Narrowed arteries
- Obstructed arteries
- Rupture of unstable plaque
- Vasospasm of coronary arteries
- Ineffective cardiac muscle contraction
- Conditions that compromise the blood supply
- Difficulty of the heart muscle to pump
- Increased exertion in workload
- Inadequate blood supply to the heart

As evidenced by:

- Decreased blood pressure (hypotension)
- Decreased peripheral pulses
- Increased central venous pressure (CVP)
- Tachycardia
- Dysrhythmias

- Decreased oxygen saturation
- Chest pain (angina)
- Difficulty breathing (dyspnea)
- Difficulty of breathing when lying down and relieved by upright position (orthopnea)
- Rapid breathing (tachypnea)
- Alteration in the level of consciousness
- Restlessness
- Fatigue
- Intolerance in activities
- Cold and clammy skin
- Prolonged capillary refill time
- Pallor or cyanosis
- Edema
- Complaints of claudication
- Numbness
- Pain in the lower extremities

Expected outcomes:

- Patient will display palpable peripheral pulses and capillary refill time < 3 seconds.
- Patient will manifest skin that is warm to the touch without edema.
- Patient will maintain an alert, conscious, and coherent level of consciousness.

Assessment:

1. Determine the patient's vascularization status.

Reduced vascularization or blood flow to the tissues results in inadequate tissue perfusion. Chronic conditions such as peripheral vascular disease can result in poor circulation to the lower extremities.

2. Calculate ankle-brachial index.

This test checks the blood pressure in the arms and ankles and compares the readings to assess for poor blood flow in the legs.

3. Assess the patient's skin color, capillary refill, and sensations.

Note the following signs and symptoms: Edema, Poor ulceration or wound healing, Skin color (pale/cyanotic), Temperature, Hair loss, Thickened nails, Absent or weak pulses, Pain, Dulled sensations, Claudication (pain when the legs are dependent such as with walking)

4. Use doppler ultrasound.

By reflecting high-frequency sound waves (ultrasound) onto moving red blood cells, a Doppler ultrasound is a noninvasive diagnostic that assesses blood flow and tissue perfusion, particularly in the lower extremities.

Interventions:

1. Administer medications to improve blood flow.

Vasodilators (such as nitroglycerin for chest pain or hydralazine for hypertension) enhance tissue perfusion by widening the blood vessels.

2. Prepare for a possible surgical procedure.

Surgical procedures may be necessary to enhance blood flow and tissue perfusion.

- Placing a stent to reopen the obstructed artery (Percutaneous coronary intervention (PCI))
- Re-route the blood to flow around the obstructions (Coronary artery bypass grafting (CABG))

3. Start aspirin therapy as ordered.

Aspirin, a blood thinner, can assist in lowering the risk of plaque rupture and clotting and improve blood flow and tissue perfusion in patients with coronary artery disease.

4. Instruct on mobility and activity contraindications.

Educate the client not to sit for long periods, cross their legs, or wear constricting clothing, as this can prevent venous return. Perform active and passive ROM exercises and ambulate as tolerated. Keep the legs elevated when sitting to promote venous return.

5. Refer the patient to cardiac rehab.

Improving risk factors, exercise ability, medication adherence, and diet control following percutaneous coronary intervention and coronary artery bypass graft surgery are benefits of cardiac rehabilitation for a patient with coronary artery disease.

Risk for Unstable Blood Pressure

Risk for unstable blood pressure (BP) associated with coronary artery disease can be caused by the formation of plaque resulting in narrowed or obstructed arteries and reduced blood flow, resulting in blood pressure instability.

Nursing Diagnosis: Risk for Unstable Blood Pressure

Related to:

A). Plaque formation, b). Narrowed arteries, c). Blocked arteries, d). Rupture of unstable plaque, e). Coronary vasospasme, f). Ineffective cardiac muscle contraction, g). Conditions that compromise the blood supply, h). Difficulty of the heart muscle to pump, I). Increased workload, j). Inadequate blood supply to the heart, k). Inability to contract and relax effectively

As evidenced by:

A risk diagnosis is not evidenced by signs and symptoms as the problem has not yet occurred and the goal of nursing interventions is aimed at prevention.

Expected outcomes:

- Patient will display blood pressure within ordered parameters.
- Patient will be able to sit or stand without significant fluctuation in blood pressure.
- Patient will not experience complications of unstable blood pressure such as myocardial ischemia or cerebrovascular accident.

Assessment:**1. Track the patient's blood pressure.**

Because it exerts more tension on the arterial walls, high blood pressure can develop into coronary artery disease, damaging blood vessels and causing plaque rupture.

2. Assess for signs and symptoms.

Initial symptoms may not be apparent or only present as tachycardia during exercise. Decreased blood reaches the heart as the coronary arteries narrow, and symptoms may worsen or occur more frequently. Angina, dyspnea, fatigue, and dizziness are all symptoms of unstable blood pressure.

3. Determine the patient's risk factors.

When combined, certain risk factors increase the likelihood of developing hypertension, such as high blood sugar, physical inactivity, high triglyceride levels, high sodium diets, and excessive alcohol intake.

4. Assess body fat.

Excess body weight or obesity can cause high blood pressure. Increasing visceral and retroperitoneal fat can elevate blood pressure by directly compressing the kidneys. Hypertension is linked to excessive fat buildup in and around the kidneys.

Interventions:**1. Advise caution with exertional activities.**

Blood pressure increases when the arteries are obstructed, and the blood cannot flow freely. It is more evident in stressful conditions such as exertional activities because the heart has to work harder to provide the body with enough oxygen and nutrients.

2. Administer medications as prescribed.

Beta-blockers and ACE inhibitors reduce blood pressure and the workload on the heart. For some patients with atherosclerosis, antiplatelet or anticoagulant medications may help lower the risk of complications.

3. Educate on blood pressure control.

Atherosclerosis causes heart attacks and strokes, with high blood pressure as a common trigger. Educate patients that <120/80 mmHg is a “normal” blood pressure. Patients should be instructed on the parameters for their blood pressure based on their cardiovascular history.

4. Emphasize blood pressure control in lifestyle modification.

Modifying diet and exercise routines and other potential lifestyle changes like smoking cessation are often the first steps in treating atherosclerosis by lowering blood pressure levels.

5. Assist with stress testing.

The patient must run on a treadmill during an exercise stress test until the heart rate reaches 85% of what is anticipated for the patient’s age. A stress test indicates whether a patient has exertional hypotension or hypertension (>200/110 mmHg).

Nursing Care for Patients with Hypertension

Introduction

Almost 50% of adults in the United States have hypertension. As a nurse, it is one of the most common comorbidities that require management and treatment. Patients cannot hinge risk factors such as family history or ethnicity, but can change lifestyle behaviors. Nurses can assist patients in recognizing risk factors such as smoking, poor diet choices, and stress and educating on ways to reduce their risks. Controlling blood pressure prevents complications and poor health outcomes.

A. Definitions

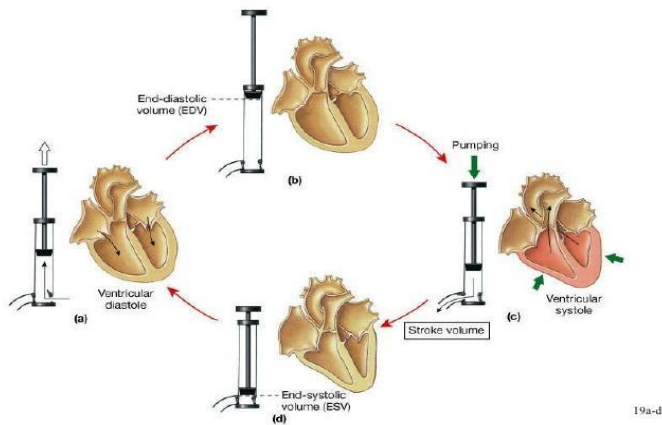
Hypertension or high blood pressure is an increase in systolic pressure above 139 mmHg or diastolic pressure above 90 mmHg. Hypertension is a condition in which blood vessels have high blood pressure (systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg).

What is Hypertension?

Hypertension is one of the most common lifestyle diseases to date. It affects people from all walks of life. Let us get to know hypertension more by its definitions.

- Hypertension is defined as a systolic blood pressure greater than 140 mmHg and a diastolic pressure of more than 90 mmHg.
- This is based on the average of two or more accurate blood pressure measurements during two or more consultations with the healthcare provider.
- The definition is taken from the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

A Simple Model of Stroke Volume



A. Classification

In 2020, the American College of Cardiology and the American Heart Association revised their hypertension guidelines. The previous guidelines set the threshold at 140/90 mm Hg for younger people and 150/80 mm Hg for those ages 65 and older.

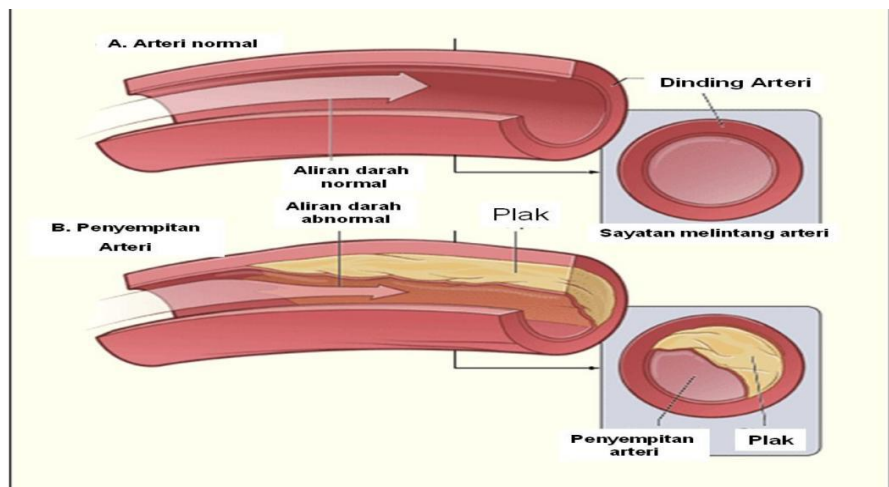
- **Normal.** The normal range for blood pressure is between, less than 120 mmHg and less than 80 mmHg.
- **Elevated.** The elevated stage starts from 120 mmHg to 129 mmHg for systolic blood pressure and less than 80 mmHg for diastolic pressure.
- **Stage 1 hypertension.** Stage 1 starts when the patient has a systolic pressure of 130 to 139 mmHg and a diastolic pressure of 80 to 89 mmHg.
- **Stage 2 hypertension.** Stage 2 starts when the systolic pressure is already more than or equal to 140 mmHg and the diastolic is more than or equal to 90 mmHg.

B. Pathophysiology

In a normal circulation, pressure is transferred from the heart muscle to the blood each time the heart contracts and then pressure is exerted by the blood as it flows through the blood vessels.

The pathophysiology of hypertension follows.

- Hypertension is multifactorial
- When there is **excess sodium intake**, renal sodium retention occurs, which increases fluid volume resulting in increased preload and increase in contractility.
- **Obesity** is also a factor in hypertension because hyperinsulinemia develops and structural hypertrophy results leading to increased peripheral vascular resistance.
- **The genetic alteration** also plays a role in the development of hypertension because when there is cell membrane alteration, functional constriction may follow and also results in increased peripheral vascular resistance.



C. Epidemiology

Hypertension is slowly rising to the top as one of the primary causes of morbidity in the world. Here are the current statistics of the status of hypertension in some of the leading countries.

- About 31% of the adults in the United States have hypertension. African-Americans have the highest prevalence rate of 37%. In the total US population of persons with hypertension, 90% to 95% have primary hypertension or high blood pressure from an unidentified cause., The remaining 5% to 10% of this group have secondary hypertension or high blood pressure related to identified causes, Hypertension is also termed as the “silent killer” because 24% of people who had pressures exceeding 140/90 mmHg were unaware that their blood pressures were elevated.

D. Causes

Causes of hypertension generally do not have a specific cause. Hypertension occurs in response to increased cardiac output or increased peripheral pressure. However, there are several factors that affect the occurrence of hypertension, including:

- a. Genetic: Neurologic response to stress or abnormalities in sodium excretion or transport.
- b. Obesity: associated with high insulin levels resulting in increased blood pressure.
- c. Environmental stress.
- d. Loss of tissue elasticity and arteriosclerosis in old age and widening of blood vessels.

Hypertension has a lot of causes just like how fever has many causes. The factors that are implicated as causes of hypertension are:

- Increased sympathetic nervous system activity. Sympathetic nervous system activity increases because there is dysfunction in the autonomic nervous system.

- Increase renal reabsorption. There is an increase reabsorption of sodium, chloride, and water which is related to a genetic variation in the pathways by which the kidneys handle sodium.
- Increased RAAS activity. The renin-angiotensin-aldosterone system increases its activity leading to the expansion of extracellular fluid volume and increased systemic vascular resistance.
- Decreased vasodilation of the arterioles. The vascular endothelium is damaged because of the decrease in the vasodilation of the arterioles.

E. Clinical Manifestations

Many people who have hypertension are asymptomatic at first. Physical examination may reveal no abnormalities except for an elevated blood pressure, so one must be prepared to recognize hypertension at its earliest.

- Headache. The red blood cells carrying oxygen is having a hard time reaching the brain because of constricted vessels, causing headache.
- Dizziness occurs due to the low concentration of oxygen that reaches the brain.
- Chest pain. Chest pain occurs also due to decreased oxygen levels.
- Blurred vision. Blurred vision may occur later on because of too much constriction in the blood vessels of the eye that red blood cells carrying oxygen cannot pass through.

F. Complications

If hypertension is left untreated, it could progress to complications of the different body organs.

Heart failure. With increased blood pressure, the heart pumps blood faster than normal until the heart muscle goes weak from too much exertion.

- Myocardial infarction. Decreased oxygen due to constriction of blood vessels may lead to MI.
- Impaired vision. Ineffective peripheral perfusion affects the eye, causing problems in vision because of decreased oxygen.
- Renal failure. Blood carrying oxygen and nutrients could not reach the renal system because of the constricted blood vessels.

G. Assessment and Diagnostic Findings

Assessment of the patient with hypertension must be detailed and thorough. There are also diagnostic tests that can be performed to establish the diagnosis of hypertension.

Assessment

- 1). Assess the patient's health history,
- 2). Perform physical examination as appropriate.
- 3). The retinas are examined to assess possible organ damage,
- 4). Laboratory tests are also taken to check target organ damage.

Diagnostic Tests

- Urinalysis is performed to check the concentration of sodium in the urine through the specific gravity.
- Blood chemistry (e.g. analysis of sodium, potassium, creatinine, fasting glucose, and total and high density lipoprotein cholesterol levels). These tests are done to determine the level of sodium and fat in the body.
- 12-lead ECG. ECG needs to be performed to rule presence of cardiovascular damage.
- Echocardiography. Echocardiography assesses the presence of left ventricular hypertrophy.
- Creatinine clearance. Creatinine clearance is performed to check for the level of BUN and creatinine that can determine if there is renal damage or not.

- Renin level. Renin level should be assessed to determine how RAAS is coping.
- Hemoglobin/hematocrit: Not diagnostic but assesses relationship of cells to fluid volume (viscosity) and may indicate risk factors such as hypercoagulability, anemia.
- Blood urea nitrogen (BUN)/creatinine: Provides information about renal perfusion/function.
- Glucose: Hyperglycemia (diabetes mellitus is a precipitator of hypertension) may result from elevated catecholamine levels (increases hypertension).
- Serum potassium: Hypokalemia may indicate the presence of primary aldosteronism (cause) or be a side effect of diuretic - therapy.
- Serum calcium: Imbalance may contribute to hypertension.
- Lipid panel (total lipids, high-density lipoprotein [HDL], low-density lipoprotein [LDL], cholesterol, triglycerides, phospholipids): Elevated level may indicate predisposition for/presence of atheromatous plaques.
- Thyroid studies: Hyperthyroidism may lead or contribute to vasoconstriction and hypertension.
- Serum/urine aldosterone level: May be done to assess for primary aldosteronism (cause).
- Urinalysis: May show blood, protein, or white blood cells; or glucose suggests renal dysfunction and/or presence of diabetes.
- Creatinine clearance: May be reduced, reflecting renal damage.
- Urine vanillylmandelic acid (VMA) (catecholamine metabolite): Elevation may indicate presence of pheochromocytoma (cause); 24-hour urine VMA may be done for assessment of pheochromocytoma if hypertension is intermittent.
- Uric acid: Hyperuricemia has been implicated as a risk factor for the development of hypertension.
- Renin: Elevated in renovascular and malignant hypertension, salt-wasting disorders.

- Urine steroids: Elevation may indicate hyperadrenalism, pheochromocytoma, pituitary dysfunction, Cushing's syndrome.
- Intravenous pyelogram (IVP): May identify cause of secondary hypertension, e.g., renal parenchymal disease, renal/ureteral - calculi.
- Kidney and renography nuclear scan: Evaluates renal status (TOD).
- Excretory urography: May reveal renal atrophy, indicating chronic renal disease.
- Chest x-ray: May demonstrate obstructing calcification in valve areas; deposits in and/or notching of aorta; cardiac enlargement.
- Computed tomography (CT) scan: Assesses for cerebral tumor, CVA, or encephalopathy or to rule out pheochromocytoma.
- Electrocardiogram (ECG): May demonstrate enlarged heart, strain patterns, conduction disturbances. Note: Broad, notched P wave is one of the earliest signs of hypertensive heart disease.

H. Medical Management

Main Topic: Antihypertensive Drugs

The goal of hypertensive treatment is to prevent complications and death by achieving and maintaining the arterial blood pressure at 140/90 mmHg or lower.

Pharmacologic Therapy

- The medications used for treating hypertension decrease peripheral resistance, blood volume, or the strength and rate of myocardial contraction.
- For uncomplicated hypertension, the initial medications recommended are diuretics and beta blockers.
- Only low doses are given, but if blood pressure still exceeds 140/90 mmHg, the dose is increased gradually.
- Thiazide diuretics decrease blood volume, renal blood flow, and cardiac output.
- ARBs are competitive inhibitors of aldosterone binding.

- Beta blockers block the sympathetic nervous system to produce a slower heart rate and a lower blood pressure.
- ACE inhibitors inhibit the conversion of angiotensin I to angiotensin II and lowers peripheral resistance.

Stage 1 Hypertension

- Thiazide diuretic is recommended for most and angiotensin-converting enzyme-1, aldosterone receptor blocker, beta blocker, or calcium channel blocker is considered.

Stage 2 Hypertension

- Two-drug combination is followed, usually including thiazide diuretic and angiotensin-converting enzyme-1, or beta-blocker, or calcium channel blocker.

I. Nursing Management

The goal of nursing management is to help achieve a normal blood pressure through independent and dependent interventions.

Nursing Assessment

Nursing assessment must involve careful monitoring of the blood pressure at frequent and routinely scheduled intervals.

- If patient is on antihypertensive medications, blood pressure is assessed to determine the effectiveness and detect changes in the blood pressure.
- Complete history should be obtained to assess for signs and symptoms that indicate target organ damage.
- Pay attention to the rate, rhythm, and character of the apical and peripheral pulses.

Diagnosis

Based on the assessment data, nursing diagnoses may include the following:

- Deficient knowledge regarding the relation between the treatment regimen and control of the disease process.
- Noncompliance with the therapeutic regimen related to side effects of the prescribed therapy.
- Risk for activity intolerance related to imbalance between oxygen supply and demand.
- Risk-prone health behavior related to condition requiring change in lifestyle.

Nursing Care Plans

Once the nurse identifies nursing diagnoses for hypertension, nursing care plans help prioritize assessments and interventions for both short and long-term goals of care. In the following section you will find nursing care plan examples for hypertension.

Decreased Cardiac Output

Vasoconstriction from chronic hypertension and vessel resistance can result in decreased cardiac output.

Nursing Diagnosis: Decreased Cardiac Output

Related to:

- a). Impaired cardiac muscle contraction,
- b). Conditions that compromise blood flow,
- c). Structural impairment of the heart,
- d). Difficulty of the heart muscle to pump,
- e). Increased exertion in workload,
- f). Alteration in stroke volume,
- g). Plaque formation,
- h). High blood viscosity,
- i). Atherosclerosis,
- j). Sedentary lifestyle

As evidenced by:

- a). Increased central venous pressure (CVP),
- b). Increased pulmonary artery pressure (PAP),
- c). Tachycardia,
- d). Dysrhythmias,
- e). Ejection

fraction less than 40%, f). Decreased oxygen saturation, g). Presence of abnormal S3, S4 heart sounds upon auscultation, h). Chest pain (angina), i). Presence of abnormal lung sounds upon auscultation, j). Difficulty breathing (dyspnea), k). Rapid breathing (tachypnea), l). Restlessness, m). Fatigue, n). Intolerance in activities, o). Prolonged capillary refill time, p). Significant weight gain, q). Edema

Expected outcomes:

- a). Patient will manifest blood pressure and pulses within acceptable limits., b). Patient will not develop complications from hypertension, c). Patient will adhere to lab testing, medications, and follow-up appointments for hypertension.

Assessment:

1. Auscultate the heart sounds.

The existence of an S4 heart sound indicates a rigid left ventricle, causing left ventricular hypertrophy and diastolic dysfunction. Both S3 and S4 sounds indicate heart failure.

2. Obtain ECG.

Patients with hypertension are given an electrocardiogram to check for silent myocardial infarction or left ventricular hypertrophy. ECG is useful for assessing heart attacks and thickening/enlargement (hypertrophy) of the heart wall or muscle, which are effects of high blood pressure.

3. Determine the patient's risk factors for hypertension.

The following tests check for possible causes of hypertension: Electrolytes, Blood, urea nitrogen (BUN) and creatinine levels for renal failure, Lipid profile for cholesterol levels, Hormone (adrenal gland or thyroid gland) levels, Urine tests, Imaging scans, such as kidney ultrasound and CT scan of the abdomen to assess kidneys and adrenal glands.

4. Assess for signs and symptoms.

Hypertension may be asymptomatic, and the diagnosis is discovered by chance during the recording or measurement of blood pressure. Chronic hypertension results in organ damage such as: Stroke, Hypertensive encephalopathy, Chest pain, Shortness of breath, Heart failure, Kidney problems, Vision changes

Interventions:

1. Assist the patient in lifelong change.

Since hypertension is a chronic disorder, it requires constant monitoring and management. Exercise, weight management, and limiting alcohol and smoking are crucial to minimizing cardiovascular risk.

2. Administer beta-blockers or calcium-channel blockers as prescribed.

Beta-blockers and calcium channel blockers offer quick heart rate control at rest and during activity. They can be administered intravenously (IV) or orally.

3. Use CPAP or supplemental oxygen at night.

Obstructive sleep apnea requires treatment to reduce sympathetic nervous system stimulation to reduce cardiac workload and blood pressure.

4. Monitor and increase activity as tolerated.

Exercise is a necessity to strengthen the heart and lower blood pressure. Closely monitor the patient's response to activity through their HR and BP.

5. Limit salt intake.

Consuming excess salt raises the incidence of cardiovascular disease and hypertension. Hypertension results from increased salt absorption leading to increased volume, reduced renin-angiotensin-aldosterone system (RAAS) response, and increased sympathetic nervous system activity.

Deficient Knowledge

A lack of understanding of hypertension prevents the patient from making appropriate lifestyle choices and places them at risk for worsening health conditions.

Nursing Diagnosis: Deficient Knowledge

Related to:

a). Lack of understanding of hypertension and its effect on the body, b). Lack of knowledge of risk factors, c). Poor health literacy, d). Lack of interest or motivation

As evidenced by:

a). Worsening blood pressure, b). Inability to recall information provided, c). Incorrect follow-through with diet or lifestyle recommendations, d). Development of a chronic condition due to uncontrolled hypertension

Expected outcomes:

a). Patient will “teach-back” education provided to them regarding how to manage their blood pressure, b). Patient will state their personal risk factors for hypertension., c). Patient will explain the action of their blood pressure medications and the importance of not missing doses.

Assessment:

1. Assess the patient’s understanding of hypertension.

Many patients do not understand the role high blood pressure plays in contributing to other conditions and placing them at risk for stroke or heart disease. Assess the patient’s knowledge deficit to fill in the gaps.

2. Assess barriers to learning.

Assess for cognitive, cultural, or language barriers. Perception of the problem and motivation for change is also important. If the patient is not yet ready to learn or does not perceive a reason to, learning will not take place.

3. Assess support systems.

Patients who have difficulty remembering to take medications, monitor their BP, limit salt intake, or follow-up with appointments may need support from family members or friends to manage their condition.

Interventions:

1. Help the patient identify their personal risk factors.

Educate between modifiable (stress, diet, weight, tobacco use) vs. non-modifiable risk factors (age, family history, ethnicity). From there, patients can identify areas of improvement.

2. Teach the patient how to monitor blood pressure.

Educate the patient on what their blood pressure number should be, and what is considered high or low. Have the patient bring in their own BP monitor to calibrate it and observe them using it to ensure accuracy of readings.

3. Provide positive reinforcement.

Do not criticize a patient for mistakes or difficulty in implementing their treatment plan. Reinforce any attempt to learn more or even a slight improvement.

4. Review medications thoroughly.

Patients may not understand the purpose of their medications and may skip or miss doses. Review the action, side effects, and rationale of each blood pressure medication as well as the frequency and interactions with other drugs.

Excess Fluid Volume

An increase in the circulating blood volume will cause the heart to pump harder, increasing blood pressure.

Nursing Diagnosis: Excess Fluid Volume

Related to:

a). Chronic conditions: heart failure, kidney disease, b). Excess fluid intake, c). Excess sodium intake

As evidenced by:

- Weight gain, Edema in extremities, Jugular vein distention, High blood pressure, Tachycardia

Expected outcomes:

a). Patient will maintain stable fluid volume as evidenced by balanced intake and output, weight at baseline, and no signs of edema, b). Patient will verbalize the importance of reducing sodium intake.

Assessment:

1. Assess for peripheral edema and weight gain.

Excess fluid causes swelling to the extremities, usually the lower legs and feet/ankles. The patient may also notice a sudden weight gain.

2. Assess lab values.

Monitor electrolyte imbalances that are caused by fluid overload such as increased sodium levels or decreased potassium. Monitor renal values that show evidence of fluid retention: BUN, creatinine, urine specific gravity.

3. Assess diet and fluid intake.

An unbalanced diet with either a large amount of sodium or water intake can contribute to fluid overload and increase blood pressure.

Interventions:

1. Educate on fluid and/or sodium restrictions.

Patients with hypertension must be aware of their sodium and fluid intake. This is even more important when coupled with kidney disease or heart failure as this complicates the ability to regulate this balance.

2. Administer diuretics.

Diuretics may be required to rid the body of extra fluid if the patient is displaying symptoms such as shortness of breath or extremely elevated blood pressure.

3. Elevate extremities.

Edematous extremities should be elevated above the level of the heart in order to aid in circulation. Frequent positioning and use of pillows will also prevent skin breakdown.

4. Instruct on low-sodium options.

Patients are often unaware of the amount of sodium in foods. Frozen dinners, canned food, and most restaurant entrees are overloaded with sodium. Educate patients on their daily recommended sodium intake and to limit processed foods and opt for low-sodium options.

Risk for Unstable Blood Pressure

Hypertension correlates with the risk for unstable blood pressure (BP) as medical or pharmacologic causes result in elevations in blood pressure.

Nursing Diagnosis: Risk for Unstable Blood Pressure

Related to:

- a). Structural impairment of the heart, b). Difficulty of the heart muscle to pump, c). Increased exertion in workload, d). Dysrhythmias, e). Electrolyte imbalances, f). Excess fluid volume, g). Adverse effects of medications

As evidenced by:

A risk diagnosis is not evidenced by signs and symptoms as the problem has not yet occurred. Nursing interventions are aimed at prevention.

Expected outcomes:

- Patient will maintain blood pressure within normal limits, Patient will remain asymptomatic with elevations in blood pressure, Patient will adhere to their antihypertensive medications to prevent unstable blood pressure.

Assessment:

1. Regularly measure the patient's blood pressure.
High blood pressure often has no symptoms or warning indications. Many patients are unaware they have it. Regular monitoring is necessary to prevent or detect hypertension.
2. Screen for secondary causes of hypertension.
renal disease, obstructive sleep apnea, thyroid disorders, and alcohol-induced hypertension require their own management to control blood pressure.
3. Assess caffeine consumption.
High caffeine intake stimulates sympathetic activity, which increases blood pressure. Assess how much caffeine the patient consumes each day.
4. Review the patient's treatment list.
Numerous drugs and nutritional supplements increase blood pressure. Aspirin used in excessive quantities, NSAIDs, antidepressants, decongestants, and birth control pills are a few examples. Some herbal remedies may interact with antihypertensive medications.

Interventions:

1. Decrease the risk.
Ensure the patient understands that substances such as cocaine, synthetic cannabinoids, cigarette smoking, and excessive alcohol increase the risk of cardiovascular effects and hypertension.
2. Teach the importance of treatment adherence.
Educate on the importance of adhering to blood pressure medication regimens. Uncontrolled blood pressure is the most common cause of a hypertensive crisis: a BP of 180/120 mmHg or higher.
3. Remind the patient to report all medications and remedies.
It is best if the patient keeps an updated list and has this available at all appointments. The nurse can reconcile medications, over-the-counter drugs, and herbal remedies for interactions that may cause unstable blood pressure.

4. Remind the patient to keep Blood Pressure logs.

Home BP readings should be kept and evaluated at least every three months to monitor the effectiveness of treatment.

Sedentary Lifestyle

A sedentary lifestyle is a risk factor for developing hypertension. Inactivity naturally contributes to a higher heart rate causing the heart to work harder. Those who exercise regularly normally have a lower heart rate, decreasing stress on the heart and arteries.

Nursing Diagnosis: Sedentary Lifestyle

Related to:

- a). Lack of interest in physical activity, b). Inability to participate due to health or physical limitations, c). Lack of knowledge related to the benefit of exercise on blood pressure.

As evidenced by:

- Deconditioned appearance, Overweight/obese or very frail, Activity intolerance, Tachycardia at rest, Abnormal heart rate or BP response to activity
-

Expected outcomes:

- Patient will participate in physical activity within their capabilities at least 3 times per week.
- Patient will report an improvement in their ability to exercise as evidenced by no shortness of breath with minimal exertion and heart rate within safe limits.
- Patient will report a decrease in their blood pressure after 1 month of exercising.

Assessment:

1. Build a rapport.

Exercise can be a difficult subject to broach with patients. Those with a sedentary lifestyle may balk at changing their behavior. It's important for the nurse to first form a therapeutic relationship with the patient to understand and overcome resistance.

2. Assess their history and interests.

Instead of simply telling the patient to move more, get to know what types of exercise or activities they've done in the past. Patients are more likely to create a habit when they enjoy what they're doing.

3. Ensure the patient is safe for activity.

The provider will advise if exercise is unsafe for the patient, but most patients will benefit from some kind of movement. If the patient becomes very short of breath, fatigued, or dizzy from a certain exercise, it should be avoided or decreased.

Interventions:

1. Help with coaching and goal setting.

Depending on the patient's activity level, strength, age, and health status, meet them where they are in their journey. Walking to the mailbox daily may be a great goal for some, while others may be able to handle more strenuous activity. Start slow and create attainable goals the patient will be excited to reach.

2. Keep track of progress.

Instruct the patient to keep a log of activity completed, time spent exercising, and improvement in physiological responses or weight loss. Along with this, the patient should be monitoring their BP as directed by their provider, and they may notice a decrease in their blood pressure along with regular exercise.

3. Refer to PT, cardiac rehab, or local programs.

Patients who require a more supervised approach may need PT evaluation for safety modifications. Cardiac rehab teaches exercise

training specific to heart health. Patients may also find support from their local gym or programs that offer free or low-cost classes.

4. Educate on the benefits and necessity of exercise.

Exercise not only benefits the heart and circulation, but it also improves muscle strength, coordination, and boosts mood. Patients should not be scared into exercising for fear of illness, but providing the positive aspects that are relevant to them (more time with grandkids, for example) will help them see the benefits.

Documentation Guidelines

These are the following data that should be documented for the patient's record:

- Effects of behavior on health status/condition, Plan for adjustments and interventions for achieving the plan and the people involved, Client responses to the interventions, teaching, and action plan performed, Attainment or progress towards desired outcome, Modifications to plan care, Individual findings including deviation from prescribed treatment plan, Consequences of actions to date.

Nursing Care for Patients with Anemia

A. Definition

Iron-deficiency anemia typically results when the intake of dietary iron is inadequate for hemoglobin synthesis. Iron deficiency anemia is the most common type of anemia in all age groups, and it is the most common anemia in the world. The most common cause of Iron deficiency anemia in men and postmenopausal women is bleeding from ulcers, gastritis, inflammatory bowel disease, or GI tumors. The most common causes of iron-deficiency anemia in premenopausal women are menorrhagia (i.e., excessive menstrual bleeding) and pregnancy with inadequate iron supplementation. Patients with chronic alcoholism often have chronic blood loss from the GI tract, which causes iron loss and

eventual anemia. Other causes include iron malabsorption, as is seen after gastrectomy or with celiac disease.

Encourage the patient to continue iron therapy for total therapy time (6 to 12 months), even when fatigue is no longer present

Anemia occurs when there are not enough red blood cells or red blood cells do not function properly resulting in low hemoglobin and a lack of oxygen throughout the body.

Iron-deficiency anemia is the most common type of anemia and is appropriately named, as it is a lack of iron in the body. This can result from blood loss, pregnancy, or poor absorption.

Other types of anemia that may be encountered are **vitamin-deficiency anemia** (low levels of vitamin B12 or folate), **aplastic anemia** (the bone marrow stops making blood cells), and **hemolytic anemia** (when blood cells are destroyed faster than they are replaced).

B. Clinical Manifestations

- Symptoms of anemia
- Symptoms in more severe or prolonged cases: smooth, sore tongue; brittle and ridged nails; angular cheilosis (mouth ulceration)

C. Assessment And Diagnostic Methods

- Bone marrow aspiration
- Laboratory values, including serum ferritin levels (indicates iron stores), blood cell count (hemoglobin, hematocrit, RBC count, MCV), serum iron level, and total iron-binding capacity.

D. Medical Management

- Search for the cause, which may be a curable GI cancer or uterine fibroids.
- Test stool specimens for occult blood.

- People aged 50 years or older should have a periodic colonoscopy, endoscopy, or x-ray examination of the GI tract to detect ulcerations, gastritis, polyps, or cancer.
- Administer prescribed iron preparations (oral, intramuscular [IM], or IV).
- Have the patient continue iron preparations for 6 to 12 months.

E. Nursing Management

See “Nursing Management” under “Anemia” for additional information.

- Administer IM or IV iron in some cases when oral iron is not absorbed, is poorly tolerated, or is needed in large amounts.
- Administer a small test dose before IM injection to avoid the risk of anaphylaxis (greater with IM than with IV injections).
- Advise the patient to take iron supplements an hour before meals. If gastric distress occurs, suggest taking the supplement with meals and, after symptoms subside, resuming a between-meal schedule for maximum absorption.
- Inform the patient that iron salts change stool to dark green or black.
- Advise the patient to take liquid forms of iron through a straw, to rinse the mouth with water, and to practice good oral hygiene after taking this medication.
- Teach preventive education because iron-deficiency anemia is common in menstruating and pregnant women.
- Educate the patient regarding foods high in iron (e.g., organ and other meats, beans, leafy green vegetables, raisins, molasses).
- Instruct patient to avoid taking antacids or dairy products with iron (diminishes iron absorption).
- Provide nutritional counseling for those whose normal diet is inadequate.

F. The Nursing Process

Anemia will likely be the result of a larger condition that nurses will manage. Treatment will depend on the type of anemia and underlying causes such as infection, cancer, or inherited disorders. Sickle cell anemia is a complicated and severe form of anemia that requires inpatient treatment when a crisis occurs. A pain crisis is very painful and has life-threatening complications that nurses must understand how to appropriately assess for and treat.

Nursing Care Plans Related to Anemia

Imbalanced Nutrition: Less than Body Requirements Care Plan

Iron-deficient and vitamin-deficient anemia can occur due to poor dietary intake or an inability to absorb nutrients.

Nursing Diagnosis: Imbalanced Nutrition

Related to:

- a). Inability to absorb iron or vitamins., b). Lack of vitamin B12 and folate in the diet, c). Pregnancy, d). Gastric bypass surgery, e). Inflammatory bowel diseases, g). Vegetarian diet

As evidenced by:

- Pale skin, Feeling cold, Fatigue, Rapid heartbeat, Brittle nails, Hair loss, Craving ice (pagophagia), Headaches

Expected Outcomes:

a) The patients will display an improvement in iron and B-12 levels through lab testing, b). The patients will add three foods high in iron, B-12, and folic acid to their diet, c). The patients will recognize the signs and symptoms of anemia and when to call their doctor.

Imbalanced Nutrition: Less than Body Requirements Assessment

1. Assess lab values.

Monitor red blood cell count, hemoglobin, hematocrit, ferritin, iron, and total iron-binding capacity for abnormalities.

2. Assess the patient's usual diet.

Assess for nutritional gaps in the patient's diet by taking a history of foods they normally eat as well as any food allergies they may have.

3. Assess access to healthy foods.

Assess if access to food prevents the patient from obtaining nutritionally balanced foods that are high in vitamins.

Imbalanced Nutrition: Less than Body Requirements Interventions

1. Instruct on a healthy diet.

Iron-rich foods include dark green, leafy vegetables, nuts, and eggs. Foods high in vitamin B-12 include meat and dairy products. Folic acid is found in legumes, citrus juices, and dark green leafy vegetables.

2. Consider supplements.

Patients may be prescribed oral supplements of iron or vitamin B-12 (cyanocobalamin) if they cannot get enough from their diet. Patients may also receive vitamin B-12 injections regularly usually administered by a nurse.

3. Encourage prenatal supplements.

Pregnant patients should be instructed on the importance of prenatal vitamins which contain iron and folate. These vitamins are essential to support a healthy pregnancy and prevent birth defects.

4. Improve iron absorption.

Some patients struggle with absorbing iron and will need instruction on when and which foods to eat to increase absorption. It is easier for the body to absorb meat and seafood iron-containing products. Iron in vegetables, grains, and seeds is more difficult for the body to absorb. Vitamin C can help with the absorption of iron when taken with a meal. Tannins in tea and coffee can inhibit the absorption of iron.

Fatigue Care Plan

A lack of oxygen-carrying red blood cells will result in decreased energy and fatigue.

Nursing Diagnosis: Fatigue

Related to:

- Decreased hemoglobin

As evidenced by:

- Exhaustion, Inability to maintain physical activity, Increased need for rest, Reported lack of energy, Lethargy

Expected Outcomes:

a) . The patient will verbalize techniques to conserve energy, b). The patient will report an increase in energy and ability to perform tasks

Fatigue Assessment

1. Monitor CBC.

Assess the patient's complete blood count including red blood count and hemoglobin levels. These will be low in anemic patients.

2. Assess for chronic conditions that worsen anemia.

Chronic conditions can cause and contribute to anemia. These include pregnant patients, those with cancer, or autoimmune diseases. Treating the underlying cause of anemia should be a priority.

3. Assess the extent of fatigue in daily life.

Inquire about activities the patient can or cannot perform, the effect it has on their responsibilities and roles, and how they manage their symptoms.

Fatigue Interventions

1. Instruct on energy conservation.

Plan rest periods, delegate tasks to others, cluster activities together, prioritize activities when energy levels are highest.

2. Apply oxygen.

Patients being treated for anemia in the hospital may require supplemental oxygen for very low hemoglobin levels.

3. Administer blood transfusions.

If a patient is severely anemic or has suffered a blood loss causing anemia, blood transfusions may help with fatigue.

4. Administer erythropoietin injections.

Epogen and Procrit are two common injections given that stimulate the bone marrow to produce red blood cells. Patients with cancer, HIV, or kidney disease often have severe anemia and require these injections.

Acute Pain Care Plan

Acute pain is a nursing diagnosis specific to sickle cell anemia. This genetic condition causes red blood cells to 'sickle' and clump together, decreasing blood flow and perfusion causing a pain crisis.

Nursing Diagnosis: Acute Pain

Related to:

- a). Sickling of red blood cells occluding blood vessels, b). Lack of perfusion and oxygenation to extremities

As evidenced by:

- a). Intense complaint of pain anywhere in the body, b). Pain described as stabbing, sharp, or throbbing, c). Reduced activity, d). Restlessness, e). Distractive behavior (pacing, watching tv, talking on the phone)

Expected Outcomes:

- a). patient will report a decrease in pain to a level of 2/10 by discharge.,
- b). The patient will verbalize an understanding of behaviors that trigger a pain crisis.,
- c). The patient will adhere to the prescribed pain medication regimen.

Acute Pain Assessment

1. Assess pain.

Perform a complete pain assessment using a numeric or FACES pain scale. Assess character, duration, frequency, precipitating factors, and any interventions.

2. Assess for acute chest syndrome.

Acute chest syndrome is vaso-occlusion that occurs in the pulmonary vasculature. It is life-threatening and the most common cause of death in sickle cell patients. Monitor for symptoms of chest pain, fever, dyspnea, and infiltrates on a chest x-ray.

3. Assess pain medication regimen.

Many sickle cell pain crises occur due to missed doses of pain medication or an inadequate regimen. Assess the patient's adherence as well as doses and frequency of pain medication.

Acute Pain Interventions

1. Provide fluids.

IV hydration is a priority for treating a sickle cell crisis. IV fluids will stop or slow the sickling process and reduce pain. Patients should also be encouraged to drink plenty of fluids.

2. Administer analgesics.

Sickle cell patients often have a very high pain tolerance and will receive high doses of narcotics. Some patients may be on a PCA pump until their pain is better controlled. The nurse should closely monitor the patient and provide adequate pain control without over-sedating the patient.

3. Administer blood transfusions.

Depending on the patient's hemoglobin level, blood transfusions may be necessary to prevent worsening complications and correct anemia. Some patients may receive long-term transfusions monthly on an outpatient basis.

4. Educate on preventing a sickle cell crisis.

Patients should be educated on triggers of a sickle cell crisis to prevent them. Maintaining hydration, preventing infections, avoiding exposure to cold weather, reducing stress, and adhering to medications are necessary to manage sickle cell anemia.

Nursing Care for Patients with Peripheral Vascular Disease (PVD)

A. Definition

Peripheral vascular disease (PVD), also known as peripheral artery disease (PAD), is a condition characterized by **slow and progressive narrowing of the arteries of the extremities**.

This condition stems from structural damage in the blood vessels often caused by atherosclerosis. Additional risk factors include: Diabetes, Hypertension, Hyperlipidemia, Obesity, Smoking, Increasing age, over 50 years old can lead to gangrene and limb amputation in the affected extremity if left untreated. Other complications of Peripheral vascular disease(PVD) include blood clots, kidney failure, and a heightened risk of death from heart attack and stroke.

Clinical manifestations of Peripheral vascular disease(PVD) will depend on the location and extent of the blockage. Intermittent claudication is the classic sign of lower extremity Peripheral vascular disease(PVD) which is described as an ischemic muscle pain that occurs during exercise and resolves with rest. Other manifestations include the following: Paresthesias, thin, shiny, and taut skin appearance, Decreased peripheral pulses, Pallor, Reactive hyperemia.

Medical history and physical examination are important in diagnosing Peripheral vascular disease (PVD). Additionally, tests like Doppler ultrasound studies, segmental BPs, ankle-brachial index (ABI), duplex imaging, angiography, and magnetic resonance angiography aid in diagnosing Peripheral vascular disease (PVD).

B. The Nursing Process

The primary goal in the management of peripheral vascular disease is to reduce the risk of developing cardiovascular disorders and chronic conditions that affect the blood vessels. Nurses play a critical role in health promotion efforts through patient education and encouragement to adhere to risk factor modification and drug therapy.

When medications, exercise, and lifestyle changes are not enough to improve the symptoms of Peripheral vascular disease (PVD), surgical intervention for revascularization like angioplasty and bypass grafting may be indicated.

C. Nursing Care Plans Related to Peripheral Vascular Disease

Acute Pain Care Plan

Acute pain is a usual finding of peripheral vascular disease. The pain usually occurs when walking at the level distal to the blocked artery and is described as a cramp or ache. Since the pain is relieved when the patient rests, it is often left untreated and the condition is undiagnosed.

Nursing Diagnosis: Acute Pain

Related to: Vascular system blockage, Peripheral vascular disease

As evidenced by:

a). Expression of pain, cramping, or aching when walking, b). Burning pain in the feet (in severe cases), c). Muscle fatigue, d). Choosing not to partake in physical activity

Expected Outcomes:

a). The patient will verbalize reduced pain with walking. b).The patient will increase physical activity without experiencing pain.

Acute Pain Assessment

1. Assess pain characteristics.

Meticulous pain assessment can help establish the diagnosis of peripheral vascular disease. In severe cases of PVD, pain also occurs with rest. It is described as a burning pain in the feet that is worse at night and can be relieved by dangling the feet over the side of the bed.

2. Assess the patient's prior pain relief efforts.

Assessing what the patient has tried to relieve their pain and the outcome will help the nurse tailor interventions as well as aid in diagnosis.

Acute Pain Interventions

1. Administer medications as indicated.

Cilostazol is a vasodilator that can help treat claudication. It may take up to 12 weeks to take effect.

2. Encourage exercise.

Despite walking causing PVD pain, it is the best treatment for reducing disease severity. Patients should be instructed to walk until reaching their pain tolerance, pausing, and restarting once the pain is relieved. Walking sessions should last 30-45 minutes, 3-4 times per week.

3. Educate on lifestyle modifications.

Treating PVD and corresponding pain requires lifestyle modifications of maintaining a healthy weight, exercising, and managing chronic conditions.

4. Instruct the patient to avoid massaging affected extremities.

Massaging the affected extremities may feel good, but can dislodge an embolus. Speak with your doctor first before attempting.

Ineffective Peripheral Tissue Perfusion Care Plan

Patients with peripheral vascular disease have decreased peripheral tissue perfusion due to atherosclerotic plaque build-up in the arterial walls causing blocked arteries and poor circulation.

Nursing Diagnosis: Ineffective Tissue Perfusion

Related to:

a). Disease process, b). Atherosclerotic plaque buildup, c). Reduced blood flow

As evidenced by:

- Absent/weak peripheral pulses, Muscle weakness and fatigue, Cool and cyanotic skin, The skin on the legs is shiny and hairless, Decreased blood pressure in extremities., Delayed peripheral wound healing, Edema, Extremity pain, Femoral bruit, Intermittent claudication, Paresthesia, Skin color pales with limb elevation

Expected Outcomes:

- a). The patient will demonstrate adequate tissue perfusion with 3+ peripheral pulses, b). The patient will verbalize their medication regimen to manage PVD.

Ineffective Peripheral Tissue Perfusion Assessment**1. Assess peripheral pulses.**

Reduced or absent peripheral pulses indicate arterial insufficiency that can result in ischemia and necrosis.

2. Assess ankle-brachial index (ABI).

ABI measures the systolic blood pressure at the ankle compared to the arm using a manual BP cuff. An ABI less than 0.9 is found in patients with PVD.

Ineffective Peripheral Tissue Perfusion Interventions**1. Manage chronic conditions.**

Patients with PVD often have atherosclerosis, diabetes, hypertension, or other chronic conditions that affect blood vessels. Ensure patients are receiving and adhering to their treatment plan to prevent worsening complications.

2. Avoid long periods of sitting.

Ambulation is crucial in the treatment of PVD and patients should avoid sitting for long periods to increase venous return.

3. Consider the use of statins.

Statin medications used for hyperlipidemia improve atherosclerotic disease. This coupled with lifestyle changes can improve PVD.

4. Prepare the patient for surgical intervention if indicated.

Surgical intervention is usually reserved for severe cases. Prepare the patient preoperatively for revascularization procedures such as balloon angioplasty, stent placement, or bypass grafting.

Risk for Injury Care Plan

Patients with peripheral vascular disease are at risk for injury as it can significantly impair physical functioning. The patient is at risk for falls, trauma, and skin breakdown.

Nursing Diagnosis: Risk for Injury

Related to:

- a). Disease process, b). Tissue hypoxia, c). Altered peripheral sensation, d). Decreased lower extremity strength, e). Impaired balance

As evidenced by:

A risk diagnosis is not evidenced by signs and symptoms, as the problem has not occurred yet and nursing interventions are directed at the prevention of symptoms.

Expected Outcomes:

- a). The patient will remain free of injury, b). The patient will demonstrate two strategies to reduce falls and injury

Risk for Injury Assessment

1. Assess the environment and self-care abilities.

Patients with PVD are often of older age. Assess where the patient lives and if there are additional risks to safety such as stairs. Assess their ability to manage their health and if support services are needed.

2. Assess for mobility issues in addition to symptoms of PVD.

It is critical to determine the patient's functional ability and appropriately plan ways to prevent falls and other injuries.

Risk for Injury Interventions

1. Prevent falls when walking.

Initial treatment for patients with PVD and intermittent claudication is an exercise program. If patients are reluctant due to poor balance or strength, provide assistive devices such as a cane or walker.

2. Instruct the patient on foot care.

PVD coupled with diabetes increases the risk of injury to the feet from decreased blood flow and poor wound healing. Instruct the patient to wear proper footwear when walking and to inspect the feet and lower legs daily.

3. Stop smoking.

Smoking is the key risk factor for limb ischemia and increases the risk of amputation. Nurses can work with patients on finding a smoking cessation program that works for them.

4. Refer to PT/OT.

Institute the help of a physical or occupational therapist to ensure the patient's living environment is safe for activity. They can also instruct the patient on appropriate exercise programs.

Summary

Abnormalities of gas exchange in patients are present in not only those with lung disease but also others, both during the surgical procedure and in the post-operative period. Pulmonary complications especially infection, atelectasis, and thromboembolism are frequent in postoperative patients.

A patient's oxygenation status is routinely assessed using pulse oximetry, referred to as SpO₂ is an estimated oxygenation level based on the saturation of hemoglobin measured by a pulse oximeter. Because the majority of oxygen carried in the blood is attached to hemoglobin within the red blood cell, SpO₂ estimates how much hemoglobin is "saturated" with oxygen

When assessing a patient's oxygenation status, it is important for the nurse to have an understanding of the underlying structures of the respiratory system to best understand their assessment findings. Visit the "Respiratory Assessment" chapter for more information about the structures of the respiratory system. The target range of SpO₂ for an adult is 94-98%. For patients with chronic respiratory conditions, such as COPD, the target range for SpO₂ is often lower at 88% to 92%. Although SpO₂ is an efficient, noninvasive method to assess a patient's oxygenation status, it is an estimate and not always accurate. For example, if a patient is severely anemic and has a decreased level of hemoglobin in the blood, the SpO₂ reading is affected. Decreased peripheral circulation can also cause a misleading low SpO₂ level.

A more specific measurement of oxygen and carbon dioxide in the blood is obtained through an Arterial Blood Gas (ABG) results are often obtained for patients who have deteriorating or unstable respiratory status requiring urgent and emergency treatment. An Arterial Blood Gas (ABG) is a blood sample that is typically drawn from the radial artery by a respiratory therapist, emergency or critical care nurse, or health care provider. Arterial Blood Gas (ABG) results evaluate oxygen, carbon dioxide, pH, and bicarbonate levels. The partial pressure of oxygen

in the blood is referred to as. The normal PaO₂ level of a healthy adult is 80 to 100 mmHg. The PaO₂ reading is more accurate than a SpO₂ reading because it is not affected by hemoglobin levels. The PaCO₂ level is the partial pressure of carbon dioxide in the blood. The normal PaCO₂ level of a healthy adult is 35-45 mmHg. The normal range of pH level for arterial blood is 7.35-7.45, and the normal range for the bicarbonate level is 22-26. The level is also obtained, which is the calculated arterial oxygen saturation level.

Review Question

1. Characteristics of the *Mycobacterium tuberculosis* include all of the following except:
 - A. It can be transmitted only by droplet nuclei.
 - B. It is acid-fast.
 - C. It is able to lie dormant within the body for years.
 - D. It survives in anaerobic conditions.**
2. It is estimated that *Mycobacterium tuberculosis* infects about what percentage of the world's population?
 - A. 10%.
 - B. 25%.
 - C. 35%.**
 - D. 50%.
3. For the tubercle bacilli to multiply and initiate a tissue reaction in the lungs, it must be deposited in:
 - A. The alveoli.**
 - B. The bronchi.
 - C. The trachea.
 - D. All of the above.

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CHAPTER 7

NURSING CARE CONCEPTS

FOR PATIENTS WITH FLUID DISORDERS

Introduction

Dynamic fluid and electrolyte balance systems maintain biological homeostasis. Every condition, disorder, and change that affects healthy and sick people can cause fluid and electrolyte balance difficulties. Nurses must understand fluid, electrolyte, and acid-base physiology to detect and treat abnormalities. Maintaining fluid and electrolyte balance is crucial for all patients in all clinical settings (Brunner & Suddarth, 2021).

Chemistry governs fluid and electrolyte equilibrium. Solute small particles and solvents liquid mediums—make up a solution. Cells comprise plasma-suspended blood. Blood cells include leukocytes, platelets, and erythrocytes. Plasma is 92% water with electrolytes such as proteins (mainly albumin), glucose, lipoproteins, and mineral ions (Brunner & Suddarth, 2021).

Major diseases and injuries disrupt the body's homeostatic mechanisms, causing fluid and electrolyte imbalances. Burns and heart failure cause fluid and electrolyte imbalances. Diuretics and colonoscopy preparation can worsen imbalances. Surgery can cause fluid and electrolyte imbalances due to fluid restrictions, blood or fluid loss, and stress.

Fluid and electrolyte shortages or surpluses are common. Hypervolemia and hypovolemia are common clinical issues. ECF volume disparities often occur with serum sodium anomalies. This chapter covers each imbalance separately, but most patients have several. During

nasogastric (NG) suction, patients lose sodium, potassium, hydrogen, and chloride ions. HCl acid loss can cause metabolic alkalosis, sodium and potassium deficiency, and dehydration (Lewis, 2020).

A fluid volume deficit can come from inadequate fluid intake, plasma to interstitial fluid conversion, or excessive fluid loss from diarrhoea, vomiting, bleeding, or polyuria. Despite their similarities, dehydration and fluid volume deficiency are distinct conditions. Dehydration is water loss without salt loss (Lewis, 2020).

Key Term

1. Pyelonephritis
2. Glomerulonephritis
3. Nephrotic syndrome
4. Urinary tract Obstruction
5. Kidney failure
6. Diabetes insipidus

Learning Objectives

1. Identify the etiology, epidemiology, and pathophysiology of Pyelonephritis.
2. Recall, analyze, and select appropriate history, physical, and evaluation of Pyelonephritis.
3. Explain the treatment and management options available for Pyelonephritis.
4. Identify the etiology, epidemiology, and pathophysiology of Glomerulonephritis.
5. Recall, analyze, and select appropriate history, physical, and evaluation of Glomerulonephritis.
6. Explain the treatment and management options available for Glomerulonephritis.

7. Identify the etiology, epidemiology, and pathophysiology of Nephrotic syndrome.
8. Recall, analyze, and select appropriate history, physical, and evaluation of Nephrotic syndrome.
9. Explain the treatment and management options available for Nephrotic syndrome.
10. Identify the etiology, epidemiology, and pathophysiology of Urinary tract obstruction.
11. Recall, analyze, and select appropriate history, physical, and evaluation of Urinary tract obstruction.
12. Explain the treatment and management options available for Urinary tract obstruction.
13. Identify the etiology, epidemiology, and pathophysiology of Kidney failure.
14. Recall, analyze, and select appropriate history, physical, and evaluation of Kidney failure.
15. Explain the treatment and management options available for Kidney failure.
16. Identify the etiology, epidemiology, and pathophysiology of Diabetes Insipidus.
17. Recall, analyze, and select appropriate history, physical, and evaluation of Diabetes Insipidus.
18. Explain the treatment and management options available for Diabetes Insipidus.

A. Nursing Care for Patients with Pyelonephritis

a. Definition

Pyelonephritis is renal parenchyma and collecting system inflammation. Bacteria, fungi, protozoa, and viruses can infect the kidney. Early pyelonephritis colonises and infects the lower urinary tract via the ascending urethral channel. Pyelonephritis is often caused by gut bacteria as *E. coli*, *Proteus*, *Klebsiella*, and

Enterobacter. Lower urinary tract dysfunction, vesico-ureteral reflux (the retrograde or backward transit of urine from the lower to the upper urinary tract), strictures, urinary stones, or BPH blockage are sometimes present. In acute pyelonephritis, the renal medulla extends to the cortex. Chronic pyelonephritis can cause kidney scarring and impaired function (Bucher, 2019).

b. Clinical Manifestation

The classic manifestations of acute pyelonephritis include:

- a) fever/chills,
- b) nausea/vomiting
- c) Malaise, and
- d) flank pain

c. Medical Management

Hospitalization is necessary for patients with severe infections or complicating conditions like nausea vomiting, and dehydration. For 14 to 21 days, patients with minor symptoms may receive outpatient antibiotic therapy. In the hospital, parenteral antibiotics are frequently administered at first to quickly raise serum and urinary drug levels. The patient may be released with an oral antibiotic regimen in place for an additional 14 to 21 days after the initial treatment has successfully treated acute symptoms and the patient can tolerate oral fluids and medications. Within 48 to 72 hours of beginning therapy, symptoms, and indicators usually get better or go away.

d. Diagnostic:

- a) History and physical examination
- b) Blood culture (if bacteraemia is suspected)
- c) CBC count with WBC differential
- d) Palpation for flank pain

- e) Ultrasound (initially), IVP, VCUG, radionuclide imaging, CT scan
- f) Urinalysis
- g) Urine for culture and sensitivity

e. Collaborative Therapy

Mild Symptoms

- a) Adequate fluid intake
- b) Follow-up urine culture and imaging studies
- c) Nonsteroidal anti-inflammatory drugs or antipyretic drugs
- d) Outpatient management or short hospitalization for IV antibiotics:
 - 1. Empirically selected broad-spectrum antibiotics (ampicillin, vancomycin) combined with an aminoglycoside (e.g., tobramycin, gentamicin)
 - 2. Switch to sensitivity-guided therapy (when results available) for 14–21 days
 - 3. Trimethoprim–sulphamethoxazole (Septra)
 - 4. Fluoroquinolones (e.g., ciprofloxacin [Cipro], norfloxacin)

Severe Symptoms

- a) Adequate fluid intake (initially parenteral; switched to oral fluids as nausea, vomiting, and dehydration subside)
- b) Hospitalization
- c) Nonsteroidal anti-inflammatory or antipyretic drugs to reverse fever and relieve discomfort
- d) Parenteral antibiotics:
 - 1. Empirically selected broad-spectrum antibiotics (e.g., ampicillin, vancomycin) combined with an aminoglycoside (e.g., tobramycin, gentamicin)
 - 2. Switch to sensitivity-guided antibiotic therapy when results of urine and blood cultures are available

3. Oral antibiotics when patient tolerates oral intake; administer for 7–21 days
- e) Urinary analgesics (e.g., to relieve bothersome lower urinary tract symptoms)
- f) Follow-up urine culture and imaging studies

f. Nursing Management

a) Assessment

1. Subjective Data

Important Health Information

Past health history: Previous UTIs; urinary calculi, stasis, reflux, strictures, or retention; neurogenic bladder; pregnancy; prostatic hyperplasia; sexually transmitted infection; bladder cancer

Medications: Use of antibiotics, anticholinergics, antispasmodics
Surgery or other treatments: Recent urological instrumentation (catheterization, cystoscopy, surgery)

2. Symptoms

- a. Lassitude, malaise
- b. Nausea, vomiting, and anorexia; chills
- c. Suprapubic or low back pain, pressure in the bladder area, costovertebral tenderness; bladder spasms, dysuria, burning on urination, sense of incomplete emptying
- d. Urinary frequency, urgency, hesitancy; nocturia

3. Objective Data

- a. General: Fever
- b. Urinary: Hematuria; cloudy, foul-smelling urine; tender, enlarged kidney
- c. Possible Findings: Leukocytosis; urinalysis positive for bacteria, pyuria, RBCs, and WBCs; positive urine culture; IVP, CT scan, ultrasound, voiding

cystourethrogram, and cystoscopy demonstrating abnormalities of urinary tract

b) Nursing Diagnoses

1. Impaired urinary elimination related to multiple causality (effects of UTI)
2. Readiness for enhanced health management as evidenced by expressed desire to enhance management of risk factors

c) Planning

1. relief of pain,
2. normal body temperature,
3. no complications,
4. normal renal function, and
5. no recurrence of symptoms.

d) Nursing Implementation Health Promotion

Health promotion and cystitis treatment are similar (see “Nursing Management: Urinary Tract Infection,” earlier in this chapter). Early cystitis treatment prevents infections from spreading. Since anatomical urinary tract defects increase infection risk, they should be reminded of the significance of routine medical treatment.

e) Acute Intervention and Home Care.

Symptom intensity determines nursing interventions. Interventions include training and working with the patient to promote a knowledge of the illness process, emphasizing

1. the need to continue medicines as prescribed,
2. the necessity for a follow-up urine culture to confirm correct care, and
3. Risk assessment for relapse

After antibiotic treatment, patients should consume eight glasses of liquids daily. Rest improves patient comfort. Long-term, low-dose antibiotics may help relapsed patients. Understanding therapy rationale helps patients control disease.

Nursing Care for Patients with Glomerulonephritis

a. Definition

Urinary tract immunology mostly affects the renal glomerulus. Immune-related glomerulonephritis causes proteinuria, haematuria, reduced urine output, and oedema. Each kidney is affected. Tubular, interstitial, and vascular alterations accompany glomerulus inflammation.

Glomerulonephritis is classified by

- a) the extent of damage (diffuse or focal),
- b) the initial aetiology (systemic lupus erythematosus, systemic sclerosis [scleroderma], streptococcal infection),
or
- c) the level of alterations (minimum or widespread).

Glomerulonephritis, a glomeruli infection, affects both kidneys equally. It causes third-most ESRD in the US. The kidney can have tubular, interstitial, vascular scarring, and hardness (glomerulosclerosis) in addition to inflammation in the glomerulus.

Several disorders are associated to glomerulonephritis. These include kidney infections, kidney-harming drugs, immune system difficulties, and systemic illnesses. Chronic or acute glomerulonephritis is possible. Acute glomerulonephritis develops quickly. They may be temporary or irreversible. APSGN is an example. Chronic glomerulonephritis progresses slowly, causing irreversible renal failure. Diagnostic testing, history,

recent illnesses such as sore throats or upper respiratory tract infections, and diabetes diagnoses help identify glomerulonephritis type.

b. Clinical Manifestation

Glomerulo-nephritis symptoms include microscopic to severe hematuria and urine discharge of RBCs, WBCs, and casts. Proteinuria, elevated BUN, and elevated creatinine are other signs. Acute illness usually heals. Progression causes renal tissue destruction and renal insufficiency.

Understanding glomerulonephritis requires a patient's medical history. Medication, immunization, microbiological, and viral infections including hepatitis must be assessed. Systemic lupus erythematosus and systemic sclerosis should also be checked.

c. Diagnostic

- a) History and physical examination
- b) BUN, serum creatinine, and albumin
- c) CBC
- d) Complement levels and ASO titer
- e) Renal biopsy (if indicated)
- f) Urinalysis
- g) Collaborative Therapy
- h) Adjustment of dietary protein intake to the level of proteinuria and uraemia
- i) Antihypertensive therapy
- j) Diuretics
- k) Rest
- l) Sodium and fluid restriction

d. Nursing Care of the Patient with Glomerulonephritis

a) Assessment

UTI assessment. Acute glomerulonephritis patients should note symptoms, recent infections (particularly sore throat or skin sores), and urine alterations. Look for fluid around the eyes, limbs, and abdomen during the physical exam. Tissue turgor. Dyspnea, tachycardia, and hypertension indicate high fluid volume. Accurate intake and output data and daily weights assist evaluate the kidneys' fluid excretion.

b) Interventions

1. Excess Fluid Volume

Take diuretics as prescribed. Track fluid intake and output. Instruct patients and families to meticulously document intake and outflow. Explain why fluids are limited and help the patient schedule them. Limiting fluids is distressing. Instead of a few ounces in a large glass, serve fluids in little containers. Edoema requires special skin care. Tense, bulging tissue is readily damaged and recovers slowly.

2. Low Activity Tolerance.

Activity intolerance can result from infection, anaemia, or toxins. For renal recovery, limit activity during acute illness. Explain how rest helps recovery. Schedule rest breaks. Bedrest can cause skin disintegration, pneumonia, muscle weakness, joint stiffness, constipation, and thrombus development. "Inadequate Condition Management." Change positions, cough, deep breathe, and gently exercise joints every two hours.

Patients must understand rest, food, and drugs. Help with ADLs. Stress follow-up care. After discharge,

emphasise reporting recurrence indicators such as urine changes or oedema. As oedema and fatigue subside, instruct the patient to increase activities.

Acute glomerulonephritis patients may worry about developing a life-threatening illness. Allow patient queries and concerns. Helpful treatments include listening, providing accurate information, and recommending to professionals.

Nursing Care for Patient with Nephrotic Syndrome

a. Definition

Proteinuria, low plasma albumin, and oedema originate from glomerulus hyperpermeability in nephrotic syndrome. Several diseases can cause nephrotic syndrome. One-third of persons with nephrotic syndrome have a systemic illness like diabetes or lupus. The others have idiopathic nephrotic syndrome.

b. Etiology and Clinical Manifestations

Symptoms include peripheral oedema, severe proteinuria, dyslipidemia, and hypoalbuminemia. Blood chemistries include low serum albumin, total serum protein, and cholesterol. Increased glomerular membrane permeability in nephrotic syndrome causes proteinuria. This discharge lowers serum protein, causing oedema. Severe hypoalbuminemia causes ascites and anasarca. Lower plasma oncotic pressure from fewer serum proteins stimulates hepatic lipoprotein synthesis, causing dyslipidemia. Initial cholesterol and LDL are high. Triglycerides rise later. Urine often contains fatty casts.

Peripheral oedema, severe proteinuria, hyperlipidemia, hypoalbuminemia, and frothy urine are typical. Increased glomerular membrane permeability causes large protein excretion in urine. Reduced total serum protein causes oedema.

Severe hypoalbuminemia causes ascites and anasarca. Hyperlipidemia occurs from lower serum protein plasma oncotic pressure, which increases hepatic lipoprotein production. Cholesterol and LDL triglycerides can rise significantly. Foamy urine is caused by fatty casts. Impaired immunity. Infection risk rises. Hypocalcaemia, decreased parathyroid hormone response, hyperparathyroidism, and osteomalacia can develop. Hypercoagulability in nephrotic syndrome is dangerous. Hypercoagulability increases pulmonary embolism and deep vein or renal thrombus risk.

c. Causes of Nephrotic Syndrome

Primary Glomerular Disease

- a) Focal-segmental glomerulosclerosis
- b) Membranous glomerulopathy
- c) Minimal-change disease

Secondary Causes Cancers

- a) Hodgkin lymphoma
- b) Leukaemia
- c) Solid tumors of lungs, colon, stomach, breast, renal, prostate

Drugs

- a) Captopril
- b) Heroin
- c) Lithium
- d) NSAIDs
- e) Penicillamine

Infections

- a) Bacterial (streptococcal, syphilis)
- b) Protozoal (malaria)
- c) Viral (hepatitis, HIV, mononucleosis)

Multisystem Disease

- a) Amyloidosis
- b) Diabetes
- c) SLE

d. Collaborative Care

Nephrotic syndrome is treated symptomatically (Mayo Clinic Staff, 2012). The goals are to treat oedema while also curing or controlling the fundamental illness. Angiotensin-converting enzyme inhibitors, nonsteroidal anti-inflammatory medications, and a low-sodium (2-3 g/day), low- to moderate-protein (0.5-0.6 g/kg of body weight per day) diet are used to treat oedema. Dietary salt limitations are essential for oedema management. Thiazide or loop diuretics may be required in some cases. If urine protein loss exceeds 10 g/24 hr, nutritional protein may be required. Dyslipidaemia treatment is frequently ineffective. However, lipid-lowering medications such as colestipol (Colestid) and lovastatin may result in mild reductions in serum cholesterol levels. If thrombosis is discovered, anticoagulant medication may be required for up to 6 months. In severe cases of nephrotic syndrome, corticosteroids and cyclophosphamide (Procytox) may be utilized. Diabetes management and oedema treatment are the only treatments for nephrotic syndrome caused by diabetes.

e. Nursing Care and Interprofessional Care

- a) Nephrotic syndrome's cause dictates treatment. Curing and alleviating symptoms are the goals. Cyclophosphamide and corticosteroids may help. Membranous glomerulonephritis and lupus nephritis respond differently to prednisone. Nephrotic syndrome requires diabetes management. Angiotensin-converting enzyme inhibitors or receptor blockers diminish urine protein losses.

b) Loop diuretics help oedema.

Lipid-lowering drugs treat hyperlipidemia. Anticoagulants can treat thrombosis.

The patient is given a low-sodium (2 g/day) and low-moderate protein (1 g/kg/day) diet. Protein may be needed if urinary protein losses exceed 10 g/day.

Usually anorexic. Urine protein loss can cause malnutrition.

To increase intake, serve small, frequent meals in a pleasant setting.

f. Nursing Management

Nephrotic syndrome patients need oedema management. Daily weight, intake and outflow, and belly girth or extremities size are essential for oedema monitoring.

Daily comparisons let the nurse assess therapy efficacy. Clean oedematous skin thoroughly. Avoid trauma and monitor diuretic efficacy.

Due to urine protein loss, nephrotic syndrome patients may become malnourished or anorexic. Maintaining a low-to-moderate-protein, low-sodium diet is difficult. Small, frequent, and pleasurable meals may increase food consumption. Patients should avoid sick people due to their infection vulnerability. Oedematous nephrotic syndrome patients need help adjusting to their new body image.

Nursing Care for Patient with Urinary Tract Obstruction

a. Pathophysiology

Calcium salts, uric acid, magnesium ammonium phosphate (struvite), or cystine precipitate most calculi. Urine contains these chemicals. Concentrated urine, excessive vitamin D, animal protein, oxalates, sodium, sugar, vitamin C, and calcium-based antacids can cause calculi. Low dietary calcium intake,

familial history, hyperparathyroidism, gout, diabetes, obesity, gastric bypass procedure, Crohn's disease, renal tubular acidosis, immobility, urinary stasis, sedentary lifestyle, altered urine pH, and lack of kidney material that inhibits calculi formation

Evidence suggests that calculi production is linked to insufficient calcium consumption. According to Pagana et al. (2017), the pH range of urine is typically 4.6 to 8.0, making it acidic. Some chemicals tend to precipitate in alkaline urine, preventing the formation of calculi, while others do so in acidic urine. Because *Proteus*, *Klebsiella*, and *Pseudomonas* cause the urine to become alkaline, UTIs, particularly those brought on by these pathogens, are linked to calculi. A decrease in the chemicals the kidneys secrete may help calculi form because they are thought to prevent their formation. The ureters carry most calculi from the kidney (nephrolithiasis) to the bladder (urolithiasis).

b. Signs and Symptoms

Patients seek care for pain. Pain location and features may indicate calculus location. Dull flank pain signals a renal pelvis calculus or renal capsule stretching from urine retention (hydronephrosis). A calculus in a ureter causes excruciating abdominal discomfort that radiates to the groin or perineum. To remove the calculus, the ureter spasms (colic). Pain, nausea, and hematuria may occur. UTI symptoms may appear.

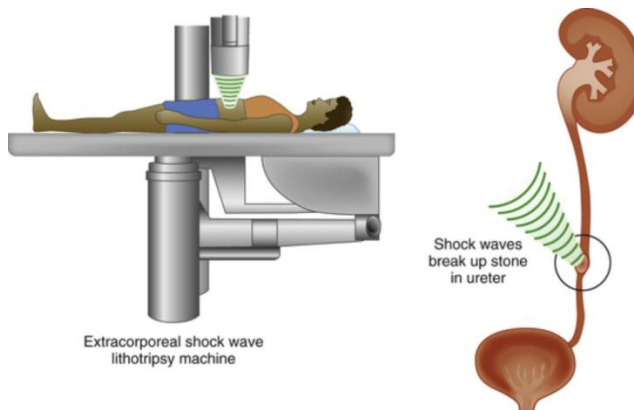
c. Medical Diagnosis

When stones are suspected, a computed tomography (CT) scan is the standard imaging approach. Typically, routine urinalysis, culture, and sensitivity tests are also requested. If a calculus can be acquired, a laboratory analysis can be used to establish its composition. To rule out further sources of pain, such as acute cholecystitis, pyelonephritis, musculoskeletal discomfort,

duodenal ulcer, and abdominal aortic aneurysm, additional diagnostic procedures may be performed.

d. Medical Treatment

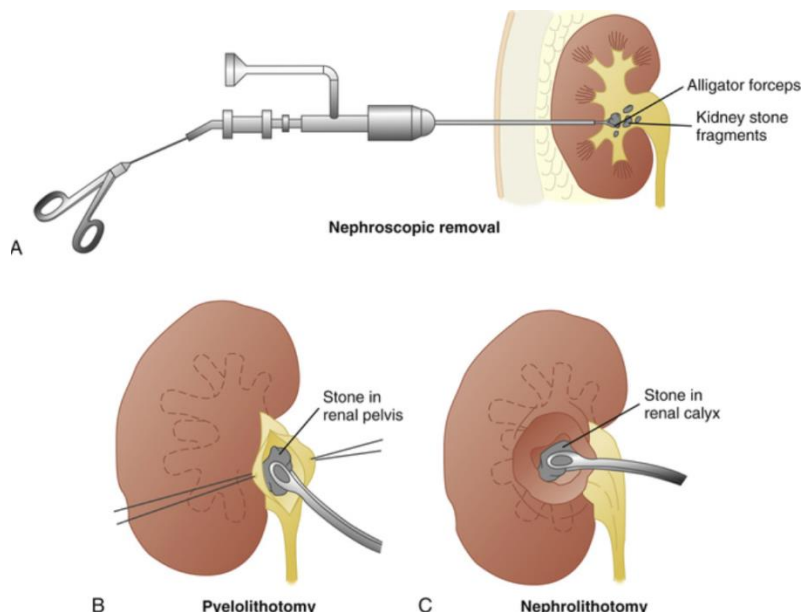
Calculi often self-correct. Ambulation may help pass calculi. The severe, colicky pain is treated with parenteral or opioid NSAIDs and antispasmodics. Intravenous fluids are routinely given, but they do not improve stone clearance. If calculus manipulation or infection is present. If the calculus doesn't pass and symptoms linger, there are many ways to remove it. Percutaneous nephrostolithotomy, lithotripsy, cystoscopic stone removal, and ureteral stents are options.



Picture 1. “Extracorporeal shock wave lithotripsy (ESWL). (From Monahan FD, Drake DT, Neighbors M, editors. *Medical-Surgical Nursing: Foundations for Clinical Practice*, 2nd ed. Philadelphia: Saunders; 1998.)”

e. Surgical Procedures

Surgery may be needed if calculi do not pass spontaneously or with a lithotripter. Lithotomy involves cutting an organ or duct to remove a calculus. Nephrolithotomy is the kidney calculus surgery. Pyelolithotomy removes kidney calculi. Ureter lithotomy removes calculi.



Picture 2. "Surgical procedures for renal calculi. (A) Nephroscopy. (B) Pyelolithotomy. (C) Nephrolithotomy. (From Black JM, Hawks JH. *Medical-Surgical Nursing: Clinical Management for Positive Outcomes*, 8th ed. St. Louis: Saunders; 2009.)"

f. Prevention

Renal calculi prevention is crucial. Long-term therapy of these people requires a high fluid intake to dilute urine, dietary restrictions for certain stones (e.g., animal protein, purines), regular exercise, and sometimes "medications to alter the urine pH." Urine output of at least 2 L/day indicates adequate fluid

intake. Perspiration in hot temperatures may require more fluid intake. Thiazide diuretics and allopurinol can treat high urine calcium and uric acid, respectively. Order potassium citrate and magnesium for oxalate stones. Dietary management outperforms medication.

g. Nursing Care Plan

a) Assessment

Health History

A 40-year-old lady was admitted with acute flank and stomach pain, nausea, and vomiting. She took amlodipine 5 mg daily for hypertension and lovastatin 20 mg at bedtime for high cholesterol.

Physical Examination

Vital signs include oral temperature of 100°F (37.8°C), blood pressure of 136/76 mm Hg, pulse of 90 beats per minute, and breathing of 20 breaths per minute. 5'11" tall, 200 lbs. She is groggy but aware of time, place, people, and surroundings. Her belly is soft, and there is no bladder distention visible. She just urinated 350 mL of pink-tinged urine, and she feels right lower abdominal pain that is rated as "5" on a scale of 1 to 10. Intravenous fluids are being infused at a rate of 125 mL/h.

b) Nursing Diagnoses

Urinary tract lithiasis nursing diagnosis may include:

- 1) Trauma-related urinary impairment
- 2) Stone-induced acute pain
- 3) Lack of information and experience with urinary stones

c) Problem, Outcome, and Interventions

1) Pain related to ureter obstruction

Outcome: Patient will report pain decrease to a level of “3” or below on a 1–10 pain scale.

Interventions:

1. Assess pain characteristics.
2. Administer analgesics and antispasmodics as ordered.
3. Assist with ambulation when permitted to promote passage of calculus fragments.
4. Position changes, back rubs, relaxation, and imagery may be used to relieve pain.
5. Document effects of pain relief interventions.”

2) Reduced urinary elimination related to obstruction

Outcome: Patient’s urine output will be approximately equal to fluid intake (e.g., 1 L input approximately equal to 1 L output).

Interventions:

1. Measure all fluid intake and output.
2. Report low output to health care provider.
3. Strain all urine to collect calculi fragments.
4. Send fragments to laboratory for analysis.
5. Maintain intravenous fluids as ordered.

3) Potential for decreased cardiac output related to blood loss

Outcome: Patient’s cardiac output will remain normal, as evidenced by vital signs consistent within what is expected for the average healthy 40-year-old female and by absence of tachycardia, hypotension, or restlessness

Interventions:

1. Assess the abdomen and groin area for bruising; some is expected; report increased redness and bruising.
2. Note red color and report increased viscosity of urine associated with bleeding.
3. Monitor vital signs to detect signs of decreasing cardiac output: tachycardia, restlessness, and hypotension.”

4) Inability to perform self-care and manage care after lithotripsy related to lack of knowledge of prevention and treatment of calculi, self-care after lithotripsy.

Outcome: Patient will effectively manage self-care, as evidenced by correct description of self-care after lithotripsy and measures to prevent recurrence of calculi.

Interventions:

1. Tell the patient that the fragments of the stones are usually passed in the urine over a period of several weeks and may cause some pain.
2. Administer antibiotics as ordered and emphasize the importance of treating any new urinary tract infections (UTIs) to reduce the risk of calculi formation.
3. Advise the patient to consume enough fluid daily to produce at least 2 L of output unless the health care provider prescribes less.
4. Fluids should be consumed around the clock to prevent concentration during the night. If any dietary restrictions are imposed, request a dietary consultation to explain them to the patient.

5) Pain

Outcome: Pain relief: patient states pain has been alleviated or relieved, and reports pain is decreased from prior assessment

Interventions:

1. Give intravenous opioids or NSAIDs to ease discomfort.
2. Antispasmodics are prescribed for ureteral smooth muscle spasms. If pain is intermittent, the patient may walk when comfortable to help the calculus pass through the urinary tract.
3. Opioids require safeguards. If calculus enters the bladder or urethra, pain may disappear.

6) Reduced urinary output related to obstruction

Outcome: Unobstructed urine elimination: urine output equal to fluid intake

Interventions:

1. Maintain accurate records of fluid intake and output and report low output to the health care provider.
2. In addition, all urine is strained and examined for calculi.
3. If any calculi are recovered, send them to the laboratory for analysis.

Nursing Care for Patients with Kidney Failure

- A. Kidney failure is any condition that impairs kidney function. Acute kidney injury (AKI) and chronic renal disease are characterised by onset and reversibility. Rapid-onset AKI may be reversible. Depending on additional diseases or complications, in-hospital mortality can reach 62%. Chronic kidney disease (CKD) progresses irreversibly over months or years. Renal replacement therapy

(RRT)—dialysis or transplantation—is required for long-term survival in stage 5 CKD. Early CKD care focuses on prevention and slowing disease development and teaching patients about RRT therapy options so they can make an informed decision.

	Acute Kidney Injury	Chronic Kidney Disease
Onset	Sudden	Gradual, often over many years
Most common cause	Acute tubular necrosis	Diabetic nephropathy
Diagnostic criteria	Acute reduction in urine output, elevation in serum creatinine, or both	GFR <60 mL/min/1.73 m ² for >3 mo, kidney damage >3 mo, or both
Reversibility	Potentially	Progressive and irreversible
Mortality	High (~60%)	19%–24% (patients on dialysis)
Primary cause of death	Infection	Cardiovascular disease

Picture 3. GFR, glomerular filtration rate. Source: Kellum, J., Bellomo, R., & Ronco, C. (2008). Definition and classification of acute kidney injury. *Nephron Clinical Practice*, 109(4), 182–187. doi:10.1159/000142926; and U.S. Renal Data System. (2008). *USRDS 2008 annual data report: Atlas of end-stage renal disease*. Bethesda, MD: National Institute of Diabetes and Digestive and Kidney Diseases.

1. Acute Kidney Injury

Acute kidney injury (AKI) is a broader term than acute renal failure (ARF) and encompasses patients with varying degrees of kidney injury (Moreland & Phiri, 2015). AKI is a sudden kidney impairment that raises blood creatinine, lowers urine production, or both, according to Moreland & Phiri (2015). Dysfunction can range from a minor elevation in serum creatinine or a decrease in urine output to azotemia (a buildup of nitrogen waste products

like urea nitrogen and creatinine in the blood). AKI's mortality rate remains high despite management advancements (Libório, Leite, Neves, et al., 2015). AKI usually affects those with life-threatening conditions. AKI usually follows prolonged hypotension, hypovolemia, or nephrotoxic exposure. ARF linked with AKI causes oliguria and rising BUN, creatinine, and potassium levels. 60% of ICU patients have severe AKI.

a. Etiology and Pathophysiology

Common Cause Prerenal:

a) Decreased Cardiac Output

- 1) Cardiogenic shock
- 2) Dysrhythmias
- 3) HF
- 4) MI

b) Decreased Peripheral Vascular Resistance

- 1) Anaphylaxis
- 2) Neurologic injury
- 3) Septic shock Decreased Renovascular Blood Flow
- 4) Bilateral renal vein thrombosis
- 5) Embolism
- 6) Hepatorenal syndrome
- 7) Renal artery thrombosis
- 8) Hypovolemia
- 9) Burns
- 10) Dehydration
- 11) Excessive diuresis
- 12) GI losses (diarrhea, vomiting)
- 13) Haemorrhage
- 14) Hypoalbuminemia

Common cause intrarenal

a) Interstitial Nephritis

- 1) Allergies: antibiotics (sulphonamides, rifampin), NSAIDs, ACE inhibitors
- 2) Infections: bacterial (acute pyelonephritis), viral (Epstein-Barr), fungal (candidiasis)

b) Nephrotoxic Injury

- 1) Chemical exposure: ethylene glycol, lead, arsenic, carbon tetrachloride
- 2) Contrast media
- 3) Drugs: aminoglycosides (gentamicin, amikacin), amphotericin B
- 4) Haemolytic blood transfusion reaction
- 5) Severe crush injury

c) Other

- 1) Acute glomerulonephritis
- 2) Malignant hypertension
- 3) Prolonged prerenal ischemia
- 4) Systemic lupus erythematosus
- 5) Thrombotic disorders
- 6) Toxaemia of pregnancy

Common cause postrenal

a) BPH

b) Bladder cancer

c) Calculi formation

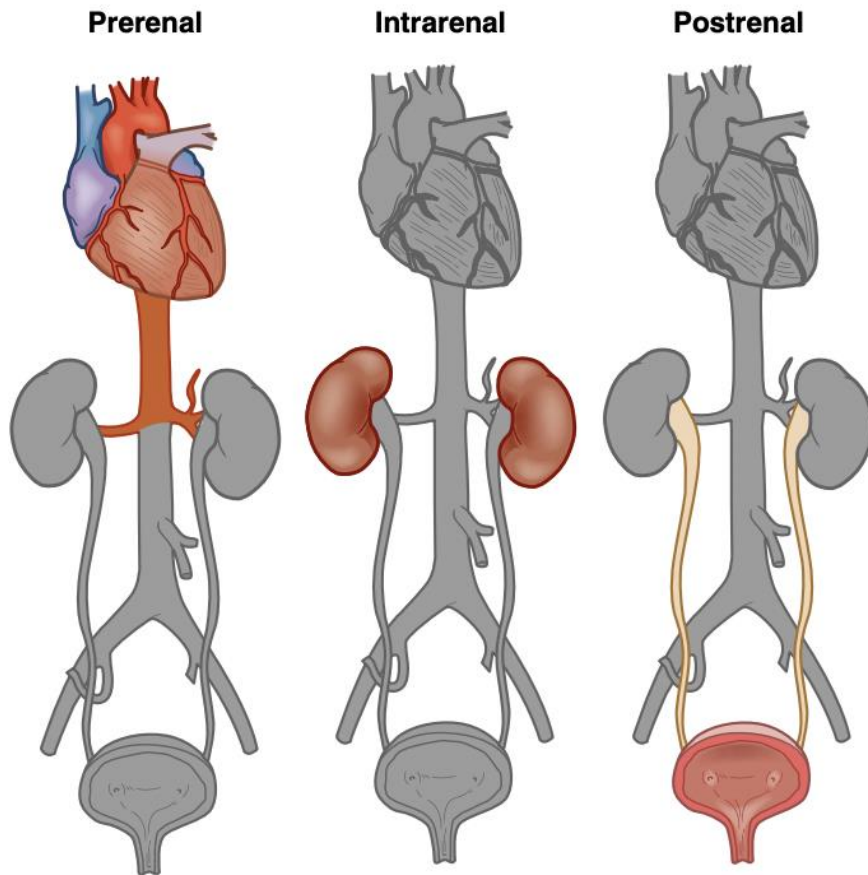
d) Neuromuscular disorders

e) Prostate cancer

f) Spinal cord disease

g) Strictures

h) Trauma (back, pelvis, perineum)



Picture 4. Prerenal, intrarenal, and postrenal causes of AKI. Definition and classification of acute kidney injury. *Nephron Clinical Practice*, 109(4), 182–187. doi:10.1159/000142926; and U.S. Renal Data System. (2008). *USRDS 2008 annual data report: Atlas of end-stage renal disease*. Bethesda, MD: National Institute of Diabetes and Digestive and Kidney Diseases

b. Diagnostic Criteria

RIFLE Classification for Acute Kidney Injury

Table 1. RIFLE Classification for Acute Kidney Injury

Stage	GFR Criteria	Urine Output Criteria	Clinical Example
Risk	Serum creatinine increased $\times 1.5$ OR GFR decreased by 25%	Urine output 0.5 ml/kg/hr for 6 hr	<ul style="list-style-type: none"> • 68-year-old patient with type 2 diabetes, hypertension, CAD, CKD • Scheduled for emergency coronary artery bypass graft • Serum creatinine is 1.8 mg/dl. (increased), weight 60 kg • Calculated GFR is 35 ml/min/1.73 m² • Has stage 3 CKD
Injury	Serum creatinine increased $\times 2$ OR GFR decreased by 50%	Urine output <0.5 mL/kg/hr for 12 hr	<ul style="list-style-type: none"> • During surgery, hypotensive for a sustained period • Diagnosed with acute tubular necrosis • After surgery: serum creatinine is 3.6 mg/dl., urine output reduced to 28 mL/hr
Failure	Serum creatinine increased $\times 3$ OR GFR decreased by 75% OR Serum creatinine > 4 mg/dl with acute rise ≥ 0.5 mg/dL	Urine output <0.3 mL/kg/hr for 24 hr (oliguria) Anuria for 12 hr	<ul style="list-style-type: none"> • 72 hr after surgery, develops ventilator-associated pneumonia and sepsis while in ICU • Serum creatinine rises to 5.2 mg/dl, urine output drops to 10 ml/hr • BP remains low despite dopamine therapy
Loss	Persistent acute kidney failure. Complete loss of kidney function >4 weeks	-	<ul style="list-style-type: none"> • Starts on continuous venovenous hemodialysis • After 3 weeks of therapy has a cardiopulmonary arrest and does not survive
End-stage renal disease	Complete loss of kidney function >3 months	-	-

c. Clinical Manifestations

1. Initial phase: rising BUN and serum creatinine with normal to decreased urine production. To prevent future impairment, reversing renal function is the main therapy goal.
2. Oliguric (Anuric) Phase: 400 mL or less urine per day. Serum BUN, creatinine, potassium, and phosphorus rise. Ca²⁺ and bicarbonate drop. The 8–14-day oliguric phase follows the initial stage. The tubules cannot concentrate urine, resulting in a fixed urine-specific gravity of 1.010. Hypervolemic patient
3. Diuretic Phase: Urine output is 400–4 L/day. Wastes collect in the blood despite significant urine production. In the late diuretic stage, the kidneys expel BUN, creatinine, potassium, and phosphorus and retain calcium and bicarbonate. Kidney function returns. This period requires monitoring electrolyte depletion.
4. Recovery Phase: Renal tissue recovers, restoring serum electrolytes, BUN, and creatinine to normal and restoring glomerular filtration rate to 70% to 80% (Dirkes, 2015). Recovery takes months to a year (Dirkes, 2015). Renal insufficiency or chronic renal failure may result from incomplete recovery. 80% function loss indicates renal insufficiency. Renal insufficiency can be managed until other illnesses strain kidney function.

d. Diagnostic Assessment

1. History and physical assessment
2. Identify cause
3. Serum creatinine and BUN levels
4. Serum electrolytes
5. Urinalysis
6. Renal ultrasound

7. Renal scan
8. CT scan

e. Management

1. Treat cause
2. Fluid restriction (600 mL plus previous 24-hr fluid loss)
3. Nutrition therapy
4. Adequate protein intake (0.8–1.0 g/kg/day) depending on degree of catabolism
5. Enteral nutrition
6. PN
7. Diet restrictions (potassium, phosphate, sodium)
8. Measures to lower potassium (if high) (Table 51.5)
9. Calcium supplements or phosphate-binding agents
10. Dialysis (if necessary)
11. Continuous RRT (if necessary)

f. Medical Treatment

AKI treatment aims to stop damage. To manage symptoms and prevent complications, fluid and dietary restriction, electrolyte balance, and dialysis are used. Avoid nephrotoxic and renal-blood-flow-reducing medications. Failure's reason determines treatment. Restore BP and blood volume for prerenal AKI. Intrinsic AKI treatment involves intravenous fluids, dopamine, and furosemide to increase urine output. Obstruction removal treats postrenal AKI.

g. Nursing Management: Acute Kidney Injury

Assessment

Several assessments are needed to create the care plan. Vital signs, exact intake/output, and daily weights are required. Prognosis requires daily urine monitoring. Treatment and fluid replacement depend on it. Check urine's specific gravity,

colour, protein, blood, and sediment. Look at the patient's skin tone. Oedema, neck vein distention, or bruising? Dialysis patients should check their access sites for inflammation and exudate. Assess mental health and consciousness. Check oral mucosa for dryness and discomfort. Auscultate the lungs for crackles, wheezes, or decreased breath sounds. Watch for cardiac murmurs, S3 gallop, and pericardial friction rub. Check ECGs for dysrhythmias. Check all lab and diagnostic test findings.

Clinical Problems

1. Electrolyte imbalance
2. Fluid imbalance
3. Risk for infection
4. Anxiety

Nursing Diagnoses

Nursing diagnoses and potential complications for the patient with AKI include, but are not limited to, the following:

1. Risk for infection as evidenced by alteration in skin integrity (invasive lines)
2. Excess fluid volume related to excessive fluid intake (kidney injury and fluid retention)
3. Fatigue related to malnutrition, physical deconditioning (anaemia, metabolic acidosis, uremic toxins)
4. Anxiety related to the threat to current status, threat of death (disease processes, therapeutic interventions, uncertainty of prognosis)
5. Potential complication: dysrhythmias related to electrolyte imbalances

Planning

1. completely recover without any loss of kidney function,
2. maintain normal fluid and electrolyte balance,
3. have decreased anxiety, and
4. adhere to and understand the need for careful follow-up care.

Implementation

1. Health Promotion
2. Ambulatory Care
3. Acute Care

Evaluation

1. Regain and maintain normal fluid and electrolyte balance
2. Adhere to the treatment regimen
3. Have no complications
4. Have a complete recovery

2. Chronic Kidney Disease

a. Definition

Chronic kidney disease destroys both kidneys' nephrons. Stage 5—ESRD—has severity phases. Healthy kidneys have too many nephrons. 80% of nephrons can be lost before kidney function is affected. Creatinine clearance indicates renal function. Less than 15 mL/min necessitates dialysis or a transplant. Chronic kidney disease is characterised by blood nitrogenous waste accumulation, or azotaemia. Uremia occurs when the kidneys cannot maintain fluid, electrolyte, or acid-base balance, resulting in end-stage renal disease (ESRD). Uremic symptoms include nausea, vomiting, anorexia, peripheral neuropathy, and central nervous system abnormalities (Rosenberg, 2017). All AKI causes can produce chronic renal dysfunction. Chronic kidney infections may also

cause progressive renal failure. Atherosclerosis, diabetes, and hypertension are the main reasons. CKD causes irreversible renal function decline. CKD is kidney damage or GFR according to KDOQI.

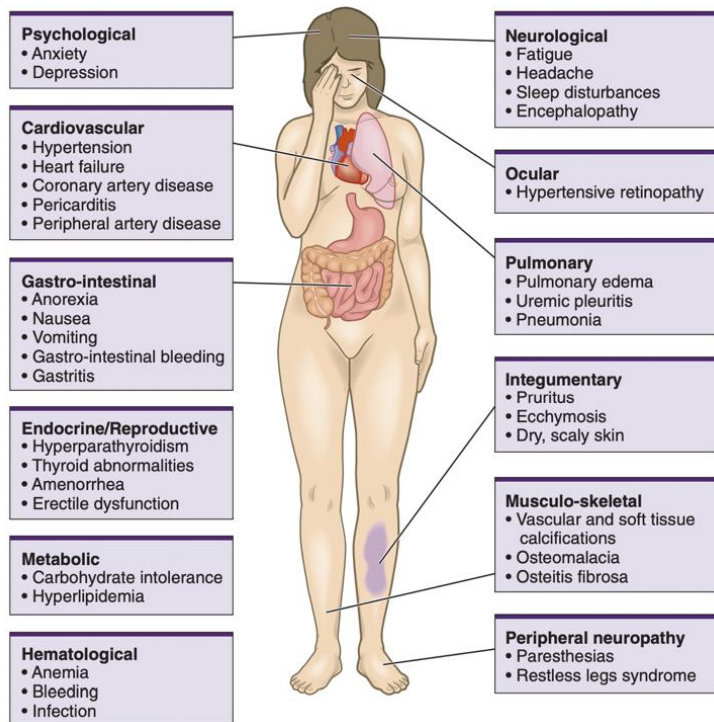
Table 2. Stage and Description of Chronic Kidney Disease

	Description	GFR (mL/ min/1.73 m²)	Action†
Stage 1	Kidney damage with normal or ↑ GFR	≥90	Diagnosis and treatment of comorbid conditions CVD risk reduction
Stage 2	Kidney damage with mild ↓ GFR	60–89	Estimation of progression
Stage 3	Moderate ↓ GFR	30–59	Evaluation and treatment of complications
Stage 4	Severe ↓ GFR	15–29	Preparation for renal replacement therapy
Stage 5	Kidney failure	<15 (or dialysis)	Renal replacement therapy (if uremia present and patient desires treatment)

b. Signs and Symptoms

1. Azotaemia
2. Insulin Resistance.
3. Hyperkalaemia
4. Hypocalcaemia
5. Metabolic Acidosis
6. Fluid Balance
7. Anaemia
8. Infection
9. Cardiovascular System: heart failure
10. Neurologic System.: mental status changes
11. Integumentary System: uremic frost
12. Gastrointestinal System: nausea, vomiting

13. Musculoskeletal system: metastatic calcification, bone demineralization, osteitis fibrosa
14. Reproductive System: decrease sex of hormone
15. Endocrine Function: hypothyroid, hyperparathyroidism
16. Emotional and Psychologic Effects: lability, depression, anxiety, and slowed intellectual functioning



Picture 5. Clinical manifestations of chronic uremia. Source: Kellum, J., Bellomo, R., & Ronco, C. (2008). Definition and classification of acute kidney injury. *Nephron Clinical Practice*, 109(4), 182–187. doi:10.1159/000142926; and U.S. Renal Data System. (2008). *USRDS 2008 annual data report: Atlas of end-stage renal disease*. Bethesda, MD: National Institute of Diabetes and Digestive and Kidney Diseases.

c. Collaborative care for the Management of Chronic Kidney Disease

Diagnostic

- a) BUN, serum creatinine, and eGFR
- b) CT scan
- c) History and physical examination
- d) Identification of reversible renal disease
- e) Protein-to-creatinine ratio in first, morning-voided specimen
- f) Renal biopsy
- g) Renal scan
- h) Renal ultrasound
- i) Serum calcium, phosphorous, albumin, and parathyroid hormone levels
- j) Serum electrolytes
- k) Serum haemoglobin level and iron indices
- l) Urinalysis and urine culture

Collaborative Therapy

- a) Adjustment of drug dosages according to the degree of renal function
- b) Antihypertensive therapy
- c) Calcium supplementation, phosphate binders, or both
- d) Correction of extracellular fluid volume overload or deficit
- e) Erythropoietin therapy
- f) Measures to lower potassium
- g) Nutritional therapy
- h) Renal replacement therapy (dialysis, kidney transplantation)

Drug Therapy

- a) Calcium supplementation, phosphate binders, or both

- b) Antihypertensive therapy
- c) ACE inhibitors or ARBs
- d) Erythropoietin therapy
- e) Lipid-lowering drugs
- f) Adjust drug dosages to the degree of renal function

d. Nursing Management: Chronic Kidney Disease

a. Assessment

Ask about family history and renal illness. Hereditary kidney illnesses include Alport syndrome and polycystic kidney disease. Diabetes, hypertension, and SLE also cause CKD. Get a drug history because many medications are nephrotoxic. Decongestants and antihistamines like pseudoephedrine and phenylephrine cause blood pressure-raising vasoconstriction. Magnesium and aluminium from antacids can build up since they cannot be removed. Salty antacids exist. Blood pressure rises. Aspirin, ibuprofen, and naproxen in excessive doses can accelerate CKD and AKI. When used properly, these analgesics are safe.

Discuss the patient's diet and consumption difficulties. height and weight. Check weight changes. CKD and its long-term treatment affect nearly every aspect of a person's life, including family, social, and professional activities, self-image, and mood. Assess patient support. Support networks may determine treatment.

b. Clinical Problems

- a. Fluid imbalance
- b. Electrolyte imbalance
- c. Impaired cardiac function
- d. Difficulty coping

c. Nursing Diagnoses

Nursing diagnoses for the patient with CKD in stage 4 may include, but are not limited to, the following:

- a. Excess fluid volume related to excessive fluid intake (impaired kidney function)
- b. Risk for electrolyte imbalance as evidenced by excessive fluid volume (impaired kidney function)
- c. Imbalanced nutrition: less than body requirements related to insufficient dietary intake (restricted intake of nutrients, nausea, vomiting, anorexia, stomatitis)

d. Planning

- a. adhere to the treatment plan,
- b. have effective coping strategies, and
- c. continue with activities of daily living within their limitations.

e. Implementation

- a. Health Promotion
- b. Care considerations for chronic kidney disease in stages 4 to 5
- c. Acute Care
- d. Ambulatory Care

f. Evaluation

- a. Fluid and electrolyte levels within normal ranges
- b. An acceptable weight with no more than a 10% weight loss

a. Definition

Diabetes insipidus causes excessive thirst and urination. Body fluid imbalance causes this. Diabetes insipidus is rare but can affect anyone. Congenital or acquired diabetes insipidus. Diabetes insipidus is caused by ADH/vasopressin interference. The hypothalamus produces this hormone. The pituitary gland will reserve vasopressin until needed. Behind your nose lies this gland. AVP regulates fluid levels by modulating renal urine production. When water levels drop, the pituitary gland releases AVP to save water and reduce urine production. Diabetes mellitus and this illness are extremely different. Diabetes mellitus and insipidus produce frequent drinking and urination. Diabetes insipidus is unrelated to blood sugar, unlike diabetes mellitus. Like diabetes mellitus, this disorder is not caused by diet or lifestyle.

b. Etiology

Antidiuretic hormone (ADH) is a hormone that functions to limit the disposal of body fluids in the form of urine based on the level of body fluid needs at that time. If the body of needs more fluids, ADH will work, and the body will produce less urine. Diabetes insipidus can occur when the body lacks ADH or when ADH work is disrupted. In other words, any condition that causes a deficiency or disturbance of these hormones can trigger diabetes insipidus.

c. Type of Diabetes Insipidus

1. Cranial Diabetes Insipidus

Cranial diabetes insipidus or central diabetes insipidus results from damage to the hypothalamus or pituitary gland. The hypothalamus is the part of the brain that produces ADH, while the pituitary gland is the organ where ADH is stored.

Damage to the hypothalamus or pituitary gland causes impaired ADH production.

Some of the causes are:

- a) Brain tumor
- b) Severe head injury
- c) Brain or pituitary gland surgery
- d) Genetic disorders, such as Wolfram syndrome
- e) Brain infection, such as encephalitis or meningitis
- f) Brain damage due to lack of blood flow or oxygen, for example, due to stroke and drowning.

Of all cases of cranial diabetes insipidus, one-third have no known cause (idiopathic).

2. Nephrogenic Diabetes Insipidus

Nephrogenic diabetes insipidus occurs due to abnormalities in the structure of the kidneys so the kidneys cannot respond properly to ADH. This disorder can be caused by a genetic disorder that is experienced from birth (congenital nephrogenic diabetes insipidus). In addition, nephrogenic diabetes insipidus can also be caused by other diseases that develop after adulthood (acquired nephrogenic diabetes insipidus).

An example is:

- a) Side effects of long-term use of lithium.
- b) Urinary tract obstruction.
- c) Hypercalcemia (excess calcium levels).
- d) Hypokalemia (excess potassium levels).
- e) Chronic kidney disease.

3. Dipsogenic Diabetes Insipidus

Dipsogenic diabetes insipidus is caused by a problem with the brain sending the thirst signal. This disorder causes the sufferer to always feel very thirsty, so he will drink in an

amount that exceeds his needs. Just as in cranial diabetes insipidus, disturbances in the sending of thirst signals in the brain can occur due to the following conditions:

- a) Head injury
- b) Infection or inflammation
- c) Brain tumor
- d) Brain surgery

4. Gestational Diabetes Insipidus

Gestational diabetes insipidus is a type of diabetes insipidus that only occurs in pregnant women. This condition can occur when the placenta produces enzymes that destroy ADH. In addition, increased prostaglandin production can also cause the kidneys to become less sensitive to ADH. Gestational diabetes insipidus is rare and usually resolves after delivery. However, this condition can recur in subsequent pregnancies.

d. Manifestation

1. High body temperature or hyperthermia
2. Constipation
3. Hard to sleep
4. Bedwetting while sleeping.
5. Fussy or irritable
6. Loss of appetite
7. Vomit
8. Weight loss for no apparent reason
9. Constantly feeling tired and exhausted
10. Growth is slower than children his age
11. Incontinence

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CHAPTER 8

NURSING CARE CONCEPTS FOR PATIENTS WITH PATHOLOGICAL DIGESTIVE SYSTEM AND ENDOCRINE METABOLISM

Introduction

Nutrients and fluids are essential for health. The digestive tract extracts cellular-functioning substances from meals and fluids. Digestive diseases might affect other body systems and nutritional condition. The gastrointestinal (GI) tract is sometimes called the alimentary tract. A 30-foot muscular conduit. Mouth, throat, oesophagus, stomach, small intestine, large intestine, and anus comprise the digestive tract. Accessory organs are digestive system organs outside the digestive tract. Salivary glands, liver, gallbladder, and pancreas are auxiliary organs. These organs release digesting fluid with enzymes. These enzymes aid digestion. The abdominal organs are surrounded by the double-layered peritoneum. Fluid between the layers lubricates organs during respiration and digestion.

The gastrointestinal (GI) system performs food ingestion and propulsion, mucus, water, and enzyme secretion, digestion, absorption, and excretion. Each GI system component performs different functions to perform these functions.

GI haemorrhage, perforation, blockage, inflammation, and cancer can impact other organ systems. Congenital, inflammatory, viral, traumatic, and malignant lesions are seen throughout the GI system. Circulatory diseases, neural system malfunction, and ageing affect the GI tract, too. Extrinsic factors can cause symptoms in the gastrointestinal

system in addition to organic disorders. Stress and worry can cause dyspepsia, anorexia, or bowel motor abnormalities like constipation or diarrhoea. Fatigue and a poor or sudden diet can also affect the gastrointestinal tract. The nurse should assess and educate the patient on mental and physical issues that affect gastrointestinal function.

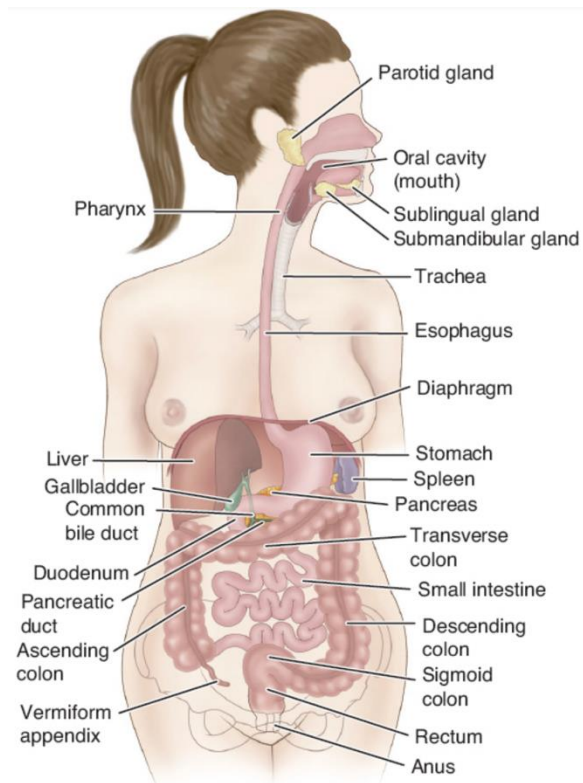


Figure 8.1. Organs of the digestive system and associated structures. (Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022)

Key Term

- a. Peptic Ulcer Disease (PUD)
- b. Gastroenteritis
- c. Typhoid
- d. Ulcerative Colitis
- e. Haemorrhoids
- f. Hepatitis
- g. Intestinal Obstructive
- h. Diabetes Mellitus

Learning Objectives

- a. Identify the etiology, epidemiology, and pathophysiology of Peptic Ulcer Disease (PUD)
- b. Recall, analyze, and select appropriate history, physical, and evaluation of Peptic Ulcer Disease (PUD)
- c. Explain the treatment and management options available for Peptic Ulcer Disease (PUD)
- d. Identify the etiology, epidemiology, and pathophysiology of Gastroenteritis
- e. Recall, analyze, and select appropriate history, physical, and evaluation of Gastroenteritis
- f. Explain the treatment and management options available for Gastroenteritis
- g. Identify the etiology, epidemiology, and pathophysiology of Typhus Abdominalis
- h. Recall, analyze, and select appropriate history, physical, and evaluation of Typhus abdominalis
- i. Explain the treatment and management options available for Typhus abdominalis
- j. Identify the etiology, epidemiology, and pathophysiology of Cholelithiasis
- k. Recall, analyze, and select appropriate history, physical, and evaluation of Cholelithiasis

- l. Explain the treatment and management options available for Cholithis
- m. Identify the etiology, epidemiology, and pathophysiology of Haemorrhoids
- n. Recall, analyze, and select appropriate history, physical, and evaluation of Haemorrhoids
- o. Explain the treatment and management options available for Haemorrhoids
- p. Identify the etiology, epidemiology, and pathophysiology of Hepatitis
- q. Recall, analyze, and select appropriate history, physical, and evaluation of Hepatitis
- r. Explain the treatment and management options available for Hepatitis
- s. Identify the etiology, epidemiology, and pathophysiology of Intestinal Obstructive
- t. Recall, analyze, and select appropriate history, physical, and evaluation of Intestinal Obstructive
- u. Explain the treatment and management options available for Intestinal Obstructive
- v. Differentiate between the types of diabetes, associated etiologic factors, and pathophysiologic alterations.
- w. Identify the diagnostic and clinical significance of blood glucose test results.
- x. Describe the relationships among diet and dietary modifications, exercise, and medication (i.e., insulin or oral antidiabetic agents) for people with diabetes.
- y. Use the nursing process as a framework for the care of the patient who has hyperglycaemia with diabetic ketoacidosis or hyperglycaemic hyperosmolar syndrome.
- z. Describe management strategies for a person with diabetes to use during "sick days."
- aa. Outline the major complications of diabetes and the self-care behaviours that are important in their prevention.

A. Nursing Care for Patients with Peptic Ulcer Disease (PUD)

a. Definition

The gastrointestinal (GI) mucosa is eroded in peptic ulcer disease (PUD) due to the digestive action of HCl acid and pepsin. Any region of the GI tract in contact with gastric secretions is prone to ulcer formation. This comprises the lower esophagus stomach, duodenum, and anastomosis margin after surgical procedures. PUD affects approximately 4.6 million Americans annually. The main incidence of peptic ulcer disease is between the ages of 30 and 60 (Anand, 2020; Norris, 2019), affecting approximately 4.6 million Americans annually. Depending on its location, a peptic ulcer may be referred to as a gastric, duodenal, or esophageal ulcer. A peptic ulcer is an excavation that develops in the mucosa of the stomach, pylorus, duodenum, or esophagus. 3444 is caused by erosion of a circumscribed area of the mucosa. This erosion may extend to the muscle tissues or through the muscle to the peritoneum (thin membrane lining the inner abdominal wall) (Norris, 2019).

The duodenum is more susceptible to peptic ulcers than the stomach. They typically occur singly, but can also occur in multiples. Chronic gastric ulcers typically develop in the stomach's minor curvature, close to the pylorus. Esophageal ulcers are caused by the reflux of gastric acid into the esophagus (gastroesophageal reflux disease, or GERD).



Figure 8.2 Deep peptic ulcer. Reprinted with permission from Strayer, D. S., Saffitz, J. E., & Rubin, E. (2015). *Rubin's Pathology: Mechanisms of Human Disease* (8th ed., Fig. 19-23). Philadelphia, PA: Lippincott Williams & Wilkins

b. Etiology

Peptic ulcers are 8%–11% lifetime risks for women and 11%–14% for men. Middle-aged men have less peptic ulcer disease than elderly persons, especially women. Outpatient and hospital peptic ulcer treatment is more common in 65-year-olds. NSAID use and *H. pylori* infections in older adults may explain this tendency (Anand, 2020). Only acidic surroundings cause peptic ulcers. Ulcers do not require sufficient HCl acid. HCl acid and a pH between 2 and 3 convert pepsinogen to pepsin. Food, antacids, and medications neutralise stomach acid, raising pH to at least 3.5. pH 3.5 or above inhibits pepsin proteolysis.

Infection with *H. pylori*, which can be acquired through food or drink, causes most peptic ulcers. Tension and worry were often thought to cause them. Intimate touch and vomit can spread the bacteria. Most Americans with *H. pylori* do not get ulcers. *H. pylori* infection does not produce ulcers in all people, but the strain and other unknown factors may predispose to ulcer formation (Anand, 2020; Norris, 2019; Santacroce & Bhutani, 2019).

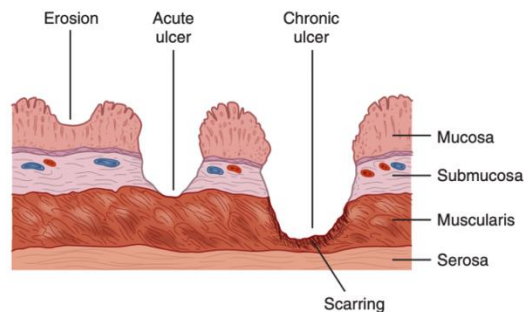


Figure 8.3 Peptic ulcers, including an erosion, an acute ulcer, and a chronic ulcer. Both acute and chronic ulcers may penetrate the entire wall of the stomach. Source: Modified from Price, S. A., & Wilson, L. M. (2003). *Pathophysiology: Clinical Concepts of Disease Processes* (6th ed., p. 331). St. Louis: Mosby

c. Pathophysiology

Because the gastroduodenal mucosa can't withstand stomach acid (HCl) and pepsin's digestion, most peptic ulcers occur there. Acid-pepsin concentration or activity or mucosal barrier resistance decreases induce erosion. Damaged mucosa cannot produce enough mucus to block digestive juices. Stomach acid (HCl), pepsin, and other irritating compounds including NSAIDs and *H. pylori* inflame, damage, and wear away the mucosa. Stomach ulcers produce less acid than duodenal ulcers. Even modest HCl levels can cause peptic ulcers when the mucosal barrier breaks. NSAIDs prevent prostaglandin production, which breaks the mucosal barrier. *H. pylori* bacteria can potentially cause sickness if the mucosal barrier is damaged (Anand, 2020; Norris, 2019).

ZES may be considered for patients with numerous peptic ulcers or unresponsive ulcers. Overproduction of gastrin, pancreatic or duodenal ulcers, and gastrinomas (islet cell tumours) indicate it. More than 80% of gastrinomas are found in the "gastric triangle," which includes the cystic and common bile ducts, the second and third portions of the duodenum, and the place where the head and body of the pancreas meet. Most gastrinomas grow slowly, but over 50% are malignant (Bonheur & Nachimuthu, 2019). Epigastric discomfort, pyrosis, diarrhoea, and steatorrhea—fatty stools—may accompany ZES. ZES and MEN-1 patients may grow pituitary or parathyroid simultaneously. ZES-induced MEN-1 syndrome is hyperparathyroidism. Patients may have hypercalcemia for years before MEN-1 is diagnosed (NIDDK, 2020b).

Stress ulcers are acute duodenal or stomach mucosal ulceration caused by physiologically stressful events such as burns, shock, sepsis, and multiple organ failure syndrome (Clarke et al., 2020). Stress ulcers, which feel different from peptic ulcers, are more common in persons with severe burns, brain injuries, or

mechanical ventilation. Ischemia and alterations in the stomach mucosa barrier may produce stress ulcers (Clarke et al., 2020; Norris, 2019). Wounded patients heal. Stress ulcers are like this.

Stress ulcer mucosal rupture generates differing theories. Ulceration is usually induced by mucosal barrier breakdown and ischemia. Mucosal ischemia forces duodenal contents into the stomach. This renders the gastric mucosa more susceptible to HCl and pepsin digestion (Anand, 2020; Clarke et al., 2020; Norris, 2019). Mucosal ischemia, stomach acid, and pepsin exposure cause ulceration.

Stress causes curling and Cushing ulcers. Curling ulcers attack the upper stomach or intestines in severely burned persons (Anand, 2020). Cushing ulcers often occur after a head injury, stroke, brain tumour, or head surgery. High intracranial pressure overstimulates the vagus nerve and increases stomach acid (HCl) production, causing a Cushing ulcer (Norris, 2019). Cushing ulcers are deep, isolated lesions that often explode (Anand, 2020). Gastric or duodenal mucosal involvement determines acute or chronic peptic ulcers. Acute ulcers cause little damage. Finding and fixing the cause fixes it quickly. Chronic ulcers last several months. Fibrous tissue degrades muscle walls. Chronic ulcers outnumber acute.

Table 8.1 Comparison of Gastric and Duodenal Ulcers. Source: Modified from Price, S. A., & Wilson, L. M. (2003). *Pathophysiology: Clinical Concepts of Disease Processes* (6th ed., p. 331). St. Louis: Mosby

Gastric Ulcers	Duodenal Ulcers
Lesion	
Superficial, smooth margins. Round, oval, or cone shaped	Penetrating (deformity of duodenal bulb from healing of recurrent ulcers)
Location of Lesion	
Predominantly antrum, also in body and fundus of stomach	First 1–2 cm of duodenum
Gastric Secretion	
Normal to decreased	↑
Incidence	
↑ in women	↑ in men, but increasing in women (especially postmenopausal)
Peak age 50–60 years	Peak age 35–45 years
↑ Cancer risk	No ↑ in cancer risk
<i>H. pylori</i> infection in 80%	<i>H. pylori</i> infection in 90%
↑ With incompetent pyloric sphincter and bile reflux	Associated with other diseases (e.g., COPD, pancreatic disease, hyperparathyroidism, ZES, chronic renal failure)
Clinical Manifestations	
Burning or gaseous pressure in epigastrium	Burning, cramping, pressure-like pain across midepigastrium and upper abdomen. Back pain with posterior ulcers
Pain 1–2 hr after meals. If penetrating ulcer, aggravation of discomfort with food	Pain 2–5 hr after meals and midmorning, midafternoon, middle of night. Periodic and episodic. Pain relief with antacids and food
Recurrence Rate	
High	High

d. Clinical Manifestation

Gastric ulcers cause epigastric pain. 1–2 hours after meals. Pain is “burning” or “gaseous.” Food aggravates stomach ulcer pain. Perforation might cause early symptoms in some patients. Gastric acid irritates duodenal ulcers. Meals buffer acid. 2–5 hours after eating, symptoms appear. Pain is “burning” or “cramp like.”

The mid epigastric region beneath the xiphoid process is the most common. Duodenal ulcers can cause back pain. Patients experience bloating, nausea, vomiting, and early fullness. Ulcers don't always hurt. Silent peptic ulcers are more common in older persons and NSAID users. Symptoms are unrelated to ulcer size or healing.

e. Interprofessional Management

Conservative Care Rest, pharmacological therapy, smoking cessation, food changes, and long-term follow-up are treatment options. Treatment reduces stomach acidity and boosts mucosal defenses. Ambulatory clinics treat patients. The pain subsides after 3–6 days. Ulcers heal slowly. Depending on ulcer size, therapy, and patient adherence, healing might take 3–9 weeks. Endoscopic ulcer monitoring is the most accurate. Endoscopic follow-up occurs 3–6 months after diagnosis and therapy. 4–6 weeks without aspirin and nonselective NSAIDs Aspirin can be taken alongside a PPI, H2 receptor blocker, or misoprostol. Ulcer patients using low-dose aspirin (LDA) for CVD and stroke risk may need long-term PPI treatment. Enteric-coated aspirin reduces regional irritation but not GI haemorrhage. Smoking irritates the mucosa and slows recovery. The patient should quit smoking. Ulcer healing requires physical and emotional rest, which may affect the patient's daily routine. Avoiding alcohol improves healing.

f. Pharmacologic Therapy

Drugs reduce stomach acid and, if necessary, eliminate *H. pylori*. *H. pylori* patients need antibiotics and PPIs. Many ulcer sufferers can cease PPI therapy after healing. Some require low-dose maintenance. Stopping therapy can harm ulcers, which typically return. Drug regimen adherence is crucial. Encourage the patient to follow treatment and follow-up. Inform the patient and

caregiver about each drug's purpose and benefits. Review what to do if pain or bleeding returns.

Table 8.2 Drug Regimens for Peptic Ulcer Disease. Source: Modified from Price, S. A., & Wilson, L. M. (2003). *Pathophysiology: Clinical Concepts of Disease Processes* (6th ed., p. 331). St. Louis: Mosby

Indications	Drug Regimen	Nursing Considerations
Ulcer healing	H₂ receptor antagonist Cimetidine 400 mg bid or 800 mg at bedtime Famotidine 20 mg bid or 40 mg at bedtime Nizatidine 150 mg bid or 300 mg at bedtime	Should be used for 6–8 wks for complete peptic ulcer healing; patients who are at high risk require a maintenance dose for 1 yr
	PPIs: Esomeprazole 40 mg daily Lansoprazole 30 mg daily Omeprazole 20 mg daily Pantoprazole 40 mg daily Rabeprazole 20 mg daily	Should be used for 4–8 wks for complete peptic ulcer healing; patients who are at high risk require a maintenance dose for 1 yr
<i>H. pylori</i> infection	<i>Quadruple therapy</i> with bismuth subsalicylate 525 mg qid, plus tetracycline 500 mg qid, plus metronidazole 500 mg bid, plus a PPI daily for 10–14 days <i>Alternate therapy</i> with clarithromycin 500 mg bid, amoxicillin 1 g bid, metronidazole 500 mg bid, plus PPI for 10–14 days	Efficacy of therapy is approximately 85% qid dosing may decrease adherence to the regimen
Prophylactic therapy for NSAID ulcers	Peptic ulcer healing doses of PPIs (above) Misoprostol 100–200 mcg qid	Prevents recurrent ulceration in approximately 80–90% of patients; qid dosing may decrease adherence to the regimen Pregnancy category X (i.e., should not be taken by a pregnant woman as it can soften the cervix and result in miscarriage or premature labor.)

g. Nursing Management

a. Nursing Assessment

1. Subjective Data

1) Important Health Information Health History:

- a. Chronic kidney disease, pancreatic disease, COPD, serious illness or trauma, hyperparathyroidism, cirrhosis, ZES
- b. Medications: Aspirin, corticosteroids, NSAIDs
- c. Surgery or other treatments: Complicated or prolonged surgery

2) Functional Health Patterns

3) Health perception–health management: Chronic alcohol use, smoking, caffeine use, Family history of PUD

4) Nutritional-metabolic: Weight loss, anorexia, nausea and vomiting, hematemesis, dyspepsia, heartburn, belching

5) Elimination: Black, tarry stools

6) Cognitive-perceptual:

- a. Duodenal ulcers: Burning, mid epigastric or back pain occurring 2–5 hr after meals and relieved by food; night time pain common
- b. Gastric ulcers: High epigastric pain occurring 1–2 hr after meals. Food may precipitate or worsen the pain.

7) Coping–stress tolerance: Acute or chronic stress

2. Objective Data

- 1) General: Anxiety, irritability
- 2) Gastrointestinal: Epigastric tenderness
- 3) Possible Diagnostic Findings: Anaemia. Guaiac-positive stools. Positive blood, urine, breath, or stool tests for *H. pylori*. Abnormal upper GI endoscopic and barium studies

3. Clinical Problems

Clinical problems for the patient with PUD may include:

- 1) Pain
- 2) Impaired GI function

b. Nursing Diagnoses

Based on the assessment data, nursing diagnoses may include the following:

1. Acute pain associated with the effect of gastric acid secretion on damaged tissue
2. Anxiety associated with an acute illness Impaired nutritional intake associated with changes in diet

c. Collaborative Problems/Potential Complications

Potential complications may include the following:

1. Haemorrhage
2. Perforation
3. Penetration
4. Gastric outlet obstruction

d. Planning

The overall goals are that the patient with PUD will

1. adhere to the therapeutic regimen,
2. achieve pain relief,
3. be free from complications,
4. have complete healing of the peptic ulcer, and
5. make appropriate lifestyle changes to prevent recurrence.

e. Nursing Implementation

1. Healthcare Implementation

You help identify PUD risk. Ulcer identification and treatment reduce morbidity. NSAIDs and LDA can cause PUD. Give these medications with food. Teach patients to

report gastric discomfort, especially epigastric pain, to their HCP.

2. Acute Care

Acute exacerbations produce pain, nausea, and vomiting. Some bleed. Self-treatment precedes medical treatment. During the acute phase, the patient may be NPO with an NG tube and IV fluids. Tell the patient and carer why these therapies are worth the discomfort. Regular mouth care eliminates dry mouth. Nares cleansing and lubrication lessen pain. Gastrointestinal blood, bile, and pH testing is possible. Eliminating gastric secretions reduces pain and heals ulcers. Symptoms, fluid loss, and test values (haemoglobin, hamatocrit, and electrolytes) determine IV fluids. Shock identification and therapy require initial and hourly vitals. IV fluids ordered. Take notes. Rest heals ulcers. Peaceful, please. Prescribe painkillers. A mild sedative can calm a worried patient. Sedating a restless person may disguise GI bleeding and shock. GI bleed. Severe upper respiratory infections often cause vital sign abnormalities and aspirate redness.

3. GI bleeding.

Blood neutralises gastric acid. Keep the NG tube blood-clot-free. Tube blockage may induce belly distention. Treat upper GI haemorrhage.

4. Perforation.

If the ulcer sufferer experiences perforation, notify the HCP immediately. Vitals every 15–30 minutes. Stop eating and taking pills. If perforated, oral ingestion can increase peritoneal cavity leakage and pain. IV fluid should replace plasma. Painkillers calm. Perforation antibiotics start.

Perforations that don't heal require surgery. Urgent surgery may prevent patient and family preparation. Stomach obstruction. Gastric outlet obstruction can happen anytime. Pylorus-proximal ulcers increase risk. Symptoms develop slowly. NG aspiration helps. Stomach contents pass regularly via the pylorus as oedema and inflammation decrease. Flush the NG tube with regular saline per agency policy. Repositioning the patient from side to side may keep the tube tip off the mucosal surface. Aspirate stomach contents.

Measure gastric residual volume and clamp the NG tube frequently to detect obstruction. Aspirate and patient comfort determine tube clamping frequency and duration. Clamping the tube overnight (8–12 hours) and monitoring stomach residual capacity in the morning is popular. Aspirating below 200 mL is normal, and the patient should drink clear drinks. 30 mL/h oral fluids increase. Gastric residuals decrease, solid foods and tube removal are added. Notify the HCP if oral feedings cause obstruction. Restarting gastric aspiration until the acute episode's oedema and inflammation diminish typically resolves it. Electrolyte-rich IV fluids hydrate patients. Conservative therapy fails, surgery follows.

5. Ambulatory Care

Acute Care PUD patients have specific needs to prevent recurrence and its effects. Teach the disease, drugs, lifestyle adjustments (alcohol, smoking), and follow-up. Dietitian-planned diet adjustments. Inform patients on prescription drug effects, side effects, and risks of skipping. Inform the patient not to take OTC NSAIDs or LDA without HCP approval. H₂ receptor blockers and PPIs are non-prescription. Before switching to OTC medication, suggest

the patient to consult the HCP to avoid side effects and improper dosing. Learn psychology. Stress, coping, smoking, and drinking may make the patient uncomfortable. Inform patients how alcohol and cigarettes impair PUD and ulcer healing. Many struggle to quit smoking and drinking. The patient may benefit from decreasing these substances. Stopping is the goal. Chronic PUD. Prep chronic PUD patients for HCP visits. Long-term follow-up. Recurring symptoms should prompt rapid therapy. Some have repeated exacerbations. Avoiding medications, smoking, and alcohol is usually easy for patients. They change little. Patients are more likely to follow treatment and lifestyle changes after an acute exacerbation.

6. Evaluation

Expected outcomes for the patient with PUD include:

- a. Have pain controlled without the use of analgesics
- b. Commit to self-care and management of the disease
- c. Be free from complications

Nursing Care for Patients with Gastroenteritis

a. Definition

Gastroenteritis inflames the stomach and small intestine mucosa. Acute gastroenteritis causes diarrhea, nausea, vomiting, fever, and abdominal cramps. Viruses cause most gastroenteritis. Norovirus causes most foodborne acute gastroenteritis outbreaks. When several people have gastroenteritis and a shared area or food can spread the virus, laboratory testing can identify norovirus. Gastroenteritis usually resolves. Oral glucose-electrolyte solutions prevent and treat dehydration. Elderly and chronically ill people may not drink enough to replace fluid loss.

Dehydration may require IV fluids. Gastroenteritis is treated like acute diarrhea in nursing.

b. Etiology

Type of Organism Manifestations

1. Bacterial

- 1) *Campylobacter jejuni*
 - a. Diarrhea, abdominal cramps, fever. Sometimes nausea, vomiting
 - b. Lasts about 7 days
- 2) *Clostridioides difficile*
 - a. Watery diarrhea, fever, anorexia, nausea, abdominal pain
- 3) *Clostridium perfringens*
 - a. Diarrhea, abdominal cramps, nausea, vomiting
 - b. Occurs 6–24 h after eating contaminated food and lasts about 24 h
- 4) Enterohemorrhagic *Escherichia coli* (e.g., *E. coli* O157:H7)
 - a. Severe abdominal cramping, bloody diarrhea, vomiting
 - b. Low-grade fever
 - c. Lasts 5–7 days
- 5) Enterotoxigenic *E. coli*
 - a. Watery or bloody diarrhea, abdominal cramps
 - b. Nausea, vomiting, and fever may be present
 - c. Lasts 3–4 days
- 6) *Salmonella*
 - a. Diarrhea, fever, abdominal cramps
 - b. Lasts 4–7 days
- 7) *Shigella*
 - a. Diarrhea (sometimes bloody), fever, stomach cramps
 - b. Lasts 5–7 days
 - c. Postinfection arthritis may occur

- 8) Staphylococcus
- a. Nausea, vomiting, abdominal cramps, diarrhea
 - b. Usually mild
 - c. May cause illness in as little as 30 min
 - d. Lasts 1–3 days

Source of Infection/Susceptibility causes of bacterial

- a. Undercooked poultry and unpasteurized milk
- b. Most frequent in summer months
- c. Prolonged use of antibiotics followed by exposure to feces-contaminated surfaces
- d. Spores on hands and environmental surfaces are extremely hard to kill
- e. Associated with meats, gravies, stews, dried or precooked foods
- f. Can cause serious illness in anyone, especially older adults
- g. Can cause serious illness, especially in older adults
- h. May progress to life-threatening renal failure •
Transmitted in water or food contaminated with infected feces
- i. Transmitted in water or food contaminated with infected feces
- j. Reservoir is poultry, reptiles, and other animals (especially turtles, lizards, snakes, chicks, and young birds)
- k. Can be transmitted by handling animals
- l. Found in undercooked poultry, meat, and foods prepared with raw eggs
- m. Most common cause of travelers' diarrhea
- n. Transmitted via fecal-oral route or in food or water contaminated with infected feces
- o. Can contaminate recreational water
- p. 25%–50% of people are carriers in mucous membranes, skin, or hair

- q. Transmitted in food contaminated by food workers who are carriers or through contaminated milk and cheese

2. Parasitic

- 1) Cryptosporidium
 - a. Watery diarrhea
 - b. Lasts about 2 weeks
 - c. May have abdominal cramps, nausea, vomiting, fever, dehydration, weight loss
 - d. May be fatal in those who are immunocompromised (e.g., AIDS)

- 2) Entamoeba histolytica
 - a. Diarrhea, abdominal cramping
 - b. Only 10%–20% are ill, and symptoms are usually mild
 - c. May last 2 weeks

- 3) Giardia lamblia
 - a. Abdominal cramps, nausea, diarrhea
 - b. May interfere with nutrient absorption

Source of Infection/Susceptibility causes of parasitic

- a. Lives in human intestines
- b. Transmitted in the stool of infected human or animal
- c. Outer shell allows it to live for long periods outside of the body and makes it resistant to chlorine
- d. Common cause of waterborne disease (swimming pools, lakes, drinking water, food contaminated with feces)
- e. Fecally contaminated food, water, or hands
- f. Most common in tropical areas

- g. In the United States, high-risk groups include travelers, recent immigrants, and men who have sex with men
- h. Highly contagious
- i. Transmitted via the fecal-oral route
- j. Found in fresh lakes and rivers. Can be transmitted in swimming pools, water parks, and hot tubs

3. Viral

1) Norovirus (Norwalk-like virus)

- a. Nausea, vomiting, diarrhea, stomach cramping
- b. Rapid onset
- c. Lasts 1–2 days

2) Rotavirus

- a. Fever, vomiting, profuse watery diarrhea
- b. Lasts 3–8 days

Source of Infection/Susceptibility Causes of Viral

- a. Very contagious
- b. Virus is present in stool and emesis
- c. Highly contagious
- d. Transmitted mainly by the fecal-oral route

c. Nursing Management

- a) Ensure the patient maintains an adequate fluid intake:
 - 1) Encourage oral fluids containing glucose and electrolytes.
 - 2) Administer IV fluids and electrolytes as ordered.
- b) Administer antidiarrheal and antibiotic drugs as ordered.
- c) Implement proper isolation and infection control precautions.
- d) Maintain accurate intake and output records, recording weight daily.

- e) Assist the patient with keeping the perianal area clean.
- f) Apply a moisturizing skin barrier cream as needed.
- g) Have the patient use dibucaine, witch hazel, or sitz baths to reduce perianal irritation and pain.
- h) Implement measures to make toileting easier for patients, such as:
 - 1) Call light in reach
 - 2) Easy-to-manage clothing
 - 3) Assistive devices available
- i) Provide privacy for toileting and use a deodorizer.
- j) Encourage the patient to increase high-fiber foods, such as whole-grain bread and cereals, and fresh fruits and vegetables, unless contraindicated.
- k) Teach the patient to avoid foods and fluids known to worsen diarrhea.

Nursing Care for Patient with Typhoid

Enteric fever characterised by “step-ladder” systemic sickness, stomach pain, and fever is typhoid fever. *Salmonella typhi* causes intestinal sickness. *Salmonella paratyphi* serotypes A, B, and C also cause similar symptoms, although with milder illnesses. This exercise discusses the diagnosis and treatment of typhoid fever and the role of the interprofessional team.

Enteric fever is typhoid. It is a multisystemic disease that has plagued poor nations. *Salmonella typhi* and *paratyphi* cause it. Enteric fever includes typhoid and paratyphoid. Enteric and typhoid fever are clinically indistinguishable. Even though research and public health efforts have lowered its prevalence, typhoid fever is a major cause of death and morbidity in congested and unclean places. Early gastrointestinal distress to a vague systemic illness may lead to various problems. The “four Fs”—flies, hands, faeces, and fomites—may spread salmonella. Fever rises and falls gradually, accompanied by headache and stomach pain.

a. Etiology

Typhoid fever is caused by Enterobacteriaceae members *Salmonella typhi* and *Salmonella paratyphi*. Salmonella is a genus comprising two species, *Salmonella enterica* serovar and *Salmonella enteritidis*. *Salmonella typhi* and *paratyphi* (A, B, C) are enterica serotypes. *Salmonella nontyphoidal* (NTS) is more common in children and causes gastroenteritis. Salmonella is spread through faeces, undercooked food, and contaminated water. Overcrowding, social turmoil, and poor sanitation increase its prevalence. It can only spread from sick persons. Poultry, eggs, and occasionally tortoises are salmonella sources. A whole-genome sequencing investigation of salmonella isolates in Chinese chicken slaughterhouses found 57% positive. Infection-fighting gut flora. Streptomycin kills natural bacteria, allowing its invasion. Malnutrition lowers intestinal flora, making this illness more likely. Thus, broad-spectrum drugs and malnutrition exacerbate typhoid fever.

b. Pathophysiology

Infectious species, virulence, host immunity, and infectious dose define typhoid fever's pathogenesis. Infection dose reduces incubation and attack rate. HIV (especially *paratyphi*), glucocorticoids, and impaired phagocyte function (malaria and sickle cell anaemia) worsen typhoid fever. Unless eaten in large amounts, gastric acid kills salmonella in the stomach. Achlorhydria patients colonise *Salmonella* with low-dose antacids and antihistamines. Food and drinks buffer stomach acid, letting pathogens enter the tiny gut.

Typhoid toxin, Vi antigen (polysaccharide capsule), oligosaccharide O antigen, and flagellar H antigen determine *Salmonella* pathogenicity. Vi-positive strains attacked twice as often with the same number of germs. *Salmonella typhi* and NTS differ in Vi antigen. Macrophage inhibition by the Vi antigen

shields the O antigen against serum-resistant antibodies. Flagellar H antigens link bacteria to gut mucosa. Flagella attack the gut wall, and the type III secretion system transfers bacterial protein into enterocytes, M cells, or the mucosa. Cytoplasmic bacteria squeeze and discharge M cell bacteria into the luminal space. M cells die, revealing the basal lamina. Pathogen invasion worsens illness. Typhoid-resistant patients have defective CFTR proteins that promote Salmonella uptake. Transferred proteins activate host cell Rho GTPases, which rearrange actin to absorb bacterial proteins in phagosomes where bacteria can grow. This helps bacteria survive host immunity. Salmonella chemically promotes epithelial production of the chemoattractant eicosanoid, which traps neutrophils in the lumen and damages the mucosa.

Bacteria attract lymphocytes and mononuclear cells, causing necrosis and ulceration that aggravate symptoms. The lymphatic and circulation transport infections to the reticuloendothelial system, including the gallbladder. Because reticuloendothelial macrophages and monocytes phagocytose these bacteria, primary bacteremia (24–72 hours) is asymptomatic. These immune cells are special because they can develop infections, and intracellular multiplication of bacteria in the reticuloendothelial system causes them to re-enter the bloodstream, causing secondary bacteremia for days and weeks. Secondary bacteremia symptoms. Gram-negative bacteria pathogens need endotoxins. Endotoxemia, vascular hyperactivity, and catecholamine release cause localised necrosis and haemorrhage. Lipopolysaccharide shocks.

c. Diagnostic

Typhoid patients need clinical care. Patients with fever for more than three days and gastrointestinal symptoms (pain, constipation, or diarrhea) from poor sanitation, unclean drinking

water, or endemic locations are suspect. Laboratory investigations help with the first-week diagnosis.

1. Blood culture: Blood culture confirms typhoid fever. Since it's cheap and easy, it's the most prevalent test. High-volume blood cultures work better. Secondary bacteremia (clinical symptoms) blood cultures are more trustworthy; however, 30% to 50% may be mistakenly negative depending on procedure and time series.
2. Stool culture: Bacteremic stool culture is less successful. Stool culture is diagnostic in weeks 2–3. Only 37% of antibiotic-treated individuals had positive results. Stool culture sensitivity depends on sample size and illness duration. Several feces samples are needed because chronic carriers intermittently transfer germs. Investigating further metabolite biomarkers. Typhoid diagnosis is best with bone marrow culture. Aspirated bone marrow is grown in agar media. Because bone marrow has more microorganisms than blood, it is more sensitive.
3. Bone marrow culture is 90% sensitive and remains positive in over 50% of cases after many days of antibiotic therapy. The test is expensive and intrusive, so it is rarely used to diagnose and cure typhoid.
4. The serological Widal test for enteric fever identifies antibodies to O (surface) and H (flagellar) antigens. In endemic areas, an antibody titer greater than 1:160 for anti-H antigen and larger than 1:80 for anti-O antigen indicates a recent typhoid fever infection. Cutoffs vary by region. Positive studies have convalescent titers four times higher than acute ones. Endemic locations require higher titers and may indicate past infections. Due to its frequent false-negative and false-positive results, poor performance, and low blood culture agreement, the Widal test is unreliable.

5. Skin snip test: Punch biopsies from typical rose patches may culture-positive in up to 63% of positive patients with preceding therapeutic antibiotic therapy.
6. PCR Assay: PCR can identify serotypes like the H and O antigen genes using DNA. Bacteremia's low bacterial concentrations can lower sensitivity. Low-resource setups cannot afford this testing.
7. Enzyme-Linked Immunosorbent Assay (ELISA): ELISA detects antibodies to capsular polysaccharide VI antigens, which can identify carriers but not acute disease.
8. Miscellaneous: Urine and string capsule duodenal content cultures can detect *Salmonella typhi*. Leukocytosis and leukopenia are found in 15% to 25% of cases, especially in youngsters. Though nonspecific C-reactive protein may be increased, liver function testing may demonstrate viral hepatitis. Cerebrospinal fluid may show minor pleocytosis (less than 35 cells), although most are unremarkable. Electrocardiograms, ultrasonography, liver enzymes and function tests, urine analyses, and diaphragm breath X-rays may be used to determine further sickness issues.

d. Medical Management

Antibiotic therapy is the primary treatment modality. Multidrug-resistant genotypes have emerged in many endemic areas, particularly India and southeast Asia, complicating treatment. The mode of treatment depends on the severity, duration, spread, and complications of the disease.

1. Antibiotic therapy: prompt administration of the appropriate antibiotic therapy protects against severe typhoid fever complications. Initial drug treatment is determined by the susceptibility of the pathogen. In the majority of instances, fluoroquinolones are the most effective medication. In severe conditions requiring prompt treatment,

fluoroquinolones may be administered empirically based on clinical suspicion to before the results of the diagnostic culture test. Fluoroquinolones cure approximately 98% of cases with relapse and less than 2% fecal carriage rates. The most efficacious fluoroquinolone is ciprofloxacin (500 mg orally twice a day for 5-7 days). Amoxicillin (750 mg orally four times a day for approximately two weeks), trimethoprim-sulfamethoxazole (160 mg twice a day for two weeks), and outside the United States, chloramphenicol (500 mg four times a day for two to three weeks) are all alternative treatments for adults who are fully susceptible, but they are increasingly met with resistance. Oral antibiotics and antipyretics can be used to treat simple illnesses at home. After recovering from the hospitalization, patients with serious complications like vomiting, diarrhea, and abdominal distension should receive additional supportive therapy and parenteral antibiotics like third-generation cephalosporins (guided by culture sensitivities) for five days. In endemic areas, multidrug-resistant (MDR) and extraordinarily drug-resistant (XDR) strains have emerged. Intracellular bacteria are resistant to extracellular antibiotics due to their structure. In cases of MDR, the optimal treatment consists of third-generation cephalosporins (ceftriaxone, ceftaxime, and oral cefixime 2g once daily for 2 weeks) and azithromycin, with ciprofloxacin serving as an alternative. The failure rate of these treatments is between 5% and 10%, and the relapse rate is between 3% and 6%. With a fecal carriage rate of less than 3%, these agents cure fever within one week. The addition of azithromycin and cefixime decreases the failure rate and hospitalization duration.

2. Vaccination prophylaxis: Since the development of the *Salmonella typhi* vaccine, the incidence of typhoid has decreased due to vaccination and preventative measures.

The vaccination is recommended for travelers to areas with an exposure risk. There are two varieties of licensed unconjugated vaccines in the United States. At the age of two, the intramuscular Vi capsular polysaccharide vaccine can be administered. It should be administered at least two weeks before travel, and a supplement should be administered every two years. A live attenuated oral vaccine (the Ty21a strain of serotype Typhi) stimulates the production of endogenous antibodies, thereby enhancing immunity. It is recommended for those over the age of 6 who are traveling to endemic regions or who will have direct contact with chronic carriers or infected patients. It requires a regimen of four capsules taken every other day, as well as rigorous guidelines regarding the temperature of liquids used to ingest the capsules and consumption on an empty stomach. It must be administered at least one week before exposure, and a supplemental dose is recommended every five years. As it is a live vaccine, the oral vaccine cannot be administered to immunocompromised or expectant patients. The oral Ty21a vaccine may provide some protection against *Salmonella paratyphi* B, despite not being licensed for this indication. Both vaccines have an efficacy between 50 and 80 percent, and travelers must also employ avoidance measures.

3. In 2017, the World Health Organization Strategic Advisory Group of Experts on Immunization recommended for the first time that typhoid conjugate vaccines (TCVs) be used in typhoid-endemic countries. TCVs with a single intramuscular dose for patients aged 6 months and older are now registered in Nepal, India, Nigeria, and Cambodia, and their use in endemic regions and outbreaks are being investigated further. During an outbreak of extensively drug-resistant typhoid in Pakistan in 2018, the TCV was determined to be safe for infants aged 10 to 6 months. TCVs are also favored

due to the possibility of a prolonged duration of immunity, their safety in younger children, and their superior immunogenicity profile compared to the Vi polysaccharide unconjugated vaccine.

4. **Miscellaneous Treatment:** Symptomatic and supportive care is required for miscellaneous treatments. In addition to analgesics and antipyretics, supportive care for metastatic complications should include maintaining adequate hydration during gastroenteritis as well as providing adequate ventilation and oxygenation for pulmonary complications. Corticosteroids have been recommended for the treatment of severe cases of encephalitis.
5. **Surgery:** When gallstones are present alongside a carrier state, cholecystectomy can be curative. Complications, such as peritonitis and ileal perforation, necessitate surgical repair.
6. **Prevention through sanitation:** Epidemiological data reveals that typhoid is more prevalent in low- and middle-income countries, as well as in regions with deficient drinking water and inadequate sanitation. Safe potable water, sanitation, and avoiding overcrowding significantly contribute to the decrease in cases.

Nursing Care for Patients with Ulcerative Colitis

a. Definition

Ulcerative colitis is a chronic ulcerative and inflammatory disease of the mucosal and submucosal layers of the colon and rectum characterized by unpredictable periods of remission and exacerbation accompanied by episodes of abdominal cramping and bloody or purulent diarrhea. Typically, the inflammatory changes start in the rectum and progress distally through the colon (Basson, 2019b).

b. Pathophysiology

The superficial mucosa of the colon is affected by ulcerative colitis, which is characterized by multiple ulcerations, diffuse inflammation, and desquamation or shredding of the colonic epithelium. Due to the ulcerations, bleeding occurs. The mucosa swells and becomes inflamed. The lesions are successive, occurring in succession.

Due to muscular hypertrophy and fat deposition, the colon eventually contracts, shortens, and thickens. Abscesses, fistulas, obstruction, and fissures are uncommon in ulcerative colitis because the inflammatory process is not transmural (i.e., it only affects the inner lining).

c. Clinical Manifestation

Typically, the clinical trajectory consists of remissions and exacerbations. The most prominent symptoms of ulcerative colitis are diarrhea with the passage of mucus, mucous, or blood, abdominal pain in the lower left quadrant, and intermittent tenesmus. Mild or severe hemorrhage may result in pallor, anemia, and fatigue. The patient may experience anorexia, weight loss, fever, vomiting, dehydration, cramping, and the daily passage of six or more liquid feces. According to the severity of the symptoms, the disease is classified as moderate, severe, or fatal. Frequently, hypoalbuminemia, electrolyte imbalances, and anemia develop. Skin lesions (e.g., erythema nodosum), eye lesions (e.g., uveitis), joint abnormalities (e.g., arthritis), and liver disease are examples of extraintestinal manifestations (Basson, 2019b).

d. Assessment and Diagnostic Findings

Abdominal X-rays help diagnose symptoms. Air in the peritoneum and bowel dilatation or obstruction must be excluded as reasons. Ulcerative colitis is diagnosed through colonoscopy. It may reveal

exudate, ulcers, and friable, inflammatory mucosa. Biopsies determine colonic tissue histology and disease severity. CT, MRI, and ultrasound can detect perirectal abscesses (Basson, 2019b). Stool tests show blood, low hematocrit and haemoglobin, increased WBC count, low albumin (indicating malabsorptive diseases), and electrolyte imbalance. High C-reactive protein. Antineutrophil cytoplasmic antibodies are high. Stool testing for parasites and bacteria can rule out dysentery caused by common intestinal organisms such *Entamoeba histolytica*, *C. difficile*, *Campylobacter*, *Salmonella*, *Shigella*, and *Cryptosporidium* species (Basson, 2019b).

e. Complication

Ulcerative colitis causes toxic megacolon, perforation, and haemorrhage. In toxic megacolon, muscle inflammation prevents contraction and causes colonic distention. Fever, stomach distention, vomiting, and weariness are symptoms. Surgery is needed if NG suction, IV fluids with electrolytes, corticosteroids, and antibiotics fail to treat toxic megacolon within 72 hours. Subtotal colectomy is possible without bowel perforation. Otherwise, one-third of severe ulcerative colitis patients require colectomy (Walfish, 2019). An ileostomy is often needed to treat the disease and its consequences. This chapter discusses faecal diversion surgery and patient care. Ulcerative colitis increases the risk of osteoporotic fractures due to low bone mineral density. Corticosteroids may reduce bone density. Ulcerative colitis increases colon cancer risk. 7% to 10% of people with severe ulcerative colitis (not limited to the rectum) will develop colon cancer 20 years after diagnosis (Walfish, 2019).

f. Nursing Management

1. Assessment

The nurse takes a health history to determine abdominal pain start, duration, and features; diarrhoea, faecal urgency, or tenesmus; nausea, anorexia, or weight loss; and family history of IBD. Smoking and diet are crucial. The nurse asks about stool elimination pattern, frequency, and blood, pus, fat, or mucus. Note food allergies and lactose intolerance. Diarrhoea or nighttime pain may indicate sleep difficulties.

2. Nursing Diagnoses

- a. Diarrhea associated with the inflammatory process
- b. Acute pain associated with increased peristalsis and GI inflammation
- c. Hypovolaemia is associated with anorexia, nausea, and diarrhea
- d. Impaired nutritional status associated with dietary restrictions, nausea, and malabsorption
- e. Activity intolerance associated with generalized weakness
- f. Anxiety associated with impending surgery
- g. Difficulty coping associated with repeated episodes of diarrhea Risk for impaired skin integrity associated with malnutrition and diarrhea
- h. Lack of knowledge concerning the process and management of the disease

3. Collaborative Problems/Potential Complications

- a. Potential complications may include the following:
- b. Electrolyte imbalance
- c. Cardiac arrhythmias related to electrolyte imbalances
- d. GI bleeding with fluid volume loss
- e. Perforation of the bowel

4. Planning and Goals

Attainment of normal bowel elimination patterns, relief of abdominal pain and cramping, prevention of fluid volume deficit, maintenance of optimal nutrition and weight, avoidance of fatigue, reduction of anxiety, promotion of effective coping, absence of skin breakdown, increased knowledge of the disease process and self-health management, and prevention of complications is the patient's primary objectives.

5. Nursing Intervention

- a. Maintaining Normal Elimination Patterns
- b. Relieving Pain
- c. Maintaining Fluid Intake
- d. Maintaining Optimal Nutrition
- e. Promoting Rest
- f. Reducing Anxiety
- g. Enhancing Coping Measures
- h. Preventing Skin Breakdown
- i. Monitoring and Managing Potential Complications
- j. Promoting Home, Community-Based, And Transitional Care

Nursing Care for Patient with Hemorrhoids

a. Definition

Hemorrhoids are enlarged vessels within the anal canal. Approximately 10 million individuals in the United States have hemorrhoids, and nearly one-third of them seek treatment annually (Perry, 2019). Hemorrhoids are abnormally dilated hemorrhoidal veins. They may be internal (above the internal sphincter) or external (outside the external sphincter). Hemorrhoids can appear periodically, depending on the amount

of anorectal pressure. The hemorrhoidal and vascular tissues in the anal canal wall slide due to the shearing of the mucosa during defecation. Due to increased pressure in the hemorrhoidal tissue, pregnancy may cause or aggravate hemorrhoids. There are two varieties of hemorrhoids: internal and external. Internal hemorrhoids are located above the internal sphincter, while external hemorrhoids are located outside the external sphincter. According to the degree of prolapse, internal hemorrhoids are categorized as follows (Soweld, 2018).

1. First-degree does not prolapse and protrude into the anal canal.
2. Second-degree prolapse: prolapse outside the anal canal during defecation but spontaneous reduction.
3. Third degree: prolapsed to the extent that manual reduction is required.
4. Fourth degree—prolapsed to the point where they cannot be reduced and pose a danger of strangulation and thrombosis.

b. Etiology

It is believed that hemorrhoids result from increased anal pressure and weakened connective tissue that supports the hemorrhoidal vessels. Weakened supporting tissue permits the hemorrhoidal veins to descend, causing them to enlarge. Blood flow is impaired within the vessels of the hemorrhoidal plexus. A thrombosed external hemorrhoid is caused by an intravascular thrombus in the venule. Numerous factors raise the danger of developing hemorrhoids. Pregnancy, constipation, straining to defecate, diarrhea, heavy lifting, protracted standing and sitting, obesity, and ascites are among these conditions.

c. Pathophysiology

Hemorrhoids are the most common cause of bright red bleeding during defecation. They also cause itching and discomfort. Extreme pain is associated with external hemorrhoids due to the inflammation and edema produced by thrombosis (blood clotting within the hemorrhoid). This may result in tissue ischemia and eventual necrosis. When internal hemorrhoids become enlarged and bleed or prolapse, they are typically not unpleasant.

d. Nursing Management

Most individuals with anorectal disorders do not require hospitalization. Those who undertake corrective surgical procedures are frequently discharged directly from the outpatient surgical center. If they are hospitalized, it is typically for less than 24 hours.

Nursing Care for Patients with Hepatitis

a. Definition

Hepatitis is liver inflammation. The most prevalent cause is a virus. Other causes include substances (such as alcohol, drugs, and chemicals), autoimmune diseases, and metabolic disorders.

Table 8.3 Characteristics of Hepatitis Viruses. (Source: Brunner’s & Suddarth’s. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022)

Incubation Period and Mode of Transmission	Sources of Infection	Infectivity
Hepatitis A Virus (HAV) Incubation: 15–50 days (average 28) Fecal-oral (primarily fecal contamination and oral ingestion)	<ul style="list-style-type: none"> Contaminated food, milk, water, shellfish Crowded conditions (e.g., day care, nursing home) Persons with subclinical infections, infected food handlers, sexual contact, IV drug users Poor personal hygiene Poor sanitation 	<ul style="list-style-type: none"> Most infectious during 2 weeks before onset of symptoms Infectious until 1–2 weeks after the start of symptoms
Hepatitis B Virus (HBV) Incubation: 115–180 days (average 56–96) Percutaneous (parenteral) or mucosal exposure to blood or blood products Sexual contact Perinatal transmission	<ul style="list-style-type: none"> Contaminated needles, syringes, and blood products HBV-infected mother (perinatal transmission) Sexual activity with infected partners. Asymptomatic carriers Tattoos or body piercing with contaminated needles 	<ul style="list-style-type: none"> Before and after symptoms appear Infectious for months Carriers continue to be infectious for life
Hepatitis C Virus (HCV) Incubation: 14–180 days (average 56) Percutaneous (parenteral) or mucosal exposure to blood or blood products High-risk sexual contact Perinatal contact	<ul style="list-style-type: none"> Blood and blood products Needles and syringes Sexual activity with infected partners, low risk 	<ul style="list-style-type: none"> 1–2 weeks before symptoms appear Continues during clinical course 75%–85% go on to develop chronic HCV and remain infectious
Hepatitis D Virus (HDV) Incubation: 2–26 weeks HBV must precede HDV Chronic carriers of HBV always at risk	<ul style="list-style-type: none"> Same as HBV Can cause infection only when HBV is present 	<ul style="list-style-type: none"> Blood infectious at all stages of HDV infection
Hepatitis E Virus (HEV) Incubation: 15–64 days (average 26–42 days) Fecal-oral route	<ul style="list-style-type: none"> Contaminated water, poor sanitation Found in Asia, Africa, and Mexico Not common in United States but is increasing in some areas 	<ul style="list-style-type: none"> Not known May be similar to HAV

b. Viral Hepatitis

In systemic viral hepatitis, liver cell necrosis and inflammation cause clinical, biochemical, and physiological changes. A, B, C, D, and E are liver-damaging viruses. Although B, C, and D share many traits, hepatitis A and E are transmitted fecally. Hepatitis is contagious and causes long absences.

Acute viral hepatitis affects 0.5%–1% of Americans annually. 2017 saw 3366 US HAV cases. From 1995 to 2011, incidence plummeted 95%, then surged 140% from 2011 to 2017. In 2017, homeless and drug users had major person-to-person epidemics (CDC, 2017). HBV caused 3407 acute viral hepatitis cases that year. In 2017, 3186 cases of viral hepatitis C (HCV) occurred at 1.0 per 100,000 individuals, up from 2013.

3729 opioid deaths. 2.4 million Americans with HCV (CDC, 2017). Acute hepatitis B cases increased slightly in 2017. Opioid-related injectable medication use and increased surveillance likely caused the spike (CDC, 2017). Hepatitis A and B immunisations, universal precautions, blood supply safety, and high-risk behaviour education have reduced HBV incidence since 1990 (Goldman & Schafer, 2019). HAV/HCV infections are rising. 60–90% of viral hepatitis cases go undetected (CDC, 2017). Misdiagnoses, subclinical instances, and underreporting may occur. Table 43-4 compares major viral hepatitis types.

Patient and virus-specific hepatitis symptoms. Infectious hepatitis has four clinical phases. Viral replication occurs in asymptomatic patients with hepatitis. Phase 2—preicteric or prodromal—may include anorexia, nausea, vomiting, fatigue, and itching. Icteric phase 3 causes jaundice and dark urine. Liver enlargement causes abdominal pain. Phase 4 is convalescence when symptoms and tests improve. Mild illness patients may skip phases (Chi, Cleary, & Bocchini, 2018; Shin, 2018).

c. Hepatitis A Virus

HAV causes 20%–25% of US clinical hepatitis (CDC, 2017). RNA enteroviruses cause infectious hepatitis A. US adults suffer most. The fecal-oral route distributes HAV through food and drink. Overcrowding and poor sanitation promote it. Patients' faeces contain the virus before and throughout illness.

Poor hygiene, hand-to-mouth contact, or other close contact at school generally infects children and young people. Home sloppiness spreads infection. Infected food handlers' sewage-contaminated water or seafood can spread the disease. Developmentally impaired people's poor hygiene has caused outbreaks in daycares and institutions. Several sex partners and oral-anal contact can spread hepatitis A (Chi et al., 2018; Goldman

& Schafer, 2019; Shin & Jeong, 2018). Transfusions don't spread hepatitis A.

Incubation averages 4 weeks (CDC, 2017; Chi et al., 2018; Shin & Jeong, 2018). Symptoms persist 4-8 weeks. Over-40s suffer longer and worse. Hepatitis A seldom causes acute liver necrosis, cirrhosis, or death. Hepatitis A kills 0.5% of under-40s. HAV does not carry chronic hepatitis. Serum virus disappears before jaundice. Hepatitis A doesn't prevent others.

Clinical Manifestation Hepatitis A Virus

Anicteric patients are symptomless. Symptoms are moderate, flu-like upper respiratory tract infections with a low-grade fever. Early signs of anorexia are severe. Damaged liver cells may emit a poison or fail to metabolize an aberrant product, causing it. Jaundice and black urine may follow. Indigestion causes diffuse epigastric pain, nausea, heartburn, and flatulence at degrees. The patient may also acquire an aversion to cigarette smoke, cigarette flavor, and other strong odors (Papadakis & McPhee, 2020; Shin & Jeong, 2018). After the jaundice peaks, usually 10 days later, these symptoms disappear. Adults may have more severe symptoms and a longer disease course than children.

Assessment and Diagnostic Findings

A few days after onset, the liver and spleen are frequently moderately enlarged; other than hepatitis, there are few other physical symptoms. An HAV antigen may be detected in the stool seven to ten days before illness and for two to three weeks after the onset of symptoms. HAV antibodies are detectable in the serum, but typically not before the onset of symptoms. Analysis of immunoglobulin subclasses can help determine whether an antibody represents an acute or past infection.

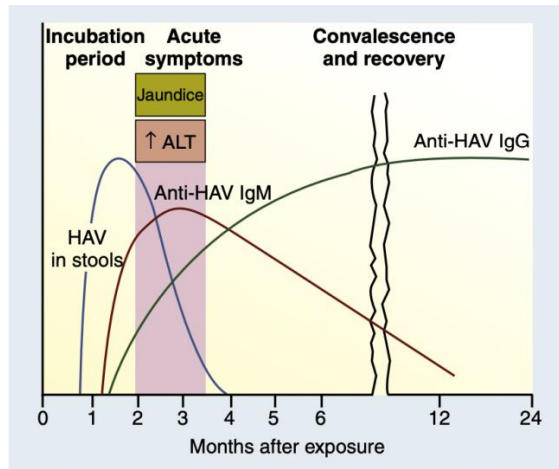


Figure 8.4. The course of infection with hepatitis A virus (HAV). ALT, Alanine aminotransferase. (From McCance KL, Huether SE: *Pathophysiology: The Biologic Basis for Disease in Adults and Children*, ed 6, St Louis, 2010, Mosby.)

Prevention of Hepatitis A

1. Educate patients regarding safe practices for preparing and dispensing food.
2. Encourage conscientious individual hygiene.
3. Encourage proper community and home sanitation.
4. Facilitate mandatory reporting of viral hepatitis to local health departments.
5. Promote community health education programs.
6. Promote vaccination to interrupt community-wide outbreaks.
7. Recommend pre-exposure vaccination for all children 12–23 months of age.
8. Continue existing immunization programs for children 1–18 years of age.
9. Recommend vaccination for travelers to developing countries, illegal drug users (injection and non-injection drug users), men who have sex with men, people with chronic liver disease,

people who work with HAV-infected animals or work with HAV in research facilities and recipients (e.g., hemophiliacs) of pooled plasma products for clotting factor disorders.

10. Support effective health supervision of schools, dormitories, extended care facilities, barracks, and camps.

Medical Management of Hepatitis A

During the acute phase, bed rest and a nutritious diet are crucial components of treatment. During anorexia, the patient should receive frequent, modest feedings and, if necessary, glucose-containing intravenous fluids. Due to the patient's common food aversion, moderate persistence and ingenuity may be necessary to stimulate appetite. Food and fluid intake must be optimized to prevent weight loss and accelerate recovery. However, many patients recover their appetites before the icteric phase. In general, the patient's perception of well-being and laboratory test results are appropriate guides for bed rest and physical activity restriction. Gradual but progressive ambulation hastens the healing process.

Nursing Management of Hepatitis A

Unless symptoms are severe, management typically occurs at home.

Therefore, the nurse assists the patient and family in coping with the transient disability and fatigue that are typical of HAV and educates them to seek further medical attention if the symptoms persist or worsen. To prevent the disease from spreading to other family members, the patient and his or her family require specific instructions regarding diet, rest, follow-up blood work, and the significance of avoiding alcohol, as well as sanitation and hygiene measures (especially hand hygiene). Specific education for patients and their families on reducing the risk of contracting HAV emphasizes good personal hygiene by emphasizing hand hygiene

(after bowel movements and before eating) and environmental sanitation (safe food and water supply, effective sewage treatment).

d. Hepatitis B Virus

HBV, unlike HAV, is predominantly transmitted via blood (percutaneous and per mucosal routes). HBV is present in blood, saliva, sperm, and vaginal secretions and can be transmitted via mucous membranes and skin breaches. HBV is also transmitted from carrier mothers to their infants, particularly in high-incidence regions (such as Southeast Asia). Typically, the infection is not transmitted through the umbilical vein but rather from the mother during birth and subsequent close contact.

HBV has a lengthy period of incubation. It replicates in the liver and persists in the serum for extended periods, allowing for its transmission. In Chart 43-7, the risk factors for HBV infection are summarized. The incidence of HBV after blood transfusion has been significantly reduced due to the screening of blood donors.

Risk Factors of Hepatitis B

1. Close contact with a carrier of hepatitis B virus
2. Frequent exposure to blood, blood products, or other body fluids
3. Health care workers: hemodialysis staff, oncology, and chemotherapy nurses, personnel at risk for needlesticks, operating room staff, respiratory therapists, surgeons, dentists
4. Hemodialysis
5. IV/injection drug use
6. Gay men and bisexual activity
7. Mother-to-child transmission
8. Multiple sexual partners

9. Receipt of blood or blood products (e.g., clotting factor concentrate)
10. Recent history of sexually transmitted infection
11. Tattooing
12. Travel to or residence in an area with uncertain sanitary conditions

Prevention of Hepatitis B

1. Advise avoidance of high-risk behaviors.
2. Avoid multidose vials in patient care settings.
3. Monitor cleaning, disinfection, and sterilization of reusable devices in patient care settings.
4. Recommend vaccination for international travelers to regions with high or intermediate levels of endemic hepatitis B virus infection and for persons with chronic liver disease or with human immune deficiency virus infection.
5. Recommend vaccination for persons at risk for infection by sexual exposure, by percutaneous or mucosal exposure to blood.
6. Recommend vaccination of all infants regardless of the mother's hepatitis B.
7. Use barrier precautions in situations of contact with blood or body fluids.
8. Use needleless IV and injection systems in health care.
9. Use standard precautions in clinical care

Clinical Manifestations of Hepatitis B

Clinically, HBV is very similar to HAV; however, the incubation period is significantly longer (1 to 6 months). HBV signs and symptoms can be subtle and variable. Fever and respiratory symptoms are uncommon; arthralgias and lesions are common. Loss of appetite, dyspepsia, abdominal pain, generalized soreness, malaise, and weakness may be experienced by the

patient. There may or may not be jaundice present. Jaundice is accompanied by light-colored feces and dark urine. The liver may be tender and 12 to 14 cm vertically enlarged. In a few patients, the spleen is distended and palpable, and the posterior cervical lymph nodes may also be enlarged. Subclinical episodes also occur frequently.

Assessment and Diagnostic Findings of Hepatitis B

1. HBV is a deoxyribonucleic acid (DNA) virus composed of the following antigenic particles:
2. HBcAg—hepatitis B core antigen (antigenic material in an inner core)
3. HBsAg—hepatitis B surface antigen (antigenic material on the viral surface, a marker of active replication and infection)
4. HBeAg—an independent protein circulating in the blood
5. HBxAg—gene product of X gene of HBV DNA

Each antigen **elicits** its specific antibody and is a marker for different stages of the disease process:

1. anti-HBc—antibody to core antigen of HBV; persists during the acute phase of illness; may indicate continuing HBV in the liver
2. anti-HBs—antibody to surface determinants on HBV; detected during late convalescence; usually indicates recovery and development of immunity
3. anti-HBe—antibody to hepatitis B e-antigen; usually signifies reduced infectivity
4. anti-HBxAg—antibody to the hepatitis B x-antigen; may indicate ongoing replication of HBV

Prevention of Hepatitis B

- a) Preventing Transmission:

Continued screening of blood donors for HBAg reduces the likelihood of blood transfusion transmission. Disposable

syringes, needles, lancets, and needleless IV administration systems have reduced the risk of spreading this infection between patients and healthcare workers during blood sample collection and parenteral therapy. The clinical laboratory and hemodialysis unit clean work spaces daily.

Handling blood, bodily fluids, HBsAg-positive specimens, or patients' secretions requires gloves. The lab and other areas with secretions, blood, or blood products restrict eating. Patient education about the disease, its infectiousness, and prognosis can avoid transmission and safeguard contacts.

b) Active Immunization: HBV:

Healthcare workers and hemodialysis patients should have the HBV vaccine. HCV and other chronic liver disease patients should also be vaccinated.

HEPLISAV-B, a newly approved hepatitis B vaccine, was recommended by the ACIP for adults over 18 in 2018. This new vaccine is given twice a month. The fewer doses and shorter time between doses may boost vaccine series completion (Chi et al., 2018).

c) Passive Immunity: Hepatitis B Immune Globulin:

For those exposed to HBV who have never had hepatitis B or received the vaccine, HBIG confers passive protection. Inadvertent exposure to HBsAg-positive blood via needlestick or transmucosal (splashes in contact with mucous membrane) routes, sexual contact with HBsAg-positive people, and perinatal exposure (infants born to HBV-infected mothers should receive HBIG within 12 hours after delivery) are all indications for HBIG postexposure vaccine. High-anti-HBs plasma is used to make HBIG. HBIG immunization between hours to days of hepatitis B exposure boosts protection.

HBV-exposed individuals should receive both active and passive vaccinations. When giving HBIG and hepatitis B vaccines together, utilize different sites and syringes. HBIG is

safe and has not transmitted infectious infections (Chi et al., 2018; Terrault et al., 2018).

Nursing Management

Complete symptomatic recovery may require three to four months or more (Papadakis & McPhee, 2020). After the jaundice has resolved, a progressive return to physical activity is encouraged during this stage. If the patient is hospitalized during the acute and infectious stages, the nurse identifies psychosocial issues and concerns, focusing on the effects of separation from family and companions. The patient will be unable to work and must avoid sexual contact even if not hospitalized. Planning is necessary to reduce social isolation. Involving the family in planning reduces their concerns and anxieties regarding the disease's spread.

e. Hepatitis C Virus

Blood transfusions and sexual contact caused most HCV instances in the US, but increasingly IV or injection drug users sharing needles and health care workers suffering needlesticks and other injuries do. CDC reported 3186 acute hepatitis C cases in 2017. After accounting for under-ascertainment and under-reporting, 2017 had 44,300 acute hepatitis C cases.

2.5 million Americans are infected with HCV, many unaware (CDC, 2017). African Americans 40–59 had higher HCV rates. 17,253 U.S. death certificates indicated HCV as a reason in 2017, but this number may be inflated (CDC, 2017; Houghton, 2019). One-third of HCC diagnoses and most liver transplants are caused by HCV (CDC, 2017; Houghton, 2019).

IV drug users, sexually active people with several partners, patients receiving frequent transfusions, those who need a lot of blood, and healthcare personnel are at risk for HCV (Chart 43-8). 15–160 days. HBV-like acute HCV symptoms are rare. HCV can

induce cirrhosis and liver cancer, and chronic carriers are frequent. High- and moderate-risk individuals and those born in high-prevalence countries or regions should be tested for HCV and HBV (CDC, 2017; Houghton, 2019; Schiff et al., 2018). Small amounts of alcohol may hasten disease. Avoid alcohol and liver-damaging medications.

Risk Factors of Hepatitis C

1. Children born to women infected with the hepatitis C virus
2. Health care and public safety workers after needlestick injuries or mucosal exposure to blood
3. Multiple contacts with a person who is infected with hepatitis C virus
4. Multiple sex partners, history of sexually transmitted infection, unprotected sex
5. Past/current illicit IV/injection drug use
6. Recipient of blood products or organ transplant before 1992 or clotting factor concentrates before 1987

Prevention of Hepatitis C

1. Advise avoidance of high-risk behaviors such as IV drug use.
2. Avoid multidose vials in patient care settings.
3. Monitor cleaning, disinfection, and sterilization of reusable devices in patient care settings.
4. Use barrier precautions in situations of contact with blood or body fluids.
5. Use needleless IV and injection systems in health care.
6. Use standard precautions in clinical care.

f. Hepatitis D Virus

Hepatitis B can cause delta agent (Hepatitis D) infection. Only hepatitis B patients are at risk for hepatitis D because viral replication requires HBsAg. HBsAg and anti-delta antibodies

corroborate the diagnosis. IV drug users, hemodialysis patients, and multiple blood transfusion recipients have hepatitis D. Hepatitis B and D are spread through sexual contact. (Schiff, 2018) Incubation lasts 30–150 days.

Hepatitis D is more likely than B to cause acute hepatic failure, chronic active hepatitis, and cirrhosis. It is treated like other hepatitis. Interferon alfa is the sole FDA-approved HDV therapy. Interferon efficacy is dose- and treatment-dependent, and recurrence rates are substantial. A year of high-dose, long-duration therapy is recommended (Friedman & Martin, 2018; Schiff et al., 2018; Sedhom, D'Souza, John, et al., 2018).

g. Hepatitis E Virus

HEV spreads via the fecal–oral pathway through polluted water in poor sanitation environments. Incubation takes 15–65 days. Generally, hepatitis E resembles A. Self-limiting and sudden onset. Almost always, jaundice. Not chronic.

Handwashing is the best way to prevent hepatitis E. Immune globulin may not protect against HEV.

h. Hepatitis G Virus and Gb Virus-C

Long thought to be caused by a non-A–E agent, hepatitis. Hepatitis B and C cannot survive posttransfusion hepatitis' 14–145-day incubation. 50% of US patients with cryptogenic chronic liver disease got blood transfusions before developing illness. Thus, hepatitis G virus (HGV) or GB virus-C (GBV-C)—two separate isolates of the same virus that are transmitted percutaneously—has been reported. No autoantibodies.

Pathogen's clinical significance is unknown. Hepatitis C shares risk factors. HGV/GBV-C does not cause progressive liver damage. Persistent infections do not impact clinical course (Papadakis & McPhee, 2020; Sedhom et al., 2018).

i. Nonviral Hepatitis

Certain compounds produce acute liver cell necrosis or toxic hepatitis when inhaled, injected intravenously, or consumed orally. Carbon tetrachloride and phosphorus are two common chemicals associated with this condition. These chemicals are genuine hepatotoxins. Numerous medications can cause hepatitis, but they are only sensitizing and not toxic.

Similar to acute viral hepatitis, but with more extensive parenchymal degeneration, is drug-induced hepatitis. Isoniazid, halothane, acetaminophen, methyldopa, as well as certain antibiotics, antimetabolites, and anesthetic agents, can cause hepatitis.

j. Toxic Hepatitis

Toxic hepatitis starts like viral. Exposure to hepatotoxic substances, pharmaceuticals, botanical agents, and other toxic agents helps diagnose and treat the cause. Jaundice and hepatocellular enlargement are typical signs. Toxicity increases symptoms. If the hepatotoxin is discovered and cleared early, acute toxic hepatitis can be treated quickly. Long delays between exposure and symptoms make recovery unlikely. No antidotes work. The patient's temperature rises, making them sick. Persistent vomiting may contain blood. Severe clotting problems can cause subcutaneous bleeding. Severe gastrointestinal discomfort may trigger vascular collapse. Delirium, coma, and seizures follow acute hepatic failure, and without a liver transplant, the patient may die within a few days. Few treatments available besides liver transplantation. Therapy focuses on blood replacement, hydration and electrolyte balance, and comfort and support. Some acute toxic hepatitis survivors acquire chronic liver damage. Fibrosis and postnecrotic cirrhosis may follow liver recovery.

k. Drug-Induced Hepatitis

Drug-induced liver disease causes almost half of acute liver failure cases in the US (Schiff et al., 2018; Stravitz & Lee, 2019; Thomas & Lewis). A medication's sensitivity may appear immediately or months later. Chills, fever, rash, pruritus, arthralgia, anorexia, and vertigo are common. Jaundice, black urine, and an enlarged, inflamed liver may follow. Symptoms may improve after stopping the medicine. Even without the drug, reactions can be severe or fatal. Fever, rash, or pruritus should stop any medicine. Acetaminophen is the most prevalent cause of acute liver failure (Schiff et al., 2018; Stravitz & Lee, 2019). Anaesthetics, rheumatic and musculoskeletal illness treatments, antidepressants, psychiatric drugs, anticonvulsants, and antituberculosis drugs can also cause liver injury (Schiff et al., 2018; Stravitz & Lee, 2019; Thomas & Lewis). A brief course of high-dose corticosteroids for severe hypersensitivity reactions is unproven. Drug-induced hepatitis may not respond well to liver transplantation.

Nursing Care for Patients with Intestinal Obstructive

When a blockage prevents the normal passage of intestinal contents through the intestinal tract, there is intestinal obstruction. This flow can be impeded by two types of processes (Norris, 2019; Ramnarine, 2017):

1. Mechanical obstruction: can be caused by extrinsic lesions from outside the intestines or intrinsic lesions within the intestines. Extrinsic lesions include adhesions, hernias, and ulcers, among others. Intrinsic lesions include benign and malignant intestinal tumors, strictures (from previous surgery or radiation), and intraluminal lesions resulting from a defect in the bowel lumen (e.g., intussusception).
2. Functional or paralytic obstruction: The intestinal musculature is unable to propel the contents along the colon due to a disruption

in the bowel's innervation or blood supply. Examples include amyloidosis, muscular dystrophy, endocrine conditions like diabetes, and neurologic conditions like Parkinson's disease. The obstruction can also be temporary and the result of surgical manipulation of the bowel (ileus).

Table 8.4 Mechanical Causes of Intestinal Obstruction. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

Cause	Description	Result
Adhesions	Loops of intestine become adherent to areas that heal slowly or scar after abdominal surgery; occurs most commonly in small intestine	After surgery, adhesions produce a kinking of an intestinal loop.
Intussusception (see Fig. 41-5A)	One part of the intestine slips into another part located below it (like a telescope shortening); occurs more commonly in infants than adults	The intestinal lumen becomes narrowed, and blood supply becomes strangulated.
Volvulus (see Fig. 41-5B)	Bowel twists and turns on itself and occludes the blood supply	Intestinal lumen becomes obstructed. Gas and fluid accumulate in the trapped bowel.
Hernia (see Fig. 41-5C)	Protrusion of intestine through a weakened area in the abdominal muscle wall	Intestinal flow may be completely obstructed. Blood flow to the area may be obstructed as well.
Tumor	A tumor that exists within the wall of the intestine extends into the intestinal lumen, or a tumor outside the intestine causes pressure on the wall of the intestine. Most common type is colorectal adenocarcinoma	Intestinal lumen becomes partially obstructed; if the tumor is not removed, complete obstruction results.

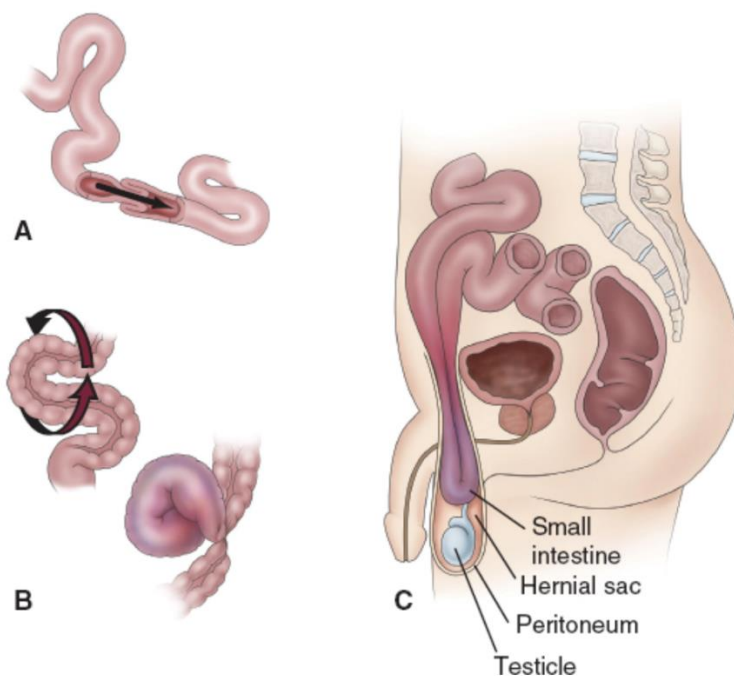


Figure 8.5 Three causes of intestinal obstruction. A. Intussusception; invagination or shortening of the colon caused by the movement of one segment of bowel into another. B. Volvulus of the sigmoid colon; the twist is counter clockwise in most cases. Note the edematous bowel. C. Hernia (inguinal). The sac of the hernia is a continuation of the peritoneum of the abdomen. The hernial contents are intestine, omentum, or other abdominal contents that pass through the hernial opening into the hernial sac. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

a. Small Bowel Obstruction

1. Pathophysiology

The accumulation of intestinal contents, fluid, and gas proximal to intestinal obstruction. The abdominal distention and fluid retention reduce fluid absorption and stimulate increased gastric secretion. With increasing distention, intestinal lumen pressure increases, resulting in a decrease in venous and arteriolar capillary pressure. There is a third spacing of fluids, electrolytes, and proteins into the intestinal lumen, leading to a decrease in the volume of circulating fluids and dehydration. With sustained intestinal distention and edema, perfusion to the affected segment of the intestine can be compromised, resulting in ischemia, necrosis, and eventual rupture or perforation of the intestinal wall, leading to peritonitis (Bordeianou & Yeh, 2019; Ramnarine, 2017).

2. Clinical Manifestations

Constant peristalsis above and below the obstruction causes crampy, colicky pain. The patient can evacuate blood and mucous but not faeces or flatus. Vomiting occurs. If the obstruction is complete, the peristaltic waves become highly powerful and finally reverse direction, forcing intestinal contents into the mouth rather than the rectum. Dehydration causes extreme thirst, lethargy, oliguria, malaise, pain, and dry tongue and mucous membranes. Distal peristalsis causes early flatus and stool. Abdominal expansion. The lower the GI tract obstruction, the more abdominal distention, which may cause reflux-related regurgitation. Vomiting induces metabolic alkalosis by reducing blood chloride and potassium levels and stomach hydrogen ions. Water and salt loss cause dehydration and acidosis. Acute fluid loss can cause hypovolemic and septic shock (Bordeianou & Yeh, 2019; Ramnarine, 2017).

3. Assessment and Diagnostic Findings

Symptoms, physical examination, and imaging studies determine the diagnosis. Bowel sounds are initially high-pitched and hyperactive to move the obstruction, then low-pitched and hypoactive. Bowel strangulation or ischemia may also cause persistent or intensified bowel sounds (Bordeianou & Yeh, 2019; Ramnarine, 2017).

Abdominal X-rays and CT scans may show abnormal gas, fluid, or both in the intestines and distal bowel collapse. Electrolyte and CBC tests show dehydration, plasma volume loss, and probable infection. Small intestinal obstruction treatment focuses on diagnosis, cause, and strangulation risk.

4. Medical Management

All patients with small bowel obstruction require decompression of the bowel through the insertion of an NG tube; reclining the bowel in this manner for up to three days may result in resolution of the obstruction (Ramnarine, 2017). Hypertonic water-soluble GI contrast media (Gastrografin) may be advantageous for stimulating peristalsis and determining the likelihood of surgical intervention in adhesion-afflicted patients. The presence of dye in the large intestine predicts the resolution of obstruction without surgical intervention (Bordeianou & Yeh, 2019).

5. Surgical Management

Approximately 25% of obstructed patients will require surgical intervention (Bordeianou & Yeh, 2019). When the bowel is completely obstructed, the risk of tissue necrosis and suffocation necessitates surgical intervention. Before surgery, it is necessary to replace lost water, sodium, chloride, and potassium with IV fluids. The surgical treatment of intestinal obstruction depends on the underlying cause. For the most common causes of obstruction, such as hernia and adhesions, surgery involves

repairing the hernia or separating the adhesion to which the intestine is affixed. In certain cases, the afflicted portion of the bowel may be removed and an anastomosis may be performed. The duration of the intestinal obstruction and the condition of the intestine determine the difficulty of the surgical procedure. Both open and laparoscopic techniques are available.

6. Nursing Management

Maintaining the function of the NG tube, assessing and measuring the NG output, assessing for fluid and electrolyte imbalance, monitoring nutritional status, and assessing for manifestations consistent with resolution (e.g., return of normal bowel sounds, decreased abdominal distention, subjective improvement in abdominal pain and tenderness, passage of flatus or stool) comprise the nursing management of the patient with a small bowel obstruction who does not require surgery.

Monitoring the patient's fluid and electrolyte balance is a top priority in the case of a minor bowel obstruction. The presence of an NG tube and the patient's nothing-by-mouth (NPO) status poses a significant risk of fluid imbalance. Consequently, measures to promote fluid homeostasis are crucial.

The nurse reports variances in the patient's intake and output, intensification of pain or abdominal distention, and increased NG output. If the patient's condition does not improve, the attendant makes surgical preparations. This preparation involves preoperative education as indicated by the patient's condition. After surgical repair of a small bowel obstruction, the nursing care of the patient is comparable to that following other abdominal operations.

b. Large Bowel Obstruction

1. Pathophysiology

Gas, fluid, and intestinal contents accumulate near big intestine obstructions. Distention and perforation can occur if 3521 gas and liquid cannot escape through the ileocecal valve. If the colon's blood supply is intact, large intestine obstruction may not be serious. However, blood loss causes intestine strangulation and necrosis, which is fatal. Due to its ability to absorb fluid and grow, the colon dehydrates more slowly than the small intestine. Perforation, peritonitis, and sepsis are like minor bowel blockage.

2. Clinical Manifestation

Large intestine obstruction symptoms develop slower than small bowel obstruction. Weeks-long sigmoid colon or rectum blockage may merely cause constipation. As the barrier increases, excrement changes shape. Stool-related anaemia is possible. Anorexia, weight loss, and exhaustion may occur. The abdomen distends, big bowel loops appear on the abdominal wall, and the patient has crampy lower abdominal pain (Hopkins, 2017).

3. Assessment and Diagnostic Findings

Diagnosis is based on symptoms, physical assessment findings, and on imaging studies. The abdomen may be distended, bowel sounds may be normal early in the obstruction, but later hypoactive to absent, and the abdomen hyper resonant (Hopkins, 2017). Abdominal X-ray and abdominal CT or MRI findings reveal a distended colon and pinpoint the site of the obstruction (Hopkins, 2017).

4. Medical Management

Immediate measures are taken to restore intravascular volume, correct electrolyte abnormalities, and perform NG aspiration and decompression. The colon can be untwisted and decompressed via colonoscopy. A rectal tube may be utilized to decompress a lower intestinal region. A metal colonic stent may be used as an alternative palliative measure or as a bridge to definitive surgery.

Endoscopic placement of the colonic stent with the aid of an image intensifier generates a fluoroscopic image (Hopkins, 2017). Typically, surgical resection is used to remove the obstructing lesion. Occasionally, a temporary or permanent colostomy is required. If the entire large bowel must be removed, an ileoanal anastomosis may be conducted (Hopkins, 2017).

5. Nursing Management

The nurse is responsible for observing the patient for signs that the intestinal obstruction is worsening or improving, as well as providing emotional support and solace. The nurse administers prescribed IV fluids and electrolytes. If nonsurgical treatment fails to improve the patient's condition, the nurse prepares the patient for surgery. This preparation involves preoperative education as indicated by the patient's condition. After surgery, routine postoperative nursing care, including abdominal wound care, is administered.

Nursing Care for Patients with Diabetes Mellitus

a. Definition

Diabetes is a collection of metabolic illnesses that induce hyperglycemia (high blood glucose) due to insulin secretion, action, or both (CDC, 2020). Diabetics must understand epidemiology, pathophysiology, diagnostic testing, medical and nursing care, and rehabilitation. Technology, research, and drugs are constantly improving diabetes care. Diabetics receive nursing care everywhere. This chapter covers diabetic nursing care.

Diabetes mellitus (DM) is a chronic multisystem disease that causes hyperglycemia from aberrant insulin production, insulin resistance, or both. Diabetes is a global issue. 34,2 million Americans—10.5%—have diabetes. 88 million adults have prediabetes. 17,3 million diabetics are unaware of their illness.

b. Epidemiology

Nearly one-third of the 34 million Americans with diabetes are undiagnosed (CDC, 2020). 1.7 million 20-year-olds are diagnosed with diabetes annually. By 2050, one in three Americans may have diabetes if this trend continues. 28.3% of 65-year-olds had diabetes in 2018 (CDC, 2020). Prediabetes prevalence keeps rising. Laboratory findings suggested 88 million US adults 18 or older had prediabetes in 2018. Prediabetes affected 48.1% of 65-year-olds (CDC, 2020). Diabetes costs \$237 billion in medical costs and \$90 billion in productivity (CDC, 2020). Diabetes disproportionately affects ethnic and racial minorities. African Americans, Native Americans, and Hispanics are more likely to develop diabetes, are at higher risk for its complications, and have higher diabetes-related mortality rates than Caucasians (CDC, 2020).

Classification

Type 1 diabetes, type 2 diabetes, gestational diabetes, LADA, and diabetes associated with other illnesses or syndromes are the main types of diabetes (ADA, 2020). Diabetes has different causes, symptoms, and treatments.

Classification is dynamic in two ways. First, research shows that each category has many subgroups. Second, patients can switch groups except type 1 diabetics. Gestational diabetes can lead to type 2 diabetes in women. Prediabetes is a condition in which blood glucose levels are between normal and those of diabetes (ADA, 2020; CDC, 2020).

Table 8.5 Genetics in Clinical Practice. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

Type 1 DM	Type 2 DM	MODY
<p>Genetic Basis</p> <ul style="list-style-type: none"> Increased susceptibility (40%–50%) when a person has specific human leukocyte antigens (HLA-DR3 and HLA-DR4) Polygenic (>40 genes influence susceptibility) <p>Risk to Offspring</p> <ul style="list-style-type: none"> Risk to offspring of mothers with DM is 1%–4% Risk to offspring of fathers with DM is 5%–6% When 1 identical twin has type 1 DM, the other gets DM about 30%–40% of the time <p>Clinical Implications</p> <ul style="list-style-type: none"> Result of complex interaction of genetic, autoimmune, and environmental factors 	<ul style="list-style-type: none"> Polygenic (>25 genes influence susceptibility) <p>Risk to offspring is 8%–14%</p> <ul style="list-style-type: none"> When 1 identical twin has type 2 DM, the other gets DM about 60%–75% of the time <p>Result of complex genetic interactions and other metabolic factors</p> <ul style="list-style-type: none"> Environmental factors, such as body weight and exercise, can sometimes modify metabolic factors 	<ul style="list-style-type: none"> Autosomal dominant Monogenic (single gene) Caused by mutations in any of 6 MODY genes (types 1–6) Gene mutations lead to β-cell dysfunction <p>If 1 parent has MODY, a child has a 50% chance of developing DM</p> <ul style="list-style-type: none"> If 1 parent has MODY, a child has a 50% chance of being a carrier <p>Accounts for 1%–5% of people with DM</p> <ul style="list-style-type: none"> Young age of onset (often before age 25) Not related to obesity or hypertension Treatment depends on the genetic mutation that caused MODY

c. Risk factors

- a) Age >30 years for type 2 and <30 years for type 1
- b) High-density lipoprotein (HDL) cholesterol level ≤ 35 mg/dL (0.90 mmol/L) and/or triglyceride level ≥ 250 mg/dL (2.8 mmol/L)
- c) History of gestational diabetes or delivery of a baby over 9 lb
- d) Hypertension
- e) Family history of diabetes (e.g., parents or siblings with diabetes)
- f) Obesity (i.e., $\geq 20\%$ over desired body weight or body mass index ≥ 30 kg/m²)
- g) Previously identified impaired fasting glucose or impaired glucose tolerance
- h) Race/ethnicity (e.g., African Americans, Hispanic Americans, Native Americans, Asian Americans, Pacific Islanders)

d. COVID-19 Considerations

Wuhan, China, had the COVID-19 epidemic in late 2019. Since then, several SARS-CoV-2 and COVID-19 concerns have been identified. Epidemiologic evidence from China suggests that any

kind of diabetes may increase the likelihood of SARS-CoV-2 and COVID-19 hospitalisation (Sommerstein, Kochen, Messerli, et al., 2020). Diabetes increases COVID-19 intubation and mortality.

In a study of 486 COVID-19 patients hospitalised, those over 60, male, and diabetic were more likely to need intubation (Hur, Price, Grey, et al., 2020). (Chen, Yang, Chen, et al., 2020) found that older diabetics, positive C-reactive protein test results, and insulin use increased mortality.

e. Pathophysiology

Insulin is a hormone that is secreted by beta cells, one of four cell types in the islets of Langerhans in the pancreas (Norris, 2019). Insulin is a storage or anabolic hormone. When a person consumes food, insulin secretion rises and glucose is moved from the circulation into muscle, liver, and fat cells.

Within these cells, insulin exerts the following effects:

1. Transports glucose and metabolizes it for energy
2. Stimulates glucose storage (in the form of glycogen) in the liver and muscle.
3. Signals the liver to cease glucose secretion
4. Enhances dietary fat storage in adipose tissue
5. Boosts the transport of amino acids (from dietary protein) into cells.
6. Inhibits the decomposition of glucose, protein, and fat stored in the body

During fasting periods (between meals and overnight), the pancreas continuously releases a small amount of insulin (basal insulin); when blood glucose levels decrease, another pancreatic hormone called glucagon (secreted by the alpha cells of the islets of Langerhans) is released, which stimulates the liver to release glucose from storage. Insulin and glucagon work together to maintain a constant glucose level in the blood by stimulating the liver to release glucose.

The liver initially generates glucose via glycogenolysis (the decomposition of glycogen). Through the process of gluconeogenesis, the liver produces glucose from the breakdown of noncarbohydrate substances, including amino acids, after 8 to 12 hours without sustenance.

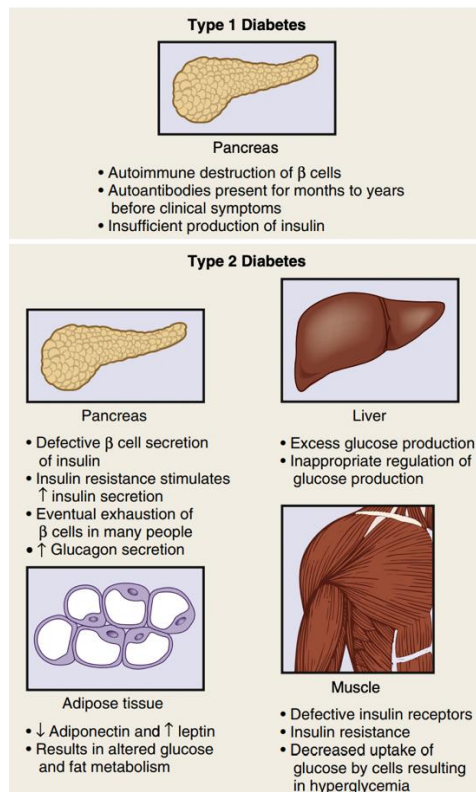


Figure 8.6 Altered Mechanisms in type 1 and type 2 DM. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

f. Type 1 Diabetes

Type 1 diabetes destroys pancreatic beta cells (Norris, 2019). Genetic, immunologic, and even viral causes may destroy beta-cells. Genetic vulnerability is a prevalent cause of type 1 diabetes, even though the events that destroy beta cells are unknown.

Type 1 diabetes is inherited as a hereditary predisposition. Human leukocyte antigens are linked to this genetic tendency. Type 1 diabetes has an autoimmune response. This inappropriate immune reaction causes antibodies to attack normal biological tissues as if they were foreign. Autoantibodies against islet cells and endogenous (internal) insulin have been found in people before and after type 1 diabetes diagnosis. Environmental factors including viruses and pollution may destroy beta cells.

Beta cell loss decreases insulin secretion, increases liver glucose production, and causes fasting hyperglycemia. Postprandial hyperglycemia is caused by dietary glucose, which cannot be stored in the liver. If the blood glucose concentration surpasses 180–200 mg/dL (9.9–11.1 mmol/L), the kidneys may not reabsorb all of the filtered glucose, resulting in glycosuria (glucose in the urine). Fluid and electrolyte loss causes urine glucose loss. Osmotic diuresis.

Insulin-deficient people have unrestricted glycogenolysis and gluconeogenesis, causing hyperglycemia. Ketone bodies, a highly acidic byproduct of liver breakdown of free fatty acids, rise in the absence of insulin.

Diabetic ketoacidosis (DKA) is a metabolic disorder caused by insulin insufficiency and metabolic acidosis. Type 1 diabetics are more at risk. Hyperglycemia, ketosis, and metabolic acidosis are the main metabolic disorders (Norris, 2019). Polyuria, polydipsia, nausea, vomiting, lethargy, stupor, and coma can precede DKA. Ketoacidosis causes fruity breath.

g. Type 2 Diabetes

Type 2 diabetes is more common in obese people over 30 years old, but the obesity epidemic in children, adolescents, and young adults is rapidly increasing its occurrence in younger people (CDC, 2020). Type 2 diabetes is characterised by insulin resistance and reduced insulin secretion. Insulin resistance decreases tissue insulin sensitivity. Insulin attaches to cell receptors and starts glucose metabolic events. These intracellular processes are reduced in type 2 diabetes, making insulin less effective at stimulating tissue glucose absorption and liver glucose release. Genetic factors may cause insulin resistance and decreased insulin production in type 2 diabetes, although the exact pathways are unknown. To avoid blood glucose accumulation and insulin resistance, more insulin must be secreted. Type 2 diabetes occurs when beta cells cannot meet insulin demand. Insulin resistance can cause metabolic syndrome, which includes hypertension, hypercholesterolemia, abdominal obesity, and other abnormalities (Norris, 2019).

Type 2 diabetes impairs insulin secretion, although enough insulin is present to inhibit fat decomposition and ketone body generation. Type 2 diabetes seldom causes DKA. Uncontrolled type 2 diabetes can cause hyperglycemic hyperosmolar syndrome (HHS).

Type 2 diabetes' slow, cumulative glucose intolerance may go unnoticed for years. The patient may develop moderate symptoms such weariness, irritation, polyuria, polydipsia, poorly healing skin wounds, vaginal infections, or blurred vision (if glucose levels are high). Most individuals (75%) are diagnosed with type 2 diabetes accidentally during normal laboratory or ophthalmoscopic investigations. Long-term diabetes complications (e.g., eye disease, peripheral neuropathy, peripheral vascular disease) 4000 may have developed before the

diagnosis of diabetes (ADA, 2020), indicating elevated blood glucose before diagnosis.

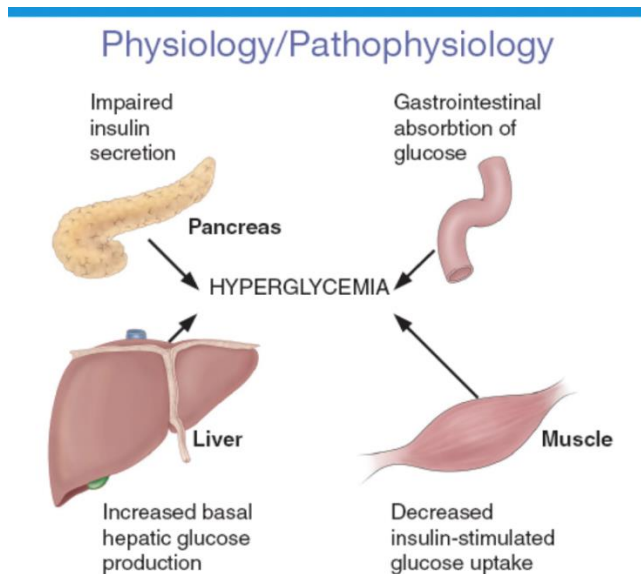


Figure 8.7 Pathogenesis of Type 2 diabetes. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

h. Gestational Diabetes

Pregnancy-onset glucose intolerance is called gestational diabetes (Norris, 2019). Placental hormones produce insulin resistance and hyperglycemia, especially in the second and third trimesters.

Obesity, a personal history of gestational diabetes, glycosuria, or a strong family history of diabetes are risk factors for gestational diabetes. Hispanic, Native, Asian, African, and Pacific Islanders are at risk. If high-risk women do not have gestational diabetes after initial screening, they should be retested between 24 and 28 weeks. All moderate-risk women should be examined at 24–28 weeks. Minimal-risk women should not be tested. Low-risk women have no history of abnormal glucose tolerance, no known

history of diabetes in first-degree relatives, and no history of poor obstetric outcomes (ADA, 2020).

In women who surpass 140 mg/dL (7.8 mmol/L), a glucose challenge test followed by an oral glucose tolerance test is recommended for high-risk women (ADA, 2020). Diet and blood glucose monitoring start treatment. 70%–85% of women with gestational diabetes can regulate blood glucose with lifestyle changes. ADA 2020 recommends 175 g of carbohydrates, 71 g protein, 28 g fibre, and minimal saturated fats. Hyperglycemia requires insulin. Pregnancy blood glucose targets are 140–180 mg/dL (7.8–10 mmol/L) (ADA, 2020). Gestational diabetes patients' blood glucose levels normally normalise after birth. Many women with gestational diabetes later develop type 2 diabetes. Every three years, women with gestational diabetes should be tested for diabetes or prediabetes (ADA, 2020).

Table 8.6 Criteria for the Diagnosis of Diabetes. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

Criteria for the Diagnosis of Diabetes

- Symptoms of diabetes plus casual plasma glucose concentration equal to or greater than 200 mg/dL (11.1 mmol/L). Casual is defined as any time of day without regard to time since last meal. The classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss.

Or

- Fasting plasma glucose greater than or equal to 126 mg/dL (7.0 mmol/L). Fasting is defined as no caloric intake for at least 8 hours.

Or

- Two-hour postload glucose equal to or greater than 200 mg/dL (11.1 mmol/L) during an oral glucose tolerance test. The test should use a glucose load containing the equivalent of 75-g anhydrous glucose dissolved in water.

Or

- Hemoglobin A1C $\geq 6.5\%$ (48 mmol/mol).

In the absence of unequivocal hyperglycemia with acute metabolic decompensation, these criteria should be confirmed by repeat testing on a different day. The third measure is not recommended for routine clinical use.

A1C, glycosylated hemoglobin

Adapted from American Diabetes Association (ADA). (2020). Standards of medical care in diabetes—2020. *Diabetes Care*, 43(Suppl 1), S1–S212.

- i. Assessment and Diagnostic Findings
 - 1. Symptoms related to the diagnosis of diabetes:
 - a. Symptoms of hyperglycemia
 - b. Symptoms of hypoglycemia
 - c. Frequency, timing, severity, and resolution
 - 2. Results of blood glucose monitoring
 - 3. Status, symptoms, and management of chronic complications of diabetes:
 - 4. Eye; kidney; nerve; genitourinary and sexual, bladder, and gastrointestinal Cardiac; peripheral vascular; foot complications associated with diabetes
 - 5. Adherence to/ability to follow prescribed dietary management plan
 - 6. Adherence to a prescribed exercise regimen
 - 7. Adherence to/ability to follow prescribed pharmacologic treatment (insulin or oral antidiabetic agents)
 - 8. Use of tobacco, alcohol, and prescribed and over-the-counter medications/drugs
 - 9. Lifestyle, cultural, psychosocial, and economic factors that may affect diabetes treatment
 - 10. Effects of diabetes or its complications on functional status (e.g., mobility, vision)

- j. Physical Examination
 - 1. Blood pressure (sitting and standing to detect orthostatic changes)
 - 2. Body mass index (height and weight)
 - 3. Funduscopic examination and visual acuity
 - 4. Foot examination (lesions, signs of infection, pulses)
 - 5. Skin examination (lesions and insulin injection sites)
 - 6. Neurologic examination
 - a. Vibratory and sensory examination using monofilament
 - b. Deep tendon reflexes
 - 7. Oral examination

- k. Laboratory Examination
 1. HgbA1C (A1C)
 2. Fasting lipid profile
 3. Test for microalbuminuria
 4. Serum creatinine level
 5. Urinalysis
 6. Electrocardiogram

- l. Need for Referrals
 1. Ophthalmologist
 2. Podiatrist
 3. Dietitian
 4. Diabetes educator
 5. Others if indicated

- m. Medical Management

Diabetes treatment aims to normalise insulin activity and blood glucose to prevent complications. The Diabetes management and Complications experiment Research Group (DCCT), a 10-year prospective clinical experiment from 1983 to 1993, showed the importance of normal blood glucose management. This landmark trial showed that stringent glucose control dramatically reduced sequelae like retinopathy, nephropathy, and neuropathy. Intensive treatment includes three or four daily insulin injections or a continuous subcutaneous insulin infusion device, frequent blood glucose monitoring, and weekly diabetes educator contact (DCCT, 1993). To avoid problems, the ADA advises glucose management (HgbA1C < 7%) for all diabetics (ADA, 2020a).

Intensive therapy should be started cautiously with patient and family education and patient responsibility. Starting intense therapy requires careful patient evaluation for capability and accountability.

Diabetes management aims for euglycemia without hypoglycemia and a great quality of life. Nutrition, exercise, monitoring, pharmaceutical therapy, and education control diabetes. Health experts and patients alter diabetes treatment everyday. The health care team directs treatment, but the patient manages the complex regimen. Diabetes treatment requires patient and family education, just like all other components.

Table 8.7 Commercially available insulin preparations showing onset, peak, and duration of action. Patient responses to each type of insulin are different and affected by many factors. Source: Brunner’s & Suddarth’s. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022


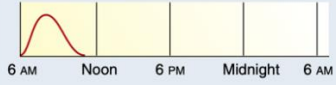


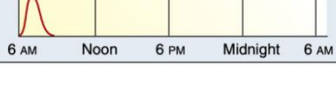
INSULIN PREPARATION	ONSET, PEAK, DURATION	EXAMPLE
Rapid acting lispro (Humalog) aspart (NovoLog, Fiasp) glulisine (Apidra)	<i>Onset:</i> 10–30 min <i>Peak:</i> 30 min–3 hr <i>Duration:</i> 3–5 hr	
Short acting Regular (Humulin R, Novolin R)	<i>Onset:</i> 30 min–1 hr <i>Peak:</i> 2–5 hr <i>Duration:</i> 5–8 hr	
Intermediate acting NPH (Humulin N, Novolin N)	<i>Onset:</i> 1.5–4 hr <i>Peak:</i> 4–12 hr <i>Duration:</i> 12–18 hr	
Long acting glargine (Lantus, Toujeo, Basaglar) detemir (Levemir) degludec (Tresiba)	<i>Onset:</i> 0.8–4 hr <i>Peak:</i> Less defined or no pronounced peak <i>Duration:</i> 16–24 hr	
Inhaled insulin Afrezza	<i>Onset:</i> 12–15 min <i>Peak:</i> 60 min <i>Duration:</i> 2.5–3 hr	

Table 8.8 Insulin Plans. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

Plan	Type of Insulin and Frequency	Action Profile	Comments
Once a day Single dose	Intermediate (NPH) <i>At bedtime</i>		1 injection should provide nighttime coverage.
	<i>OR</i> Long-acting (degludec [Tresiba], detemir [Levemir], glargine [Lantus]) <i>In am or at bedtime</i>		1 injection may last up to 24 hr with fewer defined peaks and less chance for hypoglycemia. Does not cover postprandial glucose levels.
Twice a day Split-mixed dose	NPH and regular or rapid (both regular and rapid are shown on the diagram) <i>Before breakfast and at dinner</i>		2 injections provide coverage for 24 hr. Person must eat at certain times to avoid hypoglycemia.
Three times a day Combination of mixed and single dose	NPH and regular or rapid (both regular and rapid are shown on the diagram) <i>Before breakfast</i> + Regular or rapid <i>Before dinner</i> + NPH <i>At bedtime</i>		3 injections provide coverage for 24 h, especially during early AM hours. Decreased potential for 2–3 AM hypoglycemia.
Basal-bolus Multiple dose	Regular or rapid (both regular and rapid are shown on the diagram) <i>Before breakfast, lunch, and dinner</i> + Long-acting (degludec, detemir, or glargine) <i>Once or twice a day</i> <i>OR</i> Regular or rapid (both regular and rapid are shown on the diagram) <i>Before breakfast, lunch, and dinner</i> + NPH <i>Twice a day</i>		More flexibility at mealtimes and for amount of food intake. Good postprandial coverage. Preprandial glucose checks and following a patient-centered plan are beneficial. People with type 1 DM require basal insulin to cover 24 hr. Most physiologic approach, other than pump.

Rapid-acting (lispro, aspart, glulisine) insulin.
 Short-acting (regular) insulin.
 Intermediate-acting (NPH) or long-acting (glargine, detemir, degludec) insulin.

n. Complications of Insulin Therapy

1. Local Allergic Reactions.
2. Systemic Allergic Reactions.
3. Insulin Lipodystrophy.
4. Lipohypertrophy, the formation of fibrofatty masses at the injection site, is produced by the recurrent use of an injection site.
5. Resistance to Injected Insulin.
6. Morning Hyperglycemia.

o. Oral Antidiabetic Agents

If MNT and exercise fail to treat type 2 diabetes, oral antidiabetic medicines may help. Oral antidiabetic agents in the US include second-generation sulfonylureas, biguanides, alpha-glucosidase inhibitors, non-sulfonylurea insulin secretagogues (meglitinides, phenylalanine derivatives), thiazolidinediones (glitazones), DPP-4 inhibitors, GLP-1 receptor agonists, and SGL-2 inhibitors. Oral thiazolidinediones lower insulin resistance in target tissues, improving insulin action without increasing insulin production. Second-generation sulfonylureas and meglitinides secrete insulin (Keresztes & Peacock-Johnson, 2019). Patients must understand that oral medications are used in addition to MNT and exercise. Infection, trauma, or surgery-related hyperglycemia may require stopping oral antidiabetic medicines and starting insulin. See hospitalised patient glycemic control.

Multidoses, or many medications, may improve outcomes due to different mechanisms of action (ADA, 2020). Some type 2 diabetics use oral medications with insulin, mostly glargine at bedtime. Symptomatic type 2 diabetes patients with high blood glucose and A1C levels can start insulin therapy (ADA, 2020).

p. Other Pharmacologic Therapy

Diabetes medicines are available. If diabetes requires insulin, these injectables constitute supplementary therapy. Pramlintide, a synthetic analogue of human amylin, is used to treat both type 1 and type 2 diabetes (Comerford & Durkin, 2020). It treats hyperglycemia in those who don't respond to mealtime insulin. It supplements insulin. It slows digestion and lowers appetite (Comerford & Durkin, 2020). Therapy reduces glucose fluctuations and improves glucose control. Subcutaneously inject pramlintide 2 inches from an insulin injection site (Comerford & Durkin, 2020). During pramlintide medication, patients must regularly check their blood glucose levels.

q. Nursing Management

1. Managing Glucose Control in the Hospital Setting

Hyperglycemia can lengthen lengths of stay and increase infection rates and death; hence, nurses need to address glucose management in all hospital patients. Hyperglycemia occurs most often in patients with known diabetes (i.e., type 1, type 2, gestational) and in those newly diagnosed with diabetes or stress hyperglycemia. Nursing care for hyperglycemia in the hospital uses the following concepts (ADA, 2020):

1. Blood glucose goals are 140 to 180 mg/dL.
2. Insulin (subcutaneous or IV) is preferred over oral antidiabetic medications to control hyperglycemia.
3. Hospital insulin protocols or order sets should reduce complexity, provide adequate staff training, include standardized hypoglycemia treatment, and make guidelines available for glycemic goals and insulin doses.
4. Appropriate timing of blood glucose readings, meal consumption, and insulin dose are all critical for glucose control and avoiding hypoglycemia.

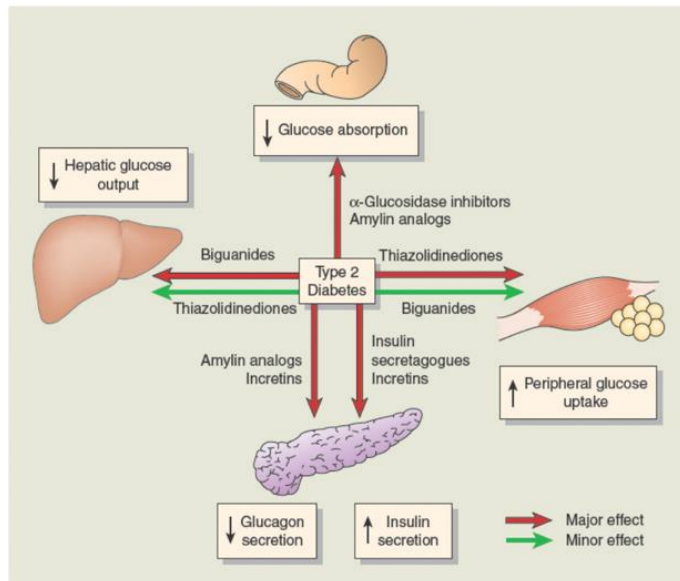


Figure 8.8 Action sites of hypoglycemic agents and mechanisms of lowering blood glucose in type 2 diabetes. The incretins are the dipeptidyl peptidase-4 inhibitors and glucagonlike peptide-1 agonists. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

2. Providing Patient Education

Basic Skills for People with Diabetes

The nurse includes the following basic information in education:

a. Pathophysiology

- a) The basic definition of diabetes (having a high blood glucose level)
- b) Normal blood glucose ranges and target blood glucose levels
- c) Effect of insulin and exercise (decrease glucose)
- d) Effect of food and stress, including illness and infections (increase glucose)
- e) Basic treatment approaches

- b. Treatment modalities
 - a) Administration of insulin and oral antidiabetic medications
 - b) Meal planning (food groups, timing of meals)
 - c) Monitoring of blood glucose and urine ketones
- c. Recognition, treatment, and prevention of acute complications
 - a) Hypoglycemia
 - b) Hyperglycemia
- d. Pragmatic information
 - a) Where to buy and store insulin, syringes, and glucose monitoring supplies
 - b) When and how to contact the primary provider

3. Assessing Readiness to Learn

The nurse evaluates the patient's social situation for factors that may influence the diabetes treatment and education plan, such as:

- a. Low literacy level (may be evaluated while assessing for visual deficits by having the patient read from educational materials)
- b. Limited financial resources or lack of health insurance
- c. Presence or absence of family support
- d. Typical daily schedule (the patient is asked about the timing and number of usual daily meals, work and exercise schedule, and plans for travel) Cognitive deficits or other disabling conditions, obtained from the patient's health history and physical assessment (the patient is assessed for aphasia or decreased ability to follow simple commands)

4. Educating Experienced Patients

Nurses must annually assess long-term diabetes patients' ability and self-care (Davidson et al., 2018). These patients must be assessed by observing abilities, not merely self-reporting self-care tasks. These patients must also understand foot, eye, and risk factor prevention. First-timers with long-term diabetic issues may grieve again. To avoid complications, some patients may take up diabetic self-care again. Some feel guilty and depressed. The patient is urged to express concerns about issues. The nurse provides diabetic information.

5. Determining Education Methods

Maintaining flexibility about schooling methodologies is vital. Providing education on skills and information in a logical sequence is not always the most useful strategy for patients. For example, many patients fear self-injection. Before students learn how to prepare, purchase, store, and mix insulins, they should be taught to insert the needle and inject insulin (or practice with saline solution).

6. Various tools can be used to complement schooling.

Many diabetic self-care product manufacturers offer patient education manuals, videotapes, DVDs, or online materials. See Resources for additional educational materials. It's crucial to use a variety of written handouts that match the patient's learning demands (including languages, low-literacy information, and large print) and reading ability, as well as technical accuracy. Community-based and online diabetes education programmes help patients learn more (Davidson et al., 2018).

7. Educating Patients to Self-Administer Insulin

Insulin injections are self-administered into the subcutaneous tissue with the use of specific insulin syringes. Basic information comprises explanations of the equipment, insulins, and syringes and how to combine insulin, if necessary.

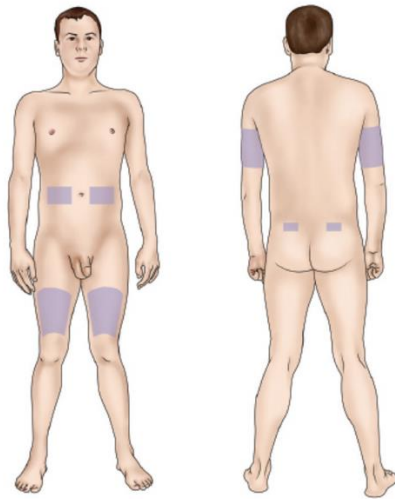


Figure 8.9 Suggested areas for insulin injection. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

8. Promoting Home, Community-Based, and Transitional Care

- a. Address any underlying problems (e.g., knowledge deficit, self-care deficit, illness) that may affect the control of diabetes.
- b. Simplify the treatment regimen if it is too tough for the patient to follow.
- c. Adjust the treatment regimen to satisfy patient preferences (e.g., adjust diet or insulin schedule to allow increased flexibility in meal composition or timing).

- d. Establish a precise strategy or contract with each patient with straightforward, measurable goals.
 - e. Provide positive rewards of self-care behaviors accomplished instead of emphasizing activities that were neglected (e.g., positively encourage blood glucose tests that were performed instead of focusing on the number of missed tests).
 - f. Help the patient uncover their motivating elements rather than focused on trying to please primary doctors.
 - g. Encourage the patient to pursue life objectives and hobbies, and avoid an inordinate concentration on diabetes.
9. Continuing and Transitional Care

Many factors affect how often people see their main doctors for ongoing care. Age, socioeconomic situation, present problems, type of diabetes, and concurrent conditions may determine follow-up frequency. Home health, community-based, and transitional care nurses provide diabetes education, wound care, insulin preparation, and glucose monitoring to many diabetics. Even individuals with adequate glycemic control should contact their primary care provider twice a year for monitoring and nutrition adjustments. The nurse should also encourage the patient to get annual flu shots and age-appropriate screenings like pelvic exams and mammograms.

Both newly diagnosed and long-term diabetics should join support groups, either in person or online. Participation may help patients and families adjust to lifestyle changes caused by diabetes and its complications. Support group members exchange valuable knowledge and learn from others. Support groups allow diabetes treatment approaches to be

discussed and verified by nurses or other health care professionals, encouraging healthier behaviours.

10. Nutritional Therapy

Nutritional management of diabetes entails the following goals:

1. To accomplish and maintain:
 - a. Blood glucose levels in the normal range or as near to normal as is safely possible
 - b. A lipid and lipoprotein profile that reduces the risk for vascular disease
 - c. Blood pressure levels in the normal range or as near to normal as is safely possible
2. To prevent, or at least delay, the rate of development of the chronic complications of diabetes by modifying the nutrient intake and lifestyle
3. To address individual nutrition requirements, taking into account personal and cultural preferences and willingness to change
4. To maintain the enjoyment of eating by only limiting food choices when indicated by scientific evidence

11. Exercise

Exercise helps treat diabetes by lowering blood glucose and cardiovascular risk factors (ADA, 2020). Exercise lowers blood glucose via improving muscle glucose uptake and insulin utilisation. It boosts circulation and muscle tone. Weightlifting increases lean muscle mass and resting metabolic rate. In diabetes, these effects help reduce weight, stress, and well-being. Exercise raises HDL and lowers total cholesterol and triglycerides. Diabetes raises the risk of cardiovascular disease, making this crucial. Diabetics should exercise regularly. Chart 46-4 describes diabetes exercise

considerations. Diabetic sequelae such as retinopathy, autonomic neuropathy, sensorimotor neuropathy, and cardiovascular disease require new exercise guidelines (ADA, 2020). Exercise-induced high blood pressure can worsen diabetic retinopathy and cause vitreous or retinal bleeding.

General Considerations for Exercise in People with Diabetes

The nurse instructs the patient to:

1. Exercise three times each week with no more than 2 consecutive days without exercise.
2. Perform resistance training twice a week if you have type 2 diabetes.
3. Exercise at the same time of day (preferably when blood glucose levels are at their peak) and for the same duration each session.
4. Use proper footwear and, if appropriate, other protective equipment (i.e., helmets for cycling).
5. Avoid trauma to the lower extremities, especially if you have numbness due to peripheral neuropathy.
6. Inspect feet daily after exercise.
7. Avoid exercise in extreme heat or cold.
8. Avoid exercise during periods of poor metabolic control.
9. Stretch for 10 to 15 minutes before exercising.

r. Acute Complications of Diabetes

1. Hypoglycemia (Insulin Reactions)

Hypoglycemia denotes low (hypo) sugar in the blood (glycemia) and occurs when the blood glucose falls to less than 70 mg/dL (3.9 mmol/L) (ADA, 2020). It can occur when there is too much insulin or oral hypoglycemic medications, too little food, or intense physical exercise. Hypoglycemia may develop at any hour of the day or night. It commonly occurs before meals, especially if meals are delayed or snacks are missing. For example, mid-morning hypoglycemia may

occur as the morning insulin is peaking, whereas hypoglycemia that occurs in the late afternoon coincides with the peak of the morning NPH insulin. Middle-of-the-night hypoglycemia may occur because to peaked evening or predinner NPH insulins, especially in individuals who have not had a bedtime snack.

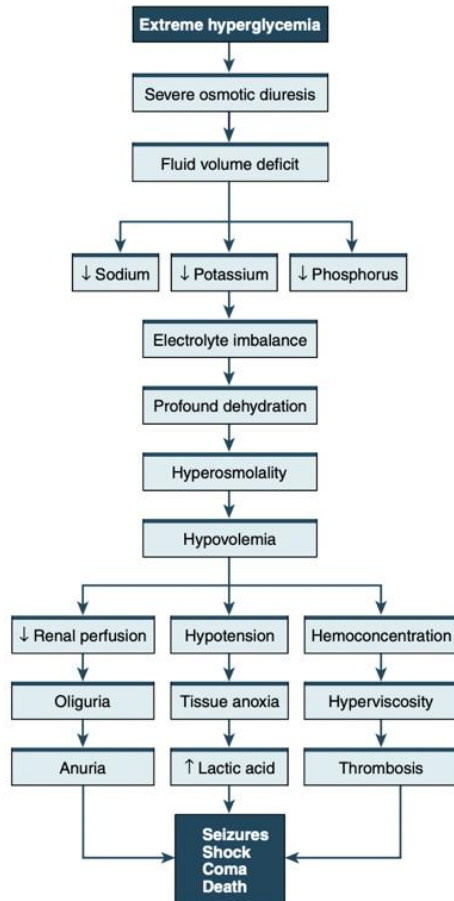


Figure 8.10 Pathophysiology of hyperosmolar hyperglycemic syndrome. (Modified from Urden LD, Stacy KM, Lough ME: *Critical Care Nursing: Diagnosis and Management*, ed 6, St Louis, 2010, Mosby.)

2. DKA (Diabetic Ketoacidosis)

The three main clinical features of DKA are as follows:

- 1) Hyperglycemia
- 2) Dehydration and electrolyte loss
- 3) Acidosis

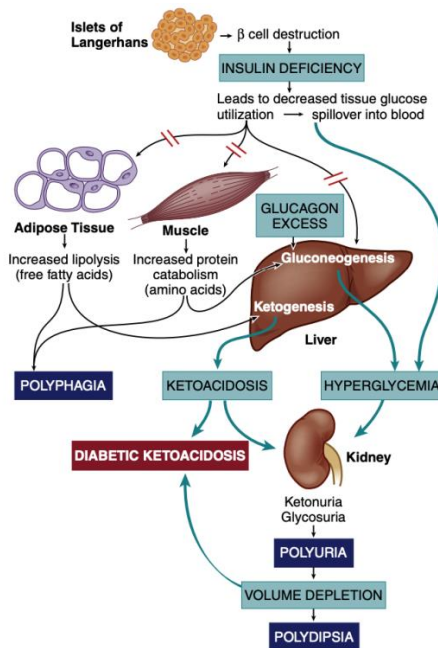


Figure 8.11 Abnormal metabolism causes signs and symptoms of diabetic ketoacidosis. Redrawn from Pearce, M. A., Rosenberg, C. S., & Davidson, M. D. (2003). Patient education. In Davidson, M. B. (Ed.). *Diabetes Mellitus: Diagnosis and Treatment*. New York: Churchill Livingstone.

3. HHS (Hyperglycemic Hyperosmolar Syndrome)

HHS is a metabolic disorder, usually type 2 diabetes, caused by a relative insulin shortage caused by an illness that increases insulin requirement. Hyperosmolality, hyperglycemia, and sensorium anomalies characterize this

serious illness. Ketosis is rare. Insulin resistance is the biological deficiency.

Hyperglycemia causes osmotic diuresis, which depletes water and electrolytes. Water moves from intracellular to extracellular fluid spaces to maintain osmotic balance. Dehydration and glycosuria cause hypernatremia and osmolarity. Table 46-6 compares DKA and HHS. HHS is more common among 50–70-year-olds with no diabetes history or type 2 diabetes (Fayfman et al., 2017).

HHS can be caused by infection, acute illness (e.g., stroke), hyperglycemia-inducing medicines, or dialysis. Polyuria with adequate fluid intake occurred for days to weeks. HHS lacks ketosis and acidosis, probably because to insulin abnormalities. Ketone bodies and ketoacidosis result from the breakdown of glucose, protein, and fat in DKA, which lacks insulin. In HHS, insulin is too low to avoid hyperglycemia and osmotic diuresis yet high enough to limit fat breakdown. HHS patients do not develop ketosis-4045-related gastrointestinal symptoms that require medical attention.

Polyuria and polydipsia may be tolerated until neurologic abnormalities, an underlying illness, or family members or others demand treatment.

4. Macrovascular Complications

Macrovascular complications are disorders of the large- and medium-sized blood arteries that develop with greater frequency and with an earlier onset in persons with DM. Macrovascular diseases include cerebrovascular, cardiovascular, and peripheral vascular illnesses. Women with DM have a 4 to 6 times increased risk for CVD. Men with DM have a 2 to 3 times greater risk for CVD compared with those without DM.

5. Microvascular Complications

Microvascular problems develop from thickening of the vessel membranes in the capillaries and arterioles (small arteries) in response to persistent hyperglycemia. Although microangiopathy can be present throughout the body, the areas most notably damaged are the eyes (retinopathy), kidneys (nephropathy), and nerves (neuropathy). Microvascular alterations are observed in some persons with type 2 DM at the time of diagnosis.

s. Nursing Management

Caring for the Patient With DM

1. Assess for risk factors for prediabetes and type 1 and type 2 DM.
2. Teach the patient and caregiver about DM management, including BGM, drug therapy, nutrition, activity, and managing hypoglycemia.
3. Develop a plan to avoid hypoglycemia or hyperglycemia in a patient with DM who is acutely ill or having surgery.
4. Assess for acute complications and implement appropriate actions for hypoglycemia, DKA, and HHS.
5. In patients with acute complications, perform or directly supervise actions, including IV fluid and insulin administration.
6. Assess for chronic complications, including CVD, retinopathy, nephropathy, neuropathy, and foot complications.
7. Teach the patient and caregiver about the prevention and management of chronic complications.
8. Supervise LPN/VNs, and in some states and settings APs, administer insulin, noninsulin injectable agents, and OAs to stable patients.

Collaborate with Other Team Members Dietitian

1. Obtain a diet history from the patient.
2. Work with the patient and caregiver to create a patient-centered meal plan.
3. Provide instructions for meal plan as needed.

Physical Therapist

1. Assess the patient's current level of fitness.
2. Develop an exercise plan with the patient.

Occupational Therapist

1. Teach patients with impaired vision how to use devices to draw up and measure insulin.
2. Provide teaching on how to use a talking glucose meter or any glucose meter one-handed.
3. Develop protective techniques for activities that involve exposure to heat, cold, and sharp objects.

Social Worker

1. Aid the patient in finding resources to meet medical and financial needs.
2. Help with coping with DM, including managing problems within the family or workplace.

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CHAPTER 9

NURSING CARE CONCEPTS FOR PATIENTS WITH PATHOLOGICAL ELIMINATION DISORDERS OF THE INTESTINAL AND URINARY SYSTEM

Introduction

This chapter covers many gastrointestinal (GI) and urinary system disorders, including constipation, faecal, and urinary incontinence; Benign Prostatic Hyperplasia (Enlarge Prostate); Nephrolithiasis; colorectal cancer (CRC); abdominal and bowel surgery (including ostomy formation); and renal cancer. Patients often have dietary and elimination difficulties. Fluid and electrolyte imbalance is common in inflamed and painful people. Nutrition and gastrointestinal health are goals.

Kidney function is vital. Complete renal failure without treatment leads to death. The upper urinary system has two kidneys and two ureters. The lower urinary system includes the bladder and urethra. The kidneys make urine, the ureters drain it into the bladder, and the urethra expels it.

Key Term

- a. Constipation
- b. Fecal Incontinence/urinary incontinence
- c. Benign Prostatic Hyperplasia (Enlarge Prostate)
- d. Nephrolithiasis
- e. Renal Cancer
- f. Colorectal Cancer

Learning Objective

- a. Identify the etiology, epidemiology, and pathophysiology of Constipation
- b. Recall, analyze, and select appropriate history, physical, and evaluation of Constipation
- c. Explain the treatment and management options available for Constipation
- d. Identify the etiology, epidemiology, and pathophysiology of Fecal Incontinence and urinary incontinence
- e. Recall, analyze, and select appropriate history, physical, and evaluation of Fecal Incontinence and urinary incontinence
- f. Explain the treatment and management options available for Fecal Incontinence and urinary incontinence
- g. Identify the etiology, epidemiology, and pathophysiology of Benign Prostatic Hyperplasia (Enlarge Prostate)
- h. Recall, analyze, and select appropriate history, physical, and evaluation of Benign Prostatic Hyperplasia (Enlarge Prostate)
- i. Explain the treatment and management options available for Benign Prostatic Hyperplasia (Enlarge Prostate)
- j. Identify the etiology, epidemiology, and pathophysiology of Nephrolithiasis
- k. Recall, analyze, and select appropriate history, physical, and evaluation of Nephrolithiasis
- l. Explain the treatment and management options available for Nephrolithiasis
- m. Identify the etiology, epidemiology, and pathophysiology of Renal Cancer
- n. Recall, analyze, and select appropriate history, physical, and evaluation of Renal Cancer
- o. Explain the treatment and management options available for Renal Cancer

- p. Identify the etiology, epidemiology, and pathophysiology of Colorectal Cancer
- q. Recall, analyze, and select appropriate history, physical, and evaluation of Colorectal Cancer
- r. Explain the treatment and management options available for Colorectal Cancer

A. Nursing Care for Patients with Constipation

a. Definition

Constipation is characterised by less than three stools per week, straining, feeling incomplete, needing digital assistance to evacuate stool, bloating, and hard or lumpy stools. Constipation is merely a symptom. It might be acute or persistent. Constipation is less than three bowel motions per week or rigid, dry, tiny, or hard (Simren, Palsson, & Whitehead, 2017). Constipation is more common among pregnant women, post-surgery patients, older adults, non-Caucasians, and people with irritable bowel syndrome (NIDDK, 2018). Constipation is a symptom that may signal an illness or GI tract motility issue. Perceived constipation is another issue. An individual's gastrointestinal elimination pattern deviates from what they consider typical (Dimidi, Cox, Grant, et al., 2019; Mari, Mahamid, Amara, et al., 2020).

Anticholinergics, antidepressants, anticonvulsants, antispasmodics, calcium channel antagonists, diuretics, analgesics, aluminium- and calcium-based antacids, and iron supplements can cause constipation. Weakness, immobility, debility, weariness, celiac disease, and the inability to elevate intra-abdominal pressure, such as in emphysema or spinal cord injury patients, can also cause constipation. Many people get constipated because they don't poop or ignore the urge. Low fibre and fluid intake, lack of exercise, and stress can cause constipation (NIDDK, 2018). Fibre helps faeces transit by

increasing its density. Dietary fibre, most of which is plant cell walls, ferments and promotes healthy intestinal wall function (Williams, Grant, Gidley, et al., 2017).

b. Etiology

Chronic constipation is linked to low-fiber diets, decreased physical activity, and ignoring bowel movements. The rectum muscles and mucosa can become desensitised to faeces if the need to defecate is ignored. Water absorption from prolonged faeces retention dries stool. Expelling solid, dry faeces is harder. Anxiety, despair, and stress can cause constipation. Constipation is linked to diabetes, Parkinson's, and MS. Opioids cause constipation.

Some think they're constipated if they don't poop daily. Chronic laxative use can cause cathartic colon syndrome, a dilated, atonic colon. Laxatives are necessary to defecate.

c. Pathophysiology

Constipation is thought to be caused by interference with one of the colon's three main functions: mucosal transport, myoelectric activity, or defecation. Four kinds of constipation are based on pathophysiologic causes (Basson, 2019a):

1. Functional constipation involves appropriate mucosal transport and transit. Fibre and fluid intake help alleviate the most common type of constipation.
2. Inherited colon motor dysfunction causes slow-transit constipation, which causes infrequent stool movements.
3. Dysfunctional pelvic floor-anal sphincter motor coordination produces defecation problems. Dyssynergia constipation involves difficulty to coordinate stomach, pelvic floor, and rectoanal muscles to defecate. Anismus describes pelvic floor dysfunction and constipation. Constipation and faecal incontinence can result (see below).

4. Opioid-induced constipation, which involves new or worsening symptoms when opioid therapy is started, adjusted, or increased and must include at least two functional constipation symptoms (see below).

Normal rectal distention increases the urge to defecate by stimulating the inhibitory recto anal reflex, relaxing the internal sphincter muscle, relaxing the external sphincter and pelvic muscles, and raising intra-abdominal pressure. Interrupting these processes may cause constipation. Disregarding the need to defecate desensitises the rectal mucous membrane and musculature to faeces, requiring a stronger stimulus to induce peristaltic evacuation. Faecal retention initially irritates the colon, which often spasms after meals, causing colicky mid-abdominal or low abdominal discomfort. After several years, the colon loses muscle tone and becomes insensitive to typical stimulation, like an overstretched balloon. Age induces muscular atony. Constipation may occur from excrement retention.

d. Clinical Manifestation

Constipation symptoms include less than three bowel movements per week, abdominal distention, abdominal pain and bloating, a feeling of incomplete evacuation, straining at stool, and small-volume, lumpy, firm, dry stools. The patient may experience low back pain or tenesmus (ineffective, uncomfortable straining and urge to evacuate faeces). Chronic constipation lasts at least 12 weeks (Basson, 2019a). Psychological issues often accompany this illness.

Clinical symptoms range from slight discomfort to “acute abdomen.” Dry or absent stools. Flatus, bloating, and rectal pressure may develop. Constipation causes haemorrhoids. Valsalva manoeuvres and hard stool cause venous engorgement. Valsalva manoeuvre can cause heart failure, cerebral edoema,

hypertension, and coronary artery disease. Inhaling and holding their breath, the sufferer strains. Intraabdominal and intrathoracic pressures rise and cardiac venous return diminishes. Heart rate and output briefly decline. Arterial pressure temporarily lowers. When the patient relaxes, thoracic pressure drops and blood rushes into the heart, elevating heart rate and arterial pressure. The patient who cannot adjust may perish.

Stasis or straining can develop rectal mucosal ulcers and fissures. Constipation causes diverticulosis. Older patients have more. Colonic perforation can result from obstructed faeces. Life-threatening perforation produces stomach pain, nausea, vomiting, fever, and increased WBC count.

e. Assessment and Diagnostic Findings

History, physical exam, barium enema or sigmoidoscopy, and stool tests for occult blood determine constipation. These tests measure intestinal spasms and narrowing. Balloon expulsion or anorectal manometry can measure sphincter dysfunction. Defecography and intestinal transit investigations help diagnose active anorectal function. X-ray, colonoscopy, and lower GI endoscopy can diagnose constipation (Basson, 2019a).

Most have functional constipation. Simren, Palsson, & Whitehead (2017).

Assess secondary constipation. Stroke, Parkinson's, diabetes, spinal cord damage, and traumatic brain injury impact intestine function. Medicines, haemorrhoids, anal fissures, diverticular disease, and colonic obstruction can cause secondary constipation. Patients who don't respond to water, fibre, and exercise should be examined after 3–6 months (Basson, 2019a).

Defecation elevates arterial pressure. When straining, the Valsalva manoeuvre raises arterial blood pressure. Active straining reduces chest venous blood flow. Pressure collapses large chest veins. The left ventricle ejects less because the atria

and ventricles get less blood. Decreased cardiac output and transient arterial pressure can cause orthostasis, dizziness, and syncope (Norris, 2019).

f. Diagnostic Criteria for Functional Constipation

Reported signs and symptoms must be present for the past 3 months with onset at least 6 months before diagnosis; these must include two or more of the following:

1. Straining during at least 25% of bowel movements
2. Lumpy or hard stools from at least 25% of bowel movements
3. Sensation of incomplete evacuation during at least 25% of bowel movements
4. The sensation of anorectal obstruction or blockage during at least 25% of bowel movements
5. Manual manoeuvres (e.g., digital stimulation, support of pelvic floor) are needed to facilitate at least 25% of bowel movements
6. Less than three spontaneous bowel movements weekly

In addition to these, loose stools are rarely present without the use of laxatives, and there must be insufficient suspicion of irritable bowel syndrome.

g. Medical Management

Constipation's cause and prevention are treated. Education, exercise, bowel habit training, increased fibre and fluid intake, and laxative use are included. Laxatives can be stopped or replaced with non-constipating medications (Lacy, Mearin, Chang, et al., 2016). After a meal and a warm drink, patients can employ the gastrocolic reflex to defecate on the toilet. Strengthen abdominal muscles.

Biofeedback can relax the sphincter to release stool. If anorectal structural abnormalities are excluded, biofeedback is the first-line

treatment for dyssynergia defecation (Rao & Patcharatrakul, 2016; Rao, Valestin, Xiang, et al., 2018). 25–30 g/day of soluble and bulk-forming fibre is recommended for geriatric constipation. Add fibre slowly to avoid bloating. 5 g of fibre and hydration are added daily (Mari et al., 2020). Fibre laxatives, saline and osmotic agents, lubricants, stimulants, and emollient stool softeners may be used as needed. Enemas and rectal suppositories are not recommended for constipation unless other therapies fail.

Table 9.1 Drug Therapy of Constipation. Source: Brunner’s & Suddarth’s. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

Mechanism of Action	Indications	Drugs	Nursing Considerations
Bulk Forming Absorbs water. Increases bulk, thereby stimulating peristalsis <i>Action:</i> Usually within 24 h	Acute and chronic constipation, IBS, diverticulosis	methylcellulose (Citrucel) psyllium (Metamucil, Konsyl, Hydrocil, Fiberall)	Do not use in patients with abdominal pain, nausea, vomiting, those suspected of having appendicitis, biliary tract obstruction, or acute hepatitis. Must be taken with fluids (≥8 oz). Best choice for initial treatment of constipation
Emollients Lubricate intestinal tract and soften feces, making hard stools easier to pass. Do not affect peristalsis <i>Action:</i> Softeners in 72 h, lubricants in 8 h	Acute and chronic constipation, fecal impaction, anorectal conditions	<i>Softeners:</i> docusate (Colace, Surfak) <i>Lubricants:</i> mineral oil (Fleet Mineral Oil Enema)	Can block absorption of fat-soluble vitamins, such as vitamin K, which may increase risk for bleeding in patients on anticoagulants
Prosecretory Drugs Increases intestinal fluid secretion through direct action on epithelial cells, speeding colonic transit <i>Action:</i> Usually within 24 h	Chronic idiopathic constipation, IBS-C (women only)	linaclotide (Linzess) lubiprostone (Amitiza) plecanatide (Trulance)	Do not use in patients with history of mechanical GI obstruction. Can cause nausea and watery diarrhea
Saline and Osmotic Solutions Cause retention of fluid in intestinal lumen, reducing stool consistency and increasing volume <i>Action:</i> Within 15 min to 3 hr	Chronic constipation, bowel preparation for diagnostic tests and surgery	lactulose magnesium salts (magnesium citrate, Milk of Magnesia) sodium phosphates (Fleet Enema) polyethylene glycol (MiralAX, GoLYTELY)	May cause abdominal distention, diarrhea. Overuse of magnesium or sodium phosphates in older adults or those with renal failure can lead to fluid and electrolyte imbalances. Least effective agents in this class
Stimulants Increases peristalsis and speeds colonic transit by irritating colon wall and stimulating enteric nerves <i>Action:</i> Usually within 12 h	Acute constipation, bowel preparation for diagnostic tests and surgery	anthraquinones (cascara sagrada, senna) sennosides (Ex-Lax, Senokot) bisacodyl (Correctol, Dulcolax)	Cause melanosis coli (brown or black pigmentation of colon). Most widely abused laxatives. Should not be used in patients with impaction or obstruction

h. Preventing Constipation

The nurse instructs the patient to:

1. Recognize the physiology of defecation and the importance of responding to the urge to defecate.
2. Understand the normal variations in patterns of defecation.

3. Establish a bowel routine, and be aware that having a regular time for defecation (e.g., the best time is after a meal) may aid in initiating the reflex.
4. Ensure proper dietary habits, such as eating high-residue, high-fiber foods (e.g., fruits, vegetables); adding fiber to the diet slowly with adequate fluid intake; choosing dietary sources of fiber, which are preferred over fiber supplements; adding bran daily (must be introduced gradually); and increasing fluid intake (unless contraindicated) to help prevent constipation.
5. Increase muscle strength through an exercise regimen, increased ambulation, and abdominal muscle toning to help propel colon contents.
6. Perform abdominal toning exercises, including contracting abdominal muscles 4 times daily and leg-to-chest lifts 10 to 20 times each day.
7. Use the normal position (semi squatting) to maximize the use of abdominal muscles and force of gravity.
8. Avoid overuse or long-term use of stimulant laxatives.

i. **Nursing Management**

a) **Assessment**

a) **Subjective Data**

Important Health Information Health history:

1. Colorectal disease, neurologic problems, bowel obstruction, environmental changes, cancer, IBD, diabetes
2. Medication

Functional Health Patterns

1. Health perception–health management: Chronic laxative, enema use. Rigid beliefs about bowel function. Malaise

2. Nutritional-metabolic: Changes in diet or mealtime. Fiber and fluid intake. Anorexia, nausea
3. Elimination: Change in usual bowel patterns. Hard, difficult-to-pass stool, decrease in stool frequency and amount. Flatus, abdominal distention. Straining, tenesmus, rectal pressure. Fecal incontinence (if impacted)
4. Activity-exercise: Daily activity routine. Immobility, sedentary lifestyle
5. Cognitive-perceptual: Dizziness, headache, anorectal pain. Abdominal pain on defecation
6. Coping–stress tolerance: Acute or chronic stress

b) Objective Data

1. General: Lethargy
2. Skin: Anorectal fissures, hemorrhoids, abscesses
3. GI: Abdominal distention. Hypoactive or absent bowel sounds. Palpable abdominal mass. Fecal impaction. Small, hard, dry stool. Stool with blood
Skin Anorectal fissures, haemorrhoids, abscesses
4. Possible Diagnostic Findings
 - a. Guaiac-positive stools.
 - b. Abdominal x-ray showing stool in the lower colon

b) Implementation

Symptoms guide constipation breastfeeding. Explain how nutrition, hydration, and exercise prevent and treat constipation. High-fiber diets. Prescribed laxatives and enemas.

Help the patient defecate regularly. Easy commode defecation with knees higher than hips. Stool flows out easily when sitting and hip bending straightens the anal canal-

rectum angle. A toilet footstool improves hip flexibility. Bedpans complicate defecation. Raise the patient's bedhead. Defecation embarrasses most people. Privacy and deodorants. Maintain abs. Encourage daily abdominal contractions. Sit-ups build abs. Constipated patients should discuss rigid bowel function beliefs. Explain intestinal function and laxative and enemas risks.

Nursing Care for Patients with Fecal Incontinence and Urinary Incontinence

1. Fecal Incontinence

a. Definition

Faecal incontinence is the involuntary release of faeces from the rectum for at least three months. This condition is affected by rectal motility, stool volume and consistency, anal sphincters and musculature, and rectum perception and accommodation. Faecal incontinence affects at least 7% of nonhospitalized individuals and 50% of nursing home residents (NIDDK, 2017b). Faecal incontinence can significantly affect quality of life (NIDDK, 2017b).

b. Etiology

Involuntary stool loss. Normal continence structures are damaged. The neuromuscular system controls defecation. Motor and sensory impairment can cause faecal incontinence. Changes in bowel habits, weakening or disruption of the internal or external anal sphincter, damage to the pudendal nerve or other anorectum nerves, and anal tissue damage contribute.

Obstetric trauma causes most sphincter damage in women. Engaged menopause helps. Anorectal surgery damages

sphincters and pudendal nerves. Radiation lowers rectal compliance. Stroke and MS impair defecation.

People with normal faeces may incontinence due to mobility or diarrhoea. Chronic constipation causes faeces to harden in the rectum or sigmoid colon. Stool around hardened faeces promotes incontinence. Faeces impaction is common in elderly disabled people. Incontinence results from constipation.

c. Pathophysiology

Faecal incontinence, a sign of an underlying disease, has many causes and risk factors. Anorectal unit disorders cause it. Common causes include traumatic (e.g., after rectum surgery) and nontraumatic (e.g., scleroderma) anal sphincter weakness; neuropathies, both peripheral (pudendal) and generalised (diabetes); pelvic floor disorders (e.g., rectal prolapse); inflammation (radiation proctitis, inflammatory bowel disease); central nervous system disorders (e.g., Improved delivery methods have reduced vaginal childbirth injuries. (Emmanuel, 2019; Rao, Bharucha, Chiaroni, et al., 2016).

d. Clinical Manifestation

Patients may experience minor soiling, intermittent urgency and loss of control, or total incontinence. Additionally, patients may experience difficulty controlling flatus, diarrhea, or constipation. Patients with urge incontinence experience the sensation of the need to defecate but are unable to reach the lavatory in time (Rao et al., 2016).

e. Assessment and Diagnostic Findings

Assessing the patient's medical history aids in determining the most probable cause. Because the treatment of faecal

incontinence depends on the underlying cause, diagnostic tests are required. To rule out the presence of tumors, inflammation, fissures, or obstruction, a rectal examination and an endoscopic examination, such as a flexible sigmoidoscopy, are performed. Anorectal manometry, defecography, electromyography, anal endosonography, pelvic MRI scan, and transit studies may be useful for identifying changes in intestinal mucosa and muscle tone or detecting other structural or functional issues (NIDDK, 2017b).

f. Medical Management

Faecal incontinence treatment tackles cause. Diarrhoea therapy may cure faecal incontinence. Faecal incontinence may stop after impaction and rectum cleaning. Stopping laxatives or magnesium-containing antacids may improve or eliminate faecal incontinence. Faecal incontinence treatments begin with underlying illnesses. Psyllium fibre aids some. Loperamide 30 minutes before meals helps some. Biofeedback with pelvic floor muscle training improves sensory awareness and sphincter control. Transanal irrigation, bowel training, abdominal massage, Valsalva manoeuvre, and digital rectal stimulation can also aid (Emmanuel, 2019; Rao et al., 2016). Sacral nerve stimulation with a low-amplitude subcutaneous stimulator may help unresponsive individuals (Emmanuel, 2019). Anal sphincter rebuilding, artificial sphincter implantation, synthetic agent injection bulking, sacral nerve stimulation, and faecal diversion are surgical options (Emmanuel, 2019).

g. Nursing Management

The nurse records past surgeries, chronic illnesses, food, bowel motions, and medications. A one-to-two-week bowel

diary can disclose elimination patterns and bowel function factors (Emmanuel, 2019). Stool charts (e.g., Bristol Stool Form, see later) can show faeces frequency, volume, and consistency. Rectal examination by nurse. Eliminate faeces before starting preventive therapy (Gump & Schmelzer, 2016; Taylor, Lynn, & Bartlett, 2019).

The nurse prescribes bowel training. Assist the patient with faeces. If not, schedule the patient's elimination. Suppositories can stimulate anal reflexes. After a routine, remove the suppository. Biofeedback and pelvic floor exercises promote sphincter contractility and rectal sensitivity.

Fibre and diet control bowels. Applesauce and fibre supplements thicken stool, enhancing continence (Gump & Schmelzer, 2016). Avoid stool-softening rhubarb, figs, prunes, and plums. Antidiarrheals may benefit faeces incontinence sufferers (Gump & Schmelzer, 2016). Loperamide, which does not impact the central nervous system, is preferred over diphenoxylate with atropine (Comerford & Durkin, 2020; Rao et al., 2016).

Faecal incontinence harms perineal skin. Elderly or disabled people should prioritise skin health. Incontinence briefs and adult diapers contain faeces but increase skin contact and may cause skin excoriation. Briefly wear incontinence briefs. The nurse cleans and moisturises perineal skin. Sometimes foam anal plugs help. (Gump & Schmelzer, 2016). The nurse helps families accept chronic incontinence. Dementia patients benefit from prompted or timed voiding and habit training (Gump & Schmelzer, 2016). Faeces incontinence can be treated with external and internal drainage systems. Drainable rectal pouches collect faeces. A buttock-shaped synthetic adhesive skin barrier holds them. Patients with chronic, debilitating illnesses (e.g., in long-term care

institutions) or acute illnesses can avoid faecal skin contact with Flexi-Seal Faecal Management System. Low-pressure balloon tubes can handle watery faeces for four weeks.



Figure 9.1 Flexi-Seal Faecal Management System. Reprinted with permission from ConvaTec, Inc.

2. Urinary Incontinence

a. Definition

Due to the range of urinary incontinence kinds, more than 25 million American people are thought to have it. 9–12% of US adults are afflicted, with women twice as often as males (Norris, 2019). Institutionalised seniors had 50–90% urinary incontinence (Eliopoulos, 2018).

Despite public attention, urinary incontinence is underdiagnosed and undertreated. Embarrassed patients may hide symptoms. Many people use absorbent pads or other devices without diagnosis or treatment. Healthcare professionals must understand subtle urine incontinence indicators and current management.

Urinary incontinence sufferers must spend for absorbent items, medications, surgery or nonsurgery, and psychosocial

costs like embarrassment, self-esteem loss, and social isolation (Norris, 2019).

Young nulliparous women may experience urinary incontinence with high-impact activity. Age, gender, and vaginal births increase women's risk. Comorbidities can cause urine incontinence in men. 40% of Parkinson's disease men reported urinary incontinence (McDonald, Winge, & Burn, 2017). UTIs and faeces impaction produce incontinence.

b. Risk Factors:

1. Age-related changes in the urinary tract
2. Caregiver or toilet unavailable
3. Cognitive disturbances—dementia, Parkinson's disease
4. Class III obesity (also called extreme or severe obesity)
5. Diabetes Genitourinary surgery
6. High-impact exercise
7. Immobility
8. Incompetent urethra due to trauma or sphincter relaxation
9. Medications—diuretic, sedative, hypnotic, and opioid agents
10. Menopause
11. Pelvic muscle weakness
12. Pregnancy—vaginal delivery, episiotomy
13. Stroke

c. Types of Urinary Incontinence:

Types of urinary incontinence include:

1. Stress incontinence: Exertion, sneezing, coughing, or changing posture might cause stress incontinence (Wooldridge, 2017). It mostly affects women who had vaginal births and is thought to be caused by decreased

ligament and pelvic floor support of the urethra and low estrogen levels in the urethral walls and bladder base. After a radical prostatectomy for prostate cancer, men may develop stress incontinence due to a lack of urethral compression and bladder wall irritation.

2. Urge incontinence occurs when a strong urge to void cannot be resisted (Wooldridge, 2017). The patient needs to urinate but can't go to a toilet. Uninhibited detrusor contraction causes it. This can happen in patients with or without neurologic impairment that inhibits bladder contraction inhibition.
3. Functional incontinence is involuntary urination due to physical or cognitive impairment. This happens when the lower urinary tract function is intact but other factors, such as severe cognitive impairment (e.g., Alzheimer's dementia), make it hard for the patient to recognize the need to void or make it impossible to reach the toilet in time (Miller, 2019; Wooldridge, 2017).
4. Iatrogenic incontinence: Medication-induced incontinence is iatrogenic. Alpha-adrenergic drugs lower blood pressure. These medicines negatively influence the alpha receptors responsible for bladder neck closing pressure, causing the bladder neck to relax to the point of incontinence with a slight increase in intra-abdominal pressure, simulating stress incontinence. Discontinuing the medicine eliminates the apparent incontinence.
5. Mixed incontinence is involuntary leakage caused by urgency, effort, sneezing, or coughing (Miller, 2019; Wooldridge, 2017).
6. Overflow incontinence: An overdistended bladder leaks pee, causing overflow incontinence (Norris, 2019). Detrusor muscle underactivity, outlet obstruction, benign prostatic hyperplasia, pelvic organ prolapse, and tumors can cause this.

d. Assessment and Diagnostic Findings

Incontinence requires a whole history. Describe the issue and medication history. The patient's voiding history, fluid intake and output diary, and bedside tests (e.g., residual urine, stress manoeuvres) can assist identify urinary incontinence. Urinalysis and urine culture detect infection. Urinary incontinence may be temporary if the reason is cured and the voiding pattern returns to normal.

e. Medical Management

Management depends on the type of urinary incontinence and its causes. Management of urinary incontinence may be behavioral, pharmacologic, or surgical.

f. Behavior Modification

Urinary incontinence is best treated with behavioural interventions. Adults with non-neurologic incontinence should start with these (AUA, 2019b). These methods assist doctors prevent pharmacologic or surgical side effects. Pelvic floor muscle exercises (Kegel exercises) are the foundation of behavioral intervention for stress, urge, and mixed incontinence (Miller, 2019; Wooldridge, 2017). Behavioural treatments include a voiding diary, biofeedback, verbal instruction (prompted voiding), and physical therapy (AUA, 2019b; Wooldridge, 2017).

g. Pharmacologic Therapy

Behavioral therapies work best with pharmacologic therapy. Incontinence type determines antibiotic (AUA, 2019a). Anticholinergic drugs are first-line treatments for urge incontinence (AUA, 2019a; Wooldridge, 2017). Mirabegron, a beta-3 adrenergic agonist, helps treat urge incontinence and overactive bladder, although it can raise blood pressure in

hypertensives (Wooldridge, 2017). Tricyclic antidepressants like amitriptyline reduce bladder contractions and increase bladder neck resistance (Wooldridge, 2017). Stress incontinence can be treated with pseudoephedrine sulphate, which causes urine retention by acting on alpha-adrenergic receptors. Men with prostatic hyperplasia and hypertensives should use it with caution.

h. Surgery Management

Surgery may be needed if behavioural and pharmacological therapies fail to establish continence. Anatomy and physiology determine surgery. To reestablish the urethrovesical angle, most surgeries lift and stabilise the bladder or urethra. For stress incontinence, anterior vaginal repair, retropubic suspension, or needle suspension realign the urethra.

Slings compress the urethra and increase urine flow resistance. To improve closure pressure, minimally invasive periurethral bulking inserts small amounts of artificial collagen into the urethra walls (Norris, 2019). Local or mild sedation takes 10–20 minutes for this procedure. Performing cystoscopy. The urologist injects a little collagen into the urethral wall with a cystoscope. Patients leave after urinating. (Norris, 2019). Collagen becomes semipermanent after 12–24 months. Collagen periurethral bulking is safer than surgery. Stress incontinence patients without behavioural treatment who wish to avoid surgery may consider it.

i. Nursing Management

Nurses may admit or discharge incontinent patients. Nurses always consider urinary incontinence as reversible and treatable. Incontinent hospitalised patients need routine skin

examinations to identify IAD from pressure injury (Francis, 2019; Qiang, Xian, Bin, et al., 2020). Take care of IAD and pressure damage (Francis, 2019; Qiang et al., 2020).

Treatment determines outpatient nursing. The nurse must support patients who grow disappointed if behavioural therapy doesn't improve continence quickly. The patient should be instructed to record pelvic floor muscle exercises, voiding frequency, bladder function changes, and incontinence episodes (Miller, 2019).

Pharmacologic treatment informs patients and families. Anticholinergic and antispasmodic drugs reduce pee urgency and frequency and urge incontinence but not stress incontinence. The patient and family know surgical corrective aims. The nurse can help patients with follow-up questions.

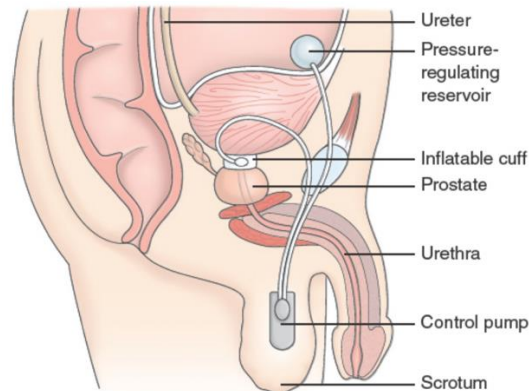


Figure 9.2 Male artificial urinary sphincter. An inflatable cuff is inserted surgically around the urethra or neck of the bladder. To empty the bladder, the cuff is deflated by squeezing the control pump located in the scrotum.

Nursing Care for Patients with Benign Prostatic Hyperplasia (Enlarge Prostate)

1. Definition

Benign prostatic hyperplasia (BPH) is a condition in which the prostate gland swells, preventing urine from leaving the bladder through the urethra. By age 50, 50 percent of men will exhibit BPH symptoms. This percentage increases to over 70% for males aged 60 to 69.

BPH, a noncancerous prostate enlargement, is one of the most frequent illnesses among ageing men. It can produce lower urinary tract symptoms that disrupt everyday living and sleep (Cheng et al., 2019). BPH affects males over 40. 50% of men have BPH by 60. 90% of 85-year-old men have it. Men over 60 have BPH surgery the second most often.

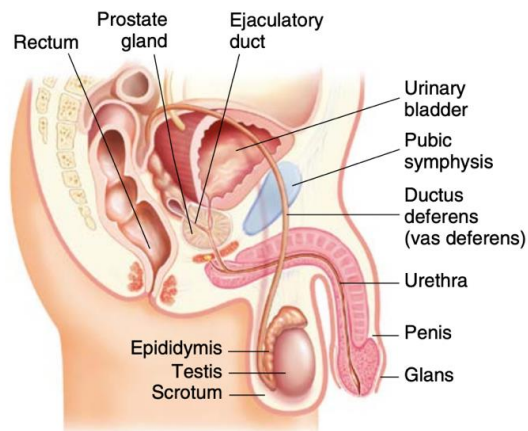


Figure 9.3 Areas of the male reproductive system in which problems are likely to develop. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

2. Pathophysiology

BPH is linked to testicular androgens. Prostate hypertrophy is mediated by dihydrotestosterone (DHT). Men may get BPH due to oestrogens, DHT, and testosterone. Oestrogen-sensitive prostate tissue causes BPH in men. BPH is also linked to a Western diet high in animal fat and protein and low in fibre (Cheng et al., 2019).

BPH develops slowly from urinary system changes. BPH develops from complex interactions between the prostatic urethra's resistance to mechanical and spastic effects, the bladder's pressure during voiding, the detrusor muscles' strength, neurological function, and general health (McCance et al., 2018). The prostate's enlarged lobes might block the urethra or bladder neck, causing urinary retention. Hydronephrosis and hydroureter may result. Trapped urine can harbour infectious organisms, causing UTIs.

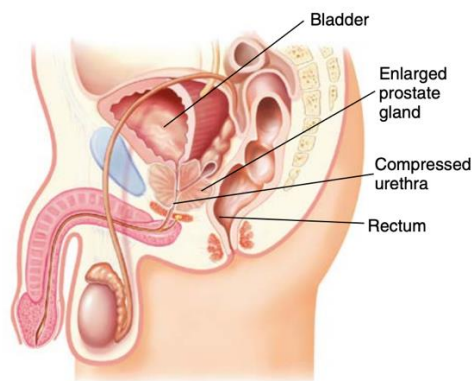


Figure 9.4 BPH. The enlarged prostate compresses the urethra. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

3. Clinical Manifestation

BPH can cause mild to severe lower urinary tract symptoms. Half of BPH patients have moderate to severe symptoms. Obstruction and irritation can cause urinary frequency, urgency, nocturia, hesitancy in starting urination, decreased and intermittent force of stream and the sensation of incomplete bladder emptying, abdominal straining with urination, dribbling (urine dribbles out after urination), complications of acute urinary retention, and recurrent UTIs. Weber and Kelley (2018) discovered that the average residual urine volume in middle-aged and older adults is less than 50 mL. Urine retention and large residual volume cause kidney failure and azotemia. Symptoms include fatigue, anorexia, nausea, vomiting, and pelvic pain. Urethral stricture, prostate cancer, neurogenic bladder, and urinary bladder stones may cause similar symptoms.

4. Assessment and Diagnostic Findings

Health history includes urinary tract, past surgeries, general health, health concerns, family history of prostate disease, and fitness for surgery (DeNunzio, Lombardo, Cicione, et al., 2020). The patient notes voids and pee in a voiding diary. DREs often show a large, rubbery, insensitive prostate. Urinalysis can detect hematuria and UTI. A PSA level is obtained if the patient is healthy and knows prostate cancer may affect therapy. The International Prostate Symptom Score (IPSS) or American Urological Association (AUA) Symptom Index can measure symptoms (Smith et al., 2019).

Another diagnostic method is urine flow rate monitoring. Urodynamic testing, urethrocytostcopy, and ultrasonography can aid determine invasive treatment. Blood testing are extensive. BPH patients are assessed for cardiac and respiratory issues due to their predominance in the elderly.

5. Medical Management

BPH treatment seeks to improve urine flow, relieve obstruction, prevent disease development, and minimise effects. The patient's condition, disease aetiology, and blockage determine treatment. Urgently admitted patients are catheterized. The catheter may not fit through the urethra. Urologists implant a stylet (thin wire) into the catheter to prevent it from collapsing when it meets resistance. A sharp-prostatic metal catheter may be used for severe blockage. Urinary discharge may require a cystostomy. The patient's primary care physician should share all treatment options with him so he can choose based on his symptoms, BPH's influence on his quality of life, and personal preferences. "Watchful waiting" may be used for patients with mild, moderate, or severe symptoms who are unconcerned and have no problems. This technique involves annual patient checkups and monitoring without treatment (DeNunzio et al., 2020). Other treatments include drug therapy, minimally invasive procedures, and surgery.

6. Pharmacologic Therapy

Alpha-adrenergic blockers and 5-alpha-reductase inhibitors treat BPH. Alpha-adrenergic blockers relax bladder neck and prostate smooth muscle. BPH symptoms improve. dizziness, headache, asthenia/fatigue, orthostatic hypotension, rhinitis, and sexual dysfunction.

Alternatives include antiandrogen treatment. Finasteride and dutasteride inhibit DHT conversion and prostate growth. Side effects include flushing, gynecomastia, ejaculatory dysfunction, and low libido. Doxazosin with finasteride reduces BPH symptoms and progression (Chapple et al., 2020; Cheng, 2019).

Alternative and complementary phytotherapeutic medications and other dietary supplements (*Serenoa repens* [saw palmetto berry] and *Pygeum africanum* [African plum]) are widely used but not approved by the medical community (Rowland, McNabney, &

Donarski, 2019). They may prevent testosterone-to-DHT conversion. *S. repens* may also directly decrease DHT-induced prostate cell growth. These medicines should not be taken with finasteride, dutasteride, or oestrogen (Rowland et al., 2019).

7. Surgical Management

a. Minimal-Invasive Therapy

b. Surgical Resection

TURP is the standard surgical treatment for BPH. An endoscope inserted through the urethra removes the prostate's inner part without skin incision. Ultrasound guides it. Tissue vaporizes or necrotizes and sloughs. Outpatient prostatectomy usually causes less postoperative bleeding than surgical prostatectomy.

Transurethral incision of the prostate (TUIP), transurethral electrovaporization, laser therapy, and open prostatectomy are further BPH surgical alternatives (Chapple et al., 2020; Smith, 2019). TUIP treats smaller prostates outpatient. One or two cuts in the prostate and prostate capsule lessen urethra constriction and bladder resistance. For big prostate glands, open prostatectomy removes the inner prostate using a suprapubic, retropubic, or perineal (rare) approach. Laparoscopic or robotic-assisted prostatectomy is possible.

c. Treatment for BPH

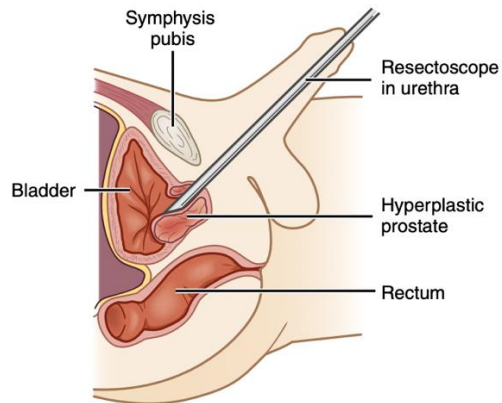


Figure 9.5 Transurethral resection of the prostate. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

d. Nursing Management

a) Assessment

1. Subjective Data

a. Important Health Information

- 1) Medications: Testosterone supplementation
- 2) Surgery or other treatments: Previous BPH treatment

b. Functional Health Patterns

- 1) Health perception–health management: Knowledge of the condition
- 2) Nutritional-metabolic: Voluntary fluid restriction
- 3) Elimination: Urinary urgency, diminution in calibre, and force of the urinary stream. Hesitancy in starting voiding. Postvoid dribbling, urinary retention, urinary incontinence

- 4) Sleep-rest: Nocturia
- 5) Cognitive-perceptual: Dysuria, the sensation of incomplete voiding, bladder discomfort
- 6) Sexuality-reproductive: Anxiety about sexual dysfunction

2. Objective Data

- a. General: Older adult male
- b. Urinary: Distended bladder on palpation. Smooth, firm, elastic enlargement of the prostate on rectal examination
- c. Possible Diagnostic Findings: Enlarged prostate on ultrasonography, bladder neck obstruction on cystoscopy, residual urine with postvoiding ultrasound or catheterization. WBCs, bacteria, or microscopic hematuria with a bladder infection. ↑ Serum creatinine levels with renal involvement

3. Clinical Problems

- a. Pain
- b. Risk for infection
- c. Impaired urinary elimination

4. Patient Receiving Bladder Irrigation

- a. Continuously monitor the inflow and outflow of the irritant.
- b. Assess for bleeding and the presence of bladder spasms.
- c. Assess catheter patency for kinks or clots.
- d. Manually irrigate catheter if bladder spasms or decreased outflow occurs.

- e. Use a careful aseptic technique because you can easily introduce bacteria into the urinary tract.
- f. Maintain a closed drainage system.
- g. Give antispasmodics and analgesics as needed.
- h. Monitor catheter drainage for increased blood or clots.
- i. Do not disconnect the system unless it is being removed, changed, or irrigated.
- j. Discontinue CBI and notify HCP if obstruction occurs.
- k. Secure the catheter to the leg with tape or a catheter strap to prevent urethral irritation and minimize the risk for infection.
- l. Teach patient Kegel exercises after catheter removal.
- m. Provide care instructions for patients discharged with indwelling catheter.

Nursing Care for Patient with Nephrolithiasis

a. Definition

In the United States, 11% of men and 7% of women will develop nephrolithiasis (kidney stone disease, renal calculi) during their lifetime. Calculus refers to the stone, whereas lithiasis is the process of stone formation.

Most patients are adults of middle age. Age increases the risk of developing kidney stones. Stone formation is more prevalent among Whites and Asians. Those with a family history of stone formation are more likely to be affected. Stones can recur in up to fifty percent of patients. The South and Southwest have the highest incidence of stone disease in the United States. Stone formation occurs more frequently in the summer, indicating that a humid climate and dehydration may be contributing factors.

b. Pathophysiology

Urinary stones occur when calcium oxalate, calcium phosphate, and uric acid levels rise. The quantity, ionic strength, and urine pH determine supersaturation. Stones can range from grit or gravel to orange-sized bladder stones in the kidney and bladder. Infection, urine stasis, and immobility impede renal drainage and alter calcium metabolism, causing kidney stones (Norris, 2019). Increased blood and urine calcium concentrations enhance calcium precipitation and stone formation (calcium-based stones are the most prevalent) (Norris, 2019).

The following can produce hypercalcemia and hypercalciuria (high serum and urine calcium) (Norris, 2019):

1. Hyperparathyroidism
2. Renal tubular acidosis
3. Cancers (e.g., leukemia, multiple myeloma)
4. Dehydration
5. Granulomatous diseases (e.g., sarcoidosis, tuberculosis) that may increase vitamin D production in granulomatous tissue include sarcoidosis and tuberculosis.
6. excessive vitamin D ingestion
7. excessive milk and alkali consumption
8. Myeloproliferative diseases, such as polycythemia vera, are characterized by an abnormal proliferation of blood cells in the bone marrow.
9. Intestine bypass operation

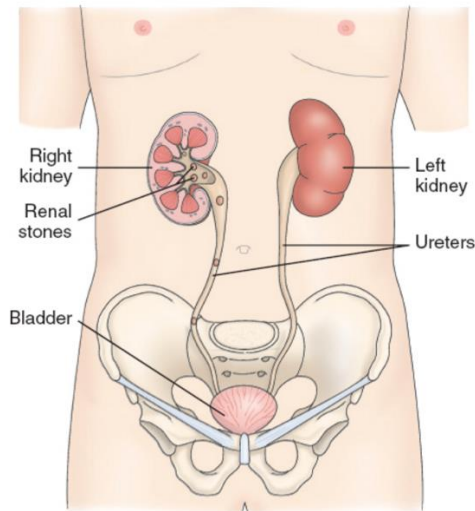


Figure 9.6 Examples of potential sites of calculi formation in the urinary tract (urolithiasis) and kidney (nephrolithiasis). Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

c. Clinical Manifestation

Obstacles, infections, and edoema cause urinary system stones. Urinary stone obstruction increases hydrostatic pressure and dilatation of the renal pelvis and proximal ureter (Norris, 2019). Pyelonephritis and UTI with chills, fever, and frequency might cause struvite stones. Others create unimaginable pain (Flagg & Joiner, 2017).

Renal pelvis stones can cause intense, agonising costovertebral discomfort. Pyuria and hematuria are common. The renal area causes anterior and downward pain towards the bladder in females and the testicles in males. Renal colic occurs when pain suddenly intensifies, the costovertebral area becomes sensitive, and nausea and vomiting occur. Reno intestinal reflexes and renal closeness to the stomach, pancreas, and large intestine induce diarrhoea and abdominal pain.

Ureteral stones cause painful, colicky, wavelike discomfort from the thigh to the genitalia. Due to the stone's abrasiveness, the patient often needs to urinate yet produces little bloody urine. This is ureteral colic. Prostaglandin E increases ureteral contractility, renal blood flow, and intraurethral pressure, causing colic. Patients often pass 0.5 cm stones (Norris, 2019). To pass spontaneously or eliminate, stones over 1 cm must be removed or fractured by lithotripsy. Bladder stones can cause discomfort, hematuria, and UTIs. Urinary retention occurs if the stone plugs the bladder apex. Infections with kidney stones can lead to urosepsis.

d. Assessment and Diagnostic Findings

A non-contrast CT scan confirms the diagnosis (Flagg & Joiner, 2017). The diagnostic workup may include blood chemistry tests and a 24-hour urine test to measure calcium, uric acid, creatinine, sodium, pH, and total volume. To identify predisposing factors for the formation of renal calculi, a patient's dietary and medication histories, as well as familial history of renal calculi, are gathered. When stones are recovered (whether the patient spontaneously passes them or they are extracted through special procedures), chemical analysis is performed to determine their composition. The analysis of stones can provide a distinct indication of the disorder's underlying cause. Calcium oxalate or calcium phosphate stones, for example, typically indicate disorders of oxalate or calcium metabolism, whereas urate stones suggest a disturbance in uric acid metabolism (Flagg & Joiner, 2017).

e. Medical Management

Management aims to remove the stone, determine its nature, avoid nephron degeneration, control infection, and relieve blockage. Renal or ureteral colic treatment focuses on pain management until the reason is found. Opioids prevent shock and

syncope from acute pain. Nonsteroidal anti-inflammatory medicines (NSAIDs) help renal calculus pain because they target pain. They minimise inflammation and stone passage by inhibiting prostaglandin E formation. Discomfort usually decreases once the stone passes. Unless vomiting, heart failure, or another condition requires fluid restriction, fluids are advised. Increased hydrostatic pressure behind the stone aids its drop. High fluid intake dilutes urine and decreases urinary crystalloids.

f. Prevention of Renal Stones

The nurse instructs the patient to

- 1) Avoid consuming protein to reduce calcium and uric acid excretion in the urine.
- 2) Reduce sodium intake to 3 to 4 grams per day. Because sodium competes with calcium for reabsorption in the kidneys, salt and foods high in sodium should be reduced.
- 3) Be aware that low-calcium diets are generally not advised, except genuine absorptive hypercalciuria. Limiting calcium, particularly in women, has been shown to cause osteoporosis and does not prevent calculi.
- 4) Avoid foods containing oxalate, such as spinach, Swiss chard, chocolate, hazelnuts, and pecans.
- 5) Consume fluids (preferably water) every one to two hours and one glass of cranberry juice per day. To prevent urine from becoming overly concentrated during the night, consume two glasses of water prior to slumber and an additional glass whenever you awaken.
- 6) Avoid activities that result in abrupt increases in environmental temperature, as these can cause excessive perspiration and dehydration.
- 7) At the first symptom of a urinary tract infection, contact your primary care provider.

g. Interventional procedures

Endoscopic or other procedures are used if the stone doesn't clear or if complications emerge. Ureteroscopy, ESWL, or endourologic stone removal may be needed (Norris, 2019). Ureteroscopy observes the stone before destroying it. After inserting a ureteroscope into the ureter, a laser, electrohydraulic lithotripter, or ultrasound instrument fragments and removes the stone.

A stent can be placed in the ureter for at least 48 hours to keep it open. Outpatients and short hospital stays are common.

ESWL (lithotripsy) breaks up calyx kidney stones noninvasively. Stone fragments spontaneously evacuate after being converted to sand grains. ESWL creates a shock wave by suddenly discharging energy through water and soft tissues. The shock wave compresses the stone's surface when it hits renal calculus. The stone is broken up by shock waves and eliminated in the urine. Shock waves can cause discomfort but seldom injure other tissues. The urinary system is examined for stone fragment blockage and infection. Urine is strained and delivered to a lab for chemical analysis. Stone disintegration may require multiple steps.

Endourologic stone removal can eliminate renal calculi that other methods cannot. Percutaneous nephrostomy and nephrolithotomy are similar. Percutaneous nephroscope insertion into renal parenchyma. Depending on size, forceps or a stone recovery container can remove the stone. An ultrasonic probe put through a nephrostomy conduit pulverises big stones that cannot be removed. Remove small stone shards and particles.

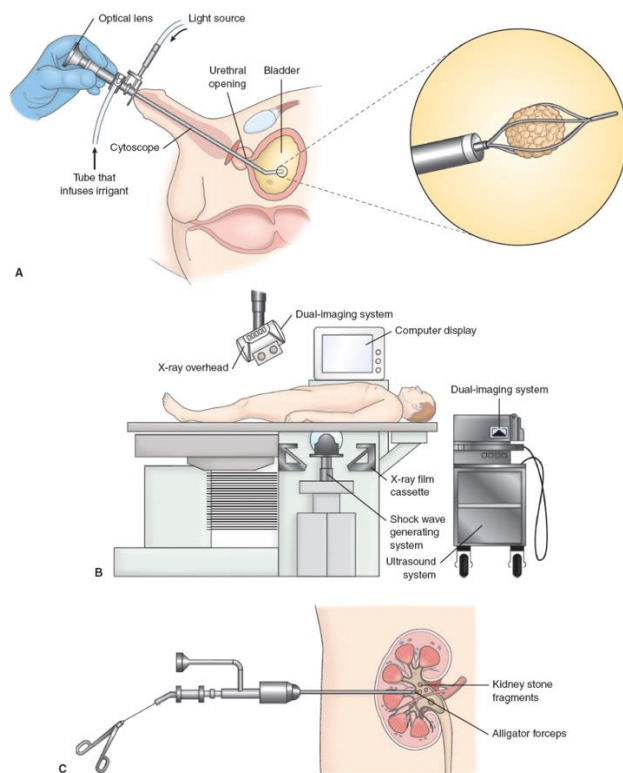


Figure 9.7 Methods of treating renal calculi. A. During ureteroscopy, which is used for removing small stones located in the ureter close to the bladder, a ureteroscope is inserted into the ureter to visualize the stone. The stone is then fragmented or captured and removed. B. Extracorporeal shock water lithotripsy is used for most symptomatic, nonpassable upper urinary stones. Electromagnetically generated shock waves are focused on the area of the renal calculus. The high-energy dry shock waves pass through the skin and fragment the stone. C. Percutaneous nephrolithotomy is used to treat larger stones. A percutaneous tract is formed, and a nephroscope is inserted through it. Then, the stone is extracted or pulverized. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

Electrohydraulic lithotripsy breaks stones by creating a hydraulic shock wave with an electrical discharge. The cystoscope probe and lithotripter are placed near the stone. Variable discharge strength and pulse frequency. Topical anesthesia is used. After the stone is removed, the percutaneous nephrostomy tube may be maintained in place to prevent edema, blood clots, and fragmented calculi from blocking the ureter (Norris, 2019). Haemorrhage, infection, and urine extravasation occur most often. The tube-free nephrostomy tract normally closes.

Chemolysis, stone dissolution using chemical solutions (e.g., alkylating agents, acidifying agents) infusions, is an alternative treatment for patients who are at risk for complications with other therapies, refuse other therapies, or have stones (struvite) that dissolve easily. Percutaneous nephrostomy allows the warm chemical solution to flow onto the stone. The ureter or nephrostomy tube drains the solution. Procedures monitor renal pelvis pressure. These treatments can be combined to remove stones.

h. Nursing Management

1. Assessment

Renal calculi patients are evaluated for pain, discomfort, nausea, vomiting, diarrhoea, and abdominal distention. Determine pain severity, location, and radiation. UTI (chills, fever, frequency, and hesitancy) and blockage (frequent tiny urination, oliguria, or anuria) are also assessed by nurses. Blood and stones are strained from urine.

The history emphasizes factors that predispose the patient to urinary tract stones or may have caused the current renal or ureteral colic. The patient's understanding of renal calculi and prevention is also tested.

2. Nursing Diagnoses
 - a) Acute pain associated with inflammation, obstruction, and abrasion of the urinary tract
 - b) Lack of knowledge regarding prevention of recurrence of renal calculi
3. Collaborative Problems/Potential Complications
 - a) Infection and urosepsis (from UTI and pyelonephritis)
 - b) Obstruction of the urinary tract by a stone or edema with subsequent acute kidney injury
4. Planning and Goals

The major goals for the patient may include relief of pain and discomfort, prevention of recurrence of renal calculi, and absence of complications.
5. Nursing Intervention
 - a) Pain relief
 - b) Monitoring and Managing Potential Complications
 - c) Ambulation helps move stones through the urinary tract
6. Promoting Home, Community-Based, And Transitional Care
Patient Self-Care. Because renal calculi recurrence is high, the nurse educates about causes and prevention.

Drink plenty of fluids since concentrated pee forms stones more easily. Stone-prone patients should drink enough fluid to excrete more than 2000 mL (preferably 3000–4000 mL) of urine daily (Flagg & Joiner, 2017).

Urine cultures are done every 1–2 months in the first year and regularly thereafter. Treat recurring UTI quickly. Since immobilisation slows renal outflow and impairs calcium metabolism, mobility is advised. Vitamin and mineral overconsumption—especially vitamin D—is warned against.

After lithotripsy, percutaneous stone removal, ureteroscopy, or other stone removal surgeries, the nurse alerts the patient to report complications to the primary practitioner. Kidney function

and renal calculi removal require follow-up. After ESWL, the nurse needs follow-up at home. To pass stone particles, the patient should drink more for 6 weeks to several months after surgery. Patients and families learn about complications. Inform the patient that hematuria is expected in all patients but should disappear after 4–5 days. The ureter stent may cause hematuria. The patient is instructed to check their temperature daily and call the primary provider if it surpasses 38°C (101°F) if the prescribed medication does not relieve pain. The treated back may bruise.

7. Evaluation

Expected patient outcomes may include:

- a) Reports relief of pain
- b) States increased knowledge of health-seeking behaviours to prevent a recurrence
 1. Consumes increased fluid intake (at least eight 8-oz glasses of fluid per day)
 2. Participates in appropriate activity.
 3. Consumes diet prescribed to reduce dietary factors predisposing to stone formation
 4. Recognizes symptoms (fever, chills, flank pain, haematuria) to be reported to the primary provider
 5. Monitors urinary pH as directed
 6. Takes prescribed medication as directed to reduce stone formation
- c) Experiences no complications
 1. Reports no signs or symptoms of infection or urosepsis
 2. Voids 200 to 400 mL per voiding of clear urine without evidence of bleeding
 3. Experiences absence of urgency, frequency, and hesitancy
 4. Maintains normal body temperature

1. Definition

Cortex, pelvis, and calyces tumours can be benign or malignant. 80% of kidney tumours arise in the cortex and 8% in the pelvis. Paediatric nephroblastoma is common. 1 in 80 women and 1 in 46 men have kidney cancer.

Most kidney malignancies are renal adenocarcinomas. Men get it twice as often as women. Diagnosis averages 64. Rare under 45s. Smoking increases risk. First-degree relatives have more renal cell cancer. Trichloroethylene, cadmium, and hypertension further increase risk. Blacks have slightly more kidney cancer.

4.2% of US cancers are renal. Over the past two decades, all stages of kidney cancer have grown (National Cancer Institute, 2019). Incidental discoveries during other diagnostic testing may have improved detection. Men and those with a higher BMI had more renal cell cancer. Smoking remains risky. African Americans also have more kidney cancer than whites (Conde & Workman, 2017).

Ninety percent of renal cancers are parenchymal renal cell carcinomas or adenocarcinomas. Seventy to eighty percent of renal cell carcinomas are clear cell (conventional or nonpapillary) and start in the proximal renal tubule. Papillary renal cell carcinomas (10%) are second most common (ACS, 2020). 30% of patients have metastasis to the lungs, abdomen and mediastinal lymph nodes, brain, bone, and liver (ACS, 2020).

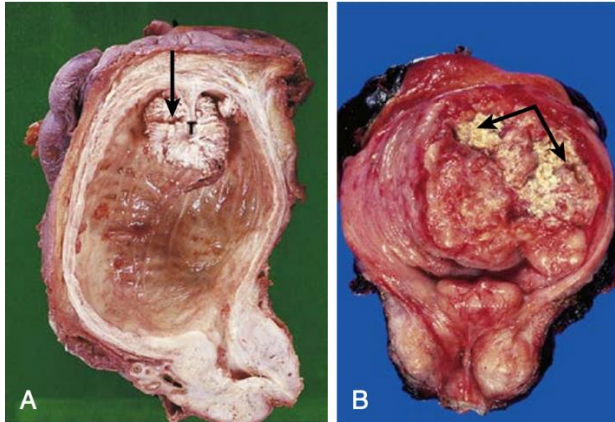


Figure 9.8 (A) Papillary transitional cell cancer (T) is seen arising from the dome of the bladder as a cauliflower-like lesion (arrow). (B) Opened bladder showing advanced stage bladder cancer. Yellow areas are ulcerations and necrosis (arrows). (A, From Stevens A, Lowe J: *Pathology: Illustrated Review in Color*, ed 2, London, 2000, Mosby. B, From Kumar V, Abbas AK, Fausto N: *Robbins and Cotran Pathologic Basis of Disease*, ed 7, Philadelphia, 2005, Saunders.)

2. Risk Factors

1. African American Race
2. Certain medications such as diuretics and other medications for hypertension
3. Genetic factors
4. Hypertension
5. Male gender
6. Obesity
7. Occupational exposure to industrial chemicals, such as heavy metals (cadmium), some herbicides, and organic solvents (e.g., trichloroethylene)
8. Smoking

3. Clinical Manifestations

Symptomless renal tumours are often found via abdominal or flank mass probing. Hematuria, flank discomfort, and a tumour occur in 10% of individuals. Painless hematuria, either intermittent and microscopic or persistent and large, is the earliest indicator of a malignancy (Conde & Workman, 2017). A dull back sensation may result from ureter compression, tumour expansion into the perirenal region, or kidney tissue bleeding. Colicky symptoms result from ureteral clots or tumour cells. Unexpected weight loss, exhaustion, and anaemia may be metastatic symptoms of a kidney cancer.

4. Assessment and Diagnostic Findings

A renal tumour may require IV urography, cystoscopic examination, renal angiograms, ultrasonography, or a CT or MRI scan for diagnosis. These tests may be exhausting for patients who are already weakened by the systemic effects of a tumor, for elderly patients, and for those who are apprehensive about the diagnosis and prognosis. The nurse assists the patient in preparing physically and psychologically for these procedures and closely monitors for indicators of dehydration and impaired coping.

5. Medical Management

The objective of medical treatment is to detect and eradicate tumours before metastasis develops. Surgical and pharmacologic management are the most common treatment methods. Patients who are ineligible for surgery or other treatments, or those with metastatic disease, may benefit from radiation therapy for palliation (ACS, 2020).

6. Surgery Management

a. Nephrectomy

Radical and partial nephrectomies are performed open, laparoscopic, or robotically (ACS, 2020). If the tumor is removable and has progressed to the inferior vena cava, radical nephrectomy is recommended (Conde & Workman, 2017). The kidney, adrenal gland, perinephric fat, Gerota fascia, lymph nodes, and tumour are removed. Laparoscopic nephrectomy removes kidneys with tiny tumors. This method is safer and faster. Surgery may be combined with radiation, hormonal, or immunotherapy. Partial nephrectomy, or nephron-sparing surgery, is increasingly utilised to treat bilateral tumors, single-kidney malignancy, and small local tumours with a normal contralateral kidney. Local illness and CKD-risk persons like this operation. Partial nephrectomies are successful with low morbidity and mortality (Richie, Atkins, & Chen, 2019).

b. Renal Artery Embolisation

Metastatic renal carcinoma patients can kill tumor cells by occluding the renal artery. After angiographic tests, a catheter is introduced into the renal artery, and embolising materials (e.g., Gelfoam, autologous blood clot, steel coils) are injected and conveyed with arterial blood flow to manually occlude tumour arteries. This reduces local blood supply, making nephrectomy easier. Postinfarction syndrome lasts 2–3 days after renal artery embolization and tumour infarction. The patient exhibits fever, flank and abdominal pain, and GI symptoms. Parenteral analgesics and acetaminophen control fever and pain. Antiemetics, oral restriction, and IV fluids alleviate GI problems.

c. Low-Invasive Technologies

Urologists or interventional radiologists perform minimally invasive radiofrequency, cryoablation, or microwave ablation.

They replace surgery for certain tumours, including renal cell carcinomas. Nephron-sparing techniques for renal cell carcinomas might be utilized for small, localised tumors, poor surgical candidates, or to preserve renal function. These techniques kill tumour cells with severe temperatures (Hines & Goldberg, 2018).

d. Drug Treatment

Immunotherapy may follow partial or radical nephrectomy, depending on tumor stage. Standard chemotherapy is exclusively used for immunotherapy failures (ACS, 2020). Targeted treatments, antiangiogenic therapy, and checkpoint inhibitors have replaced biologic response modifiers like IL-2 and interferon for stage IV clear cell renal cell carcinomas (George & Jonasch, 2019).

Autologous tumor cell immunotherapy is being tested in stage IV renal cell cancer patients (George & Jonasch, 2019).

7. Nursing Management

Renal tumour patients endure numerous diagnostic and treatment procedures. Surgery, radiation, and immunotherapy are options. Catheters and drains are used after surgery to keep the urinary system open, remove drainage, and assess urine flow. Pain and muscular soreness are typical due to the surgical incision, patient posture, and procedure. Immunotherapy may be prescribed. Infected patients are monitored.

To prevent atelectasis and other pulmonary problems, the patient needs frequent postoperative analgesics and help rotating, coughing, using incentive spirometry, and deep breathing. The

diagnosis and unknown prognosis require support for the patient and family.

Nursing Care for Patients with Colorectal Cancer

1. Definition

Colon and rectum cancers are the third most common malignancy in the US. Colorectal cancer kills 53,200 Americans, including under-50s (ACS, 2020). Colorectal cancer kills third most US men and women and second most adults (ACS, 2020). The WHO anticipated 1.8 million cases and 861,000 deaths in 2018 (Macrae & Bendell, 2020).

Age causes colorectal cancer. The median diagnostic age is 66, down from 72 20 years earlier (ACS, 2020). Rectal cancer is diagnosed at 62 for men and 63 for women (ACS, 2020). Colorectal cancer declines 2% year in adults over 50 (Macrae & Bendell, 2020). Colonoscopies rose 19% (Simonson, 2018). However, recent epidemiologic data from the Surveillance, Epidemiology, and End Results registry (SEER) of the National Cancer Institute (NCI) showed that nearly one in seven new colorectal cancer diagnoses were in adults under 50, and these patients were more likely to have advanced disease at diagnosis. Younger colorectal cancer patients often have distal rectal carcinoma. Young adults who sit may get colorectal cancer (Nguyen, Liu, Zheng, et al., 2018).

Colorectal cancer is 30% hereditary (ACS, 2020). Colon and rectal cancer risk factors (Chart 41-10). Lynch syndrome is hereditary colorectal cancer. HNPCC-defining cancers include colorectum, uterus, stomach, ovaries, urinary epithelium, and small bowel. Early HNPCC. FAP creates hundreds of colonic polyps that can become malignant.

Stage-specific colon cancer prognoses. With distant metastases, the 5-year survival rate drops to 15% from 89% (ACS, 2020). SEER

predicts 67% 5-year all-stage survival (ACS, 2020). Rectal haemorrhage and intestinal abnormalities often go untreated for years (ACS, 2020). Early detection, prevention, and education lower mortality.

2. Pathophysiology

Adenocarcinoma of the colon and rectum accounts for 95% of cases (Dragovich, 2020). Malignancy may begin with an APC gene mutation. Invasive adenocarcinoma can invade and destroy normal tissues and spread to nearby structures due to genetic changes in benign polyps. Cancer cells can travel to the liver, peritoneum, and lungs.

3. Risk Factors

- a) Cigarette smoking
- b) Family history of colon cancer (especially if history of Lynch syndrome) or polyps (especially if the history of familial adenomatous polyposis)
- c) High consumption of alcohol (i.e., >2 drinks daily in men, >1 drink daily in women)
- d) High-fat, high-protein (with high intake of beef), low-fiber diet
- e) History of genital cancer (e.g., endometrial cancer, ovarian cancer) or breast cancer (in women)
- f) History of inflammatory bowel disease
- g) History of radiation to the pelvis
- h) History of Type 2 diabetes I
- i) Increasing age male gender overweight or obesity
- j) Previous colon cancer or adenomatous polyps
- k) Racial/ethnic background: African American or Ashkenazi Jewish

4. Clinical Manifestation

Symptoms depend on tumour location, sickness stage, and intestinal function. Bowel changes are most common. Bloody stools follow. Symptoms include unexplained anaemia, anorexia, weight loss, and tiredness (ACS, 2020). Under-50 colorectal cancer patients may report abdominal pain rather than “alarm” indications as rectal bleeding, stool alterations, abdominal bulk, or anaemia (Dragovich, 2020).

Right-sided proximal tumours induce dull stomach ache and melena (black, tarry stools). Left-sided cancers have a better prognosis. Left-sided lesions can produce stomach pain, cramps, constipation, distention, and hematochezia (bright red blood in the stool).

Rectal lesions produce tenesmus, rectal pain, insufficient bowel evacuation, alternating constipation and diarrhoea, and bloody stool (Dragovich, 2020).

5. Assessment and Diagnostic Findings

Colorectal screening works. Colonoscopies reduce colorectal cancer and enhance survival (ACS, 2020). Colorectal cancer develops slowly from colon or rectum polyps, which can be treated early (Simonson, 2018). Organisations vary screening frequency, manner, and start/stop ages. The USPSTF recommends colorectal cancer screening for all 50-year-olds. Due to growing colorectal cancer rates in under-50s, the 2018 ACS proposal advises screening average-risk adults at 45 (ACS, 2020). Screen high-risk people early. Resources for ACS high-risk screening. Testing over 75-year-olds depends on patient preference and health. Colorectal cancer screening guidelines exclude screening those above 85. The American College of Gastroenterology and the National Comprehensive Cancer Network recommend colonoscopies every 5 to 10 years starting at 50 as the principal screening test for colorectal cancer (see Chapter 38 for

colonoscopies) (Cabebe, 2020). Only colonoscopy removes precancerous polyps to prevent colorectal cancer.

Screening colonoscopies should biopsy and tattoo tumours to simplify follow-up. FIT tumours should be biopsied and tattooed using a colonoscopy (Rex, 2018). Consult colorectal surgeons. Colorectal cancer symptoms are identified during preoperative workup. Lynch syndrome and FAP screening require family history. CBC, chemical panel, and liver function tests. Baseline CEA is measured. CEA, a tumour marker, can diagnose, advance, and recur colorectal cancer, but it can also produce false positives and negatives. No additional tumour marker test exists. CEA does not indicate tumour development or recurrence. Contrast CT scans of the abdomen, pelvis, and chest are advised for tumour size and metastases (Macrae & Bendell, 2020).

6. Complications

The growth of a tumor may result in partial or total bowel obstruction or perforation. Hemorrhage may result from tumour extension and ulceration into the surrounding blood vessels. Each of these complications is surgically treatable. Obstructions can be resected with or without anastomosis (e.g., Hartmann procedure). Typically, perforation has a dismal prognosis and is treated with an ostomy. Acute hemorrhage is a rare complication; when it occurs, surgical resection is the most effective treatment.

7. Prevention

Several primary prevention strategies may prevent colorectal cancer from developing. One-third of all malignancies, including colorectal cancer, are linked to tobacco use. Physical activity, dietary modification, and weight reduction strategies resemble those for other malignancies (see previous discussion of Lifestyle Factors in Chapter 12) (ACS, 2020). In addition to these strategies, the USPSTF recommends that adults between the ages of 50 and

59 who are at risk for cardiovascular disease and have no contraindications to aspirin take daily or alternate-day aspirin (dose 75 mg) for 5 to 10 years as an effective primary prevention strategy for both cardiovascular disease and colorectal cancer (Chubak, Kamineni, Buist, et al., 2015). There is currently no expert consensus guideline that recommends routine aspirin prescription following the diagnosis of colon cancer.

Table 9. 2 Tumor, Node, Metastasis (TNM) Classification of Colorectal Cancer. A, From Stevens A, Lowe J: *Pathology: Illustrated Review in Color*, ed 2, London, 2000, Mosby. B, From Kumar V, Abbas AK, Fausto N: *Robbins and Cotran Pathologic Basis of Disease*, ed 7, Philadelphia, 2005, Saunders

T	Primary Tumor
T _x	Cannot assess primary tumor because of incomplete information.
T _{is}	Carcinoma in situ. Cancer is in earliest stage and has not grown beyond mucosa layer.
T ₁	Tumor has grown beyond mucosa into the submucosa.
T ₂	Tumor has grown through submucosa into muscularis propria.
T ₃	Tumor has grown through the muscularis propria into the pericorectal tissues.
T ₄	Tumor invades the visceral peritoneum or invades or adheres to adjacent organ or structure.
N	Lymph Node Involvement
N _x	Cannot assess lymph nodes.
N ₀	No regional lymph node involvement is found.
N ₁	Cancer is found in 1–3 nearby lymph nodes.
N ₂	Cancer is found in 4 or more nearby lymph nodes.
M	Metastasis
M _x	Cannot assess presence of metastasis.
M ₀	No distant metastasis seen.
M ₁	Distant metastasis is present.

8. Diagnostic Assessment
 - a. History and physical assessment
 - b. DRE
 - c. Testing of stool for occult blood
 - d. CBC
 - e. Liver function tests
 - f. Barium enema
 - g. Sigmoidoscopy and/or colonoscopy with biopsy
 - h. Abdominal CT scan, ultrasound, or MRI
 - i. Carcinoembryonic antigen (CEA) test

9. Management
 - a. Surgery
 - b. Right hemicolectomy
 - c. Left hemicolectomy
 - d. Abdominal-perineal resection
 - e. Laparoscopic colectomy
 - f. Low anterior resection
 - g. Chemotherapy
 - h. Targeted therapy
 - i. Radiation therapy

10. Diagnostic Studies
 - a. Flexible sigmoidoscopy (5-year intervals)
 - b. Colonoscopy (10 years apart)
 - c. Double-contrast barium enema (every 5 years)
 - d. CT colonography (virtual colonoscopy) (every 5 years)
 - e. Tests that primarily find cancer include:
 - 1) High-sensitivity fecal occult blood test (FOBT) (every year)
 - 2) Fecal immunochemical test (FIT) (every year)
 - 3) Stool DNA test (every 3 years)

Table 9.3 Classification System Used to Stage Colorectal Cancer.
 Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

Stage ^a	TNM ^b	5-Year Survival Rate (%)
0	T _{is} N ₀ M ₀	>96
I	T ₁ N ₀ M ₀	92
	T ₂ N ₀ M ₀	87
II	T ₃ N ₀ M ₀	70–80
III	Any T, N ₁₋₂ M ₀	53–84
IV	Any T, any N, M ₁	12

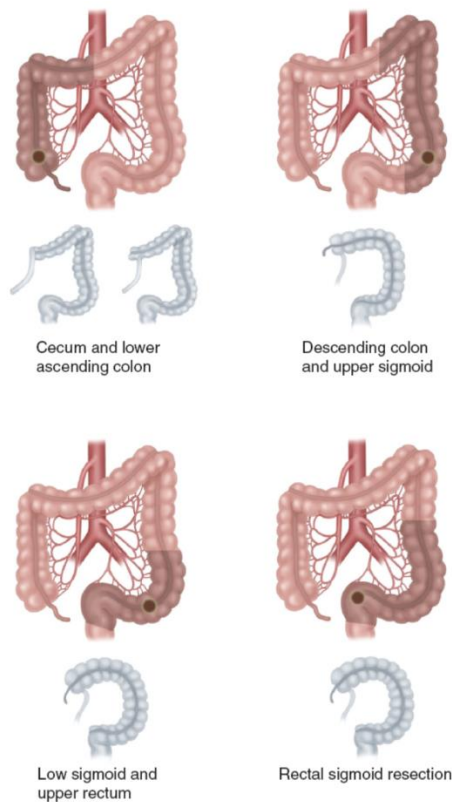


Figure 9.9 Examples of areas where cancer can occur, the area that is removed, and how the anastomosis is performed (small diagrams).
 Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

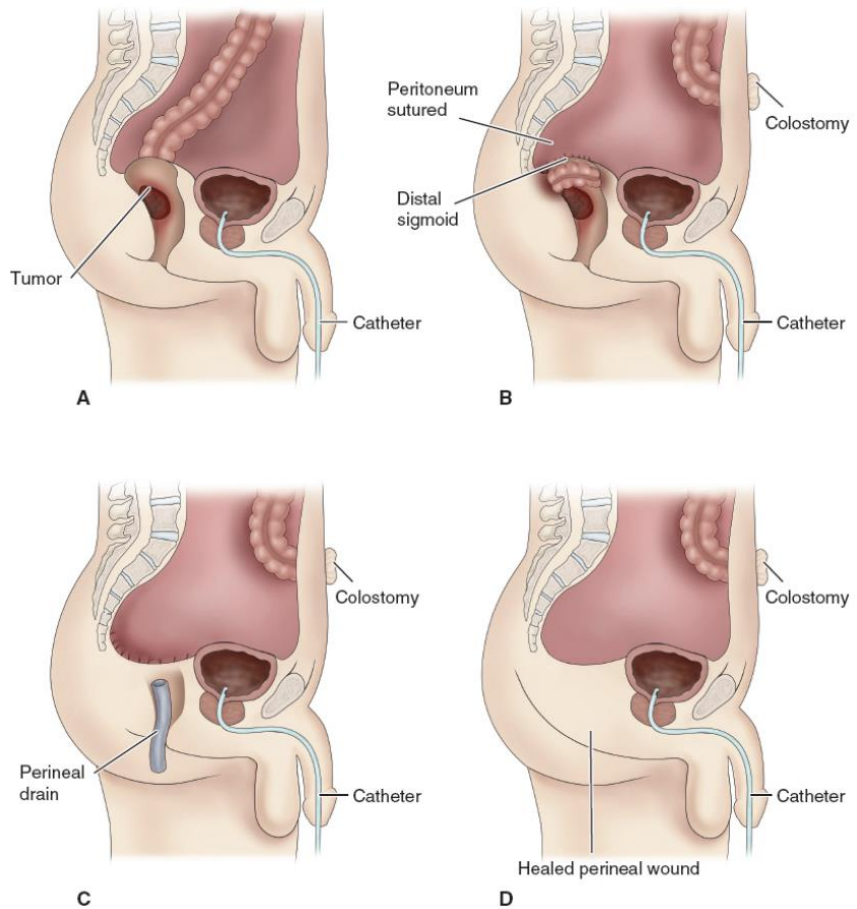


Figure 9.10 Abdominoperineal resection for carcinoma of the rectum. A. Before surgery. Note tumor in rectum. B. During surgery, the sigmoid is removed and the colostomy is established. The distal bowel is dissected free to a point below the pelvic peritoneum, which is sutured over the closed end of the distal sigmoid and rectum. C. Perineal resection includes removal of the rectum and free portion of the sigmoid from below. A perineal drain is inserted. D. The final result after healing. Note the healed perineal wound and the permanent colostomy. Source: Brunner's & Suddarth's. *Textbook of Medical Surgical Nursing*. 15th Edition. Philadelphia: Wolter Kluwer; 2022

11. Nursing Management

a. Assessment

The nurse obtains a health history regarding lethargy, abdominal or rectal pain (e.g., location, frequency, duration, association with eating or defecating), past and present elimination patterns, and stool characteristics (e.g., colour, odor, consistency, presence of blood or mucus).

A history of IBD or colorectal polyps, a family history of colorectal disease, Lynch syndrome, or FAP, and current medication therapy are included as additional information. The nurse evaluates dietary patterns, including fat and fiber consumption, as well as alcohol consumption and smoking history. The nurse describes and documents the patient's history of weight loss and symptoms of fatigue.

Auscultation of the abdomen for gastrointestinal sounds and palpation of the abdomen for tenderness, distention, and solid masses are included in the evaluation. Specimens of faeces are examined for characteristics and the presence of blood.

b. Nursing Diagnoses

1. Impaired nutritional intake associated with nausea and anorexia
2. Risk for infection associated with surgery on bowel and disruption of colonic bacteria
3. Risk for hypovolaemia associated with vomiting and dehydration
4. Lack of knowledge concerning the diagnosis, the surgical procedure, and self-care after discharge
5. Anxiety associated with impending surgery and the diagnosis of cancer
6. Impaired skin integrity associated with the surgical incisions (abdominal or perianal)

- c. Collaborative Problems/Potential Complications
Potential complications may include the following:
 - 1. Intraperitoneal infection
 - 2. Complete large bowel obstruction GI bleeding
 - 3. Bowel perforation Peritonitis, abscess, and sepsis

- d. Planning and Goals
The patient's primary objectives may include optimal nutrition, infection prevention, fluid balance maintenance, knowledge of the diagnosis, surgical procedure, self-care after discharge, anxiety reduction, optimal tissue healing, and the avoidance of complications.

- e. Nursing Interventions
Colorectal cancer surgery patients have various worries and want. They may be physically and emotionally exhausted, worrying about lifestyle changes after surgery, prognosis, capacity to function in established responsibilities, and finances. Nursing care includes physical preparation for surgery, postoperative care education, and emotional support for the patient and family. Developed in 2005 and revised in 2018, the Enhanced Recovery After Surgery (ERAS) Society pathway reduces perioperative stress, length of stay, and patient outcomes for elective colorectal surgery (Gustafsson, Scott, Hubner, et al., 2018). Evidence-based multidisciplinary solutions along the route improve morbidity, 30-day hospital readmission rates, faster healing, earlier discharge, and expenditures (Riccardi, MacKay, & Joshi, 2019). ERAS-managed patients over 70 had similar length of stay and postoperative results as younger colorectal surgery patients (Joris, Hans, Coimbra, et al., 2019).

f. Preoperative care

1) Maintaining Optimal Nutrition.

The days before surgery are spent gaining stamina. The nurse recommends a meal heavy in calories, protein, and carbohydrates and low in fat for several days before operation to provide appropriate nourishment and reduce cramping. Parenteral nutrition may be needed to replenish nutrients, vitamins, and minerals in hospitalized patients before surgery. Home parenteral nutrition may be provided before surgery (Gustafsson et al., 2018).

2) Infection prevention.

Colorectal surgery patients often die from postoperative infection (Rollins, Javanmard Emamghissi, & Lobo, 2018). Preoperative enemas and oral laxatives lower faecal volume and colonic bacteria. These methods were thought to prevent postoperative infection. A meta-analysis found that these therapies do not minimize postoperative infection complications in colorectal surgery patients (Rollins et al., 2018). However, there is no unanimity on infection-reducing practises.

The American Society of Colon and Rectal Surgeons recommends mechanical bowel preparations for elective colorectal surgery only with preoperative oral antibiotics (Migaly, Bafford, Francone, et al., 2019). Kanamycin, ciprofloxacin, neomycin, metronidazole, and cephalixin are usually given orally the day before surgery. Cefazolin and metronidazole are given intravenously within 60 minutes following surgery (Gustafsson et al., 2018).

3) Maintaining Fluid Volume Balance

The nurse records intake and output, including vomitus, for the critically ill hospitalised patient. To prevent vomiting, oral food and water may be limited. The nurse provides recommended antiemetics. NPO or full or clear

liquids may be tolerated. NG tubes can drain fluids and prevent belly distention. The nurse watches for abdominal distention, lack of bowel sounds, pain, and rigidity, which may suggest obstruction or perforation. Monitor IV fluids and electrolytes. Serum electrolytes can detect GI fluid loss-induced hypokalemia and hyponatremia.

The nurse checks for hypovolemia (tachycardia, hypotension, decreased pulse volume), hydration, skin turgor, dry mucous membranes, and concentrated urine.

4) Providing Preoperative Education.

The nurse evaluates the patient's knowledge of diagnosis, prognosis, surgery, and predicted recovery. Surgery preparation, wound care, food restrictions, pain management, and drug management are taught. Patient-friendly explanations accompany all procedures. As indicated above, the nurse coordinates the plan of care for colostomy patients.

5) Providing Emotional Support

Colorectal cancer patients anxiously await bowel surgery. They may mourn the diagnosis and operation. The nurse evaluates the patient's fear and coping techniques and recommends deep-breathing exercises and visualizing a successful operation and cancer recovery. The nurse can schedule an appointment with a spiritual adviser or the primary clinician to discuss treatment or prognosis. Relaxed, professional, and empathetic nurses comfort patients.

g. Providing Postoperative Care

Postoperative nursing care for colon resection patients includes pain management. The nurse monitors patient problems. The nurse checks peristalsis and stool

characteristics. Helping patients out of bed on the first postoperative day prevents atelectasis, VTE, and accelerates peristalsis (Chan, LeRoux, Stutzman, et al., 2019; Kaff, Wehner, & Litkouhi, 2018).

1) Maintaining Optimal Nutrition.

The nurse informs the colorectal cancer surgery patient of the health benefits of a good diet. If it's nutritious and doesn't produce diarrhea or constipation, the diet is customised. Normal diet returns quickly.

2) Providing Wound care.

The nurse often checks the abdominal dressing for hemorrhage or infection in the first 24 hours following surgery. Helping the patient splint the abdominal incision during coughing and deep breathing reduces tension on the edges. The nurse checks temperature, pulse, and respiration for signs of infection.

Haemorrhage is checked after perineal cancer removal. Drains or packing may be slowly removed from this wound. Tissue may shed for a week. Mechanical wound irrigation or sitz baths two or three times a day speed up this process. Documenting perineal wound hemorrhage, infection, and necrosis.

3) Monitoring and Managing Potential Complications

The nurse watches for increased temperature, pulse, and respiration, and lowered blood pressure, which may suggest an intra-abdominal infection. To detect an intestinal obstruction, regularly check bowel sounds and abdominal girth. Rectal bleeding implies hemorrhage. The nurse checks hemoglobin and hematocrit and delivers blood component treatment. Rapid abdominal discomfort changes are noted. Sepsis symptoms include elevated white blood cell counts, fever, and shocks nurse gives antibiotics.

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