Medical-Surgical Nursing II

NSG 315

University of Ibadan Distance Learning Centre
Open and Distance Learning Course Series Development

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Vice-Chancellor's Message

The Distance Learning Centre is building on a solid tradition of over two decades of service in the provision of External Studies Programme and now Distance Learning Education in Nigeria and beyond. The Distance Learning mode to which we are committed is providing access to many deserving Nigerians in having access to higher education especially those who by the nature of their engagement do not have the luxury of full time education. Recently, it is contributing in no small measure to providing places for teeming Nigerian youths who for one reason or the other could not get admission into the conventional universities.

These course materials have been written by writers specially trained in ODL course delivery. The writers have made great efforts to provide up to date information, knowledge and skills in the different disciplines and ensure that the materials are user-friendly.

In addition to provision of course materials in print and e-format, a lot of Information Technology input has also gone into the deployment of course materials. Most of them can be downloaded from the DLC website and are available in audio format which you can also download into your mobile phones, IPod, MP3 among other devices to allow you listen to the audio study sessions. Some of the study session materials have been scripted and are being broadcast on the university's Diamond Radio FM 101.1, while others have been delivered and captured in audio-visual format in a classroom environment for use by our students. Detailed information on availability and access is available on the website. We will continue in our efforts to provide and review course materials for our courses.

However, for you to take advantage of these formats, you will need to improve on your I.T. skills and develop requisite distance learning Culture. It is well known that, for efficient and effective provision of Distance learning education, availability of appropriate and relevant course materials is a *sine qua non*. So also, is the availability of multiple plat form for the convenience of our students. It is in fulfilment of this, that series of course materials are being written to enable our students study at their own pace and convenience.

It is our hope that you will put these course materials to the best use.

Prof. Abel Idowu Olayinka
Vice-Chancellor

Foreword

As part of its vision of providing education for "Liberty and Development" for Nigerians and the International Community, the University of Ibadan, Distance Learning Centre has recently embarked on a vigorous repositioning agenda which aimed at embracing a holistic and all encompassing approach to the delivery of its Open Distance Learning (ODL) programmes. Thus we are committed to global best practices in distance learning provision. Apart from providing an efficient administrative and academic support for our students, we are committed to providing educational resource materials for the use of our students. We are convinced that, without an up-to-date, learner-friendly and distance learning compliant course materials, there cannot be any basis to lay claim to being a provider of distance learning education. Indeed, availability of appropriate course materials in multiple formats is the hub of any distance learning provision worldwide.

In view of the above, we are vigorously pursuing as a matter of priority, the provision of credible, learner-friendly and interactive course materials for all our courses. We commissioned the authoring of, and review of course materials to teams of experts and their outputs were subjected to rigorous peer review to ensure standard. The approach not only emphasizes cognitive knowledge, but also skills and humane values which are at the core of education, even in an ICT age.

The development of the materials which is on-going also had input from experienced editors and illustrators who have ensured that they are accurate, current and learner-friendly. They are specially written with distance learners in mind. This is very important because, distance learning involves non-residential students who can often feel isolated from the community of learners.

It is important to note that, for a distance learner to excel there is the need to source and read relevant materials apart from this course material. Therefore, adequate supplementary reading materials as well as other information sources are suggested in the course materials.

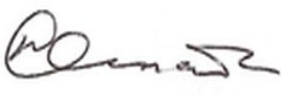
Apart from the responsibility for you to read this course material with others, you are also advised to seek assistance from your course facilitators especially academic advisors during your study even before the interactive session which is by design for revision. Your academic advisors will assist you using convenient technology including Google Hang Out, You Tube, Talk Fusion, etc. but you have to take advantage of these. It is also going to be of immense advantage if you complete assignments as at when due so as to have necessary feedbacks as a guide.

The implication of the above is that, a distance learner has a responsibility to develop requisite distance learning culture which includes diligent and disciplined self-study, seeking available administrative and academic support and acquisition of basic information technology skills. This is why you are encouraged to develop your computer skills by availing yourself the opportunity of training that the Centre's provide and put these into use.

In conclusion, it is envisaged that the course materials would also be useful for the regular students of tertiary institutions in Nigeria who are faced with a dearth of high quality textbooks. We are therefore, delighted to present these titles to both our distance learning students and the university's regular students. We are confident that the materials will be an invaluable resource to all.

We would like to thank all our authors, reviewers and production staff for the high quality of work.

Best wishes.



Professor Bayo Okunade
Director

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Course Information

Course Code & Course Name: NSG 315/MEDICAL-SURGICAL NURSING II

Credit points: 4 Units

Level; **Semester:** First Semester

About the Course:

Lecturer Information:

- **Facilitators: Dr. Prisca Olabisi ADEJUMO**
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- **Consultation: Through SMS, email**

Introduction to the Course:

You are welcome to NSG 315. This is an online course that runs in the distance learning mode. It is a compulsory course open to all nursing students and it is a 4-unit course that has 45 hours of interaction among teachers and learners for the period of the course.

The course aims at helping you acquire basic knowledge and skills of nursing care of clients with some medical and surgical problems.

The course is the continuation of medical surgical nursing 1. It introduces you to the care of patients with cardiovascular, pulmonary and gastrointestinal problems. It will also help you to identify your role as a professional care giver in identifying clients' needs with different medical and surgical problems and applying appropriate use of models and concepts including nursing process as a framework for care.

Study Session 1: Anatomic and Physiologic Overview of the Heart

Introduction

In this session, you will be learning about the anatomy and physiology of the heart. The heart is a muscular organ in humans, which pumps blood through the blood vessels of the circulatory system. Blood provides the body with oxygen and nutrients, and also assists in the removal of metabolic wastes.

The heart is located in the middle compartment of the mediastinum in the chest. In this study session also, you will be learning about the functions of the heart. Now, let us examine my expectations from you at the end of this session.

Learning Outcomes for Study Session 1

At the end of this study session, you should be able to:

1.1 Discuss the anatomy of the Heart

1.2 Highlight the functions of the Heart

1.1 Anatomy of the Heart

The heart is a hollow, muscular organ located in the centre of the thorax, where it occupies the space between the lungs (mediastinum) and rests on the diaphragm. It weighs approximately 300g, although heart

weight and size are influenced by age, gender, body weight, extent of physical exercise and conditioning, and heart diseases. The heart pumps blood to the tissues, supplying them with oxygen and other nutrients.

Human Heart

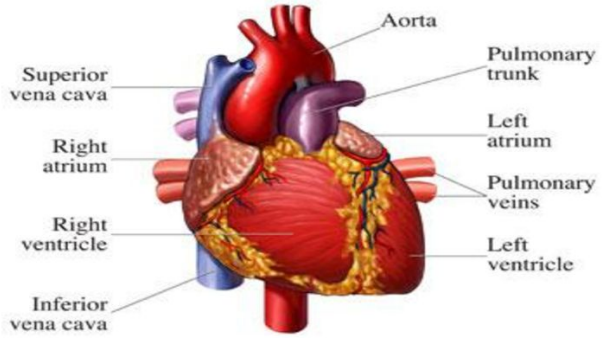

Figure 1.1: The Human Heart

Source: http://www.nationalcprfoundation.com/courses/standard-cpr-aed-first-aid/heart/

The heart is composed of three layers. The inner layer, or endocardium, consists of endothelial tissue and line the inside of the heart and valves. The middle layer, or myocardium, is made up of muscle fibres and is responsible for the pumping action. The exterior layer of the heart is called the epicardium. The heart is encased in a thin, fibrous sac called the pericardium, which is composed of two layers.

Adhering to the epicardium is the visceral pericardium. Enveloping the visceral pericardium is the parietal pericardium, a tough fibrous tissue that attached to the great vessels, diaphragm, sternum, and vertebral column and supports the heart in the mediastinum. The space between these two layers (pericardial space) is filled with about 30mL of fluid, which lubricates the surface of the heart and reduces friction during systole.

The pumping action of the heart is accomplished by the rhythmic contraction and relaxation of its muscular wall. During systole (contraction of the muscle), the chambers of the heart become smaller as the blood is ejected. During diastole (relaxation of the muscle), the heart chambers fill with blood in preparation for the subsequent ejection.

A normal resting adult heart beats approximately 60 to 80times per minute. Each ventricle ejects approximately 70mL of blood per beat and has an output of approximately 5L per minute.

ITQ

1. What is the pumping organ of the body?
2. What are the factors that influence the weight and size of the pumping organ of the body?

ITA

1. The pumping organ is the heart
2. - Age
   - Gender
   - Body weight
   - Extent of physical exercise and
   - Heart diseases.

Now that we have described the anatomy of the heart, let us consider some of the functions of the heart. Are you ready for that? Let us start.

1.2 Functions of the heart

Below are some functions of the heart.

1. Cardiac Electrophysiology

The specialized electrical cells of the cardiac conduction system methodically generate and coordinate the transmission of electrical impulses to the myocardial cells. The result is sequential atrioventricular contraction, which provides for the most effective flow of blood, thereby optimizing cardiac output. Three physiologic characteristics of two types of specialized electrical cells, the nodal cells and the Purkinje cells, provide this synchronization:

1. Automaticity: ability to initiate an electrical impulse
2. Excitability: ability to respond to an electrical impulse
3. Conductivity: ability to transmit an electrical impulse from one cell to another

The sinoatrial (SA) node, referred to as the primary pacemaker of the heart, is located at the junction of the superior vena cava and the right atrium. The SA node in a normal resting heart has an inherent firing rate of 60 to 100 impulses per minute, but the rate can change in response to the metabolic demands of the body.

The electrical impulses initiated by the SA node are conducted along the myocardial cells of the atria via specialized tracts called intermodal pathways. The impulses cause electrical stimulation and subsequent contraction of the atria. The impulses are then conducted to the atrioventricular (AV) node. The AV node (located in the right atrial wall near the tricuspid valve) consists of another group of specialized muscle cells similar to the SA node.

2. Cardiac hemodynamic

An important determinant of blood flow in the cardiovascular system is the principle that fluid flows from a region of higher pressure to one of lower pressure. The pressures responsible for blood flow in the normal circulation are generated during systole and diastole.

Cardiac cycle dynamics

During one heartbeat, ventricular diastole (relaxation) and ventricular systole (contraction) occur. During diastole, the ventricles relax, the atria contract, and blood is forced through the open tricuspid and mitral valves. The aortic and pulmonic valves are closed.

During systole, the atria relax and filled with blood. The mitral and tricuspid valves are closed. Ventricular pressure rises, which forces open the aortic and pulmonic valves. Then the ventricles contract, and blood flows through the circulatory system.

Events of the cardiac cycle

The cardiac cycle consists of the following five events.

1. *Isovolumetric ventricular contraction:* In response to ventricular depolarization, tension in the ventricles increases. The rise in pressure within the ventricles leads to closure of the mitral and tricuspid valves. The pulmonic and aortic valves stay closed during the entire phase.
2. *Ventricular ejection:* When ventricular pressure exceeds aortic and pulmonary arterial pressure, the aortic and pulmonic valves open and the ventricles eject blood.
3. *Isovolumetric relaxation:* When ventricular pressure falls below pressure in the aorta and pulmonary artery, the aortic and pulmonic valves close. All valves are closed during this phase. Atrial diastole occurs as blood fills the atria.
4. *Ventricular filling:* Atrial pressure exceeds ventricular pressure, which causes the mitral and tricuspid valves to open. Blood then flows passively into the ventricles. About 70% of ventricular filling takes place during this phase.
5. *Atrial systole:* Known as the *atrial kick,* atrial systole (coinciding with late ventricular diastole) supplies the ventricles with the remaining 30% of the blood for each heartbeat.

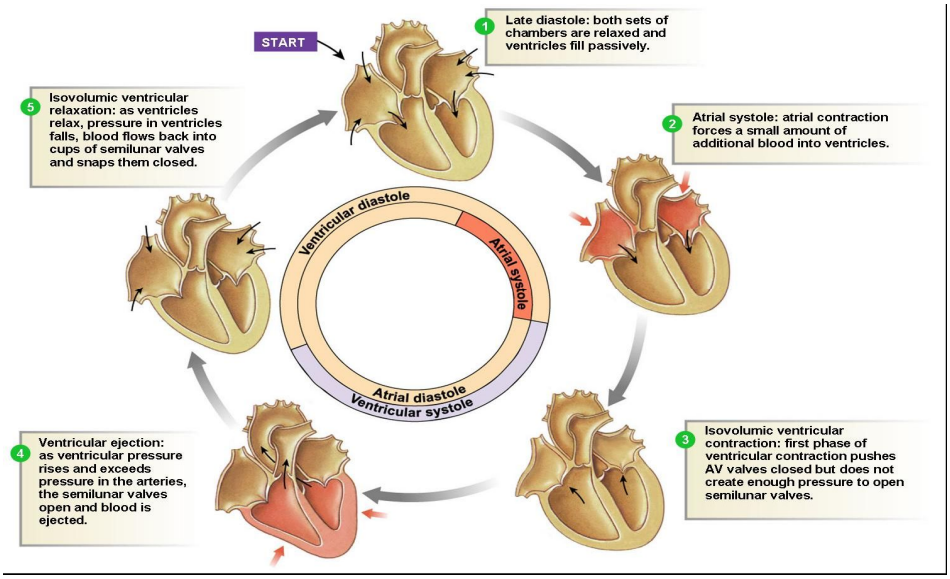

Figure 1.2: Cardiac cycle

Source: http://www.austincc.edu/apreview/PhysText/Cardiac.html

Summary of Study Session 1

In this study session, you have learnt the following:

1. The heart is a hollow, muscular organ located in the centre of the thorax, where it occupies the space between the lungs (mediastinum) and rests on the diaphragm. It weighs approximately 300g, although heart weight and size are influenced by age, gender, and body weight, extent of physical exercise and conditioning, and heart disease. The heart pumps blood to the tissues, supplying them with oxygen and other nutrients.
2. Below are some of the functions of the heart.
   - Cardiac Electrophysiology
   - Cardiac hemodynamic

Self-Assessment Questions (SAQs) for Study Session 1

Now that you have completed this study session, you can assess how well

you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 1.1

Mention the layers of the heart

SAQ 1.2

What are the physiologic characteristics of the cardiac conduction cells?

Note for SAQs

SAQs 1.1

The inner layer or endocardium

The middle layer or myocardium

The exterior layer or epicardium

SAQs 1.2

- Automaticity: ability to initiate an electrical impulse
- Excitability: ability to respond to an electrical impulse
- Conductivity: ability to transmit an electrical impulse from one cell to another

References

American Heart Association, (2012). *Heart disease and stroke statistics-2012 update.* Available at www.americanheart.org.

Heydari, A., Ahrahi, S., & Vaghee, S. (2011). The relationship between self-concept and adherence to therapeutic regimens in patients with heart failure. Journal of Cardiovascular Nursing, 26 (6), 475 - 480.

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/

Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Diehl T.S (2011) ECG made easy 5th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins

Study Session 2: Assessment of the Cardiovascular System

Introduction

The severity of the patient's symptoms, the practice setting of the nurse, and the purpose of the assessment are variables to consider in determining the frequency and extent of nursing assessment required. The assessment of the acutely ill cardiac patient will be different from that of a patient with stable or chronic cardiac problems.

The nurse must assess the patient for complications associated with the Myocardial Infarction, screen the patient for contraindications to thrombolytic therapy, and evaluate the patient's response to medical and nursing interventions. For this patient, the health history, physical assessment, and important nursing interventions, such as cardiac monitoring and administration of intravenous medications, are performed simultaneously.

Learning Outcome for Study Session 2

At the end of this study session, you should be able to:

2.1 Discuss Health Assessment for heart diseases

2.2 Explain the physical assessment for heart diseases

2.3 Highlight the risks factors for heart diseases

2.1 Health History for Heart Diseases

The patient's ability to recognize cardiac symptoms and to know what to

do when they occur is essential for effective self-care management. For the patient experiencing an acute MI, the nurse obtains the health history using a few well-chosen questions about the onset and severity of chest discomfort, associated symptoms, current medications, and allergies.

At the same time, the nurse observes the patient's general appearance and evaluates hemodynamic status (heart rate and rhythm, BP). Once the condition of the patient stabilizes, a more extensive history can be obtained.

With stable patient, a complete health history is obtained during the initial contact. Often, it is helpful to have the patient's spouse or partner available during the health history interview. Initially, demographic information regarding age, gender, and ethnic origin is obtained. Height, current weight, and usual weight (if there has been a recent weight loss or gain) are established.

During the interview, the nurse conveys sensitivity to the cultural background and religious practices of the patient. This may remove barriers to communication that may result if the interview is based only on the nurse's personal frame of reference.

The baseline information derived from the history assists in identifying pertinent problems related to the patient's illness and educational and self-care needs. Once these problems are clearly identified, a plan of care can be instituted.

During subsequent contacts or visits with the patient, a more focused health history is performed to determine if goals have been met, if the plan needs to be modified, or if new problems have developed. During the interview, the nurse asks questions to evaluate cardiac symptoms and health status.

Common Symptoms

The following are the most common signs and symptoms of CVD:

- Chest pain or discomfort (angina pectoris, dysrhythmias)
- Shortness of breath or dyspnoea (ACS, cardiogenic shock, HF, valvular heart disease)
- Peripheral oedema, weight gain, abdominal distention due to enlarged spleen and liver or ascites (HF)
- Palpitations
- Unusual fatigue, sometimes referred to as vital exhaustion (an early symptom of ACS, HF, or valvular heart disease, characterized by feeling unusually tired or fatigued, irritable, and dejected)
- Dizziness, syncope, or changes in level of consciousness (cardiogenic shock, cerebrovascular disorders, dysrhythmias, hypotension, postural hypotension, vasovagal episode)

In-Text Question

Mention five common signs and symptoms of CVD?

In-Text Answer

- Chest pain or discomfort (angina pectoris, dysrhythmias)
- Shortness of breath or dyspnoea
- Peripheral oedema, weight gain, abdominal distention due to enlarged spleen and liver or ascites
- Palpitations
- Unusual fatigue, sometimes referred to as vital exhaustion

2.1.1 Past Health, Family and Social History

The health history provides an opportunity for the nurse to assess patients' understanding of their personal risk factors for coronary

artery, peripheral vascular, and cerebrovascular diseases and nay measures that they are taking to modify these risks. Risk factors are classified by the extent to which they can be modified by changing one's lifestyle or modifying personal behaviours.

Medications

Nurses collaborate with primary providers and pharmacists to obtain a complete list of the patient's medications, including dose and frequency. Vitamins, herbals, and other over-the-counter medications are included on the list.

Nutrition

Dietary modifications, exercise, weight loss, and careful monitoring are important strategies for managing three major cardiovascular risk factors: hyperlipidaemia, hypertension, and diabetes. Diets that are restricted in sodium, fat, cholesterol, or calories are commonly prescribed.

The nurse should obtain the following dietary information:

- Food preferences (including cultural or ethnic)
- Typical diet
- Eating habits (canned or commercially prepared foods versus fresh foods, and restaurant cooking versus home cooking)
- Who shops for groceries?
- Who prepares the meal?

Elimination

Typical bowel and bladder habits need to be identified. Nocturnal (awakening at night to urinate) is common in patients with Heart Failure. Fluid collected in gravity-dependent tissues (extremities)

during the day (i.e., oedema) redistributes into the circulatory system once the patient is recumbent at night. Patients need to be aware of their response to diuretic therapy. Have there been any changes in urination?

When straining during defecation, the patient bears down (the Valsalva manoeuvre), which momentarily increases pressure on the baroreceptors. This triggers a vagal response, causing the heart rate to slow and resulting in syncope in some patients. Straining during urination can produce the same response.

Activity and Exercise

Changes in the patient's activity tolerance are often gradual and may go unnoticed. The nurse determines if there are recent changes by comparing the patient's current activity level with that performed in the past 6 to 12 months. New symptoms or a change in the usual symptoms during activity is a significant finding.

The effect of heart disease on the patient's functioning can be determined by assessing the patient's current activity level. Decreases in activity tolerance are typically gradual and may go unnoticed by the patient. In addition, the nurse needs to be certain that the patient describes symptoms, such as fatigue, angina pain, shortness of breath, or palpitations, that he or she has during exercise. Fatigue is an early indication of disease progression.

Sleep and Rest

Clues to worsening cardiac disease, especially Heart Failure, can be revealed by sleep-related events. Patients with worsening HF often experience orthopnoea, a term used to indicate the need to sit upright or stand to avoid feeling short of breath.

Clues to worsening cardiac disease, especially Chronic Heart Failure, can be revealed by sleep-related events. Determining where the patient sleeps or rests is important. Recent changes, such as sleeping upright in a chair instead of a bed, increasing the number of pillows used, awakening short of breath at night (paroxysmal nocturnal dyspnoea), or awakening with angina (nocturnal angina) are all indicative of worsening CHF.

Self-Perception and Self-Concept

Self- perception and self-concept are both related to the cognitive and emotional processes that people use to formulate their beliefs and feelings about themselves. Having a chronic cardiac illness, such as HF, or experiencing an acute cardiac event, such as MI, can alter an individual's self-perception and self-concept.

You must understand that patients' belief and feelings about their health are key determinants in adherence to health regimen recommendations and recovery after an acute cardiac event (Heydari, Ahrari, & Vaghee, 2001).

During this portion of the health history, you will discovers how patients feel about themselves by asking questions such as: how would you describe yourself? Have you changed the way you feel about yourself since your heart attack or surgery? Do you find that you are easily angered or hostile? How do you feel right now? What helps to manage these feelings?

Roles and Relationships

Determining the patient's social support systems is vitally important in today's health care environment. To assess support system, you should ask: who is the primary caregiver? With whom does the patient

live? Are there adequate services in place to provide a safe home environment?

You should also assess for any significant effects the cardiac illness has had on the patient's role in the family. Are there adequate finances and health insurance? The answers to these questions will help you in developing a plan to meet the patient's home care needs.

Sexuality and Reproduction

Although people recovering from cardiac illnesses or procedures are often concerned about sexual activity, they are unlikely to ask their nurse or other health care provider for information to help them resume their normal sex life. Patients recovering from MI and cardiac surgery have reported reduced frequency and satisfaction with sexual intercourse. The health history can be used to identify reasons for changes in sexuality.

The most commonly cited reasons for changes in the sexual activity are fear of another heart attack or sudden death, untoward symptoms such as angina, dyspnoea, or palpitations, or problems with impotence or depression.

A reproductive history is necessary for women of childbearing age, particularly those with seriously compromised cardiac function. These women may be advised by their physicians not to become pregnant. The reproductive history includes information about previous pregnancies, plans for future pregnancies, oral contraceptives use (especially in women older than age 35 who are smokers), and on hormone replacement therapy.

Coping and Stress Tolerance

Anxiety, depression, and stress are known to influence both the

development of and recovery from CAD and HF. High levels of anxiety are associated with an increased incidence of CAD and in-hospital complication rates after MI. The patient may experience four phases of emotional healing after an acute cardiac event such as MI. in the first 24 to 48hours, patients and their spouses typically experience shock and disbelief.

Patients exhibit anxiety or denial, while the partners may feel anxiety and guilt. The second phase (convalescent phase) occurs once the patient is hemodynamically stable and begins to internalize the significance of the cardiac event. After hospital discharge, the third phase begins and may last up to 3 months.

The patient is beginning to adapt to the diagnosis and starts to make decisions about lifestyle changes. The previously experienced responses continue. In addition, the partner may exhibit overprotective behaviour to compensate for the patient's emotional distress. The last phase (up to 6 months from discharge) is a time for reorganization

Class Activity

Time allowed: 1 hour

In your clinical practice setting, take a patient with cardiovascular disease and use the Gordon typology to obtain the health history.

2.2 Physical Assessment

Physical assessment is conducted to confirm information obtained from the health history, to establish the patient's current or baseline condition, and, in subsequent assessments, to evaluate the patient's response to treatment. Once the initial physical assessment is completed, the frequency of future assessments is determined by the purpose of the encounter and the patient's condition.

In addition to observing the patient's general appearance, a cardiac

physical assessment should include an evaluation of the following parameters listed in figure 2.1 below:

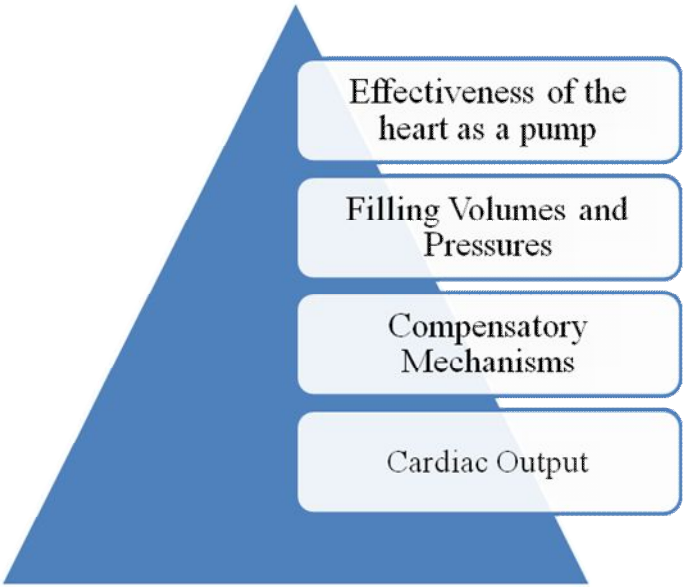

Figure 2.1: Cardiac Physical Assessment

Source: DLC, Ibadan

Indications that the heart is not contracting sufficiently or functioning ineffectively as a pump include reduced pulse pressure, cardiac enlargement, and murmurs and gallop rhythms (abnormal heart sounds).

Cardiac output is reflected by heart rate, pulse pressure, colour and texture of the skin, urine output, and sensorium. Examples of compensatory mechanisms that help maintain cardiac output are increased filling volumes and elevated heart rate.

The examination, which proceeds logically from head to toe, can be performed in about 10 minutes with practice.

1. General appearance,
2. Skin,
3. BP,

4. Arterial pulses,
5. Jugular venous pulsations and pressures,
6. Heart,
7. Extremities
8. Lungs, and
9. Abdomen

General Appearance

This part of the assessment evaluates the patient's level of consciousness (alert, lethargic, stuporous, comatose) and mental status (oriented to person, place, time; coherence). Changes in the level of consciousness and mental status may be attributed to inadequate perfusion of the brain from a compromised cardiac output or thromboembolic event (stroke).

Patients are observed for signs and symptoms, which include pain or discomfort, shortness of breath, or anxiety.

Assessment of the Skin and Extremities

Examination of the skin begins while evaluating the general appearance of the patient and continues throughout the assessment. Examination of the skin includes all body surfaces, starting with the head and finishing with the lower extremities. Skin colour, temperature, and texture are assessed for acute and chronic problems with arterial or venous circulation.

The more common findings associated with cardiovascular diseases include:

- Pallor, or decrease in the colour of the skin, is due to lack of oxyhemoglobin. It is caused by anaemia or decreased arterial perfusion. Pallor is best observed around the fingernails, lips,

and oral mucosa. In patients with dark skin, the nurse observes the palms of the hands and sole of the feet.

- Peripheral cyanosis, a bluish tinge, most often of the nails and skin of the nose, lips, earlobes, and extremities, suggests decreased flow rate of blood to a particular area, allowing more time for the haemoglobin molecule to become desaturated. This may occur normally with peripheral vasoconstriction associated with a cold environment, anxiety, or disease states such as CHF.
- Central cyanosis, a bluish tinge observed in the tongue and buccal mucosa, denotes serious cardiac conditions (pulmonary oedema and congenital disease) in which venous blood passes through the pulmonary circulation without being oxygenated.
- Xanthelamsa, yellowish, slightly raised plaques in the skin, may be observed along the nasal portion of one or both eyelids and may indicate elevated cholesterol levels (hypercholesterolemia)
- Reduced skin turgor occurs with dehydration and aging
- Temperature and moistness are controlled by the autonomic nervous system. Normally the skin is warm and dry. Under stress, hands may become cool and moist. In cardiogenic shock, sympathetic nervous system stimulation causes vasoconstriction, and the skin becomes cold and clammy. During an acute MI, diaphoresis is common.
- Ecchymosis (bruise), a purplish-blue fading to green, yellow, or brown over time, is associated with blood outside of the blood vessels and is usually due to trauma. Patients receiving anticoagulant therapy should be carefully observed for unexplained ecchymosis. In these patients, excessive bruising indicates prolonged clotting times (prothrombin or partial thromboplastin times) caused by too high dose of anticoagulant.

Wounds, scars, and tissue surrounding implanted devices should also be

examined. Wounds are assessed for adequate healing, and scars from previous surgeries are noted. The skin surrounding pacemaker of implantable cardioverter defribillator generators is examined for thinning, which could indicate erosion of the device through the skin.

Blood Pressure

Systemic arterial BP is the pressure exerted on the walls of the arteries during ventricular systole and diastole. It is affected by factors such as cardiac output, distention of the arteries, and the volume, velocity, and viscosity of the blood.

A normal BP in adults is considered a systolic BP less than 120mmHg over a diastolic BP less than 80mmHg. High BP, or hypertension is defined by having a systolic BP that is consistently greater than 140mmHg or a diastolic BP greater than 90mmHg. Hypotension refers to an abnormally low systolic and diastolic BP that can result in light-headedness or fainting.

Arterial pulses

Factors to be evaluated in examining the pulse are rate, rhythm, quality, configuration of the pulse wave, and quality of the arterial vessel.

Jugular venous pulsations

An estimate of right heart function can be made by observing the pulsations of the jugular veins of the neck. This provides a means of estimating central venous pressure, which reflects right atrial or right ventricular end-diastolic pressure (the pressure immediately preceding the contraction of the right ventricle).

Jugular vein distention is caused by increased filling volume and

pressure on the right side of the heart.

Heart inspection and palpitation

The heart is examined indirectly by inspection, palpitation, percussion, and auscultation of the chest wall. A systematic approach is the cornerstone of a thorough assessment. Examination of the chest wall is performed in the following six areas:

- Aortic area- second intercostal space to the right of the sternum
- Pulmonic area- second intercostal space to the left of the sternum
- Erb's point- third intercostal space to the left of the sternum
- Right ventricular or tricuspid area- fourth and fifth intercostal spaces to the left of the sternum
- Left ventricular or apical area- fifth intercostal space to the left of the sternum on the mid-clavicular line
- Epigastric area- below the xiphoid process

Chest percussion

Normally, only the left border of the heart can be detected by percussion. It extends from the sternum to the mid-clavicular line in the third to fifth intercostal spaces. The right border lies under the right margin of the sternum and is not detectable. Enlargement of the heart to either the left or right usually can be noted.

Cardiac auscultation

Areas auscultated include:

The aortic area,

The pulmonary area,

Erb’s point,

The tricuspid area, and

The apical area.

The actions of the four valves are uniquely reflected at specific locations on the chest wall. These locations do not correspond to the anatomic location of the valve within the chest; rather, they reflect the patterns by which the heart sounds radiate toward the chest wall. Sound in vessels though which blood if flowing is always reflected downstream.

Inspection of the extremities

The hands, arms, legs, and feet are observed for the skin and vascular changes. The most noteworthy changes include:

- *Decreases capillary refill time* indicates a slower peripheral flow rate from sluggish reperfusion and is often observed in patients with hypotension or CHF. Capillary refill time provides basis for estimating the rate of peripheral blood flow.
- *Vascular changes* from decreased arterial circulation include decrease in quality or loss of pulse, discomfort or pain, paraesthesia, numbness, decrease in temperature, pallor, and loss of movement.
- *Hematoma,* or a localized collection of clotted blood in the tissue, may be observed in patients who have undergone invasive cardiac procedures such as cardiac catheterization,

angioplasty, or cardiac electrophysiology testing.

- *Peripheral oedema* is fluid accumulation in dependent areas of the body (feet and legs, sacrum in the bedridden patient). Assess for pitting oedema (a depression over an area of pressure) by pressing firmly for 5seconds with the thumb over the dorsum of each foot, behind each medical malleolus, and over the shins
- *Clubbing* of the fingers and toes implies chronic haemoglobin desaturation, as in congenital heart disease
- *Lower extremity ulcers* are observed in patients with arterial or venous insufficiency

In-Text Question

Highlight four common findings associated with cardiovascular diseases.

In-Text Answer

- Pallor, or decrease in the colour of the skin
- Peripheral cyanosis
- Central cyanosis.
- Ecchymosis (bruise), a purplish-blue fading to green, yellow, or brown over time.

Inspection of other systems

LUNGS

Findings frequently exhibited by cardiac patients include the following:

- *Tachypnea*: rapid, shallow breathing may be noted in patients who have heart failure or pain, or who are extremely anxious
- *Cheyne-Stokes respirations:* patients with severe left ventricular failure may exhibit Cheyne-Stokes breathing, a pattern of rapid respirations alternating with apena. It is important to note the duration of the apena.
- *Haemoptysis: pink, frothy sputum is indicative of acute pulmonary oedema*

- *Cough:* a dry, hacking cough from irritation of small airways is common in patients with pulmonary congestion from heart failure
- *Crackles:* heart failure or atelectasis associated with bed rest, splinting from ischemic pain, or the effects of pain medication and sedatives often results in the development of crackles
- *Wheezes:* compression of the small airways by interstitial pulmonary oedema may cause wheezing.

ABDOMEN

For the cardiac patient, two components of the abdominal examination are frequently performed.

- *Hepatojugular reflux:* liver engorgement occurs because of decreased venous return secondary to right ventricular failure. The liver will be enlarged, firm, non-tender, and smooth. The hepatojugular reflux may be demonstrated by pressing firmly over the right upper quadrant of the abdomen for 30 to 60seconds and noting a 1cm rise in jugular venous pressure. This rise indicates an inability of the right side of the heart to accommodate increased volume
- *Bladder distention:* urine output is an important indicator of cardiac function, especially when urine output is reduced. This may indicate inadequate renal perfusion or a less serious problem such as one caused by urinary retention. When urine output is decreased, the patient needs to be assessed for a distended bladder or difficulty voiding.

Class Activity

Time allowed: 2 hours

1. Ask six of your friends in your clinical practice setting when last he or she has taken stethoscope to listen to the chest of their

patients.

2. Pair up and carry out a physical examination of the cardiovascular system on each other.

2.3 Risk Factors for Heart Diseases

There are 2 types of risk factors. There is the non-modifiable risks and the modifiable risks.

Non-modifiable risk factors include the following:

- Positive family history for premature coronary artery disease
- Increasing age
- Gender (men and post-menopausal women)
- Race (higher incidence in African Americans than in whites)

Modifiable risk factors include the following:

- Hyperlipidaemia
- Hypertension
- Cigarette smoking
- Elevated blood glucose (i.e. diabetes mellitus)
- Obesity
- Physical inactivity
- Type A personality characteristics, particularly hostility
- Use of oral contraceptives

Reading Assignment:

Various tests and procedures used for diagnostic assessment of cardiac function and its nursing implication.

Summary of Study Session 2

In this study session, you have learnt the following:

1. The patient's ability to recognize cardiac symptoms and to know what to do when they occur is essential for effective self-care

management. For the patient experiencing an acute MI, the nurse obtains the health history using a few well-chosen questions about the onset and severity of chest discomfort, associated symptoms, current medications, and allergies. At the same time, the nurse observes the patient's general appearance and evaluates hemodynamic status (heart rate and rhythm, BP). Once the condition of the patient stabilizes, a more extensive history can be obtained.

2. The health history provides an opportunity for the nurse to assess patients' understanding of their personal risk factors for coronary artery, peripheral vascular, and cerebrovascular diseases and nay measures that they are taking to modify these risks. Risk factors are classified by the extent to which they can be modified by changing one's lifestyle or modifying personal behaviours. The risk factors includes: Medications, Nutrition, Elimination, Activity and Exercise Sleep and Rest, Self-Perception and Self-Concept, Roles and Relationships, Sexuality and Reproduction and Coping and Stress Tolerance
3. Physical assessment is conducted to confirm information obtained from the health history, to establish the patient's current or baseline condition, and, in subsequent assessments, to evaluate the patient's response to treatment. Once the initial physical assessment is completed, the frequency of future assessments is determined by the purpose of the encounter and the patient's condition.
4. There are 2 types of risk factors. There is the non-modifiable risks and the modifiable risks.

Self-Assessment Questions (SAQs) for Study Session 2

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 2.1

Explain how you should handle Medications for patients with CVD

SAQ 2.2

Mention six areas where the examination of the chest can be performed.

SAQ 2.3

Mention five modifiable risk factors of heart disease.

Notes on SAQs

SAQ 2.1

Nurses collaborate with primary providers and pharmacists to obtain a complete list of the patient's medications, including dose and frequency. Vitamins, herbals, and other over-the-counter medications are included on the list.

SAQ 2.2

- Aortic area- second intercostal space to the right of the sternum
- Pulmonic area- second intercostal space to the left of the sternum
- Erb's point- third intercostal space to the left of the sternum
- Right ventricular or tricuspid area- fourth and fifth intercostal spaces to the left of the sternum
- Left ventricular or apical area- fifth intercostal space to

the left of the sternum on the mid-clavicular line

- ❖ Epigastric area- below the xiphoid process.

SAQ 2.3

Modifiable risk factors are:

- Hyperlipidaemia
- Hypertension
- Cigarette smoking
- Elevated blood glucose (i.e. diabetes mellitus)
- Obesity

References

American Heart Association, (2012). *Heart disease and stroke statistics-2012 update.* Available at www.americanheart.org.

Heydari, A., Ahrahi, S., & Vaghee, S. (2011). The relationship between self-concept and adherence to therapeutic regimens in patients with heart failure. Journal of Cardiovascular Nursing, 26 (6), 475 - 480.

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Diehl T.S (2011) ECG made easy 5th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins

Study Session 3: Myocardial Infarction (MI)

Introduction

Myocardial infarction (MI) commonly known as a heart attack, occurs when blood flow stops to part of the heart causing damage to the heart muscle. The most common symptom is chest pain or discomfort which may travel into the shoulder, arm, back, neck, or jaw. Often it is in the centre or left side of the chest and lasts for more than a few minutes. The discomfort may occasionally feel like heartburn. Other symptoms may include shortness of breath, nausea, feeling faint, a cold sweat, or feeling tired.

In this study session, you will be learning about myocardial infarction; its pathophysiology and nursing management.

Learning Outcome for Study Session 3

At the end of this study session, you should be able to:

3.1 Discuss the Pathophysiology of Myocardial infarction

3.2 Explain ways of Managing a Patient with Myocardial Infarction

3.1 Pathophysiology of MI

MI refers to the process by which areas of myocardial cells in the heart are permanently destroyed. Like unstable angina, MI is usually, but not always, caused by reduced blood flow in a coronary artery due to atherosclerosis and a complete occlusion of an artery by an embolus or

thrombus.

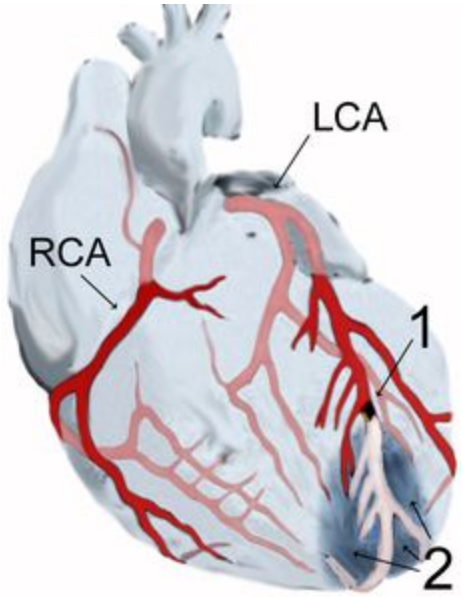

Figure 3.1: Diagram of a myocardial infarction

Source: http://en.wikipedia.org/wiki/Myocardial_infarction

Other causes of MI include vasospasm (a sudden constriction or narrowing) of a coronary artery, decreased oxygen supply (from acute blood loss, anaemia, or low blood pressure), and increased demand for oxygen (from rapid heart rate, thyrotoxicosis, or ingestion of cocaine). In each case, a profound imbalance exists between myocardial oxygen supply and demand.

Coronary occlusion, heart attack, and MI are terms used synonymously, but the preferred term is MI. The area of infarction takes time to develop. Initially, as the cells are deprived of oxygen, ischemia develops, and over time the lack of oxygen results in infarction, or the death of cells.

Clinical manifestations

Chest pain that occurs suddenly and continues despite rest and medications is the primary presenting symptoms. Patients may be anxious and restless. They may have cool, pale, and moist skin. Their heart rate and respiratory rate may be faster than normal. These manifestations

which are due to stimulation of the sympathetic nervous system may not be present; only some may be present; or they may be present for a short while.

In-Text Question

List 3 causes of MI

In-Text Answer

Vasospasm of a coronary artery

Decreased oxygen supply and

Increased demand for oxygen

3.2 Management of Patient with Myocardial Infarction (MI)

Nursing Assessment

One of the most important aspects of care of the patient with an MI is the nursing assessment. This establishes a baseline on the patient's current status so that any deviations may be noted immediately. The nursing assessment systematically identifies the needs of the patient and determines the priority of these needs.

Systematic assessment includes a careful history, particularly as it relates to symptoms, chest pain, difficulty breathing (dyspnoea), palpitations, faintness (syncope), or sweating (diaphoresis). Each symptom must be evaluated with regard to time, duration, and the factors that precipitate the symptom and relieve it.

A precise and complete physical assessment is critical to detect complications, and any change in patient status is reported immediately. The accompanying assessment chart identifies the aspects that need to be assessed and the possible assessment findings.

Nursing Diagnoses

Based on the clinical manifestations, nursing history, and diagnostic assessment data, the patient's major nursing diagnoses may include the following:

1. Decreased myocardial perfusion related to reduced coronary blood flow from coronary thrombus and atherosclerotic plaque
2. Potential impaired gas exchange related to fluid overload from left ventricular dysfunction
3. Potential altered peripheral tissue perfusion related to decreased cardiac output from left ventricular dysfunction
4. Anxiety related to fear of death
5. Knowledge deficit about post-MI self-care

Nursing Interventions

Relieving chest pain

Relieving chest pain is the top priority for the patient with an acute MI, and medication therapy is required to accomplish this goal. The accepted method for relieving chest pain associated with MI is the intravenous administration of vasodilator and anticoagulant therapy. Nitroglycerin and heparin are the medications of choice respectively.

The nurse administers pain-relieving and related medications.

Improving respiratory function

Regular and careful assessment of respiratory function can help the nurse detect early signs of complications associated with the lungs. Scrupulous attention to fluid volume status prevents overloading the heart and hence lungs. Encouraging the patient to breathe deeply and change position frequently helps keep fluid from pooling in the lung bases.

Promoting adequate tissue perfusion

Keeping the patient on bed or chair rest is particularly helpful in

reducing myocardial oxygen consumption (MVO_2). Checking skin temperature and peripheral pulses frequently is important to ensure adequate tissue perfusion. Oxygen may be administered to enrich the supply of circulating oxygen.

Reducing anxiety

Developing a trusting and caring relationship with the patient is critical in reducing anxiety. Frequent opportunities are provided for the patient to share concerns and fears privately. An atmosphere of acceptance helps the patient to know that these feelings are both realistic and normal.

Monitoring and managing potential complications

Complications that can occur after acute MI are due to damage that occurs to the myocardium and to the conduction system as a result of the reduced coronary blood flow. Because these complications can be lethal, early identification of the cardinal signs and symptoms of their onset is critical.

The nurse monitors the patient closely for changes in cardiac rate and rhythm, heart sounds, blood pressure, chest pain, respiratory status, urinary output, skin colour, and temperature, sensorium, and laboratory values. Any changes in the patient's condition are promptly reported to the physician, and emergency measures are instituted when necessary.

Promoting home and community-based care

Teaching Patients Self-Care

The most effective way to increase the probability that the patient will comply with a self-care regimen after discharge is to provide adequate education about the disease process and to facilitate the patient's involvement in a cardiac rehabilitation program. Working with patients in developing plans to meet their specific needs further enhances the potential for compliance.

Evaluation

Expected Outcomes

Expected outcomes may include:

- Experiences relief of pain
- Shows no sign of respiratory difficulties
- Maintains adequate tissue perfusion
- Is less anxious
- Complies with self-care program
- Avoids complications

Activity

Time allowed: 1 hour

Draw a nursing care plan for a patient with the diagnosis of myocardial infarction.

Summary of Study Session 3

In this study session, you have learnt the following:

1. MI refers to the process by which areas of myocardial cells in the heart are permanently destroyed. Like unstable angina, MI is usually, but not always, caused by reduced blood flow in a coronary artery due to atherosclerosis and a complete occlusion of an artery by an embolus or

thrombus.

2. One of the most important aspects of care of the patient with an MI is the nursing assessment. This establishes a baseline on the patient's current status so that any deviations may be noted immediately. The nursing assessment systematically identifies the needs of the patient and determines the priority of these needs.

Self-Assessment Questions (SAQs) for Study Session 3

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 3.1

Write short note on the clinical manifestations of Myocardial infarction

SAQ 3.2

Write 3 Nursing Diagnoses of a patient with Myocardial Infarction

Notes on SAQs

SAQ 3.1

Chest pain that occurs suddenly and continues despite rest and medications is the primary presenting symptoms. Patients may be anxious and restless. They may have cool, pale, and moist skin. Their heart rate and respiratory rate may be faster than normal. These manifestations which are due to stimulation of the sympathetic nervous system may not be present; only some may be present; or they may be present for a short while.

SAQ 3.2

Based on the clinical manifestations, nursing history, and diagnostic

assessment data, the patient's major nursing diagnoses may include the following:

1. Decreased myocardial perfusion related to reduced coronary blood flow from coronary thrombus and atherosclerotic plaque
2. Potential impaired gas exchange related to fluid overload from left ventricular dysfunction
3. Potential altered peripheral tissue perfusion related to decreased cardiac output from left ventricular dysfunction.

References

American Heart Association, (2012). *Heart disease and stroke statistics-2012 update.* Available at www.americanheart.org.

Heydari, A., Ahrahi, S., & Vaghee, S. (2011). The relationship between self-concept and adherence to therapeutic regimens in patients with heart failure. Journal of Cardiovascular Nursing, 26 (6), 475 - 480.

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Diehl T.S (2011) ECG made easy 5th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins

Study Session 4: Congestive Heart Failure

Introduction

Congestive heart failure (CHF), often referred to as cardiac failure, is the inability of the heart to pump sufficient blood to meet the needs of the tissues for oxygen and nutrients. The term "congestive heart failure" is most commonly used when referring to left-sided and right-sided failure.

In this study session, you will be learning about congestive heart failure, its pathophysiology, nursing management and nursing intervention.

Learning Outcome for Study Session 4

At the end of this study session, you should be able to:

4.1 Discuss the pathophysiology of congestive heart failure

4.2 Outline the nursing management of congestive heart failure

4.3 Describe how a nurse can intervene in managing congestive heart failure

4.1 Pathophysiology of CHF

Cardiac failure most commonly occurs with disorders of cardiac muscle that result in decreased contractile properties of the heart. Common underlying conditions that lead to decreased myocardial contractility include myocardial dysfunction especially from coronary

atherosclerosis), arterial hypertension, and valvular dysfunction.
Myocardial dysfunction may be due to coronary artery disease, dilated cardiomyopathy, or inflammatory and degenerative diseases of the myocardium. Atherosclerosis of the coronary arteries is the primary cause of heart failure.

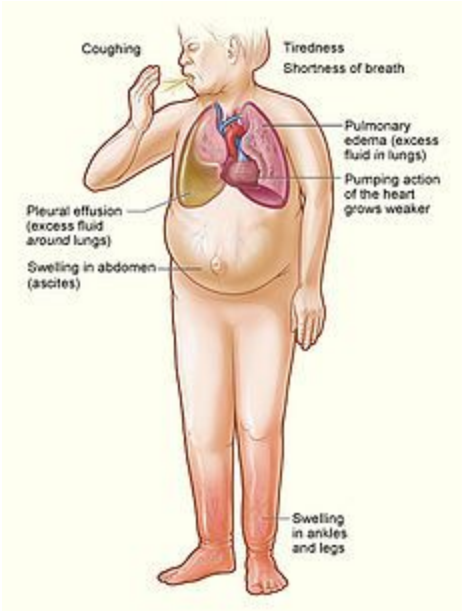

Figure 4.1: The major signs and symptoms of heart failure
Source: http://en.wikipedia.org/wiki/Heart_failure

Dilated cardiomyopathy causes diffuse cellular necrosis, leading to decreased contractility. Inflammatory and degenerative diseases of the myocardium, such as myocarditis, may also damage myocardial fibres, with a resultant decrease in contractility.
Systemic or pulmonary hypertension increased after load (the resistance to ejection), which increases the workload of the heart and in turn leads to hypertrophy of myocardial muscle fibres; this can be considered a compensatory mechanism because it increases contractility.
Valvular heart disease is also a cause of cardiac failure. The valves ensure that blood flows in one direction. With valvular dysfunction, blood has increasing difficulty moving forward. This decreases the

amount of blood being ejected, increases pressure within the heart, and eventually leads to pulmonary and venous congestion.

Etiologic factors: a number of systemic factors contribute to the development and severity of cardiac failure, including increased metabolic rate (e.g. fever, thyrotoxicosis), hypoxia, and anaemia (serum haematocrit less than 25).

In-Text Question

What do you understand by cardiac failure?

In-Text Answer

Cardiac failure is the inability of the heart to pump sufficient blood to meet the needs of the tissues for oxygen and nutrients.

4.2 Nursing Management

The nurse is responsible for administering medications but also for assessing its effects, both beneficial and detrimental, on the patient. It is the balance of these effects that determine the type and dosage of pharmacologic therapy. Nursing actions to evaluate therapeutic effectiveness include the following:

- Keeping an intake and output record to identify a negative balance (more output than input)
- Weighing the patient daily at the same time, usually in the morning after urination
- Auscultating lung sounds at least daily to detect a decrease or an absence of pulmonary crackles
- Determining the degree of jugular vein distention
- Identifying and evaluating the severity of dependent oedema
- Monitoring pulse rate and blood pressure, and making sure that the patient does not become hypotensive from dehydration

- Examining skin turgor and mucous membrane for signs of dehydration
- Assessing symptoms of fluid overload (orthopnoea, paroxysmal nocturnal dyspnoea, and dyspnoea on exertion) and evaluating changes

4.3 Nursing Intervention

Nurses can intervene in a patient with CHF by doing the following:

Promoting activity tolerance

The patient's response to activities needs to be monitored. Although prolonged bed rest and even short periods of recumbency promote dieresis by improving renal perfusion, they also promote decreased activity tolerance. An acute event that causes hospitalization indicates the need for initial bed rest.

Rest is also required in a patient with severe symptoms. Otherwise, regular activity should be encouraged, prolonged bed rest and self-imposed bed rest should be avoided because of the deconditioning effects and hazards, such as pressure ulcers (especially in oedematous patients), phlebothrombosis, and pulmonary embolism.

The patient is encouraged to perform and activity more slowly than usual, for a shorter duration, or with assistance initially. Barriers that could limit abilities to perform are identified, and methods of adjusting an activity to ensure pacing but still accomplish task are discussed.

Vital signs, especially pulses, should be taken, during, and immediately after an activity to identify whether they are within the pre-determined range. Heart rate should return to baseline within 3minutes.

Reducing fatigue

The nurse and patient can collaborate to develop a schedule that promotes pacing and prioritization of activities. The schedule should alternate with periods of rest and avoid having two significant energy-consuming activities occur on the same day or in immediate succession.
Family members can be encouraged to stagger their visits to allow for rest between visits or calls. Finally, the nurse helps the patient develop a positive outlook focused on his or her strength, abilities, and interests.

Managing fluid volume

Patients with severe CHF may receive intravenous diuretic therapy, but patients with less severe symptoms may receive oral diuretic medication. Oral diuretic should be administered early in the morning so that the resultant diuresis does not interfere with the patient's night-time rest. Discussing timing of medication administration is especially important for patients, such as elderly people, who may have urinary urgency or incontinence.
The nurse monitors the patient's fluid status closely- auscultating the lungs, comparing daily body weight, monitoring intake and output, and assisting the patient to adhere to a low-sodium diet by reading food labels and avoiding commercially prepared convenience foods.
The nurse needs to position the patient or teach the patient how to assume a position that shifts blood away from the heart.

Controlling anxiety

Because patients in cardiac failure have difficulty maintaining adequate oxygenation, they are likely to be restless and anxious and feel overwhelmed by breathlessness. Emotional stress stimulates the sympathetic nervous system, which causes vasoconstriction, elevated

arterial pressure, and increased heart rate.

This sympathetic response increases the amount of work that the heart has to do. By decreasing anxiety, patient's cardiac work is also decreased. Oxygen may be administered during the acute stage to diminish the work of breathing and to increase the comfort of patient.

When the patient exhibits anxiety, the nurse takes steps to promote physical comfort and psychological support. Once the patient is comfortable, the nurse can begin teaching the patient ways to control anxiety and avoid anxiety-provoking situations.

Minimizing powerlessness

Patients need to recognize that they are not helpless and that they can influence their direction, their lives, and their outcomes. The nurse needs to assess for factors contributing to a perception of powerlessness and intervene accordingly. Contributing factors may include lack of knowledge, hospital policies, and lack of opportunities to make decisions, particularly if health care providers and family members behave in maternalistic or paternalistic ways.

Other strategies include providing the patient with decision making opportunities, such as when activities are to occur or where objects are to be placed, and increasing the frequency and significance of those opportunities over time; providing encouragement and praise while identifying the patient's progress; and assisting the patient differentiate between factors that can be controlled and those that cannot.

Promoting home and community-based care

TEACHING PATIENTS SELF-CARE

Providing patient education and involving the patients in implementing

the therapeutic regimen promote understanding and compliance.

Recurrence of heart failure, unnecessary hospitalizations, and a decreased life expectancy occur when the patient does not comply with the therapeutic recommendations, such as failing to follow the medication regimen properly, straying from dietary restrictions, failing to obtain adequate medical follow-up, engaging in excessive physical activity, and failing to recognize recurring symptoms.

The patient and family members need to be supported and encouraged to ask questions so that information can be clarified and understanding can be enhanced.

Summary of Study Session 4

In this study session, you have learnt the following:

1. Cardiac failure most commonly occurs with disorders of cardiac muscle that result in decreased contractile properties of the heart. Common underlying conditions that lead to decreased myocardial contractility include myocardial dysfunction especially from coronary atherosclerosis), arterial hypertension, and valvular dysfunction.
2. The nurse is responsible for administering medications but also for assessing its effects, both beneficial and detrimental, on the patient. It is the balance of these effects that determine the type and dosage of pharmacologic therapy.
3. Nurses can intervene in a patient with heart failure by doing the following:
   - Promoting activity tolerance
   - Reducing fatigue
   - Managing fluid volume
   - Controlling anxiety

- Minimizing powerlessness
- Promoting home and community-based care

Self-Assessment Questions (SAQs) for Study Session 4

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 4.1

What are the etiologic factors affecting heart failure?

SAQ 4.2

List 5 ways of nursing actions to evaluate therapeutic effectiveness in heart failure

SAQ 4.3

How should a nurse intervene to help reduce fatigue in patient with CHF?

Notes on SAQs

SAQ 4.1

A number of systemic factors contribute to the development and severity of cardiac failure, including increased metabolic rate (e.g. fever, thyrotoxicosis), hypoxia, and anaemia (serum haematocrit less than 25).

SAQ 4.2

Nursing actions to evaluate therapeutic effectiveness include the following:

- Keeping an intake and output record to identify a negative balance (more output than input)
- Weighing the patient daily at the same time, usually in the morning after urination
- Auscultating lung sounds at least daily to detect a decrease

or an absence of pulmonary crackles

- Determining the degree of jugular vein distention
- Identifying and evaluating the severity of dependent oedema

SAQ 4.3

The nurse and patient can collaborate to develop a schedule that promotes pacing and prioritization of activities. The schedule should alternate with periods of rest and avoid having two significant energy-consuming activities occur on the same day or in immediate succession. Family members can be encouraged to stagger their visits to allow for rest between visits or calls. Finally, the nurse helps the patient develop a positive outlook focused on his or her strength, abilities, and interests.

References

American Heart Association, (2012). *Heart disease and stroke statistics-2012 update.* Available at www.americanheart.org.

Heydari, A., Ahrahi, S., & Vaghee, S. (2011). The relationship between self-concept and adherence to therapeutic regimens in patients with heart failure. Journal of Cardiovascular Nursing, 26 (6), 475 - 480.

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

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Study Session 5: Management of Patients with Dysrhythmias and Conduction Problems

Introduction

Cardiac arrhythmia, also known as cardiac dysrhythmia or irregular heartbeat, is a group of conditions in which the heartbeat is irregular, too fast, or too slow. Many arrhythmias have no symptoms. When symptoms are present these may include palpitations or feeling a pause between heartbeats. More seriously there may be light-headedness, passing out, shortness of breath, or chest pain.

While most arrhythmias are not serious some predispose a person to complications such as stroke or heart failure. Others may result in cardiac arrest.

In this study session, you will be learning about management of dysrhythmias and its assessment, intervention and diagnosis by a nurse

Learning Outcome for Study Session 5

At the end of this study session, you should be able to:

5.1 Explain how a nurse manage a patient with dysrhythmia

5.2 Highlight the nursing intervention for a patient with dysrhythmia

5.1 Nursing Process: The Patient with Dysrhythmia

Without a regular rate and rhythm, the heart could not perform efficiently as a pump to circulate oxygenated blood and other life-

sustaining nutrients to all the body organs (including itself) and tissues. With an irregular or erratic rhythm, the heart is considered to be dysrhythmic (sometimes called arrhythmic). This is a dangerous condition.

Dysrhythmias are disorders of the formation and/or conduction of the electrical impulses within the heart. These can cause disturbances of the heart rate, the heart rhythm, or both. Dysrhythmias are named according to the site of origin of the impulse and the mechanism of formation or conduction involved.

Assessment

Major areas of assessment include possible cause of the dysrhythmia and the dysrhythmia's effect on the heart's ability to pump an adequate blood volume. When cardiac output is reduced, the amount of oxygen reaching the tissues and vital organs is diminished.

The diminished oxygenation produces the signs and symptoms associated with dysrhythmia. If these signs and symptoms are severe or if they occur frequently, the patient may experience significant distress and disruption of daily life.

A health history is obtained to identify possible cause and past incidences of syncope (fainting), light-headedness, dizziness, fatigue, chest discomfort, and palpitations. Any or all of these signs and symptoms can be present if the dysrhythmia causes decreased cardiac output. A thorough psychosocial assessment is also performed to identify the possible effects of the dysrhythmia.

The nurse conducts a physical assessment to confirm the data obtained from the history and to observe for signs of diminished cardiac output during the dysrhythmic event, especially changes in level of consciousness. The nurse then directs attention to the skin, which may be pale and cool.

Signs of fluid retention, such as neck vein distention, and crackles and wheezes auscultated in the lungs may be detected. The rate and rhythm of apical and peripheral pulses are also assessed, and any pulse deficit is noted. Just one assessment may not disclose significant changes in cardiac output; therefore, the nurse compares the multiple assessment findings over time.

In-Text Question

What happen when cardiac output is reduced in a patient with dysrhythmia?

In-Text Answer

When the cardiac output reduced, the amount of oxygen reaching the tissues and vital organs is diminished

5.1.1 Nursing diagnoses

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

- Potential/actual decrease in cardiac output
- Anxiety related to fear of the unknown
- Lack of knowledge about the dysrhythmia and its treatment

Collaborative problems/potential complications

Based on the assessment data, a potential complication that may develop is ischemic heart disease.

Planning and goals

The major goals of the patient may include eradicating or decreasing the incidence of the dysrhythmia (by decreasing contributory factors) to maintain cardiac output, minimizing anxiety, and acquiring knowledge about the dysrhythmia and its treatment.

5.2 Nursing Interventions

A nurse is expected to intervene in the following ways to a patient suffering from dysrhythmia.

Monitoring and managing the dysrhythmia

Controlling the incidence and/or effect of the dysrhythmia is most often achieved by the use of anti-dysrhythmia medications. The nurse manages medication administration carefully so that a constant serum blood level of the medication is maintained at all times. This maximizes beneficial effects and minimizes adverse effects.

Minimizing anxiety

When the patient experiences episodes of dysrhythmia, the nurse maintains a calm and reassuring attitude. The demeanours fosters a trusting relationship with the patient and assists in reducing anxiety. Successes are emphasized with the patient to promote a sense of confidence in living with a dysrhythmia. The nursing goal is to maximize the patient's control and to make the unknown less threatening.

Promoting home and community-based care

TEACHING PATIENTS SELF-CARE

When teaching patients about dysrhythmias, the nurse presents the information in terms that are understandable and in a manner that is not frightening or threatening. The nurse explains the importance of maintaining therapeutic serum levels of anti-dysrhythmia medications so that the patient understands why the medications are to be taken at regular times each day.

In addition, the relationship between a dysrhythmia and cardiac output is explained so that the patient understands the rationale for the medication regimen. It is also important to establish with the patient and family a plan of action to take in case of emergency. This allows the patient and family to feel in control and be prepared for possible eventualities.

Evaluation

Expected outcomes

Expected outcome may include:

1. Cardiac output is maintained
   a. Demonstrates heart rate, blood pressure, respiratory rate, and level of consciousness within normal ranges
   b. Demonstrates no or decreased episode of dysrhythmia
2. Anxiety is minimized
   a. Expresses a positive attitude about living with the dysrhythmia
   b. Expresses confidence in ability to take appropriate actions in an emergency
3. The patient knows about the dysrhythmia and its treatment
   a. Explains the dysrhythmia and its effect
   b. Describes the medication regimen and its rationale
   c. Explains the need for therapeutic serum levels of the medication
   d. States actions to take in the event of emergency

In-Text Question

What should a nurse do when a patient is experiencing episodes of dysrhythmia?

In-Text Answer

When the patient experiences episodes of dysrhythmia, the nurse maintains a calm and reassuring attitude.

Summary of Study Session 4

In this study session, you have learnt the following:

1. Dysrhythmias are disorders of the formation and/or conduction of the electrical impulses within the heart. These can cause disturbances of

the heart rate, the heart rhythm, or both. Dysrhythmias are named according to the site of origin of the impulse and the mechanism of formation or conduction involved.

2. Based on the assessment data, major nursing diagnoses of the patient may include:

- Potential/actual decrease in cardiac output
- Anxiety related to fear of the unknown
- Lack of knowledge about the dysrhythmia and its treatment

3. A nurse is expected to intervene in the following ways to a patient suffering from dysrhythmia. The nurse is expected to be: Monitoring and managing the dysrhythmia, Minimizing anxiety and promoting home and community-based care.

Self-Assessment Questions (SAQs) for Study Session 4

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 5.1

What is dysrhythmias?

SAQ 5.2

What is the expected outcome if the cardiac output of a patient with dysrhythmias is managed well?

Notes on SAQs

SAQ 5.1

Dysrhythmias are disorders of the formation and/or conduction of the electrical impulses within the heart. These can cause disturbances of

the heart rate, the heart rhythm, or both. Dysrhythmias are named according to the site of origin of the impulse and the mechanism of formation or conduction involved.

SAQ 5.2

If the Cardiac output is maintained, the expected outcome will be:

a. Demonstrates heart rate, blood pressure, respiratory rate, and level of consciousness within normal ranges

b. Demonstrates no or decreased episode of dysrhythmia

References

American Heart Association, (2012). *Heart disease and stroke statistics-2012 update.* Available at www.americanheart.org.

Heydari, A., Ahrahi, S., & Vaghee, S. (2011). The relationship between self-concept and adherence to therapeutic regimens in patients with heart failure. Journal of Cardiovascular Nursing, 26 (6), 475 - 480.

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Diehl T.S (2011) ECG made easy 5th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins

Session Study 6: Cardiomyopathies

Introduction

Cardiomyopathy is the measurable deterioration for any reason of the ability of the myocardium (the heart muscle) to contract, usually leading to heart failure. Common symptoms include dyspnoea (breathlessness) and peripheral oedema (swelling of the legs). Those with cardiomyopathy are often at risk of dangerous forms of irregular heart rate and sudden cardiac death.

In this study session, you will be learning about the pathophysiology of cardiomyopathy and how a nurse should manage a patient with cardiomyopathy.

Learning Outcome for Study Session 6

At the end of the study session, you should be able to:

6.1 Discuss the Pathology of Cardiomyopathy

6.2 Explain the Nursing process for a patient with Cardiomyopathy

6.1 Pathophysiology of Cardiomyopathy

Cardiomyopathy is a heart muscle disease of unknown cause. The three types of cardiomyopathy are classified according to the structural and functional abnormalities of the heart muscle; dilated cardiomyopathy (sometimes called congestive cardiomyopathy), hypertrophic cardiomyopathy, and restrictive or constrictive cardiomyopathy.

Regardless of the category and the causes, these diseases may lead to severe heart failure, significant dysrhythmias, and death.

Dilated or congestive cardiomyopathy, the most common form of cardiomyopathy, is distinguished by significant concomitant hypertrophy (an increase in muscle wall thickness). The result is poor systolic functioning.

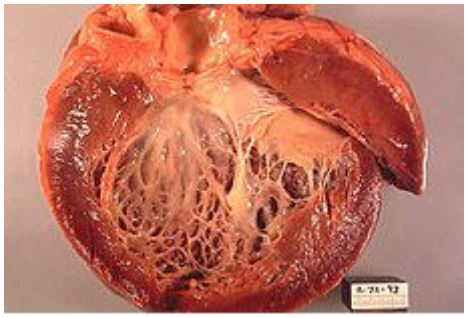

Figure 6.1: Dilated left ventricle showing cardiomyopathy

Source: http://en.wikipedia.org/wiki/Cardiomyopathy

In hypertrophic cardiomyopathy, which is less common, the heart muscle actually increases in size and mass, especially along the septum. The increase in thickness of the heart muscle reduces the size of the ventricular cavities and causes the ventricles to take a longer time to relax, making it more difficult for the ventricles to fill with blood during the first part of the diastole and more dependent on the atrial contraction for filling.

Restrictive cardiomyopathy, the rarest category, is characterized by an impairment of ventricular stretch and therefore volume. Restrictive cardiomyopathy can be associated with amyloidosis (in which amyloid, a protein substance, is deposited within the cells) and other such infiltrative diseases.

Regardless of the distinguishing features, the pathophysiology of cardiomyopathy is a series of progressive events that culminate in an impaired pumping of the heart. The gradually decreasing stroke volume stimulates the sympathetic nervous system, resulting in increased

systemic vascular resistance. As in heat failure from any cause, the left ventricle enlarges to accommodate the demands and eventually fails.

In-Text Question

Which is the commonest form of cardiomyopathy?

In-Text Answer

Dilated or congestive cardiomyopathy

Clinical manifestations

Cardiomyopathies may occur at any age; they affect both men and women. The patient may have the disease but remain stable and without symptoms for many years. The patient with hypertrophy cardiomyopathy is often active and may even be an athlete.

As the disease progresses, so do symptoms; the patient may experience multiple hospitalizations, with a grim prognosis. Most patients with cardiomyopathy initially present with shortness of breath on exertion.

6.2 Nursing Process: The Patient with Cardiomyopathy

Assessment

Nursing assessment for the patient with cardiomyopathy begins with a detailed history of presenting signs and symptoms. The nurse identifies the possible etiologic factors, such as heavy alcohol intake, recent illness or pregnancy, or history of the disease in immediate family members. If the patient complains of chest pain, a thorough review of the pain, including its precipitating factors, should be performed.

Nursing Interventions

Improving cardiac output

During a symptomatic episode, rest is indicated. Many patients find that leaning back in a chair is more comfortable than lying down in a bed.

This position is helpful in pooling venous blood in the periphery and reducing preload.

Because the medical regimen is primarily palliative, careful monitoring is needed to correlate the intervention with the patient's response and then adjust the treatment plan accordingly.

Attention to the timeliness of administering prescribed medications is vital. Ensuring that the patient receives or chooses food selections that are appropriate for the low-sodium diet is also important. I addition, helping the patient keep warm and change position frequently stimulates circulation and reduces the possibility of skin breakdown.

Increasing activity tolerance

The nurse plans the patient's activities so that they occur in cycles, alternating rest with activity periods. The nurse can then make sure that the patient recognizes the symptoms that indicate the need for rest and the actions to take when the symptoms occur.

Reducing anxiety

Spiritual, psychological, and emotional support may be indicated for the patient, family, and significant others. Interventions are directed toward eradicating or alleviating perceived stressors.

The patient is provided with appropriate information about cardiomyopathy and encouraged to accomplish self-care activities. Nurses help the patient, family, and significant others with anticipating grieving. Accomplishing a goal, no matter how small, also promotes the patient's sense of well-being.

Promoting home and community-based care

TEACHING PATIENTS' SELF-CARE

The patient with cardiomyopathy needs to learn to participate in and accomplish self-care activities within the boundaries of activity limitations. Teaching patients about the medication regimen and dietary restrictions is a key part of the plan of nursing care. Helping patients to cope and accept their disease status makes it easier for them to adjust their expectations and follow the self-care program at home.

CONTINUING CARE

Patients who have significant symptoms of congestive heart failure or other complications of cardiomyopathy may need a home care referral. The nurse reinforces previous teaching and performs ongoing assessment of the patient's symptoms and progress. The nurse also assists the patient and family to adjust to lifestyle changes imposed by activity limitations. Simple suggestions for organizing daily activities and for increasing tolerance to activity can be helpful.

Summary of Study Session 6

In this study session, you have learnt the following:

1. Cardiomyopathy is a heart muscle disease of unknown cause. The three types of cardiomyopathy are classified according to the structural and functional abnormalities of the heart muscle; dilated cardiomyopathy (sometimes called congestive cardiomyopathy), hypertrophic cardiomyopathy, and restrictive or constrictive cardiomyopathy. Regardless of the category and the causes, these diseases may lead to severe heart failure, significant dysrhythmias, and death.
2. Nursing assessment for the patient with cardiomyopathy begins with a detailed history of presenting signs and symptoms. The nurse identifies the possible etiologic factors, such as heavy alcohol intake, recent illness or pregnancy, or history of the disease in

immediate family members. If the patient complains of chest pain, a thorough review of the pain, including its precipitating factors, should be performed.

3. The patient with cardiomyopathy needs to learn to participate in and accomplish self-care activities within the boundaries of activity limitations. Teaching patients about the medication regimen and dietary restrictions is a key part of the plan of nursing care.

Self-Assessment Questions (SAQs) for Study Session 6

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 6.1

Describe the pathophysiology of cardiomyopathy.

SAQ 6.2

How will the nurse increase activity tolerance of a patient with cardiomyopathy?

Notes on SAQs

SAQ 6.1

Dilated or congestive cardiomyopathy, the most common form of cardiomyopathy, is distinguished by significant concomitant hypertrophy (an increase in muscle wall thickness). The result is poor systolic functioning.

In hypertrophic cardiomyopathy, which is less common, the heart muscle actually increases in size and mass, especially along the septum. The increase in thickness of the heart muscle reduces the size of the

ventricular cavities and causes the ventricles to take a longer time to relax, making it more difficult for the ventricles to fill with blood during the first part of the diastole and more dependent on the atrial contraction for filling.

Restrictive cardiomyopathy, the rarest category, is characterized by an impairment of ventricular stretch and therefore volume. Restrictive cardiomyopathy can be associated with amyloidosis (in which amyloid, a protein substance, is deposited within the cells) and other such infiltrative diseases.

Regardless of the distinguishing features, the pathophysiology of cardiomyopathy is a series of progressive events that culminate in an impaired pumping of the heart. The gradually decreasing stroke volume stimulates the sympathetic nervous system, resulting in increased systemic vascular resistance. As in heat failure from any cause, the left ventricle enlarges to accommodate.

SAQ 6.2

The nurse plans the patient's activities so that they occur in cycles, alternating rest with activity periods. The nurse can then make sure that the patient recognizes the symptoms that indicate the need for rest and the actions to take when the symptoms occur.

References

American Heart Association, (2012). *Heart disease and stroke statistics-2012 update.* Available at www.americanheart.org.

Heydari, A., Ahrahi, S., & Vaghee, S. (2011). The relationship between self-concept and adherence to therapeutic regimens in patients with heart failure. Journal of Cardiovascular Nursing, 26 (6), 475 - 480.

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

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Study Session 7: Anatomic and Physiologic Overview of Respiratory System

Introduction

The respiratory system is a biological system consisting of specific organs and structures used for the process of respiration in man. The respiratory system is involved in the intake and exchange of oxygen and carbon dioxide between man and his environment. Respiration takes place in the respiratory organs called lungs.

The passage of air into the lungs to supply the body with oxygen is known as inhalation, and the passage of air out of the lungs to expel carbon dioxide is known as exhalation; this process is collectively called breathing or ventilation.

In this study session, you will be learning about the anatomy and physiology of the respiratory system.

Learning Outcome for Study Session 7

At the end of this study session, you should be able to:

7.1 Explain the Anatomy of the Respiratory system

7.2 Highlight the Functions of the Respiratory system

7.1 Anatomy of the Respiratory System

The respiratory system is composed of the upper and lower respiratory

tracts. Together, the two tracts are responsible for ventilation (movement of air in and out of the airways). The upper respiratory tract warms and filters inspired air so that the lower respiratory tract can accomplish gas exchange or diffusion.

Upper Respiratory Tract

Upper airway structures consist of the nose; paranasal sinuses; pharynx, tonsils, and adenoids: larynx; and trachea.

Nose: the nose serves as a passageway for air to pass to and from the lungs. It filters impurities and humidifies and warms the air as it is inhaled. The nose is composed of the external and an internal portion. The external portion protrudes from the face and is supported by the nasal bones and cartilage.

The inner portion of the nose is a hollow cavity separated into the right and left nasal cavities by a narrow vertical divider, the septum.

Paranasal sinuses: the paranasal sinuses include four pairs of bony cavities that are lined with nasal mucosa and ciliated pseudo stratified columnar epithelium. These air spaces are connected by a series of ducts that drain into the nasal cavity. The sinuses are named by their location: frontal, ethmoid, sphenoid, and maxillary. The sinuses are a common site of infection.

Pharynx, Tonsils, and Adenoids: the pharynx, or throat, is a tube-like structure that connects the nasal and oral cavities to the larynx. It is divided into three regions: nasal, oral, and laryngeal.

The adenoids, or pharyngeal tonsils, are located in the roof of the nasopharynx. The tonsils, the adenoids, and other lymphoid tissue encircle the throat. The pharynx functions as a passageway for the respiratory and digestive tracts.

Larynx: the larynx, or voice box, is cartilaginous epithelium-lined organ that connects the pharynx and the trachea and consists of the following: epiglottis, glottis, thyroid cartilage, cricoid cartilage, arytenoids cartilages, and vocal cords.

Although the major function of the larynx is vocalization, it also protects the lower airway from foreign substances and facilitates

coughing.

Trachea: the trachea, or windpipe, is composed of smooth muscle with C-shaped rings of cartilage at regular intervals. The cartilaginous rings are incomplete on the posterior surface and give firmness to the wall of the trachea, preventing it from collapsing.

Lower Respiratory Tract

The lower respiratory tract consists of the lungs, which contain the bronchial and alveolar structures needed for gas exchange.

Lungs- the lungs are paired elastic structures enclosed in the thoracic cage, which is an airtight chamber with distensible walls. Each lung is divided into lobes.

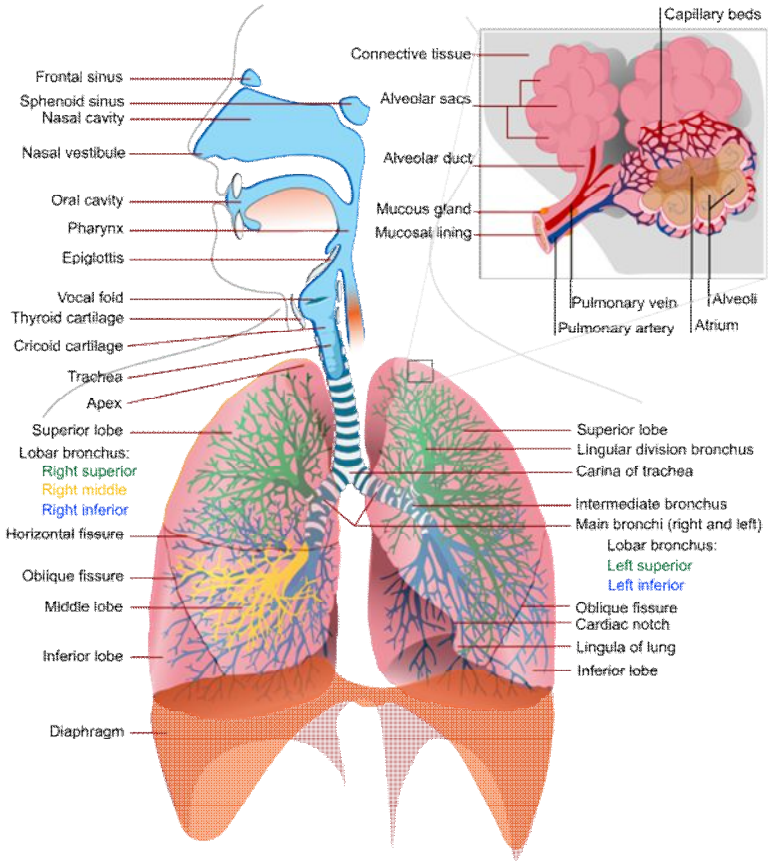

Figure 6.1: Respiratory system

Diagram adopted from medical exam essential 2012.

In-Text Question

List the structures in the upper respiratory system.

In-Text Answer

It consist of the nose; paranasal sinuses; pharynx, tonsils, and adenoids: larynx; and trachea

7.2 Functions of the Respiratory System

The cells of the body derive the energy they need from the oxidation of carbohydrates, fats, and proteins. This process requires oxygen. The respiratory system facilitates life-sustaining processes such as oxygen transport, respiration, ventilation, and gas exchange.

Oxygen Transport- oxygen is supplied to, and carbon dioxide is removed from cells by way of the circulating blood through the thin walls of the capillaries. Oxygen diffuses from the capillary through the capillary wall to the interstitial fluid. The movement of carbon dioxide occurs by diffusion in the opposite direction- from cell to blood.

Respiration- after tissue capillary exchanges, blood enters the systemic venous circulation and travels to the pulmonary circulation. Movement of air in and out of the airways continually replenishes the oxygen and removes the carbon dioxide from the airways and lungs. This whole process of gas exchange between the atmosphere air and the blood and between the blood and cells of the body is called **respiration.**

Ventilation- ventilation requires movement of the walls of the thoracic cage and of its floor, the diaphragm. The effect of these movements is alternately to increase and decrease the capacity of the chest.

When the capacity of the chest is increased, air enters through the trachea (inspiration) and moves into the bronchi, bronchioles, and alveoli, and inflates the lungs. When the chest wall and diaphragm return to their previous positions (expiration), the lungs recoil and force the air out through the bronchi and trachea.

Pulmonary Diffusion and Perfusion

Pulmonary diffusion is the process by which oxygen and carbon dioxide are exchanged from areas of high concentration to areas of low concentration at the air-blood interface. The alveolar-capillary membrane is ideal for diffusion because of its thinness and large surface area.

Pulmonary perfusion is the actual blood flow through the pulmonary vasculature. The blood is pumped into the lungs by the right ventricle through the pulmonary artery. The pulmonary artery divides into the right and left branches to supply both lungs.

The pulmonary circulation is considered a low-pressure system because the systolic blood pressure in the pulmonary artery is 20 to 30mmHg and the diastolic pressure is 5 to 15mmHg. Because of these low pressures, the pulmonary vasculature normally can vary its capacity to accommodate the blood flow it receives.

Ventilation and Perfusion Balance and Imbalance- adequate gas exchange depends on an adequate ventilation-perfusion (V/Q) ratio. In different areas of the lung, the (V/Q) ratio varies. Airway blockages, local changes in compliance, and gravity may alter ventilation. Alterations in perfusion may occur with a change in the pulmonary artery pressure, alveolar pressure, or gravity.

(V/Q) imbalance occurs as a result of inadequate ventilation, adequate perfusion, or both.

Carbon Dioxide Transport- at the same time that oxygen diffuses from the blood into the tissues, carbon dioxide diffuses from tissue cells to blood and is transported to the lungs for excretion. The amount of carbon dioxide in transit is one of the major determinants of the acid-base balance of the body.

Neurologic Control of Ventilation- resting respiration is the result of cyclic excitation of the respiratory muscles by the phrenic nerve. The rhythm of breathing is controlled by respiratory centers in the brain. The inspiratory and expiratory centers in the medulla oblongata and pons control the rate and depth of ventilation to meet the body's metabolic demands.

Gas exchange- The major function of the respiratory system is gas exchange between the external environment and an organism's circulatory system. In humans, this exchange facilitates oxygenation of the blood with a concomitant removal of carbon dioxide and other gaseous metabolic wastes from the circulation.

As gas exchange occurs, the acid-base balance of the body is maintained as part of homeostasis. If proper ventilation is not maintained, two opposing conditions could occur: respiratory acidosis, a life-threatening condition, and respiratory alkalosis.

In-Text Question

List the functions of the respiratory system.

In-Text Answer

- oxygen transport,
- respiration,
- ventilation,
- gas exchange

Summary of Study Session 7

In this study session, you have learnt the following:

1. The respiratory system is composed of the upper and lower respiratory tracts. Together, the two tracts are responsible for ventilation (movement of air in and out of the airways). The upper respiratory tract

warms and filters inspired air so that the lower respiratory tract can accomplish gas exchange or diffusion.

2. The cells of the body derive the energy they need from the oxidation of carbohydrates, fats, and proteins. This process requires oxygen. The respiratory system facilitates life-sustaining processes such as oxygen transport, respiration, ventilation, and gas exchange.

Self-Assessment Questions (SAQs) for Study Session 7

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 7.1

Describe the anatomy of the upper respiratory tract.

SAQ 7.2

Differentiate between Pulmonary diffusion and pulmonary perfusion

Notes on SAQs

SAQ 7.1

Upper airway structures consist of the nose; paranasal sinuses; pharynx, tonsils, and adenoids: larynx; and trachea.

Nose- the nose serves as a passageway for air to pass to and from the lungs. It filters impurities and humidifies and warms the air as it is inhaled. The nose is composed of the external and an internal portion. The external portion protrudes from the face and is supported by the nasal bones and cartilage.

The inner portion of the nose is a hollow cavity separated into the right and left nasal cavities by a narrow vertical divider, the septum.

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columnar epithelium. These air spaces are connected by a series of ducts that drain into the nasal cavity. The sinuses are named by their location: frontal, ethmoid, sphenoid, and maxillary. The sinuses are a common site of infection.

Pharynx, Tonsils, and Adenoids- the pharynx, or throat, is a tubelike structure that connects the nasal and oral cavities to the larynx. It is divided into three regions: nasal, oral, and laryngeal.

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Although the major function of the larynx is vocalization, it also protects the lower airway from foreign substances and facilitates coughing.

Trachea- the trachea, or windpipe, is composed of smooth muscle with C-shaped rings of cartilage at regular intervals. The cartilaginous rings are incomplete on the posterior surface and give firmness to the wall of the trachea, preventing it from collapsing.

SAQ 7.2

Pulmonary diffusion is the process by which oxygen and carbon dioxide are exchanged from areas of high concentration to areas of low concentration at the air-blood interface. The alveolar-capillary membrane is ideal for diffusion because of its thinness and large surface area.

Pulmonary perfusion is the actual blood flow through the pulmonary

vasculature. The blood is pumped into the lungs by the right ventricle through the pulmonary artery. The pulmonary artery divides into the right and left branches to supply both lungs.

References

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Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Medical exam essential 2012 from www.medical.exam.essential

Study Session 8: Pulmonary Assessment

Introduction

These are steps that are designed to take the nurse through the assessment of a patient in a logical and organized sequence. You should first start with a very general inspection and history of the patient; then your exam becomes more detailed as you begin to examine the interaction of all body systems.

In this study session, you will be learning about pulmonary assessment using health history, past history, social and family history.

Learning Outcome for Study Session 8

At the end of this study session, you should be able to:

8.1 Explain Health History in Pulmonary Assessment

8.2 Discuss Risk Factors for Respiratory Disease

8.1 Health History

The health history initially focuses on the patient's presenting problem and associated symptoms, with close attention to how all aspects of the patient's life, including activities of daily living and quality of life, are impacted. In conducting the history, the nurse should explore the onset, location, duration, character, aggravating and alleviating factors, radiation (if relevant), and timing of the presenting problem and associated symptoms.

Common Symptoms

The major signs and symptoms of respiratory disease are dyspnoea, cough, sputum production, chest pain, wheezing, and haemoptysis. The nurse also assesses the impact of signs and symptoms on the patient's activities of daily living and to participate in usual work and family activities.

Dyspnoea- Dyspnoea (subjective feeling of difficult or laboured breathing breathlessness, shortness of breath) is a multidimensional symptom common to many pulmonary and cardiac disorders, particularly when there is decreased ling compliance or increased airway resistance. Dyspnoea may also be associated with allergic reactions, anaemia, neurologic or neuromuscular disorders, trauma, and advance disease. It is common at the end of life.

Cough- cough is a reflex that protects the lungs from the accumulation of secretions or the inhalation of foreign bodies. Its presence or absence can be a diagnostic clue because some disorders caused coughing and other suppress it. The cough reflex may be impaired by weakness or paralysis of the respiratory muscles, prolonged inactivity, the presence of a nasogastric tube, or depressed function of the brain's medullary centres (e.g., anaesthesia, brain disorders).

To determine the cause of the cough, the nurse inquires about the onset and time of coughing. Coughing at night may indicate the onset of left-sided heart failure or bronchial asthma. A cough in the morning with sputum production may indicate bronchitis. Coughing after food intake may indicate aspiration of material into the tracheobronchial tree. A cough of recent onset is usually from an acute infection.

Sputum Production- sputum production is the reaction of the lungs to any constantly recurring irritant and often results from persistent coughing. It may also be associated with a nasal discharge. The nature of the sputum is often indicative of its cause. A profuse amount of

purulent sputum (thick and yellow, green, or rust coloured) or a change in colour of the sputum is a common sign of a bacterial infection.

Thin, mucoid sputum frequently results from viral bronchitis. Pink-tinged mucoid sputum suggests a lung tumour. Profuse, frothy, pink material, often welling up into the throat, may indicate pulmonary oedema.

Chest pain- chest pain or discomfort may be associated with pulmonary, cardiac, gastrointestinal, or musculoskeletal disease or anxiety. Chest pain associated with pulmonary conditions may be sharp, stabbing, and intermittent, or it may be dull, aching, and persistent.

The pain usually is felt on the side where the pathologic process is located, although it may be referred elsewhere- for example, to the neck, back, or abdomen. Chest pain may occur with pneumonia, pulmonary infarction, or pleurisy, or as a late symptom of bronchogenic carcinoma. The nurse assesses the quality, intensity, and radiation of pain and identifies and explores precipitating factors and their relationship to the patient's position. In addition, the nurse must assess the relationship of pain to the inspiratory and expiratory phases of respiration.

Wheezing- wheezing is a high-pitched, musical sound heard mainly on expiration (asthma) or inspiration (bronchitis). It is often the major finding in a patient with bronchoconstriction or airway narrowing.

Haemoptysis- haemoptysis is the expectoration of blood from the respiratory tract. It can present as small to moderate blood-stained sputum to a large haemorrhage and always warrants further investigation. The onset of haemoptysis is usually sudden, and it may be intermittent or continuous.

The most common causes are:

- Pulmonary infection,

- Carcinoma of the lung,
- Abnormalities of the heart or blood vessels,
- Pulmonary artery or vein abnormalities,
- Pulmonary embolus and infarction.

The nurse must determine the source of the bleeding, as the term haemoptysis is reserved for blood coming from the respiratory tract.

In-Text Question

List the major sign and symptoms of respiratory disease.

In-Text Answer

The major signs and symptoms of respiratory disease are dyspnoea, cough, sputum production, chest pain, wheezing, and haemoptysis.

8.2 Past Health, Social and Family History

In addition to the presenting problem and associated symptoms, the history should also focus on the patient's health, personal, and social history, as well as the family health history. Specific questions are asked about childhood illnesses, immunizations (including the most recent influenza and pneumonia vaccinations), medical conditions, injuries, hospitalizations, surgeries, allergies, and current medication (including over-the-counter medications and herbal remedies).

Personal and social history addresses issues such as diet, exercise, sleep, recreational habits, and religion. Psychosocial factors that may affect the patient are also explored. The nurse assesses for risk factors and genetic factors that may contribute to the patient's lung condition.

Risk Factors for Respiratory Disease

- Smoking (the most important contributor to lung disease)
- Exposure to second hand smoke
- Personal or family history of lung disease

- Genetic makeup
- Exposure to allergens and environmental pollutants
- Exposure to certain recreational and occupational hazards
- Vitamin D deficiency
- Obesity
- Excessive exposure to acetaminophen prenatally and in the first 2 years of life

Summary of Study Session 8

In this study session, you have learnt the following:

1. The health history initially focuses on the patient's presenting problem and associated symptoms, with close attention to how all aspects of the patient's life, including activities of daily living and quality of life, are impacted. In conducting the history, the nurse should explore the onset, location, duration, character, aggravating and alleviating factors, radiation (if relevant), and timing of the presenting problem and associated symptoms.
2. In addition to the presenting problem and associated symptoms, the history should also focus on the patient's health, personal, and social history, as well as the family health history. Specific questions are asked about childhood illnesses, immunizations (including the most recent influenza and pneumonia vaccinations), medical conditions, injuries, hospitalizations, surgeries, allergies, and current medication (including over-the-counter medications and herbal remedies).

Self-Assessment Questions (SAQs) for Study Session 8

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 8.1

Explain 3 common symptoms of the upper respiratory tract infection

SAQ 8.2

List 6 risk factors for respiratory diseases

Note on SAQs

SAQ 8.1

The major signs and symptoms of respiratory disease are dyspnoea, cough, sputum production, chest pain, wheezing, and haemoptysis.

Cough- cough is a reflex that protects the lungs from the accumulation of secretions or the inhalation of foreign bodies. Its presence or absence can be a diagnostic clue because some disorders caused coughing and other suppress it. The cough reflex may be impaired by weakness or paralysis of the respiratory muscles, prolonged inactivity, the presence of a nasogastric tube, or depressed function of the brain's medullary centres (e.g., anaesthesia, brain disorders).

Sputum Production- sputum production is the reaction of the lungs to any constantly recurring irritant and often results from persistent coughing. It may also be associated with a nasal discharge. The nature of the sputum is often indicative of its cause. A profuse amount of purulent sputum (thick and yellow, green, or rust coloured) or a change in colour of the sputum is a common sign of a bacterial infection. Thin, mucoid sputum frequently results from viral bronchitis. Pink-tinged

mucoid sputum suggests a lung tumour. Profuse, frothy, pink material, often welling up into the throat, may indicate pulmonary oedema.

Chest pain- chest pain or discomfort may be associated with pulmonary, cardiac, gastrointestinal, or musculoskeletal disease or anxiety. Chest pain associated with pulmonary conditions may be sharp, stabbing, and intermittent, or it may be dull, aching, and persistent. The pain usually is felt on the side where the pathologic process is located, although it may be referred elsewhere- for example, to the neck, back, or abdomen. Chest pain may occur with pneumonia, pulmonary infarction, or pleurisy, or as a late symptom of bronchogenic carcinoma.

SAQ 8.2

Risk Factors for Respiratory Disease

- Smoking (the most important contributor to lung disease)
- Exposure to second hand smoke
- Personal or family history of lung disease
- Genetic makeup
- Exposure to allergens and environmental pollutants
- Exposure to certain recreational and occupational hazards

References

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

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Study Session 9: Upper Airway Infections

Introduction

Many upper airway disorders are relatively minor and their effects are limited to mild and temporary discomfort and inconvenience for the patient. However, other upper airway disorders are acute, severe, and life-threatening and may require permanent alterations in breathing and speaking. Thus, the nurse must have good assessment skills, an understanding of the wide variety of disorders that may affect the upper airway, and an awareness of the impact of these alterations on patients. In this study session, you will be learning about the different types of infections of the upper airways, nursing interventions on those diseases and tracheostomy.

Learning Outcome for Study Session 9

At the end of this study session, you should be able to:

9.1 Highlight the different upper respiratory tract infections

9.2 Explain the Nursing Process involve with a Patient with Upper Airway Infections

9.3 Discuss Tracheostomy

9.1 Upper Airway Infections

Upper airway infections are common conditions that affect most people on occasions. Some infections are acute, with symptoms that last several

days; others are chronic, with symptoms that last a long time or recur. Patients with these conditions seldom require hospitalization.

However, nurses working in community settings or long-term care facilities may encounter patients who have these infections. Thus, it is important for nurses to recognize the signs and symptoms and to provide appropriate care.

9.1.1 Common cold

The phrase "common cold" often is used when referring to symptoms of an upper respiratory tract infection characterized by nasal congestion, sore throat, and cough. The term *cold* refers to an afebrile, infectious, acute inflammation of the mucous membranes of the nasal cavity.

More broadly, the term refers to an acute upper respiratory tract infection; terms such as *rhinitis, pharyngitis, laryngitis,* and *chest cold* distinguish the sites of the major symptoms. Colds are highly contagious because patients shed virus for about 2days before the symptoms appear and during the first part of asymptomatic phase.

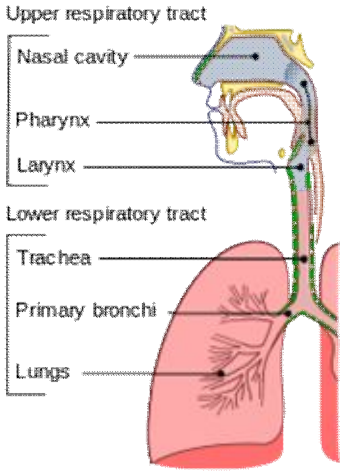

Figure 9.1: The common cold is a disease of the upper respiratory tract
Source: http://en.wikipedia.org/wiki/Common_cold

Nursing management

Because most cold viruses are self-treated by patients at home and others are treated incidentally in long-term or acute care facilities, nursing management consists primarily of patient education.

TEACHING PATIENTS SELF-CARE

Most viruses are transmitted by hand-to-hand contact. It is important to teach the patient and the patient's family how to break the chain of infection. Hand washing remains the most effective preventive measures to reduce the transmission of organisms. The nurse teaches measures to prevent the common cold and methods to treat symptoms and prevent complications such as superinfection, bronchitis, and pneumonia.

In-Text Question

How many days does the patient with cold shed the virus before the appearance of the symptoms

In-Text Answer

The patient will shed it for two days.

9.1.2 Acute Sinusitis

The sinuses are involved in a high proportion of upper respiratory tract infections. If their openings into the nasal passages are clear, the infections resolve promptly. However, if their drainage is obstructed by a deviated septum or by hypertrophied turbinate's spurs, nasal polyps, or tumours, sinus infections may persist as a smouldering secondary infection or progress to an acute suppurative process (causing purulent discharge).

Nursing Management

TEACHING PATIENTS SELF-CARE

Patient teaching about self-care is an important aspect of nursing care for the patient with acute sinusitis. The nurse instructs the patient about methods to promote sinus drainage such as inhaling steam (steam bath, hot shower, and facial sauna), increasing fluid intake, and applying local heat (hot wet packs). The nurse also informs the patient about the side effect of nasal decongestant sprays and about rebound congestion.

The nurse stresses the importance of following the recommended medication regimen because a consistent level is critical to treat the infection. The nurse teaches the patient the early signs of a sinus infection and recommends preventive measures, such as following healthy practices and avoiding contact with people who have upper respiratory infections.

The nurse should explain to the patient that fever, severe headache, and nuchal rigidity are signs of potential complications.

9.1.3 Chronic sinusitis

Chronic sinusitis is an inflammation of the sinuses that persists for more than 8weeks in an adult or 2weeks in a child.

Nursing Management

Because care measures for sinusitis are performed primarily by the patient at home, nursing management consists mainly of patient teaching

TEACHING PATIENTS SELF-CARE

The nurse should teach the patient to promote sinus drainage by increasing the environmental humidity (steam bath, hot shower, and facial sauna), increasing fluid intake, and applying local heat (hot wet packs). The nurse also instructs the patient about the ways to prevent a sinus infection and how to recognize the early signs and symptoms.

9.1.4 Rhinitis

Rhinitis is an inflammation of the mucous membrane of the nose. It may be classified as infectious, allergic, or non-allergic. Rhinitis may be an acute or chronic condition

Nursing Management

TEACHING PATIENTS SELF-CARE

The nurse instructs the patient with allergic rhinitis to avoid or reduce exposure to allergens and irritants, such as dust, moulds, animals, fumes, odours, powders, sprays, and tobacco smoke. The importance of controlling the environment at home and work is also explained. The nurse instructs the patient in the proper use of and technique for administering these types of medications.

9.1.5 Acute pharyngitis

Acute pharyngitis, a febrile inflammation of the throat, is caused by a virus about 70% of the time. When Group A streptococci cause the infection, the condition is referred to as strep throat. Group A streptococci are the most common bacterial organisms associated with acute pharyngitis.

Nursing Management

The nurse instructs the patient to stay in bed during the febrile stage of illness, to rest frequently once out of bed, and to dispose of tissues properly to prevent spreading the infection. It is important to examine the skin once or twice daily for possible rash because acute pharyngitis may precede some other communicable disease.

The nurse encourages proper mouth care, which may increase the patient's comfort and prevent the development of lip fissures (cracking) and oral inflammation when bacterial infection is present. The nurse instructs the patient to resume activity gradually. The nurse instructs the patient or the family about the importance of taking the full course of therapy and about additional symptoms that indicate possible complications.

9.1.6 Chronic pharyngitis

Chronic pharyngitis is common in adults who work or live in dusty surroundings, use the voice to excess, suffer from chronic cough, and habitually use alcohol and tobacco.

Three types of chronic pharyngitis are recognized:

- Hyper-trophic: characterized by general thickening and congestion of the pharyngeal mucous membrane
- Atrophic: probably a late stage of the first type (the membrane is thin, whitish, glistening, and at times wrinkled)

□ Chronic granular ("clergyman's sore throat"): characterized by numerous swollen lymph follicles on the pharyngeal wall

Nursing Management

TEACHING PATIENTS SELF-CARE

To prevent the infection from spreading, the nurse instructs the patient to avoid contact with others until the fever subsides. Alcohol, tobacco, second-hand smoke, and exposure to cold are avoided, as are environmental or occupational pollutants if possible.

The nurse encourages the patient to drink plenty of fluids. Gargling with warm saline solutions may relieve throat discomfort, and lozenges keep the throat moistened.

In-Text Question

Give four examples of upper respiratory tract infection

In-Text Answer

Common cold, rhinitis, pharyngitis, sinusitis

9.2 Nursing Process: The Patient with Upper Airway Infection

Assessment

A health history reveals possible signs and symptoms of headache, sore throat, pain around the eyes and on either side of the nose, difficulty swallowing, cough, hoarseness, fever, stuffiness, and generalized discomfort and fatigue. Determining when the symptoms began, what precipitated them, and what aggravated them is part of the assessment. It is also important to determine any history of allergy or the existence of a concomitant illness.

Inspection may reveal swelling, lesions, or asymmetry of the nose as

well as bleeding or discharge. The nurse inspects the nasal mucosa for abnormal findings such as redness, swelling, or exudates and nasal polyps, which may develop in chronic rhinitis.

Diagnosis

Nursing Diagnoses

Based on all the assessment data, the patient's major nursing diagnoses may include the following:

- Ineffective airway clearance related to excessive secretions secondary to inflammation
- Pain related to upper airway irritation secondary to an infection
- Impaired verbal communication related to upper airway irritation secondary to infection or swelling
- Fluid volume deficit related to increased fluid loss secondary to diaphoresis associated with a fever
- Knowledge deficit regarding prevention of upper respiratory infection, treatment regimen, surgical procedure, or postoperative care

Collaborative problems/potential complications

Based on assessment data, potential complications may include:

- Sepsis
- Peritonsillar abscess
- Otitis media
- Sinusitis

Planning and Goals

The major goals for the patient may include maintenance of a patent airway, relief of pain, maintenance of effective means of communication, absence of fluid volume deficit, knowledge of how to prevent upper

airway infections, and absence of complications.

In-Text Question

List the potential complication of upper respiratory tract infection

In-Text Answer

- Sepsis
- Peritonsillar abscess
- Otitis media
- Sinusitis

9.2.1 Nursing Interventions

Maintaining a patent airway

An accumulation of secretions can block the airway in patients with an upper airway infection. As a result, changes in the respiratory patter occur, and the work of breathing required to get beyond the blockage increases. The nurse can implement several measures to loosen thick secretions or to keep the secretions moist so that they can be easily expectorated. Increasing fluid intake helps thin the mucus.

Humidifying the environment with room vaporizer or inhaling steam also loosens secretions and reduces inflammation of the mucous membranes. To enhance drainage from the sinuses, the nurse instructs the patient about the best position to assume; this depends on the location of the infection or inflammation. In some conditions, topical or systemic medications, when prescribed, help to relieve nasal or throat congestion.

Promoting comfort

Upper respiratory tract infections usually produce localized discomfort.

In sinusitis, pain may occur in the area of the sinuses or may produce a general headache. In pharyngitis, laryngitis, or tonsillitis, a sore throat occurs. The nurse encourages the patient to take analgesics, such as acetaminophen with codeine, as prescribed, which will help relieve this discomfort.

Other helpful measures include topical anaesthetics for symptomatic relief of herpes simplex blisters, and sore throats, hot packs to relieve the congestion of sinusitis and promote drainage, and warm water gargles or irrigations to relieve the pain of a sore throat.

The nurse encourages rest to relieve the generalized discomfort and fever that accompany many upper airway conditions (especially rhinitis, pharyngitis, and laryngitis). The nurse instructs the patient in general hygiene techniques to prevent the spread of infection.

Promoting communication

Upper airway infections may result in hoarseness or loss of speech. The nurse instructs the patient to refrain from speaking as much as possible and to communicate in writing instead, if possible. Additional strain on the vocal cords may delay return of the full voice.

Encouraging fluid intake

In upper airway infection, the work of breathing and the respiratory rate increase as inflammation and secretion develop. This in turn, may increase insensible fluid loss. Fever further increases the metabolic rate, diaphoresis, and increased fluid loss.

Sore throat, malaise, and fever may interfere with a patient's willingness to eat. The nurse encourages the patient to drink 2 to 3L of fluid per day during the acute stage of airway infection, unless contraindicated, to thin secretions and promote drainage. Liquids (hot or cold) may be soothing, depending on the illness.

Promoting home and community-based care

TEACHING PATIENTS SELF-CARE

Prevention of most upper airway infections is difficult because of the many potential causes. However, most upper respiratory infections are transmitted by hand-to-hand contact. Therefore, it is important to teach the patient and family how to minimize spread of infection to others. The nurse advises the patient to avoid exposure to others at risk for serious illness if respiratory infection is transmitted.

Those at risk include elderly adults, immunosuppressed people, and those with chronic health problems.

The nurse teaches patients and their families strategies to relieve symptoms of upper respiratory infections. These include increasing the humidity level, encouraging adequate fluid intake, getting adequate rest, using warm water gargles or irrigations and topical anaesthetics to relieve sore throat, and applying hot packs to relieve congestion. The nurse reinforces the need to complete the treatment regimen, particularly when antibiotics are prescribed.

CONTINUING CARE

Referral for home care is rare. However, it may be indicated for the person whose health status was compromised before the onset of the respiratory infection and for those who cannot manage self-care without assistance. In such circumstances, the home care nurse assesses the patient's respiratory status and progress in recovery.

The nurse may advise elderly patients and those who would be at increased risk from a respiratory infection to consider an annual influenza vaccine. A follow-up appointment with the primary care provider may be indicated for patients with compromised health status to ensure that the respiratory infection has resolved.

9.2.2 Evaluation

Expected Outcomes

Expected outcomes may include:

1. . Maintains a patent airway by managing secretions
   a. Reports decreased congestion
   b. Assumes best position to facilitate drainage of secretions
2. Reports feeling more comfortable
   a. Follows comfort measures: analgesics, hot packs, gargles, rest
   b. Demonstrates adequate oral hygiene
3. Demonstrates ability to communicate needs, wants, level of comfort
4. Maintains adequate fluid intake
5. Identifies strategies to prevent upper airway infections and allergic reactions
6. Demonstrates an adequate level of knowledge and performs self-care adequately
7. Becomes free of signs and symptoms of infection
   a. a. Exhibits normal vital signs (temperature, pulse, respiratory rate)
   b. b. Absence of purulent discharge
   c. c. Free of pain in ears, sinuses, and throat

Activity 9.1

Time allowed: 1 hour

Use the nursing process to assess any patient of your choice with upper respiratory tract infection and draw the nursing care plan for the patient.

9.3 Tracheostomy

The term tracheostomy refers to the formation of a surgical opening in the trachea. It refers strictly to a temporary procedure. Tracheostomy on the other hand refers to the creation of a permanent stoma between the trachea and the cervical skin. The two terms are however in common use and are interchangeable.

History

Tracheostomies have been performed since ancient times and the first known reference can be found in Rig Veda, the sacred Hindu scripture which dates back to 2000 BC. In 1620 Habicot published the first book on tracheostomies. In the 1800s tracheostomy gained in popularity, as it became a recognized way of treating patients with Diphtheria. At the time there were two ways of performing a tracheostomy.

The first was the 'high' method in which the trachea was entered through the larynx, usually dividing the cricoid cartilage. The second way was the 'low' tracheostomy in which the trachea was entered directly. This was felt to be very difficult and there was a taboo about dividing the thyroid gland in order to gain access to the trachea.

Tracheostomies therefore tended to be performed by the 'high' method. There were significant problems associated with this method especially laryngeal stenosis and a high mortality rate.

Chevalier Jackson in 1923 published his work on tracheostomies and was the first person to recognize that dividing the cricoid cartilage during a 'high' tracheostomy leads to stenosis.

The modern practice of placing the tracheostomy below the first tracheal ring significantly reduced these complications and it was largely due to Jackson's teachings that the mortality rate dropped from 25% to 1-2% and the incidence of stenosis, particularly in children, decreased.

Indications for Tracheostomy

Diphtheria is now largely a historical disease but the indications for tracheostomy continue to evolve. The indications fall into five broad categories, with some overlap between them:

1. Mechanical obstruction of the upper airways.
2. Protection of tracheobronchial tree in patients at risk of aspiration.
3. Respiratory failure.
4. Retention of bronchial secretions.
5. Elective tracheostomy, e.g. during major head and neck surgery a tracheostomy can provide/improve surgical access and facilitate ventilation. Examples of each category can be found

Activity 9.2

Time allowed: 1 hour

Read more about the types of tracheostomy and its nursing care.

Benefits of A Tracheostomy

Patients with tracheostomies tend to have fewer days of mechanical ventilation because of the improvements in the respiratory physiology, as alluded to earlier. This is especially true in trauma patients. They have a lower risk of laryngotracheal injury than patients with ET tubes, largely because of anatomical factors.

They have improved secretion clearance as suction is easy and less strength is required for expectoration. This may be linked to the lower incidence of pneumonia and respiratory infections seen, especially in trauma victims.

The airway is more secure than with an ET tube, particularly if the patient is transported to other parts of the hospital (e.g. X-ray or theatres) or not sedated and therefore able to move about in bed. Less sedation is required as the tube is more comfortable than an ET tube.

The patients may also be able to swallow, so may be started on oral

feeding sooner and mouth care is easier compared with an ET tube. The most significant benefit from a patient's point of view is that they can communicate more easily, either by articulating or mouthing words or by using a speaking valve and/or fenestrated tube

Table 9.1: Complications of Tracheostomy

Stage	Complication
Intra-operative	Haemorrhage
	Airway fire
	Injury to trachea and larynx
	Injury to paratracheal structures
	Air embolism
	Apnoea
	Cardiac arrest
Early post-operative	subcutaneous emphysema
	Pneumothorax/pneumomediastinum
	Tube displacement
	Tube blockage (crusts)
	Wound infection
	Tracheal necrosis
	Secondary haemorrhage
	Swallowing problems
Late post-operative	Haemorrhage

	Granuloma formation
	Tracheo-oesophageal fistula
	Difficult decannulation
	Tracheocutaneous fistula
	Laryngotracheal stenosis and Tracheostomy scar

Summary of Study Session 9

In this study session, you have learnt the following:

1. Upper airway infections are common conditions that affect most people on occasions. Some infections are acute, with symptoms that last several days; others are chronic, with symptoms that last a long time or recur. Patients with these conditions seldom require hospitalization. However, nurses working in community settings or long-term care facilities may encounter patients who have these infections. Thus, it is important for nurses to recognize the signs and symptoms and to provide appropriate care.
2. A health history reveals possible signs and symptoms of headache, sore throat, pain around the eyes and on either side of the nose, difficulty swallowing, cough, hoarseness, fever, stuffiness, and generalized discomfort and fatigue. Determining when the symptoms began, what precipitated them, and what aggravated them is part of the assessment. It is also important to determine any history of allergy or the existence of a concomitant illness.
3. The term tracheostomy refers to the formation of a surgical opening in the trachea. It refers strictly to a temporary procedure. Tracheostomy on the other hand refers to the creation

of a permanent stoma between the trachea and the cervical skin. The two terms are however in common use and are interchangeable.

4. Self-Assessment Questions (SAQs) for Study Session 9
5. Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 9.1

Write short note on Common cold and Rhinitis

SAQ 9.2

Explain the nursing diagnoses for a patient with upper airway disorders

SAQ 9.3

List the indications for tracheostomy

Note on SAQs

SAQ 9.1

Common cold: The phrase "common cold" often is used when referring to symptoms of an upper respiratory tract infection characterized by nasal congestion, sore throat, and cough. The term *cold* refers to an afebrile, infectious, acute inflammation of the mucous membranes of the nasal cavity. More broadly, the term refers to an acute upper respiratory tract infection; terms such as *rhinitis, pharyngitis, laryngitis,* and *chest cold.*

Rhinitis: Rhinitis is an inflammation of the mucous membrane of the nose. It may be classified as infectious, allergic, or non-allergic. Rhinitis may be an acute or chronic condition and the nursing management

involve educating the patient to avoid or reduce exposure to allergens and irritants, such as dust, moulds, animals, fumes, odours, powders, sprays, and tobacco smoke. The importance of controlling the environment at home and work is also explained. The nurse instructs the patient in the proper use of and technique for administering these types of medications.

SAQ 9.2

Based on all the assessment data, the patient's major nursing diagnoses may include the following:

- Ineffective airway clearance related to excessive secretions secondary to inflammation
- Pain related to upper airway irritation secondary to an infection
- Impaired verbal communication related to upper airway irritation secondary to infection or swelling
- Fluid volume deficit related to increased fluid loss secondary to diaphoresis associated with a fever
- Knowledge deficit regarding prevention of upper respiratory infection, treatment regimen, surgical procedure, or postoperative care

SAQ 9.3

The indications fall into five broad categories, with some overlap between them:

1. Mechanical obstruction of the upper airways.
2. Protection of tracheobronchial tree in patients at risk of aspiration.
3. Respiratory failure.
4. Retention of bronchial secretions.
5. Elective tracheostomy.

References

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

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Study Session 10: Lower Respiratory Tract Infections

Introduction

Conditions affecting the lower respiratory tract range from acute problems to long-term chronic disorders. Many of these disorders are serious and often life-threatening. The patient with a lower respiratory tract disorder requires care from nurses with astute assessment and clinical management skills as well as an understanding of the impact of the disorder on the patient's quality of life and ability to carry out usual activities of daily living.

In this study session, you will be learning about the anatomy of the lower respiratory tract and diseases of the lower respiratory tract.

Learning Outcome for Study Session 10

At the end of this study session, you should be able to:

10.1 Further Explain the Anatomy of the Lower Respiratory Tract

10.2 Discuss the Diseases of the Lower Respiratory Tract

10.1 Review of the Lower Respiratory Tract Anatomy

The lower respiratory tract consist of: bronchi, bronchioles, alveolar ducts and alveoli. All structures are within the lung tissue, except the main stem bronchi (right and left). The right lung is divided into 3 lobes (upper, middle, lower). Left lung divided into 2: (Upper and lower)

Once air passes the *carina,* it is in the lower respiratory tract. The carina is the point at which the trachea bifurcates into right and left mainstream bronchi. (At the manubriosternal junction or the angle of Louis).

The right bronchus is shorter and wider than the left. The mainstream bronchi subdivide several times to form the lobar, segmental and sub segmental bronchi. Further divisions form the bronchioles. The most distant bronchioles as the respiratory bronchioles.

Alveolar ducts and sacs lie beyond the respiratory bronchioles. The bronchioles are encircled with smooth muscles; these muscles constrict and dilate in response to various stimuli. A decrease and increase in diameter of the airway (bronchoconstriction and bronchodilation) are caused by contraction or relaxation of the muscles.

In-Text Question

What structure ends the upper respiratory tract?

In-Text Answer

Carina

10.1.1 Exchange of Gases

No exchange of gases occurs until air enters the respiratory bronchioles.

Anatomic dead space (VD): Area of the respiratory tract from the nose to the respiratory bronchioles

Conducting pathway: trachea, bronchi, segmental and sub-segmental bronchi

The anatomic dead space must be filled with every breath. However, the air that fills it is not available for gas exchange. Normal **tidal volume** in adult is about 500mls, of each tidal volume (500mls), 150 is VD.

During shallow breathing (post operatively, asthmatic attacks), sufficient air (>150ml/breath) may not be moving, resulting in hypoxemia. After moving through the VD, air reaches the respiratory bronchioles and alveoli. Alveoli (Small sacs) are the functional units of the lungs.

Alveoli are interconnected by pores of Kohn which allows movement of air from alveolus to alveolus. There are 300 million alveoli in the adult. Total volume is 2500ml. Surface area for gas exchange: about the size of a tennis court.

The alveolar-capillary membrane: very thin, < 1/5000 of an inch or 5μm. It is the site of gas exchange. Gas exchange is reduced in pulmonary oedema (excess fluid fills the interstitial space and alveoli).

10.1.2 Surfactant

The lung can be conceptualized as a collection of 300million bubbles (alveoli), each 0.3mm in diameter. Naturally the alveoli have a tendency to collapse. The alveolar surface is composed of cells that provide structure and secrete surfactant.

Surfactant is a lipoprotein that reduces the surface tension in the alveoli. It reduces the tendency of alveolar collapse. Secretion of surfactant is stimulated by the stretching of the alveolar during a *sigh* breath. (Sigh is a slightly larger breath after every 5-6 breaths)

10.2 Diseases of the Lower Respiratory Tract

Lower respiratory tract infections are the most common causes of death in the world. Chronic lower respiratory diseases are the 4th leading cause of death in the US. Pneumonia ranks the 7th leading cause of death despite availability of antimicrobials. TB (though curable and preventable) is a public health threat globally.

10.2.1 Acute Bronchitis

Inflammation of the bronchi due to an infection. Occurs commonly as a consequence of upper respiratory tract infections. A potentially serious problem that can lead to respiratory failure.

Common causes-

Viral infections: rhinovirus, influenza;

Bacterial infections: *Streptococci pnuemoniae, Haemophilus influenza* (common in smokers), in non-smokers: *Mycoplasma pneumoniae, Chlamydia pneumoniae*

Symptoms: persistent cough following an acute URTI e.g. rhinitis, pharyngitis. Cough is accompanied by clear, mucoid sputum, sometimes purulent sputum.

Other symptoms: fever, headache malaise, shortness of breath on exertion.

On physical examination: mildly elevated temperature, pulse and respiration with either normal breath sounds or bronchi and expiratory wheezing.

On X-ray: No evidence of consolidations or infiltration. (Infiltration and consolidation are common in Pneumonia).

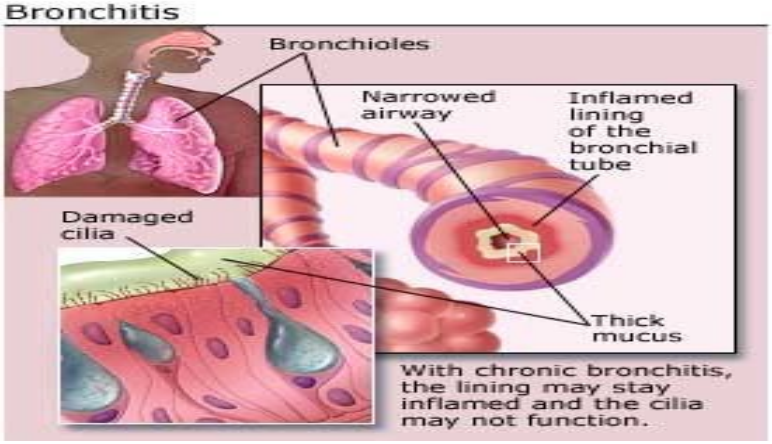

Figure 10.1: Acute Bronchitis

Source: Webmd, 2001

Treatment: Usually supportive as condition is self-limiting, Fluids, rest, anti-inflammatory agents, cough suppressants or bronchodilators may be prescribed for nocturnal and symptomatic cough.

10.2.2 Pneumonia

Acute inflammation of the lung parenchyma. It is the 7th leading cause of death in the US.

Aetiology: a break in the normal or defective respiratory defense mechanism.

Normal defense mechanism: Filtration of the air, warming, humidification of inspired air, closure of the epiglottis over the trachea, cough reflex, mucocilliary escalator mechanism, secretion of immunoglobulin A,

alveolar macrophages.

Other predisposing factors: when the body is overwhelmed by the quantity of infectious agents; decrease consciousness: depressing the cough and epiglottal reflexes, allowing aspiration of oropharyngeal content; tracheal intubation: interferes with normal cough reflex and the mucocilliary escalator mechanism, tracheal intubation bypasses the upper airways, where filtration and humidification of air occurs normally.

Mucocilliary mechanism is impaired by: air pollution, cigarette smoking, viral upper respiratory tract infections, and normal changes of aging.

Malnutrition: altered functions of the leucocytes and polymophonuclear (PMN) leucocytes

Diseases: leukaemia, alcoholism, diabetes mellitus are associated with increased frequency of gram -ve bacilli on the oropharynx

Summary of Predisposing Causes

- Aging, air pollution, altered consciousness (alcoholism, head injury, drug overdose, bed rest and prolonged immobility,
- Chronic diseases: chronic lung disease, DM,HD, cancer, end-stage renal disease
- HIV infection, immune-suppressive drugs (steroids, cancer chemotherapy)
- Inhalation or aspiration of noxious substances
- Malnutrition, smoking,
- Tracheal intubation (endotracheal intubation, tracheostomy
- Upper respiratory tract infection.

Causative organisms/Mode of entry

The organisms that cause pneumonia reach the lungs by 3 methods:

- Aspiration from the nasopharynx or oropharynx
- Inhalation of microbes from the air. Example mycoplasma pneumoniae and fungal pneumonias
- Haematogenous spread: from a primary infection elsewhere in the body: example *Staphylococcus aureus*

Types of pneumonia

- Community Acquired Pneumonia.
- Hospital acquired pneumonia.

Community acquired pneumonia (CAP): onset in the community OR first 48hrs of hospital admission. Number of cases increases during the winter. Smoking is an important risk factor. Common causative organism: *S. pneumonia* (35% of cases), *Haemophilus influenza, S. aureus.*

Management- Once a patient is diagnosed with CAP, a 3-step approach identifies where the patient is treated:

Step 1: Assess ability to treat at home: evaluate co-morbidities, hemodynamic stability.

Step 2: Calculate patient's pneumonia severity index (PSI). The risk level determines location of treatment either as inpatient or outpatient.

Clinician judgment regarding location of treatment.

Medication- Treatment is 'door to dose' that is must be commenced within 4hrs of arrival in the hospital.

First line: Macrolides: erythromycin, azithromycin (zithromax), clarithromycin, and doxycycline. If co-morbidities are present: a β-lactam antibiotics (amoxycillin, augmentin) may be added. Once specific organism is identified, then antibiotics should be pathogen- specific

Recommendations for discharge- During 24hrs prior to discharge, patient should have not more than one of the following: Temp: 37.8, pulse >100beats /min, resp > 24 breathes/ mins, systolic pressure < 90mm/Hg, oxygen saturation in arterial blood by pulse oximetry (SpO_2) < 90%, inability to maintain oral intake.

Hospital acquired pneumonia- Occurs 48hrs or longer after admission and not incubating at the time of admission.

- Ventilator- Associated (VAP): Pneumonia that occurs more than 48 -72hrs after endotracheal intubation.
- Health care-associated pneumonia(HCAP): Includes patients in the following categories:

Hospitalized in an acute care setting for 2 or more days within 90 days of infection, resided in a long term care facility, received recent intravenous antibiotic therapy OR attended a hospital or haemodialysis clinic.

Incidence- Estimate rate of HAP is 5 to 15 cases per 1000 hospital admissions. Rate increases by 6 to 20 times in pts requiring mechanical ventilation. HAP is the second most common nosocomial infections (second only to UTI)

Causative organism- Organism responsible for HAP, VAP, and HCAP are usually bacterial and rarely fungal or viral. Examples: pseudomonas aeruginosa, Enterobacter, Escherichia coli, Klebsiella, *Staph. aureus*, *Streptococcus pneumoniae*, oral anaerobes.

Risk factors- Many of the orgs enter the lungs after aspiration of particles from the patients; own oropharynx, immunosuppressive therapy, general debility, endotracheal intubation, contaminated health care devices are sources of pathogens

Classification based on cause- Fungal pneumonia: caused by pulmonary fungal infection

Aspiration Pneumonia: Following aspiration of substances into the lower airway

Opportunistic pneumonia: As a complication of immunosuppressive conditions. Common in individuals with: protein-calorie malnutrition

Immune deficiencies: those who have received transplant and been treated with immunosuppressive drugs, prolonged radiation therapy and chemotherapy.

In-Text Question

Two types of pneumonia are?

In-Text Answer

Community acquired pneumonia and hospital acquired pneumonia

Pathophysiology of Pneumonia

Pneumococcal pneumonia is the commonest cause of bacterial pneumonia (*caused by the Streptococus pneumonia. Also called pneumococcus.* It can affect the upper respiratory tract, the blood and the nervous system. Organism is usually found in the nose and throat.

Four Stages of Disease Process

1. Congestion: After the organism reaches the alveoli, there is an outpouring of fluid into the alveoli. The organisms multiply in the serous fluid and the infection spreads. The pneumococci damage the host by their overwhelming growth and by interfering with lung function.
2. Red hepatisation: There is massive dilation of the capillaries. Alveoli are filled with orgs, neutrophil, RBC and fibrin. The lungs appear red and granular, like the liver thus the process is called hepatisation.
3. Grey Hepatisation: Decreased blood flow, with leukocytes and fibrin consolidation in the affected lung.

4. Resolution of infection: Without complications, complete resolution and healing occurs. The exudates become lysed and is processed by the macrophages. Normal lung tissue and function is restored.

Clinical manifestations- Sudden onset of symptoms; fever, chills, shortness of breath, cough (productive of purulent sputum); rust coloured sputum can be seen in pneumococcal infection; pleuritic chest (in some cases); confusion and stupor in elderly and debilitated patients.

On physical examination- Signs of pulmonary consolidation, such as dullness to percussion, increased fremitus (vibration of the chest wall produced by vocalization. Increased fremitus occurs when the lung is filled with fluid or more dense), bronchial breath sound and crackles.

Complications- Complications develop commonly in individuals with co-morbidities. Otherwise pneumonia often runs an uncomplicated course.

- Pleurisy: inflammation of the pleura.
- Pleural effusion: transudate of fluid in the pleural space. Develops in 40% of hospitalized patients with pneumonia. Usually effusion is sterile is reabsorbed in 1-2wks. Occasionally aspiration by thoracentesis may be required.
- Atelectasis: Collapsed airless alveoli of one or part of one lobe may occur. Ares usually clear with effective coughing and deep breathing.
- Bacteraemia: Occurs in 30% of cases with pneumococcal pneumonia and is associated with 20% mortality rate.
- Lung abscess: seen with P. caused *by Staph. aureus* and gram -ve pneumonias
- Emphysema: Accumulation of purulent exudate in the plural cavity.

Requires drainage by chest tube or open surgical drainage.

- Pericarditis: from spread of the infecting org from an infected pleura via haematogenous route to the pericardium
- Meningitis: A person with pneumonia, who disoriented, confused or somnolent should have a lumbar puncture to rule out meningitis.
- Endocarditis. Can occur when org attack endocardium and the valves.

Diagnostic studies-

History: physical examination; Chest X-ray: (invaluable in the diagnosis of pneumonia). Lobar or segmental consolidation suggests a bacterial cause, usually S. pneumonia or kliebsiella; diffuse pulmonary infiltrates most commonly caused by viral infection: legionella or pathogenic fungi.

Cavitary shadows suggest the presence of necrotizing infection with destruction of lung tissue, caused by *S. aureus,* gram -ve bacteria, *M. tuberculosis.* Lower respiratory tract sputum for culture before antibiotic therapy. Sputum should be sent for culture as soon as it is collected.

Pulse oximetry: may show oxygen desaturation

Arterial blood gases: May reveal hypoxemia (PaO_2 < 80mmHg, hypercapnia (partial pressure of CO2 in arterial blood ($PaCO_2$) >45mmHg, and acidosis.

Leucocytosis is present in majority of pts with pneumonia, WBC count > 15000/µl (15x 109/L with the presence of bands (immature neutrophils)

In-Text Question

List 5 complications of pneumonia

In-Text Answer

- Pleurisy
- Pleural effusion
- Atelectasis
- Bacteraemia
- Lung abscess

Management- prompt treatment with antibiotics almost always cures bacterial and mycoplasma pneumonia, patient responds to drugs within 48-72hrs if no complications occur.

Supportive measures: Oxygen therapy for hypoxaemia. Analgesics to relief chest pain

Antipyretic (Aspirin or acetaminophen) for elevated temperature, encouraged bed rest during acute illness, nutritional therapy: small frequent meals are better tolerated by the dyspnoeic patient, fluid intake of at least 3L /day is important in the supportive treatment (Note : if patient has heart failure, fluid intake should be individualized).

Health promotion activities- Good health habits such as proper diets and hygiene, adequate rest, and regular exercises can maintain natural resistance to infecting organism. Prompt treatment of URI with supportive measures (rest, fluids). If symptoms persist for 7days, medical treatment should be encouraged.

In hospitalized patients, identify patients at risk for pneumonia and take measure to prevent the development; pt with altered consciousness should be placed in appropriate positions: side-lying, upright that will prevent or minimize risk of aspiration; patients should be turned and repositioned at least 2 hourly to facilitate adequate lung expansion and to discourage pooling of secretions.

In VAP, reduction in pneumonia is achieved when pts are placed in semi-recumbent position (45degrees). The American Thoracic Society (ATS) recommends that intubated pts be in semi-recumbent position (30-45 degrees), particularly during enteral feeding.

In intubated patients, the ATS also recommends continuous aspiration of the subglottic secretions above the tracheal tube cuff using a specially designed endotracheal tube to prevent the risk of VAP. For tube feeding, oral tube is preferred to nasal tubes to prevent nosocomial sinusitis (ATS recommendations), the patient who has difficulty in swallowing, (stroke pt) needs assistance in eating, drinking, and taking medication to prevent aspiration.

Surgical pts and mobility compromised pts need turning and deep breathing exercises at frequent intervals. Avoid overmedication with opioids or sedatives, which can depress cough reflex and accumulation of fluid in the lungs

The gag reflex should be present in the person who has had anaesthesia before administration of fluids or foods. Strict medical asepsis and adherence to infection control guidelines should be practiced to reduce nosocomial infections. Hand washing by staff before and after care should be encouraged

Strict sterile aseptic technique should be used when suctioning the trachea of a patient. Caution is required when handling ventilator circuits, tracheostomy tubing, and nebulizer circuits that can become contaminated from pt ‘s secretions.

Note (*respiratory devices can harbour Microorganisms and have been associated with pneumonia outbreaks).*

Obstructive Pulmonary Diseases

- Asthma
- Chronic obstructive pulmonary diseases: Chronic bronchitis,

emphysema

- Cystic fibrosis: a genetic disorder

10.2.3 Asthma

A chronic inflammatory disorder of the airways. Chronic inflammations causes hyper- responsiveness in the airway resulting in recurrent episodes of wheezing, breathlessness, tightness in the chest, cough especially at night and early morning.

Definition and Overview

Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with an increase in airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning.

These episodes are usually associated with widespread, but variable airflow obstruction within the lung that is often reversible either spontaneously or with treatment.

Pathophysiology

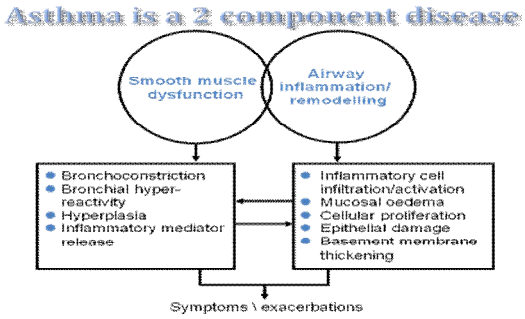

Figure 10.2: Component of Asthma

Ongoing (or untreated) inflammation may cause airway remodelling and irreversible structural changes

Characteristic structural changes occur as a result of the inflammatory

process of the airways, followed by healing, whose end result may be an altered structure referred to as airway remodelling.

This results in an increased resistance to airflow, particularly when there is bronchial contraction and bronchial hyper-responsiveness. The presence of increased mucous secretion and inflammatory exudates, not only blocks the airway passages but causes an increased surface tension favouring airway closure

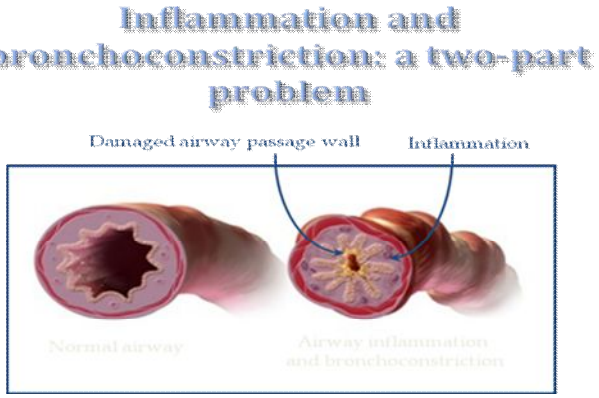

Figure 10.3: Inflammation and Constriction

Chronic inflammation is associated with airway hyper-responsiveness (AHR)

AHR is defined as the ability of the airways to narrow too easily and by too much in response to provoking stimuli, leading to: recurrent episodes of wheezing, breathlessness, chest tightness and coughing. Airway narrowing leads to variable airflow limitation and intermittent symptoms, airway remodelling is even apparent in children with mild, intermittent asthma, inhaled steroids prevents collagen deposition and airway remodelling

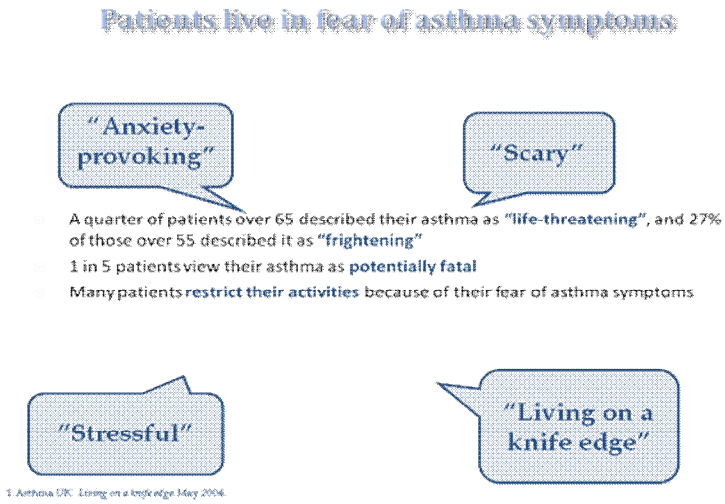

Figure 10.4: Patients with Asthma

Source: Asthma UK. Living on a knife edge. May, 2004.

Asthma- a global healthcare issue

Asthma is a worldwide problem approximately 300 million individuals are affected. Over the last 40 years there has been a sharp increase in the global prevalence, morbidity, mortality, and economic burden associated with asthma. Asthma prevalence is expected to increase by 50% every decade. There are an estimated 250,000 annual worldwide deaths from asthma

Incidence: About 20 million Americans are affected by asthma. Women have 30% greater prevalence than men, 39% higher prevalence in African Americans than the whites. The most striking increases in asthma are seen in children.

The rate of asthma increases as communities adopt western lifestyles and become urbanized. With increasing westernization, immunization against childhood diseases, improvement in hygiene and standard of living the immune system is stimulated in the direction(Th2) that would enhance the development of asthma and other allergic states rather than in "fighting" one infection or the other (Th1). The so called "hygiene hypothesis"

Reading Assignment: Hygiene Hypothesis

Triggers of Asthma-

- Allergens: In about 40% of cases. Allergic asthma maybe seasonal
- Exercise (Exercised -Induced asthma). It occurs commonly after vigorous exercise and not during the exercise.
- Air pollution: example cigarette, wood smoke, vehicular exhaust, elevate ozone level, sulphur dioxide and nitrogen dioxide
- Occupational factors: Example wood and vegetable dust (flour), pharmaceutical agents, laundry detergents, animal and insects dusts, secretions etc.
- Respiratory infections: viral or bacterial and allergy to microorganisms is the major precipitating factor of an acute attack. Infections cause inflammatory changes in the tracheobronchial system and alter the mucocilliary mechanism, thereby increasing hyper responsiveness of the bronchial system.
- Nose and sinus problems: allergic rhinitis, nasal polyps; drugs and food additives; gastrointestinal reflux disease

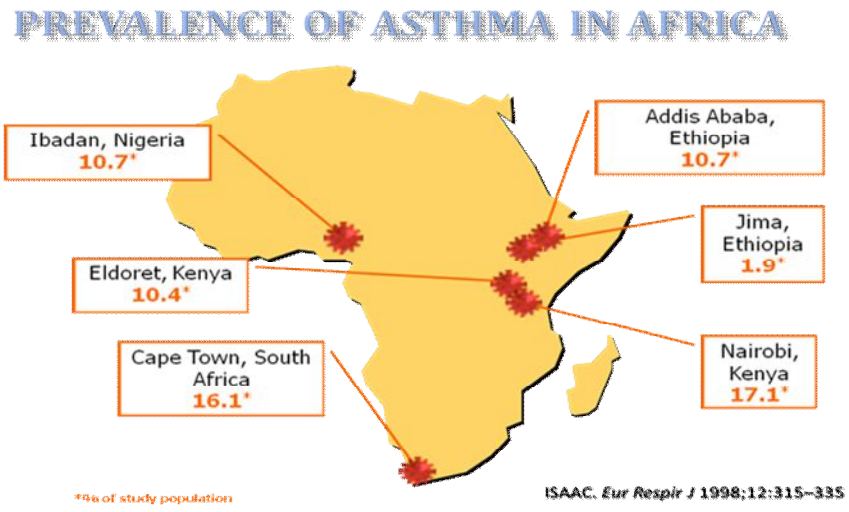

Figure 10.5: Prevalence of Asthma in Africa

Source: European respiratory journal, 1998

Table 10.1: Levels of Asthma Control

Characteristics	Controlled (all of the following)	Partly controlled (any percent in any week)	Uncontrolled
Daytime symptoms	None (2 or less/week)	More than twice/week	3 or more features of partly controlled asthma present in any week
Limitations of activities	None	Any	
Nocturnal symptoms/awakening	None	Any	
Need for rescue "reliever" treatment	None (2 or less/week)	More than twice/week	
Lung function (PEF or FEV_1)	Normal	<80% predicted or person best (if known) on any day	
Exacerbation	None	One or more/year	1 in any week

Factors That Can Contribute To Poor Asthma Control

- Low use of controller therapy
- Management guidelines not followed
- Underestimate severity and overestimate control

Goals of Long-Term Management

- Achieve and maintain control of symptoms
- Maintain normal activity levels, including exercise
- Maintain pulmonary function as close to normal levels as

possible

- Prevent asthma exacerbations
- Avoid adverse effects from asthma medications
- Prevent asthma mortality

In-Text Question

What factors triggers asthma?

In-Text Answer

- Allergens
- Exercise (Exercised -Induced asthma). It occurs commonly after vigorous exercise and not during the exercise.
- Air pollution: example cigarette, wood smoke, vehicular exhaust, elevate ozone level, sulphur dioxide and nitrogen dioxide
- Occupational factors: Example wood and vegetable dust (flour), pharmaceutical agents, laundry detergents, animal and insects dusts, secretions etc.
- Respiratory infections
- Nose and sinus problems: allergic rhinitis, nasal polyps; drugs and food addictives; gastrointestinal reflux disease

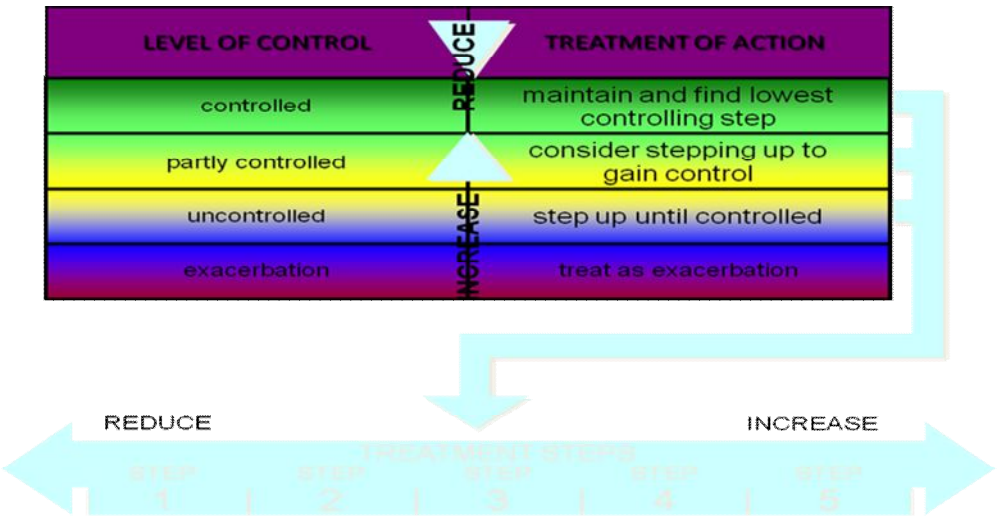

Figure 10.6: Level of Control and Treatment

Table 10.2: Assessment of Control: Symptoms

Parameter	Asthma	
	Controlled	Uncontrolled
Daytime symptoms	<4days/week	>= 4days/week
Night-time symptoms	<1 night/week	>= 1 nights/week
Physical activity	Normal	Restricted in previous 3 months
Absenteeism	None	Missed School/work or social engagement in previous 3 months
As- needed short-acting bronchodilator use	<4 doses/week	>= 4 doses/week (excluding pre-exercise)

Summary of Study Session 10

In this study session, you have learnt the following:

1. The lower respiratory tract consist of: bronchi, bronchioles, alveolar ducts and alveoli. All structures are within the lung tissue, except the main stem bronchi (right and left). The right lung is divided into 3 lobes (upper, middle, lower). Left lung divided into 2: (Upper and lower)
2. Lower respiratory tract infections are the most common causes of death in the world. Chronic lower respiratory diseases are the 4th leading cause of death in the US. Pneumonia ranks the 7th leading cause of death despite availability of antimicrobials. TB (though curable and preventable) is a public health threat globally.
3. The infections include: Asthma, Pneumonia and Acute Bronchitis

Self-Assessment Questions (SAQs) for Study Session 10

Now that you have completed this study session, you can assess how well

you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 10.1

Write short note on surfactant

SAQ 10.2

Describe the 4 stages of the pathophysiology of pneumonia

Note on SAQs

SAQ 10.1

Surfactant is a lipoprotein that reduces the surface tension in the alveoli. It reduces the tendency of alveolar collapse. Secretion of surfactant is stimulated by the stretching of the alveolar during a *sigh* breath. (Sigh is a slightly larger breath after every 5-6 breaths).

SAQ 10.2

Four stages of disease process are:

1. Congestion: After the organism reaches the alveoli, there is an outpouring of fluid into the alveoli. The organisms multiply in the serous fluid and the infection spreads. The pneumococci damage the host by their overwhelming growth and by interfering with lung function.
2. Red hepatization: There is massive dilation of the capillaries. Alveoli are filled with orgs, neutrophil, RBC and fibrin. The lungs appear red and granular, like the liver thus the process is

called hepatization.

3. Grey Hepatization: Decreased blood flow, with leukocytes and fibrin consolidation in the affected lung.
4. Resolution of infection: Without complications, complete resolution and healing occurs. The exudates become lysed and is processed by the macrophages. Normal lung tissue and function is restored.

References

Hinkle, J. L., & Cheever, K. H. (2014). Brunner & Suddarth's textbook of medical-surgical nursing- 13th ed. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). Brunner & Suddarth's textbook of medical-surgical nursing- 12ed. Volume 1. Wolter Kluwer Health/ Lippincott Williams & Wilkins.

Medical exam essential 2012 from www.medical.exam.essential

Study Session 11: Overview of the Digestive System

Introduction

In the digestive system, the process of digestion has many stages, the first of which starts in the mouth (oral cavity). Digestion involves the breakdown of food into smaller and smaller components which can be absorbed and assimilated into the body. The secretion of saliva helps to produce a bolus which can be swallowed to pass down the oesophagus and

into the stomach.

In this study session, you will be learning about the digestive system, Gerontological changes in the GIT and assessment of the abdomen

Learning Outcome for Study Session 11

At the end of this study session, you should be able to:

11.1 Highlight the functions of Digestive system

11.2 Discuss the Gerontological changes in the GIT

11.3 Explain how to assess the abdomen

1.1 Functional Anatomy of the Digestive System

The Organs fall into two groups: alimentary canal and accessory digestive organs.

Alimentary canal: Mouth, pharynx, oesophagus, stomach, small intestine, large intestine, anus.

Accessory organs: tongue, teeth, gall bladder, salivary glands, glands of the large intestine, liver, pancreas.

GIT extends from the mouth, oesophagus, stomach, intestines to the anus.

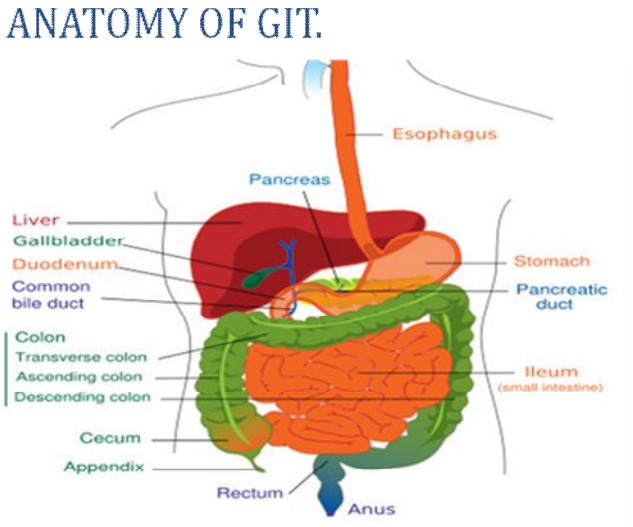

Figure 11.1: Anatomy of the GIT

Mouth: A cavity lined by mucosa (oral or buccal cavity). Boundaries: anteriorly- lips, laterally- cheeks, superiorly- palate, inferiorly- tongue, posteriorly- continuous with the oropharynx.

Lined with thick stratified squamous epithelium. Withstands considerable friction. Epithelium on the gum, hard palate, dorsum of the tongue is slightly keratinized for extra protection against abrasion during eating.

The oral mucosa responds to injury by producing antimicrobial peptides defensins, which explains how the mouth remains healthy despite teeming disease causing microbes

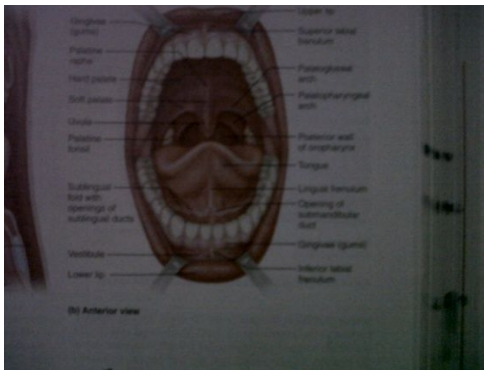

Figure 11.2: Anterior view of Buccal Cavity

Tongue- Occupies the floor of the mouth, fills most of the oral cavity when the mouth is closed. Composed of interlacing bundles of skeletal muscle fibres. During chewing, it grips the food and constantly repositions it between the teeth, mixes food with saliva to form a blos, initiates swallowing by pushing the bolus posteriorly into the pharynx. Intrinsic and extrinsic skeletal muscle fibres.

Intrinsic muscles: confined in the tongue and NOT attached to bone. Fibres run along several planes, allows the tongue to change its shape (but not position), becoming thicker, thinner, longer or shorter as needed for speech and swallowing.

Extrinsic muscles: (*Genioglossus, hyoglossus, styloglossus*). Extends from the point of origin on bones of the skull (mandible, hyoid bone,

styloid process of the temporal bone respectively) or soft palate. These muscles protrude, retract and move it side by side.

The lingual frenulum: secures the tongue to the floor of the mouth and limits posterior movement of the tongue.

Filiform papillae: peg-like projections of the underlying mucosa. Provides the tongue with roughness that aids in licking semi solid foods such as ice cream and provides friction for manipulating food in the mouth.

Fungiform papillae: widely scattered on the surface of the tongue

Circumvallate: located in a V-shaped row at the back of the tongue

Foliate papillae: on lateral aspect of the posterior tongue

The fungiform, circumvallate and foliate hose the taste buds, but those on the foliate papillae function in taste in infancy and early childhood.

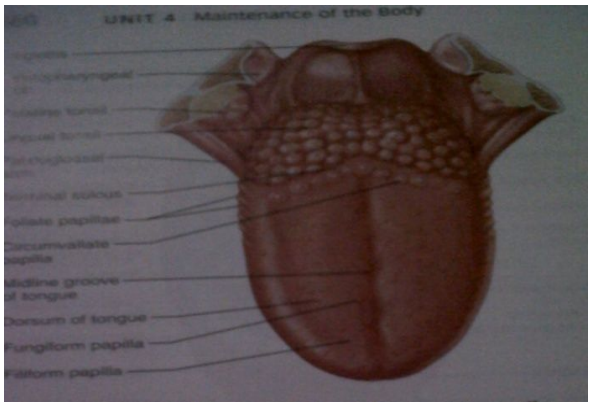

Figure 11.3: The Papillae of the Tongue

In-Text Question

Mention the types of papillae

In-Text Answer

- Filiform papillae
- Fungiform papillae
- Circumvallate
- Foliate papillae

Salivary Glands

Functions: Cleanses the mouth, dissolves food chemical so that they can be tasted, moistens food and aids in compacting it into a bolus, contains enzymes that begin chemical breakdown of starchy foods.

Types

- Intrinsic salivary or buccal glands: scattered throughout the oral cavity
- Extrinsic glands: Paired, compound, tubular glands. they include:
- Parotid glands: lies anterior to the ear. The parotid duct parallels the zygomatic arch, pierces the buccinators muscle and opens into the vestibule next to the 2^{nd} molar. Branches of the facial nerve runs through the parotid gland (surgery on the gland can result in facial paralysis)
- Inflammation of the parotid gland (mumps) occurs commonly in children. It is caused by mumps virus (Myxovirus). Spreads through saliva
- Mumps in adult males carry a 25% risk that the testes may become infected as well, resulting in sterility.

Salivary Glands

Submandibular gland: About size of walnut. Lies along the medial aspect of the mandible. Duct runs beneath the mucosa of the floor of the mouth. Opens at the base of the lingual frenulum.

Sublingual gland: lies anterior to the submandibular, under the tongue. Opens via 10-12 ducts into the floor of the mouth.

Cells of the Salivary Glands

Two types of secretory cells:

Serous cells: produce watery secretions containing enzymes, ions, tiny bits of mucin.

Mucous cells: produce mucus.

The parotid glands contain only serous cells. Submandibular and buccal glands have equal number of serous and mucous cells. The sublingual contain mostly mucous cells.

Composition of Saliva

Largely water, therefore hypo osmotic. Osmolarity depends on the precise glands that are active and nature of the stimulus for salivation. Saliva is slightly acidic (pH 6.75 to 7.00). Solutes include: electrolytes: Na, K, Cl, PO_4 and HCO_3)

Digestive enzyme: salivary amylase and lingual lipase (*both optimally active at an acid pH)*. Protein (*mucin), lysozyme, IgA, metabolic waste (urea and uric acid) when dissolved in water, the glycoprotein mucin forms thick mucus that lubricates the oral mucosa and food*

In-Text Question

Mention the cells of the salivary glands.

Serous cells and the mucous cells

Protective Function of Saliva

Protection is provided by: immunoglobulin A (IgA) antibodies; lysozymes: a bactericidal enzyme that inhibits bacterial growth in the mouth, may help prevent tooth decay.

A cyanide compound defensins functions as a cytokine to call defensive cells (lymphocytes, neutrophils etc.) into the mouth for battle.

Friendly bacteria that live on the back of the tongue convert food-derived nitrates in saliva into nitrites which, in turn are converted to nitric oxide in an acid environment. This transition occurs around the

gum where acid-producing bacteria tend to cluster, and in the HCl-rich secretions of the stomach.

The highly toxic nitric oxide is believed to act as a bactericidal agent in these areas.

ESOPHAGUS: a muscular tube extending from the pharynx to the stomach. Two openings: upper oesophageal sphincter at the cricopharyngeal muscle; lower oesophageal sphincter (LES) or cardiac sphincter (normally remains closed and opens only to pass food into the stomach)

STOMACH: a hollow distensible muscular pouch. Located in the Left Upper Quadrant, below the diaphragm and between the liver and the spleen. Consist of 3 anatomic areas: the fundus, body (corpus) and antrum (pylorus). Stores, churns and digest food.

SPHINCTERS: The LES: Allows food to enter the stomach, prevents reflux into the oesophagus

Pyloric sphincter: regulates flow of stomach content (Chyme) into the small intestine.

SMALL INTESTINE: a coiled tube. Extends from the pyloric sphincter to the ileocecal valve at the large intestine. Has 3 sections: Duodenum, jejunum, and ileum.

LARGE INTESTINE: a shorter, wider tube (approximately 6.ocm), length 1.4m. Begins at ileocecal valve (in the RLQ) and ends at the anus. Consist of 3 sections:

1. The cecum: a blind pouch that extends from the ileocecal valve to the vermiform appendix
2. The colon: main portion of the large intestine. Divided into 4 parts: ascending, transverse, descending and sigmoid.
3. The rectum: extends from the sigmoid colon to the rectum.

THE ILEOCECAL VALVE: Prevents the return of faeces from the cecum into

the small intestine.

The appendix: Collects lymphoid tissue. Arises from the cecum

LARGE INTESTINE: The large intestine consists of the caecum; ascending, transverse, descending, and sigmoid colon; and the rectum. In adults, it extends about 1.5 m and has a diameter ranging from 8 cm in the caecum to 2 cm in the sigmoid colon.

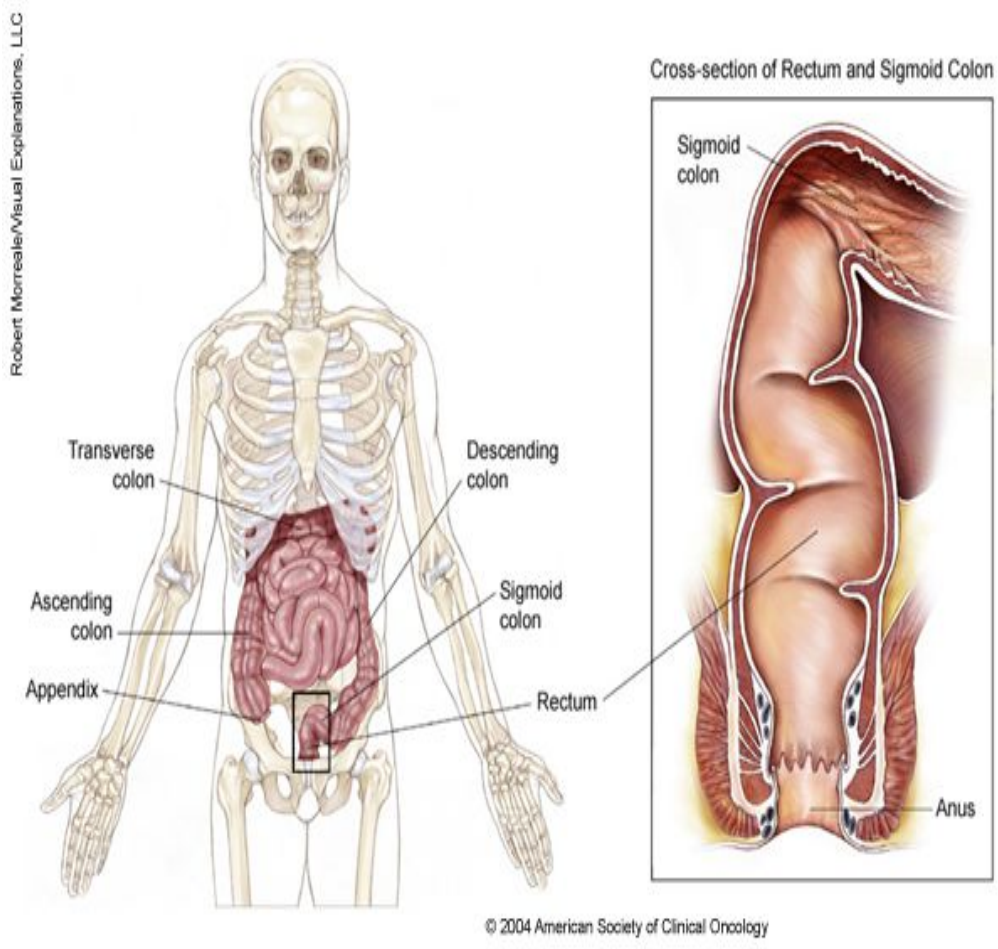

Figure 10.4: Anterior view of the Large intestine

Source: American Society of Clinical Oncology

The function of the large intestine is to receive 500 to 2,000 mL of ilea contents per day. Absorption of fluid and solutes occurs in the right colon or the segments proximal to the middle of the transverse colon, with movement and storage of faecal material in the left colon and distal segments of the colon.

Mucus secretion from goblet cells into the intestinal lumen lubricates the mucosal surface and facilitates movement of the dehydrated faeces. It also serves to protect the luminal wall from bacteria and colonic irritants such as bile acids.

Four major tissue layers, from the lumen outward, form the large intestine: the mucosa, submucosa, muscularis externa and serosa.

Lymphatic channels do not extend into the mucosa. The muscularis externa consists of circular smooth muscle and three outer longitudinal smooth muscle bands. The outermost layer of the colon, the serosa, secretes a fluid that allows the colon to slide easily over nearby structures within the peritoneum.

The serosa covers only the anterior and lateral aspects of the upper third of the rectum. The lower third lies completely extra peritoneal and is surrounded by fibro-fatty tissue as well as adjacent organs and structures.

In-Text Question

List the colons in the large intestine

In-Text Answer

It consist of ascending colon, sigmoid colon, transverse colon, and descending colon.

11.1.1 Layers of the GIT

4 layers from within outward:

- Inner mucosal layer: lubricates and protects the inner surface of the tract
- Submucosa: responsible for secreting digestive enzymes.
- Muscles: Circular, Longitudinal & oblique muscles
- Outer serosa (peritoneum): composed parietal and visceral peritoneum

11.1.2 Functions of the GIT

- Ingestion and propulsion of food
- Digestion
- Absorption
- Elimination

Digestion- Begins in the mouth with chewing and action of ptyalin (salivary enzyme) that breaks starch. Swallowed food passes through the oesophagus to the stomach. Process of digestions continues in the stomach: secretion of gastric juices, HCl and enzyme pepsin and lipase (and renin in infants)

Absorption: Mixing and churning through peristaltic action. From pylorus, the Chyme passes into the duodenum through pyloric valve. Food digestion is completed in the small intestine. Most nutrients absorption occurs. Pancreatic and intestinal enzymes (trypsin, lipase, amylase, lactase, maltase, and sucrase) and bile are involved in digestion.

Elimination- Waste products: through the anus. Water and electrolytes are absorbed at the cecum and ascending colon. Rectum stores faeces for elimination

In-Text Question

List 3 pancreatic and intestinal enzymes

In-Text Answer

Lactase, maltase, and sucrase

11.1.3 Movement in the GIT

There are 2 types of movement in the GIT, they are:

Segmentation: mixing;

Propulsion: peristalsis.

SECRETIONS OF THE GIT:

Enzymes and hormones: digestion;

Mucus: lubrication and protection;

Water and electrolyte

Activity 11.1

Reading Assignment*: Detailed Structure and Function of the GI Organs, Physiology of Digestion.*

11.2 Gerontologic Changes in the GIT

Abdomen- aging alters abdominal appearance. Accumulation of fat in the supra pubic areas in females at middle age (decreased oestrogen levels*).* In male, fat deposits resulting in *'spare tyre' or bay window.'*

Fat redistribution away from face and extremities to abdomen and hips (with further ageing). Relaxed abdominal musculature.

GIT: *d*ecreased salivation: dry mouth and decreased sense of taste

Mouth: atrophy of soft tissues and thinning of epithelium (cheek and tongue): *loss of taste*. Atrophic tissues ulcerate easily: risk of oral moniliasis. Abrading of the tooth surface, gum begin to recede, teeth erode at the gum line.

A smooth V-shaped cavity forms around the neck of the tooth, exposing the nerve (*resulting in hypersensitive tooth)*. Some tooth loss due to bone reabsorption (*osteoporosis) which decreases the inner tooth structure and its outer support. Poor oral hygiene, tooth decay*

exacerbates tooth loss. When tooth loss occurs, remaining teeth drift causing *malocclusion*. Mal-occluded teeth cause stress during chewing and other problems:

1. *Excessive bone resorption with further tooth loss*
2. *Muscle imbalance (maxilla and mandible out of alignment)*
3. *Spasms and tenderness of muscles of mastication*
4. *Chronic headache*
5. *Temporomandibular joint stress*

Delayed oesophageal emptying: *risk of aspiration if fed in supine position,* Decreased gastric acid secretion causing pernicious anaemia (interferes *with vitamin B12 absorption),* iron deficiency anaemia and malabsorption of calcium.

Increased incidence of gall stones

Liver decreases in size (*function may remain normal).*Drug metabolism by liver is impaired (particularly after 80yrs) and blood flow to the liver decreases by ½ by age 85. Liver metabolism responsible for enzymatic oxidation, reduction and hydrolysis of drugs decreases.

Prolonged liver metabolism increases side effects of the drugs. Examples: *acetaminophen, barbiturates, diazepam. Ibuprofen, lidocaine, propranolol, quinidine, salicylates, warfarin etc.*

Constipation: slowed passage in the distal colon and delayed rectal emptying.

11.3 Assessment of the Abdomen

Physical examination- Four quadrants: Right upper quadrant (RUQ), Left Upper quadrant (LUQ), Right lower quadrant (RLQ), Left lower quadrant (LLQ)

Quadrants are determined by imaginary vertical line (midline) from the tip of the sternum, thru the umbilicus to the symphysis pubis. The line is bisected perpendicularly by the lateral line which runs thru the umbilicus across the abdomen.

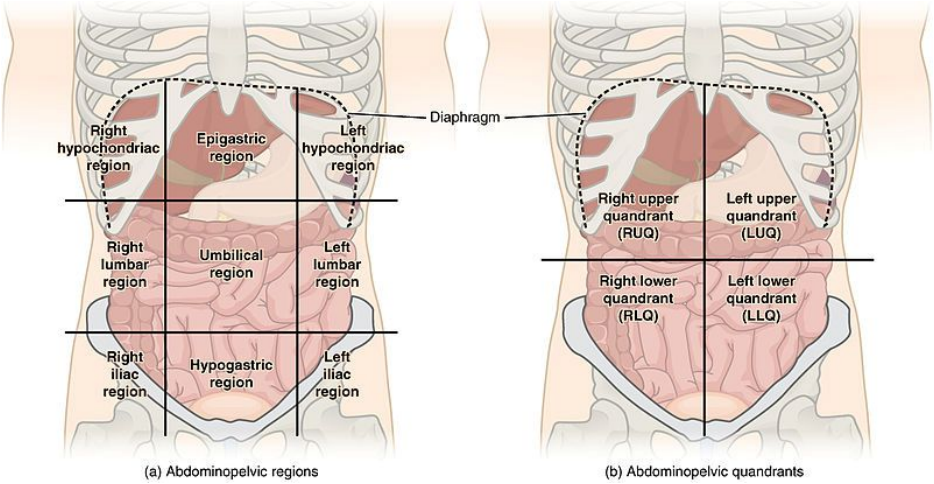

Figure 10.5: Abdominal Regions and Quadrants

Source:

http://commons.wikimedia.org/wiki/File:Abdominal_Quadrant_Regions.jpg

Locating Structures by Quadrants

11.3.1 History of Symptoms ***RUQ:*** Ascending and transverse colon, duodenum, gall bladder, hepatic flexure of the liver, liver, pancreatic head, pylorus, Rt adrenal gland, upper pole of right kidney, Rt urethra.

RLQ: appendix, ascending colon, cecum, Rt Kidney (lower pole), Rt Ovary and tube, Rt ureter, Rt spermatic cords

LUQ: left adrenal gland, left kidney (upper pole), left ureter, pancreas (body and tail), spleen, splenic flexure of colon, stomach, transverse descending colon

LLQ: left kidney (lower pole), Lt Ovary, left ureter, left spermatic cord, descending and sigmoid colon.

Use the mnemonic COLDSPA

C -character

O-onset

L-location

D- Duration

S- Severity

P- Pattern

A- Associated factors.

Example:

- *Are you experiencing abdominal pain?*
- *How would you describe the pain?*
- *How bad is the pain on a scale of 1 to 10, with 10n being the worst?*

11.3.2 Sources of Abdominal Pain

Quality and character of pain may suggest origin.

Abdominal pain may be: *visceral, parietal or referred.*

Visceral pain: Visceral pain is directly related to the organ involved. The majority of organs do not have an abundance of nerve fibres, so the patient might experience mild or less severe pain that is poorly localized. It's important to understand this does not mean the patient is experiencing a mild or less severe condition.

Parietal pain: Parietal pain occurs when there is an irritation of the peritoneal lining. The peritoneum has a higher number of sensitive nerve fibres, so the pain is generally more severe and easier to localize. The patient will typically present in a guarded position with shallow breathing. This minimizes the stretch of the abdominal muscles and limits the downward movement of the diaphragm, which reduces pressure on the peritoneum and helps ease the pain.

Referred pain: Referred pain is visceral pain that is felt in another

area of the body and occurs when organs share a common nerve pathway. For this reason, it is poorly localized but generally constant in nature. An example is a patient with liver problems that experiences referred pain in the neck or just below the scapula.

Summary of Study Session 11

In this study session, you have learnt the following:

1. Alimentary canal: Mouth, pharynx, oesophagus, stomach, small intestine, large intestine, anus while Accessory organs: tongue, teeth, gall bladder, salivary glands, glands of the large intestine, liver, pancreas.
2. Quadrants are determined by imaginary vertical line (midline) from the tip of the sternum, thru the umbilicus to the symphysis pubis. The line is bisected perpendicularly by the lateral line which runs thru the umbilicus across the abdomen.
3. There are 4 layers of the GIT from within outward:

- Inner mucosal layer: lubricates and protects the inner surface of the tract
- Submucosa: responsible for secreting digestive enzymes.
- Muscles: Circular, Longitudinal & oblique muscles
- Outer serosa (peritoneum): composed parietal and visceral peritoneum

Self-Assessment Questions (SAQs) for Study Session 11

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 11.1

Describe the function of the GIT

SAQ 11.2

List 5 effects of gerontology on the teeth

SAQ 11.3

Name the organs in each four quadrants of the abdomen

Note on SAQs

SAQ 11.1

Digestion- Begins in the mouth with chewing and action of ptyalin (salivary enzyme) that breaks starch. Swallowed food passes through the oesophagus to the stomach. Process of digestions continues in the stomach: secretion of gastric juices, HCL and enzyme pepsin and lipase (and renin in infants)

Absorption: Mixing and churning through peristaltic action. From pylorus, the chyme passes into the duodenum through pyloric valve. Food digestion is completed in the small intestine. Most nutrients absorption occurs. Pancreatic and intestinal enzymes (trypsin, lipase, amylase, lactase, maltase, and sucrase) and bile are involved in digestion.

Elimination- Waste products: through the anus. Water and electrolytes are absorbed at the cecum and ascending colon. Rectum stores faeces for elimination

SAQ 11.2

1. Excessive bone resorption with further tooth loss
2. Muscle imbalance (maxilla and mandible out of alignment)
3. Spasms and tenderness of muscles of mastication

4. Chronic headache
5. Temporomandibular joint stress

SAQ 11.3

RUQ: Ascending and transverse colon, duodenum, gall bladder, hepatic flexure of the liver, liver, pancreatic head, pylorus, Rt adrenal gland, upper pole of right kidney, Rt urethra.

RLQ: appendix, ascending colon, cecum, Rt Kidney (lower pole), Rt Ovary and tube, Rt ureter, Rt spermatic cords

LUQ: left adrenal gland, left kidney (upper pole), left ureter, pancreas (body and tail), spleen, splenic flexure of colon, stomach, transverse descending colon

LLQ: left kidney (lower pole), Lt Ovary, left ureter, left spermatic cord, descending and sigmoid colon.

Suggested reading: *Lewis and Heitkemper: Medical Surgical Nursing: assessment and management of clinical problems*

Study Session 12: Diseases of the GIT

Introduction

Gastrointestinal diseases refer to diseases involving the gastrointestinal tract, namely the oesophagus, stomach, small intestine, large intestine and rectum, and the accessory organs of digestions, the liver, gallbladder, and pancreas.

In this study session, you will be learning about different diseases of the GIT which includes peptic ulcer, colorectal cancer, colon cancer and cholecystitis.

Learning Outcome for Study Session 12

At the end of this study session, you should be able to:

12.1 Discuss Peptic Ulcer

12.2 Explain Colorectal Cancer

12.3 Explain Colon Cancer

12.4 Discuss Cholecystitis

12.1 Peptic Ulcer

A peptic ulcer is a distinct breach in the mucosal lining of the stomach (gastric ulcer) or the first part of the small intestine (duodenal ulcer), a result of caustic effects of acid and pepsin in the lumen. Histologically, peptic ulcer is identified as necrosis of the mucosa

which produces lesions equal to or greater than 0.5 cm (1/5″).

Figure 12.1: Deep Peptic Ulcer

Source: http://en.wikipedia.org/wiki/Peptic_ulcer

It is the most common ulcer of an area of the gastrointestinal tract that is usually acidic and thus extremely painful. Helicobacter pylori is one of the most common causes of peptic ulcer. Ulcers can also be caused or worsened by drugs such as aspirin, ibuprofen, and other NSAIDs.

Peptic ulcer disease is also refers to painful sores or ulcers in the lining of the stomach or first part of the small intestine, called the duodenum.

Pathophysiology

Normally following a meal, acetylcholine, Gastrin, histamine bind to specific receptors and stimulate parietal cells (Fundus) to secrete HCl. Parietal cells with the aid of hydrogen-potassium adenosine triphosphate pump transport HCl to the lumen of the stomach., duodenal cell secrete protective mucous barrier for the gastroduodenal area.

Hyper secretion of HCl and pepsin cause erosion of duodenal mucosa. Situation compounded by ingestion of NSAIDS which inhibits secretion of

protective mucus.

Symptoms

Due to gastric irritation by pepsins and HCl, burning or gnawing pain in the epigastrium and related to eating. Eating relieves pain and taking alkali, heartburn, vomiting (a complication following obstruction of pyloric orifice), emesis contain mainly undigested food, bleeding evidenced by passage of tarry stool, on palpation: pain in the epigastrium.

Diagnostic Procedures

- Barium study
- Gastroscopy to inspect the mucosa.
- Sample for biopsy and *H. pylorus* testing
- A urea breath test to detect *H. Pylori*
- Stools for occult blood.

Class Activity

Time allowed: 30 minutes

Highlight the differences between gastric and duodenal ulcer

Nursing Management

Functional health patterns:

- Health perception: health management pattern: History of smoking (number per day), alcohol consumption, family history of peptic ulcer, drug use e.g. NSAIDS
- Nutritional metabolic pattern: Pattern of food and fluid, food habits, preference for spicy foods, use of caffeinated beverages
- Cognitive perceptual pattern: History of pain, characteristic, location, frequency

- Elimination pattern: Diarrhoea or constipation: bloody or tarry stool.
- Coping-stress tolerance pattern: level of anxiety, general coping pattern in terms of stress tolerance, available support system.

Physical Examination

- Vital signs: tachycardia, hypotension which may indicate anaemia from bleeding.
- Palpation: For localized tenderness in the epigastrium
- Stool examination for occult blood
- Weight.

Nursing Diagnoses

- Pain related to effect of gastric secretion on the damaged tissue
- Anxiety related coping with an acute disease
- Altered nutrition less than body requirement related to changes in diet
- Knowledge deficit related to prevention of symptoms and management of condition
- Fluid volume deficit related to excessive diarrhoea and vomiting.

NOC: Pain relief

NIC:

- Foods and beverages like milk to reduce acidity
- Encourage small but frequent meals in a relaxed atmosphere
- Avoid aspirin and caffeinated drinks : stimulates release of HCl
- Administer prescribed analgesic.

NOC: Anxiety reduction/control

NIC: Encourage verbalization of fears

- Explain disease process
- Enhance development of hope in care

- Explain treatment plan including investigations
- Provide emotional support
- Teach effective coping mechanisms

NOC: Optimum nutrition

NIC: Assess signs of malnutrition and weight loss

- Encourage compliance with diet modification
- High fibre diet especially fruits and vegetables.
- Avoid carbonated beverages

Evaluation

Evaluate clinical outcomes based on objectives that were set at the beginning for each identified nursing problem.

In-Text Answer

Name the diagnostics procedure for gastric ulcer

In-Text Answer

- Barium study
- Gastroscopy to inspect the mucosa.
- Sample for biopsy and *H. pylorus* testing
- A urea breath test to detect *H. Pylori*
- Stools for occult blood.

12.2 Colorectal Cancer

Introduction: Tumours of the rectum and colon. Second most common internal cancers in the developed countries. Fast growing incidence among developing countries, attributed to post modernization, acculturation, modification in feeding patterns and lifestyle.

Epidemiology

Around 60% of cases were diagnosed in the developed world. It is estimated that worldwide, in 2008, 1.23 million new cases of colorectal cancer were clinically diagnosed, and that it killed 608,000 people. Globally more than 1 million people get colorectal cancer every year resulting in about 715,000 deaths as of 2010 up from 490,000 in 1990.

It is more common in developed than developing countries. Globally incidences vary 10-fold with highest rates in the Australia, New Zealand, Europe and the US and lowest rates in Africa and South-Central Asia.

Nigeria

The time trends in common cancers in men from the Ibadan cancer registry in Nigeria show that four decades ago (1960-1969), the top five cancers in men did not include colorectal cancer. But by the last decade, carcinoma of the colon and rectum moved from the tenth to the fourth position.

The number of patients seen per year with colorectal cancer in each centre ranges from about 6 to 25. Incidence rates in Nigeria are put at 3.4 cases per 100,000 compared with 35.8 cases per 100,000 each year in the state of Connecticut, USA. (Irabor, 2011).

Pathophysiology

The surface epithelium of the colonic mucosa undergoes continual renewal, and complete replacement of epithelial cells occurs every 4 to 8 days. Cell replication normally takes place within the lower third of crypts, the tubular glands located within the intestinal mucosa. The cells then mature and differentiate to either goblet or absorptive cells as they migrate toward the bowel lumen.

The total number of epithelial cells remains relatively constant as the number of cells migrating from the crypts is balanced by the rate of exfoliation of cells from the mucosal surface. This two-phase process is critical to the malignant transformation of the epithelial cells.

The number of dysplastic and hyperplastic aberrant crypt foci increases with increasing age; as the mass of abnormal cells accumulates at the top of the crypt and starts to protrude into the stream of faecal matter, their contact with faecal mutagens can lead to further cell mutations and eventual adenoma formation.

Nearly all Cancer of the colons begin as polyp in the large intestine. Grow undetected in the rectum and sigmoid colon. Spreads by direct extension to involve the entire bowel wall resulting in changes in bowel habits: blood in stool.

Regional and distant metastasis through the lymphatics: Liver, bones, kidneys.

Risk Factors

Specific cause unknown, heredity, rectal polyps, inflammatory bowel disease, smoking and alcohol consumption, obesity and high consumption of fat.

Figure 12.2: Tumour in sigmoid colon

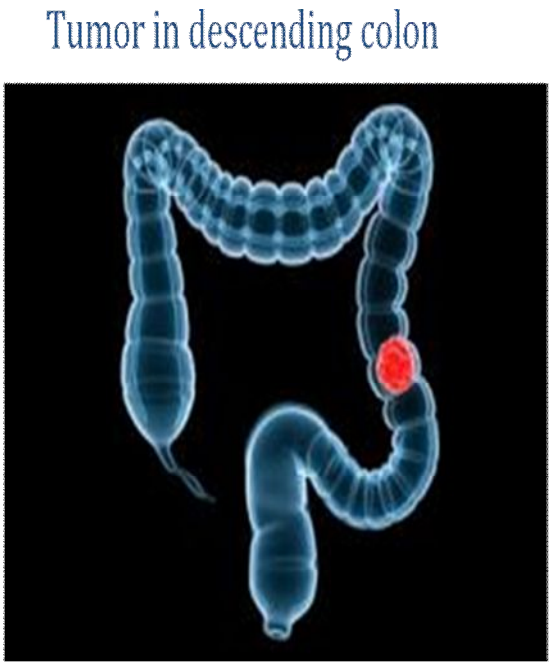

Figure 12.3: Tumour in descending colon

Common Locations

- Sigmoid colon 25% (men) 23% women
- Rectum: 22% men, 27% women.
- Ascending colon: 22% men, 27% women
- Transverse colon: 11% men, 13% women
- Caecum 11% men, 10% women
- Descending colon 6%

Symptoms

- Symptoms depend on location of lesions
- Unexplained anaemia.
- Anorexia and weight loss
- Fatigue
- Dull abdominal pain and melena (Right sided lesion)
- Cramping abdominal pain, constipation, distension bright red bloody stool (common in Left sided lesion).
- Tenesmus, rectal pain, feeling of incomplete evacuation

after bowel movement (rectal lesions)

In-Text Question

What is the most common location of colorectal cancer in men?

In-Text Answer

Sigmoid colon 25%

Diagnostic Test

- Early screening for people over 50yrs. (The month of March is observed as Colon cancer Awareness Month in US)
- Annual digital examination
- Annual faecal-occult blood test
- Barium enema
- Proctosigmoidoscopy and colonoscopy (at least every 5yrs)

(Colonoscopy is the gold standard for screening, detection and removal of precancerous polyp)

- Carcinoembryonic antigen (CEA) studies.
- Chest x-ray to detect metastasis
- CT scan

Symptoms of colorectal cancer typically include rectal bleeding and anaemia which are sometimes associated with weight loss and changes in bowel habits. (Nugent, 2014 & Wikipedia, 2014). It typically starts in the lining of the bowel and if left untreated, can grow into the muscle layers underneath, and then through the bowel wall.

12.3 Colon Cancer

Cancers that are confined within the wall of the colon are often curable with surgery while cancer that has spread widely around the body is usually not curable and management then focuses on extending the

person's life via chemotherapy and improving quality of life. (Wikipedia 2014).

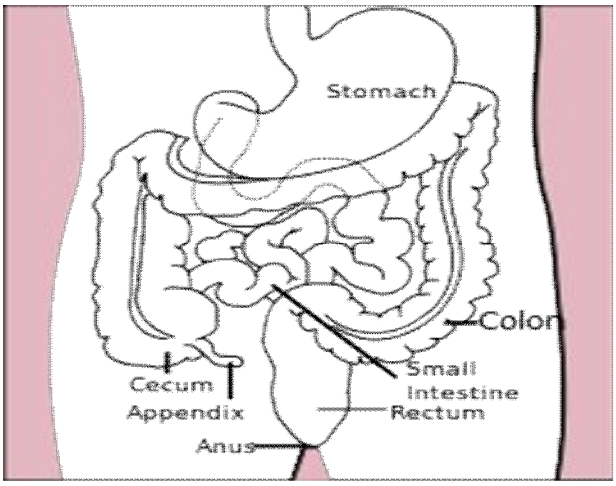

Figure 12.4: Lower GIT

Screening is effective at decreasing the chance of dying from colorectal cancer and is recommended starting at the age of 50 and continuing until a person is 75 years old. Localized bowel cancer is usually diagnosed through sigmoidoscopy or colonoscopy.

Colon cancer is not necessarily the same as rectal cancer, but they often occur together in what is called colorectal cancer.

Rectal cancer originates in the rectum, which is the last several inches of the large intestine, closest to the anus. (MNT Knowledge Centre, 2014).

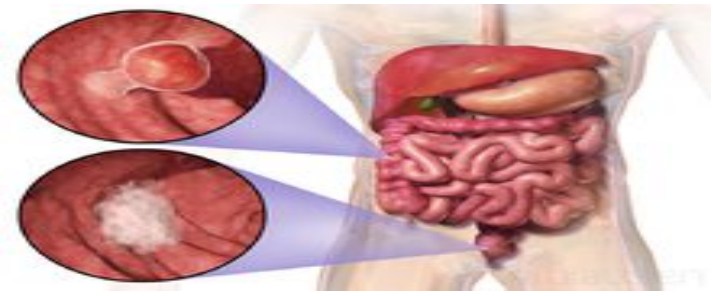

Figure 12.5: Examples of colon cancer

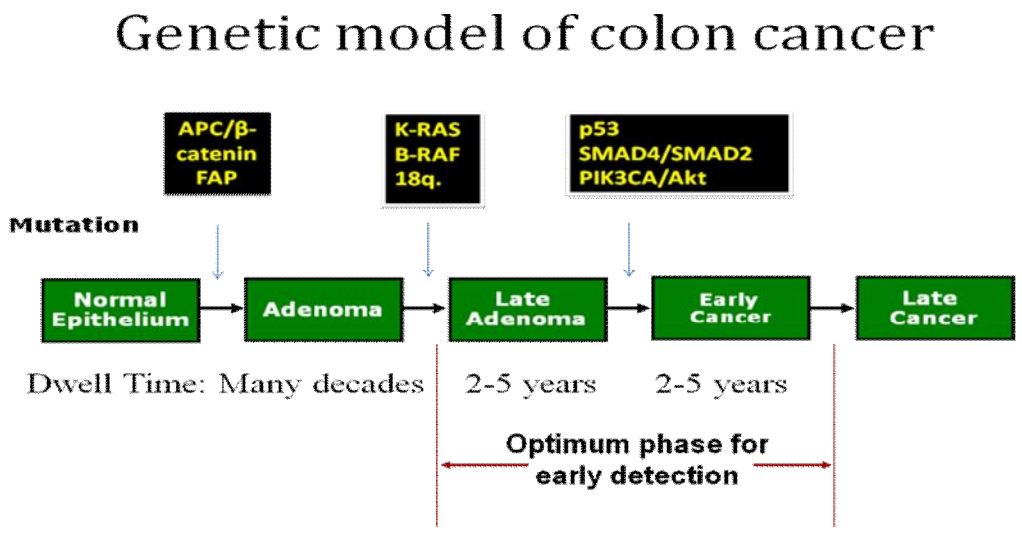

Figure 12.6: Genetic Model of colon cancer

The development of a colorectal neoplasm is a multistep process of several genetic and phenotypic alterations of normal bowel epithelium structure and function, leading to unregulated cell growth, proliferation, and tumour development.

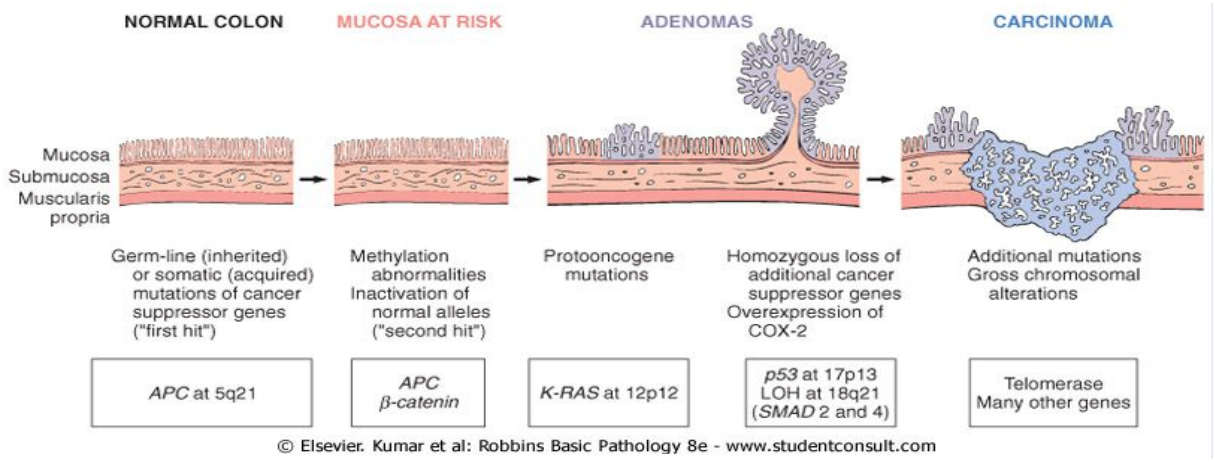

Figure 12.7: Different stage of colon cancer development

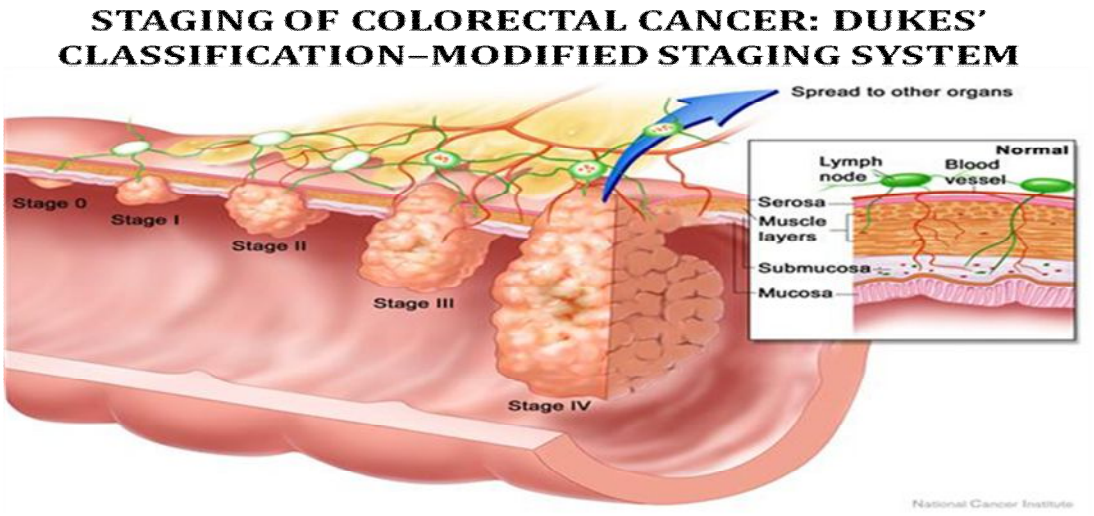

Figure 12.8: Stages of colorectal cancer

STAGE 0 Colon cancer

Known as "cancer in situ," meaning the cancer is located in the mucosa (moist tissue lining the colon or rectum). Removal of the polyp (polypectomy) is the usual treatment

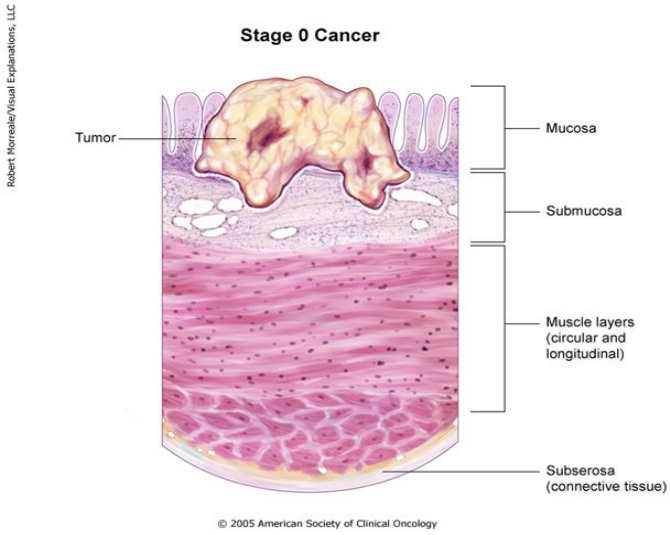

Figure 12.9: Stage 0 Cancer

Source: DLC, Ibadan

STAGE 1 Colon cancer

The cancer has grown through the mucosa and invaded the muscularis (muscular coat). Treatment is surgery to remove the tumour and some surrounding lymph nodes.

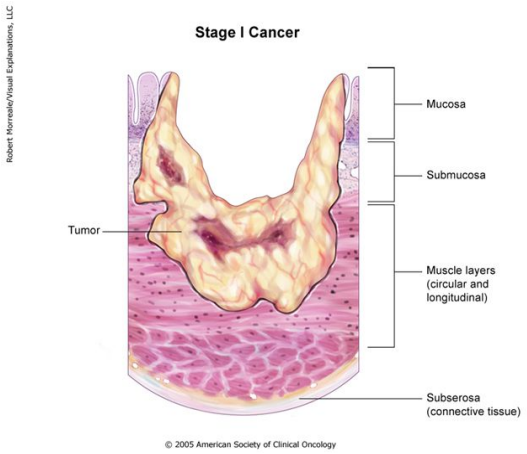

Figure 12.10: Stage I cancer

Source: DLC, Ibadan

STAGE II Colon cancer

The cancer has grown beyond the muscularis of the colon or rectum but has not spread to the lymph nodes. Stage II colon cancer is treated with surgery and, in some cases, chemotherapy after surgery. Stage II rectal cancer is treated with surgery, radiation therapy, and chemotherapy

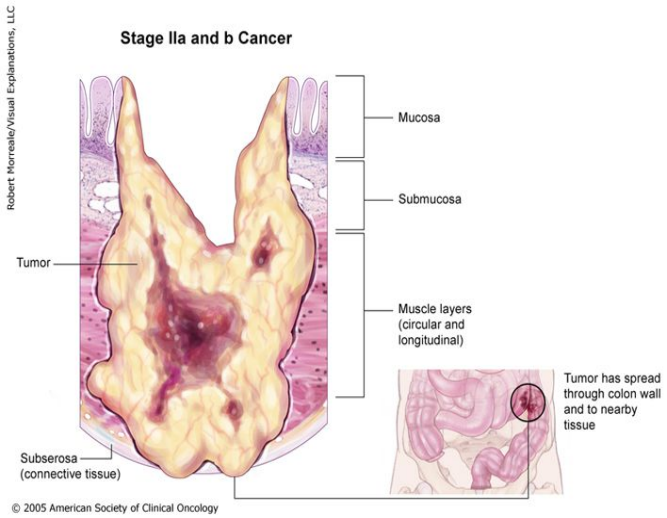

Figure 12.11: Stage II cancer

Source: DLC, Ibadan

STAGE III Colon cancer

The cancer has spread to the regional lymph nodes (lymph nodes near the colon and rectum). Stage III colon cancer is treated with surgery and chemotherapy. Stage III rectal cancer is treated with surgery, radiation therapy, and chemotherapy

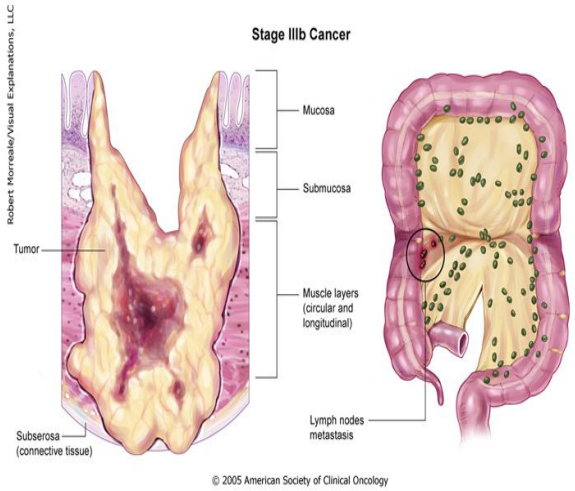

Figure 12.12: Stage III cancer

Source: DLC, Ibadan

STAGE IV Colon cancer

The cancer has spread outside of the colon or rectum to other areas of the body. Stage IV cancer is treated with chemotherapy. Surgery to remove the colon or rectal tumour may or may not be done. Additional surgery to remove metastases may also be done in carefully selected patients

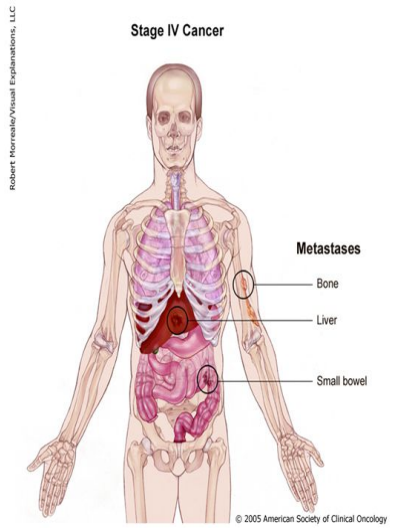

Figure 12.13: Stage IV cancer

Source: DLC, Ibadan

TNM Staging of Colon Cancer

Tumor (T)

- T0 = none evident
- Tis = in situ (limited to mucosa)
- T1 = invasion of submucosa
- T2 = invasion of muscularis propria
- T3 = invasion through muscularis propria into subserosa or non- peritonealised perimuscular tissue
- T4 = invasion of other organs or structures

Lymph Nodes (N)

- 0 = none evident
- 1 = 1 to 3 positive pericolic nodes
- 2 = 4 or more positive pericolic nodes
- 3 = any positive node along a named blood vessel

Distant Metastases (M)

- 0 = none evident
- 1 = any distant metastasis

5-Year Survival Rates

- T1 = 97%
- T2 = 90%
- T3 = 78%
- T4 = 63%
- Any T; N1; M0 = 66%
- Any T; N2; M0 = 37%
- Any T; N3; M0 = data not available
- Any M1 = 4%

Clinical Manifestation

The symptoms are greatly determined by the location of the cancer, the stage of the disease, and the function of the intestinal segment in which it is located. May remain asymptomatic for years, symptoms develop insidiously.

The most common presenting symptom is a change in bowel habits. The passage of blood in the stools is the second most common symptom.

Cecal and right colonic cancers: fatigue, weakness, iron deficiency anaemia, dull abdominal pain, melena (i.e. black, tarry stools)

Left-sided lesions: are those associated with obstruction- narrowing stools, constipation, distention, occult bleeding, changes in bowel habit, crampy left lower quadrant discomfort.

Symptoms associated with rectal lesions are:

- Tenesmus (i.e., ineffective, painful straining at stool)
- Rectal pain
- The feeling of incomplete evacuation after a bowel movement
- Alternating constipation and diarrhoea
- Bloody stool.

Symptoms of Colon Cancer

Hematochezia (passage of blood), melena, fatigue, weakness, shortness of breath, change in bowel habits, narrow stools, diarrhoea or constipation, red or dark blood in stool, weight loss, abdominal pain, cramps, bloating.

Complications

Metastasis,

Bleeding,

Perforation,

Peritonitis,

Formation of fistula

Prevention of Colon Cancer

Colon cancer prevention especially when integrated with the prevention of chronic diseases and other related issues (such as reproductive health, HIV/AIDS) offers the greatest public health potential and the most cost-effective long term method of cancer control.

Levels of Colon Cancer Prevention

- Primary prevention: health promotion and disease prevention.
- Secondary prevention: early detection, screening and diagnosis.
- Tertiary prevention: rehabilitation and restoration

In-Text Question

List the symptoms associated with rectal lesions

In-Text Answer

- Tenesmus (i.e. ineffective, painful straining at stool)
- Rectal pain
- The feeling of incomplete evacuation after a bowel movement
- Alternating constipation and diarrhoea
- Bloody stool

12.1.1 Screening for Colon Cancer

It refers to checking for health problems before they cause symptoms. Colorectal cancer screening can detect cancer; polyps; non-polypoid lesions which are flat or slightly depressed areas of abnormal cell growth; and other conditions. Non-polypoid lesions occur less often than polyps, but they can also develop into colorectal cancer

Screening Methods

- Faecal occult blood test (FOBT).
- Sigmoidoscopy
- Colonoscopy
- Virtual colonoscopy
- Double-contrast barium enema
- Biopsy

Faecal occult blood test: This test checks for hidden blood in faecal material (stool). Currently, two types of FOBT are available:

1. Guaiac FOBT
2. Immunochemical FOBT

Advantages:

- No cleansing of the colon is necessary.
- Samples can be collected at home.
- Cost is low compared with other colorectal cancer screening tests.
- Does not cause bleeding or tearing/perforation of the lining of

the colon.

Disadvantages:

- Fails to detect most polyps and some cancers.
- False-positive results (the test suggests an abnormality when none is present) are possible.
- Dietary restrictions may be needed before the test.
- Additional procedures, such as colonoscopy, may be needed if FOBT indicates an abnormality.

Sigmoidoscopy: In this test, the rectum and lower colon are examined using a lighted instrument called a sigmoidoscope. During sigmoidoscopy, precancerous and cancerous growths in the rectum and lower colon can be found and either removed or biopsied.

Advantages:

- Test is usually quick, with few complications.
- For most patients, discomfort is minimal.
- In some cases, the doctor may be able to perform a biopsy and remove polyps during the test, if necessary.
- Less extensive cleansing of the colon is necessary for this test than for a colonoscopy.

Disadvantages:

- Any polyps in the upper part of the colon will be missed because the test allows the doctor to view only the rectum and the lower part of the colon.
- Very small risk of bleeding or tearing/perforation of the lining of the colon.
- Additional procedures, such as colonoscopy, may be needed if the test indicates an abnormality.

Colonoscopy: In this test, the rectum and entire colon are examined

using a lighted instrument called a colonoscope. During colonoscopy, precancerous and cancerous growths throughout the colon can be found and either removed or biopsied, including growths in the upper part of the colon, where they would be missed by sigmoidoscopy.

Advantages:

- Allows the doctor to view the rectum and the entire colon.
- Doctor can perform a biopsy and remove polyps or other abnormal tissue during the test, if necessary.

Disadvantages:

- May not detect all small polyps, non-polypoid lesions, and cancers, but is one of the most sensitive tests currently available.
- Thorough cleansing of the colon is necessary before this test.
- Some form of sedation is used in most cases.
- Although uncommon, complications such as bleeding and/or tearing/perforation of the lining of the colon can occur
- In this test, special x-ray equipment is used to produce pictures of the colon and rectum. A computer then assembles these pictures into detailed images that can show polyps and other abnormalities.

Virtual colonoscopy (Computerized tomographic colonography): In this test, special x-ray equipment is used to produce pictures of the colon and rectum. A computer then assembles these pictures into detailed images that can show polyps and other abnormalities

Advantages:

- Allows the doctor to view the rectum and the entire colon.
- No risk of bleeding or tearing/perforation of the lining of the

colon.

Disadvantages:

- May not detect all small polyps, non-polypoid lesions, and cancers.
- Thorough cleansing of the colon is necessary before the test.
- If a polyp or non-polypoid lesion 6 to 9 millimetres in size or larger is detected, standard colonoscopy, usually immediately after the virtual procedure, will be recommended to remove the polyp or lesion or perform a biopsy.

Double-contrast barium enema:

Advantages:

- Usually allows the doctor to view the rectum and the entire colon.
- Complications are rare.
- No sedation is needed.

Disadvantages:

- May not detect some small polyps and cancers.
- Thorough cleansing of the colon is necessary before the test.
- False-positive results are possible.
- Doctor cannot perform a biopsy or remove polyps during the test.
- Additional procedures are necessary if the test indicates an abnormality

Biopsy: This is the most definitive test that detects cancer. It is the only confirmatory test for cancer. It involves taking samples of the tissue for histological analysis by the pathologist.

Advantages:

- Helps to ascertain whether the tumour is benign or malignant.
- Removal of the tumour can also be performed during biopsy.

Disadvantages:

- Thorough cleansing of the colon is necessary before this procedure.
- Some form of sedation is used in most cases.
- Although uncommon, complications such as bleeding and/or tearing/perforation of the lining of the colon can occur.

In-Text Question

List the Screening Methods for Colon Cancer

In-Text Answer

- Faecal occult blood test (FOBT).
- Sigmoidoscopy
- Colonoscopy
- Virtual colonoscopy
- Double-contrast barium enema
- Biopsy

12.1.2 Medical Management

It includes surgical therapy, chemotherapy, radiation therapy immunotherapy, or multimodality therapy. Surgery is the only cure for colorectal cancer. It includes polypectomy during colonoscopy, colostomy.

Surgical goals include:

1. Complete resection of the tumour together with adequate margins of healthy tissue.
2. A thorough exploration of the abdomen to see if the cancer has spread.
3. Removal of all lymph nodes that drain the area where the cancer is located.
4. Restoration of bowel continuity so that normal bowel function will return.
5. Prevention of surgical complications.

Abdominal Perineal Resection

Most patients need a low anterior resection or abdominal perineal resection which involves the location and staging of the cancer, the restoration of normal bowel function and continence, and the genitor urinary function.

Both the tumour and the rectum are removed with an abdominal perineal resection and the person has a permanent colostomy. The perineal wound may be closed around a drain or left open with packing to allow healing by granulation.

Nursing Care of Patient with Abdominal Perineal Resection

Pre-operative care

- Preparing the patient physically for surgery

- Providing information about postoperative care including stoma care if a colostomy is to be created,
- Supporting the patient and family emotionally.
- The patient will likely need intense emotional support to cope with their prognosis and the radical change in body appearance and function.
- The patient should be taught side to side positioning.
- The nurse should teach and assist the patient in proper positioning for taking a sitz bath.

Post-operative care

- Pain management.
- The nurse also monitors the patient for complications such as leakage from the site of the anastomosis, prolapse of the stoma and pulmonary complications associated with abdominal surgery.
- The nurse assesses the abdomen for returning peristalsis and assesses the initial stool characteristics.
- Help patients with a colostomy out of bed on the first postoperative day and encourage them to begin participating in managing the colostomy.

Other Nursing care includes:

- Provide comfort measures and reassurance for patients undergoing radiation therapy.
- Prepare the patient for the adverse effects of chemotherapy and take steps to minimize these effects.
- Use strict aseptic technique when caring for I.V. catheters.
- Have the patient wash his hands before and after meals and after going to the bathroom.
- Listen to the patient's fears and concerns, stay with him during periods of severe stress and anxiety.

- Encourage the patient to identify actions and care measures that will promote his comfort and relaxation.
- Monitor the patient's bowel patterns.
- Monitors the patient's diet modification, and assess the adequacy of his nutrition intake.
- Direct the patient to follow a high fibre diet.
- Caution him to take laxatives or an antidiarrheal medication only as prescribed by the doctor.

Complications of Abdominal Perineal Resection

Delayed healing, haemorrhage, persistent perineal sinus tract, infections, and urinary tract and sexual dysfunctions.

Coloplasty or J-pouch

Coloplasty is an alternative to the pouch. It is created by slitting the side of a section of colon transversely and making it wider, and then suturing it closed in the new widened position. It is called the colon J pouch.

The colonic J- pouch is made by folding the distal colon back on itself and suturing it to form a pouch, which will eventually replace the rectum as reservoir for stool. The patient usually has a temporary colostomy to allow the J-pouch sutures time to heal before stool enters it. It decreases diarrhoea and constipation, patient may have difficulty evacuating stool.

There are 2 main types of systems available. Both kinds include an adhesive part that sticks to the skin (called a faceplate, flange, skin barrier, or wafer) and a collection pouch. One-piece pouches are attached to the skin barrier

One Pouch System

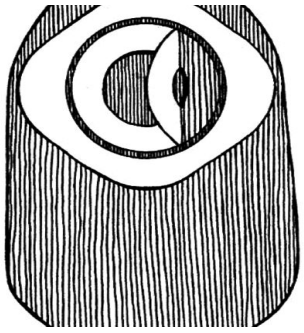

Figure 12.14: One-piece drainable pouch with skin barrier

Source: DLC, Ibadan

Colostomy

Another surgery is colostomy; it is a surgical procedure that allows interstitial contents to pass from the bowel through an opening called the STOMA. The stoma is created when the intestine is brought through the abdominal wall and sutured to the skin. An ostomy in the colon is called colostomy.

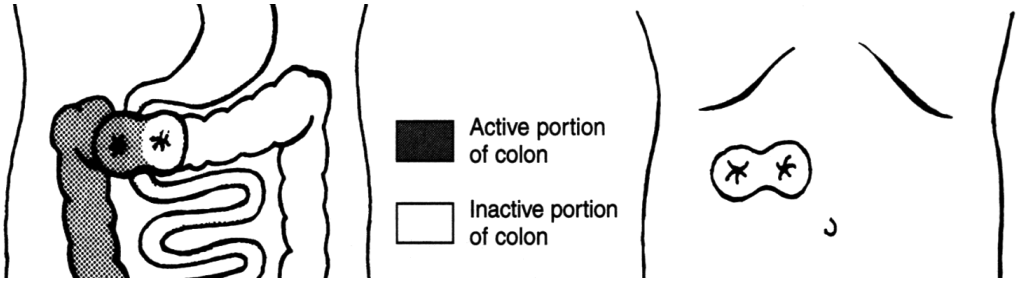

Figure 12.15: Colostomy

Source: DLC, Ibadan

Types of colostomy

A colostomy can be short-term (temporary) or life-long (permanent) and can be made in any part of the colon.

Transverse colostomy- this type of colostomy allows the stool to leave the body before it reaches the descending colon.

Double Barrel Colostomy

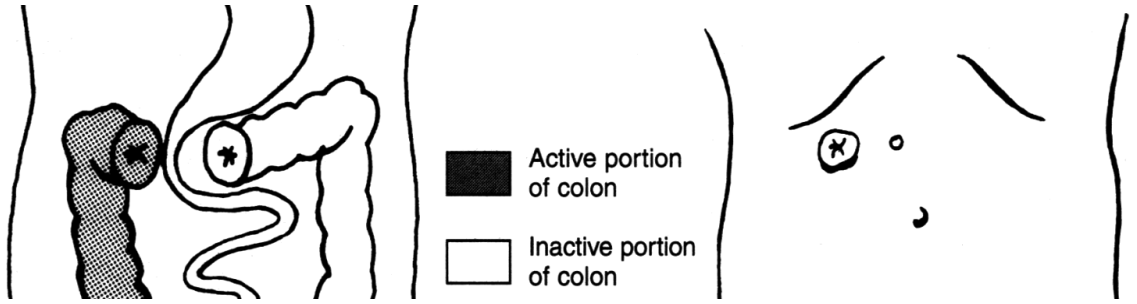

Figure 12.16: Double barrel colostomy

Source: DLC, Ibadan

Ascending colostomy- This means that the output is liquid and it contains many digestive enzymes. A drainable pouch must be worn at all times, and the skin must be protected from the output. This type of colostomy is rare because an ileostomy is better if the discharge is liquid.

Descending colostomy- Located at in the descending colon, the descending colostomy (is placed on the lower left side of the belly). Most often, the output is firm and can be controlled.

Sigmoid colostomy- A sigmoid colostomy is made in the sigmoid colon, and located just a few inches lower than a descending colostomy because there is more working colon, it may put out solid stool on a more regular schedule.

Chemotherapy

Chemotherapy is recommended when a patient has positive lymph nodes at the time of surgery or has metastatic disease. Chemotherapy can be used to shrink the tumour before surgery, as an adjuvant therapy following colon resection, and a palliative treatment for non-resettable CRC

The standard adjuvant therapy administered to patients with Dukes' class C colon cancer is the 5-fluorouracil plus levamisole regimen

(Wolfe, 2000). Patients with Dukes' class B or C rectal cancer are given 5-fluorouracil and high doses of pelvic irradiation. Mitomycin is also used.

Biologic Therapy

Biologic and targeted therapy is also used. Bevacizumab (Avastin) prevents the formation of new blood vessels, a process known as angiogenesis. It can be used alone or in conjunction with other chemotherapeutic agents.

Cetuximab blocks the epidermal growth factor receptor. They can be used for treatment of metastatic colorectal cancer.

Radiation Therapy

Radiation therapy may be used as an adjuvant to surgery and chemotherapy or as a palliative measure for patients with metastatic cancer. Its primary objective is to reduce tumour size and provide symptomatic relief.

Surgical goals include:

1. Complete resection of the tumour together with adequate margins of healthy tissue.
2. A thorough exploration of the abdomen to see if the cancer has spread.
3. Removal of all lymph nodes that drain the area where the cancer is located,
4. Restoration of bowel continuity so that normal bowel function will return.
5. Prevention of surgical complications

When the cancer is located in the rectum, the surgeon has three major options depending on the depth and staging of the cancer.

1. Local excision
2. Low anterior resection to preserve sphincter function
3. Abdominal perineal resection.

Nursing Process for a Patient with Colorectal Cancer

Nursing Management: Functional health pattern

- Health perception health management pattern:
- History of fatigue, abdominal or rectal pain
- Past history of inflammatory bowel disease or colorectal polyps
- Family history
- Dietary habits including fibre intake
- History of drugs

Nutritional Metabolic Pattern

- Dietary regimen: High calorie, high fat, low fibre diet.
- Anorexia, weight loss, nausea , vomiting
- Alcohol consumption

Elimination Pattern

- Change in bowel habits: Alternating diarrhoea and constipation
- Rectal bleeding, black tarry stools, feelings of incomplete evacuation, mucoid stools

Cognitive Perceptual Pattern

- Abdominal or low back pain

- Tenesmus

Self-perception - self-concept pattern:

- Change in body image.

Activity - exercise pattern

- Fatigue

Physical Examination

- Abdominal palpation for tenderness, Distension and solid mass
- Auscultate for bowel sounds to rule out obstruction.
- Vital signs.
- Stool specimen

Nursing Diagnoses

- Altered nutrition less than body requirement related to nausea and anorexia.
- Risk for fluid volume deficit related to vomiting
- Anxiety related to impending surgery and diagnosis of cancer
- Risk for ineffective management of therapeutic regimen
- Body image disturbance related to colostomy.

In-Text Question

What is the gold standard for screening, detection and removal of precancerous polyp?

In-Text Answer

Colonoscopy

Nursing Intervention

- Preparation for intervention
- Provision of emotional support
- Post-operative wound care
- Monitoring and managing complications

- Irrigating the colostomy
- Maintaining optimal nutrition
- Supporting a positive body image
- Discussing sexual issues
- Promoting home and continuing care.

EVALUATION: Evaluation of expected clinical outcome

In conclusion, the implication of colon cancer for us as student nurses and prospective nurses is that the presence of polyps in the colon should not be left unattended to; it should be surgically removed because if left, they can undergo morphological changes and thus resulting in cancer.

Activity

Time allowed: 1 hour

Draw a nursing care plan for a patient with the diagnosis of colorectal cancer.

12.4 Cholecystitis

Cholecystitis is a disease affecting the gallbladder. Most cases are caused by gallstones. Normally if one is diagnosed with cholecystitis the person is admitted to the hospital for treatment with pain killers, fluids, (and sometimes antibiotics) directly into the vein. The inflammation may settle down with treatment.

However, removal of the gallbladder is usually advised to prevent further bouts of cholecystitis. Women are more often affected than men. About 1 in every 3 women and 1 in every 6 men, form gallstones at some stage in their lives. They become more common with increasing age

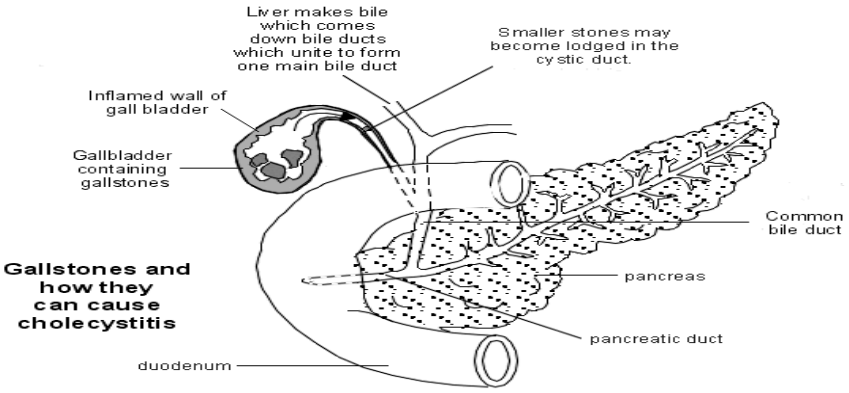

Figure 12.17: Duodenum and Pancreas

Source: DLC, Ibadan.

Understanding the Bile and Gallbladder

Bile is a fluid made in the liver. It contains various substances, including bile pigment, bile salts, cholesterol and lecithin. Bile is passed into tiny tubes called bile ducts. The bile ducts join together (like the branches of a tree) to form the main bile duct.

Bile constantly drips down the bile ducts, into the main bile ducts and then into the gut.

The gall bladder is a small pear shaped organ (7 - 10cm long). It lies underneath the lobe of the liver in which the bile is stored.

Bile passes (via the hepatic duct) to the gallbladder from the liver, where it is formed, and is released into the duodenum(through the common bile duct)under the influence of the hormone cholecystokinin, which is secreted when food is present.

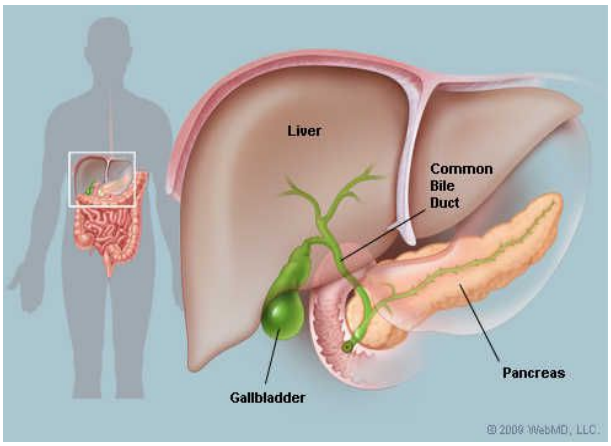

Figure 12.18: Diagram of Liver, Bile and Gallbladder

Source: DLC, Ibadan

Signs and Symptoms

- Pain in the upper abdomen is the main symptom.
- It is usually worse on the right side under the ribs.
- The pain may radiate to the back or to the right shoulder.
- The pain tend to be worse if one breath in deep
- Nausea and vomiting, fever and malaise may also develop

Types

- Acute cholecystitis is due to a bacterial infection causing fever and acute pain over the gallbladder. It is usually treated by rest and antibiotics.
- Chronic cholecystitis is often associated with gall stone and causes recurrent episodes upper abdominal pain. Recurrent bacterial infection may be the cause of chronic cholecystitis, but the physical process leading to gall stone formation may also be important. It is also associated with cholecystitis glandularis proliferans.

Investigation

An ultrasound scan is commonly done to clarify the diagnosis. An ultrasound scan will usually detect gallstones, and if the wall of the gall bladder is thickened. If the diagnosis is in doubt then other more detailed scan may be done.

Complications

If treatment is delayed or not available, in some cases the gall bladder becomes severely affected and even gangrenous. This can lead to blood poisoning (septicaemia) which is very serious and can be life threatening. The gallbladder may burst or may fun fistula between the gallbladder and gut as a result of continued inflammation.

In-Text Question

Mention the complication that can occur during abdominal perineal

resection

In-Text Answer

- Delayed healing,
- haemorrhage,
- persistent perineal sinus tract,
- Urinary tract infections.
- sexual dysfunctions

Treatment

Firstly the person is admitted into the hospital, there will be restriction from food and fluids so that the gall bladder can relax. Fluids and antibiotics can be admitted directly into the vein. The gall bladder is removed to prevent further damage. Laparoscopic cholecystectomy is usually done. Class Activity

Time allowed: 1 hour

Discuss the peri- and post nursing care of cholecystectomy.

Summary of Study Session 12

In this study session, you have learnt the following:

1. A peptic ulcer is a distinct breach in the mucosal lining of the stomach (gastric ulcer) or the first part of the small intestine (duodenal ulcer), a result of caustic effects of acid and pepsin in the lumen. Histologically, peptic ulcer is identified as necrosis of the mucosa which produces lesions equal to or greater than 0.5 cm (1/5″).
2. Colorectal tumour is tumours of the rectum and colon. Second most common internal cancers in the developed countries. Fast growing

incidence among developing countries, attributed to post modernization, acculturation, modification in feeding patterns and lifestyle.

3. Colon cancers are cancers that are confined within the wall of the colon are often curable with surgery while cancer that has spread widely around the body is usually not curable and management then focuses on extending the person's life via chemotherapy and improving quality of life.
4. Cholecystitis is a disease affecting the gallbladder. Most cases are caused by gallstones. Normally if one is diagnosed with cholecystitis the person is admitted to the hospital for treatment with pain killers, fluids, (and sometimes antibiotics) directly into the vein. The inflammation may settle down with treatment.

Self-Assessment Questions (SAQs) for Study Session 12

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 12.1

Write on the symptoms of peptic ulcer

SAQ 12.2

List the risk factors for colorectal cancer.

SAQ 12.3

What is colostomy and mention the types of colostomy

SAQ 12.4

Describe the types of cholecystitis

Note on SAQs

SAQ 12.1

Due to gastric irritation by pepsins and HCl, burning or gnawing pain in the epigastrium and related to eating. Eating relieves pain and taking alkali, heartburn, vomiting (a complication following obstruction of pyloric orifice), emesis contain mainly undigested food, bleeding evidenced by passage of tarry stool, on palpation: pain in the epigastrium.

SAQ 12.2

Risk factors for colorectal cancer

- heredity,
- rectal polyps,
- inflammatory bowel disease,
- smoking and
- alcohol consumption,

- obesity and high consumption of fat

SAQ 12.3

Colostomy is a surgical procedure that allows interstitial contents to pass from the bowel through an opening called the STOMA. The stoma is created when the intestine is brought through the abdominal wall and sutured to the skin. An ostomy in the colon is called colostomy. A colostomy can be short-term (temporary) or life-long (permanent) and can be made in any part of the colon

SAQ 12.4

The types of cholecystitis are:

Acute cholecystitis is due to a bacterial infection causing fever and acute pain over the gallbladder. It is usually treated by rest and antibiotics.

Chronic cholecystitis is often associated with gall stone and causes recurrent episodes upper abdominal pain. Recurrent bacterial infection may be the cause of chronic cholecystitis, but the physical process leading to gall stone formation may also be important. It is also associated with cholecystitis glandularis proliferans

Study Session 13: Quality Of Life Issues

Introduction

In general, quality of life is the perceived quality of an individual's daily life, that is, an assessment of their well-being or lack thereof. This includes all emotional, social, and physical aspects of the individual's life. In health care, health-related quality of life is an assessment of how the individual's well-being may be affected over time by a disease, disability, or disorder.

In this study session, you will be learning about the quality of life and quality of life issues for cancer patients especially.

Learning Outcome for Study Session 13

At the end of this study session, you should be able to:

13.1 Discuss Quality of Life

13.2 Explain the Quality of Life for Cancer Patients

13.1 Quality of Life

Quality of life is a broad term that reflects a patient's overall sense of well-being and satisfaction with living. From the time of diagnosis, the quality of life of every person with cancer is affected in some way. They may be affected socially, psychologically and physically (Ropka, Padila, 2007).

Physical needs

- Weight loss, change in taste and decrease appetite
- Increased bowel movements resulting in diarrhoea or constipation.
- Odours and flatus may arise from stomas, faecal or urinary fistulae.

- Reduced sexual interest and sexual dysfunction
- Erectile dysfunction and ejaculation dysfunction

Psychological needs

- Anxiety and depression
- Body image
- Fertility

Social needs

- Restriction from social activities

Information needs

- Family history

Hypothetical Case Study

Mrs. DT, 55 year old secondary school principal, arrives at the emergency department complaining of severe abdominal pain, nausea and vomiting and constipation. Four days ago, she noticed blood in her stool, but says she thought it was haemorrhoid.

Mrs. DT is Igbo, weighs 90.9kg drinks alcohol occasionally and eats diet high in fat, Two years ago; four benign polyps were removed from her colon. Her brother died of prostate cancer, and her mother and two aunts died of breast cancer

Mrs. DT's abdominal x-ray shows a partial bowel obstruction. She was admitted for more testing, which revels a 2-inch (5cm) descending colon mass and a diagnosis of colorectal cancer was made and she was booked for left hemicolectomy.

Nursing Assessment

Subjective Data

- Past health history: previous benign polyps, haemorrhoid.
- Medication history: Imodium and bisacodly tablets.

Functional Health Patterns

- Health perception - health management: patient occasional feels weak and fatigue, as regards to vomiting and constipation she feels it's as a result of constipation, she has been taking bisacodly, bloody stool she thought it was haemorrhoid but as for severe abdominal pain she does not understand.

Nutrition metabolic pattern: the nurse identifies dietary habit of patient, which include;

- Low fibre intake
- Alcohol intake occasionally
- High fat diet
- Presently feels nauseated

Elimination pattern:

- Vomiting sometimes relieves feeling of constipation
- Constipated often
- Occasional diarrhoea
- Bloody stool

Activity-exercise pattern: able to carry out her activity of daily living and attend to her office activity until the morning of her admission because of severe abdominal pain.

Sleep-rest pattern: patient sleeps well at night until onset of nausea, vomiting and severe abdominal pain.

Cognitive perception pattern: patient is able to express feeling of an abdominal pain, nausea and has background knowledge about cancer.

Self-perception-self management pattern: patient don't feel less of herself before diagnosis, with diagnosis she is afraid.

Role-relationship pattern: she is effective at work as a principal, attends social function, enjoys her role as a mother and grandmother

Sexuality- reproductive pattern: she is a widow, has four children and two grandchildren.

Coping - stress pattern: she enjoy time out with children and grandchildren

Value-believe pattern: she is a catholic, will love to be visited by priest. Religious belief does not interfere with treatment regimen.

Objective Data

- Palpable abdominal mass
- Palpable mass on digital rectal examination

- Colon biopsy reveals presence of cancerous cells

Pre-Operative Nursing Diagnosis

1. Fear related to diagnosis and unknown outcome of surgery as evidenced by patient verbalization.
2. Acute pain related to difficulty in passing stool as evidenced by patient verbalization of pain on defecation
3. Risk for imbalance nutrition less than body requirement related nausea and vomiting

Table 13.1: Pre-operative nursing care plan of Mrs. DT with diagnosis of colorectal cancer

S/N	Nursing Diagnosis	Nursing Objective	Nursing Intervention	Scientific Rationale	Evaluation
1.	Fear related to diagnosis and unknown outcome of surgery as evidenced by patient verbalization	Mrs. DT will verbalize less fear and accurate knowledge of disease process and prognosis within 24hours of nursing interventi on	1. Assess degree of fear and reality of threat perceived by comparing patient verbal/nonverbal responses. 2. Create rapport with patient. 3. Ascertain current knowledge about diagnosis.	1. To identify congruencies or misperception of situation. 2. To establish nurse patient relationship. 3. To assess background knowledge and identify misconception about diagnosis and prognosis.	Patient verbalizes less fear after 24hours of nursing intervention.
2.	Acute pain related to difficulty in passing stool as evidenced by patient verbalization of pain on defecation	Patient will verbalize less pain on defecation within 4hours of nursing interventi	1. Assess level of pain using scale 0 to 1 2. Obtain fluid and diet history. 3. Auscultate abdomen for presence, location and characteristics of	1. It serves as baseline data to evaluate effectiveness of intervention. 2. It helps identify other possible contributing factor.	Patient verbalizes less pain on defecation after 4hours of nursing intervention and throughout hospitalizati

		on and throughout hospitalization.	bowel sounds. 4. Encourage adequate fluid intake. 5. Give prescribed laxative.eg Bisacodly tablet 5mg. 6. Give prescribed analgesic .e.g. paracetamol tablet 1000mg	3. To assess reflecting bowel activity. 4. To soften/ moist stool and enhance easy elimination. 5. It stimulate enteric nerve in the colon thereby increasing bowel movement 6. Non opioid analgesic, effective in relieving mild to moderate pain , by inhibiting synthesis of prostaglandin.	on.
3.	Risk for imbalance nutrition less than body requirement related nausea and vomiting	Patient will show no sign of imbalance nutrition less than body requirement throughout	1. Obtain diet history 2. Ascertain understanding of nutritional needs. 3. Weigh patient. 4. Give oral care. 5. Teach patient deep and slow	1. It serves as baseline data to evaluate effective ness of intervention. 2. To determine patient understanding on nutritional need.	Patient show no sign of imbalance nutrition throughout hospitalization.

		hospitalization.	breathing. 6. Give prescribed anti emetic drug. E.g. chlorpromazine tablet.	3. Patient weight serves as comparative base line data. 4. It cleanses the mouth and stimulates appetite. 5. It promotes relaxation refocuses attention away from nausea. 6. Blocks dopamine receptors thereby relieving nausea and vomiting.	

Post-operative nursing care plan of Mrs. DT with diagnosis of colorectal cancer

1. Acute pain related to surgical incision as evidenced by patient verbalization.
2. Risk for infection related to surgical incision.

Table 13.2: Post-operative nursing care plan of Mrs. DT with diagnosis of colorectal cancer

S/N	Nursing Diagnosis	Nursing Objective	Nursing Intervention	Scientific Rationale	Evaluation
1.	Acute pain related to surgical incision as evidenced by patient verbalization.	Patient will verbalize less pain within 1hours of nursing intervention	1. Assess level of pain using scale 0 to 1. 2. Monitor vital signs. 3. Give diversional therapy 4. Give prescribed analgesic e.g. pentazocin	1. It serves as baseline data to evaluate effectiveness of intervention. 2. Help to identify alteration in acute pain. 3. It provides non-pharmacological pain management by taking patient mind away from pain. 4. Opioid analgesic, effective in relieving moderate to severe pain.	Patient verbalizes less pain after 1hour of nursing intervention
2.	Risk for infection related surgical incision.	Patient will show no sign and symptoms of infection throughout	1. Assess and document skin condition around operative site.	1. Serves as baseline data for management. 2. A first-line defense against	Patient show no sign of infection throughout hospitalizati

		hospitalization.	2. Ensure proper hand washing and maintenance of aseptic technique for invasive procedure. 3. Encourage intake of protein and calorie rich foods. 4. Give prescribed antibiotics e.g. ceftriaxone.	nosocomial infection and reduce the risk of cross-contamination. 3. To maintain optimal nutritional status. Broad spectrum antibiotics of cephalosporin group, active in prevention of infection.	on as evidenced by no redness, swelling or purulent discharge from incision site.

Mrs. DT Progress- after undergoing left hemicolectomy, Mrs DT experienced an uneventful recovery and was discharged home and advice to;

- Avoid exposure to known or carcinogens such as cigarette.
- Eat food high in fruit and fibre
- Keep follow-up appointment
- Encourage other family member on cancer screening and genetic counselling.

13.2 Quality of Life for Cancer Patients

Quality of life for a cancer patient can be defined in so many ways. The

quality of life can be significantly affected by pain, fatigue and other symptoms of cancer and treatment side effects. Stress, family issues and financial concerns can also impact quality of life.

Nurses study cancer patients frequently to understand quality of life while going through cancer treatment. However, they are also aware that quality of life is affected long after the treatment is over. It's not uncommon to hear that people are struggling with fatigue, pain and stress for years after cancer treatment has been completed.

As a nursing student and a nurse to be, the following are your concern about the quality of life for a cancer patient:

What's your quality of life? What makes a difference for you? Here are a few thoughts:

- Do you have continuing pain?
- Are you experiencing peripheral neuropathy?
- What about your level of fatigue?
- What's your stress level?

Summary of Study Session 13

In this study session, you have learnt the following:

1. Quality of life is a broad term that reflects a patient's overall sense of well-being and satisfaction with living. From the time of diagnosis, the quality of life of every person with cancer is affected in some way. They may be affected socially, psychologically and physically.
2. Quality of life for a cancer patient can be defined in so many ways. The quality of life can be significantly affected by pain, fatigue and other symptoms of cancer and treatment side effects. Stress, family issues and financial concerns can also impact quality of life.

Self-Assessment Questions (SAQs) for Study Session 13

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 13.1

Write short note on nursing care of patient with abdominal perineal resection

SAQ 13.2

List 4 questions a nurse should ask a cancer patient regarding quality of life issue.

Note on SAQs

SAQ 13.1

NURSING CARE OF PATIENT WITH ABDOMINAL PERINEAL RESECTION

- ♣ Preparing the patient physically for surgery
- ♣ Providing information about postoperative care including stoma care if a colostomy is to be created,
- ♣ Supporting the patient and family emotionally.
- ♣ The patient will likely need intense emotional support to cope with their prognosis and the radical change in body appearance and function.
- ♣ The patient should be taught side to side positioning.
- ♣ The nurse should teach and assist the patient in proper positioning for taking a sitz bath.

POST-OPERATIVE CARE

- ♣ Pain management.
- ♣ The nurse also monitors the patient for complications such as leakage from the site of the anastomosis, prolapse of the stoma and pulmonary complications associated with abdominal surgery.
- ♣ The nurse assesses the abdomen for returning peristalsis and assesses the initial stool characteristics.
- ♣ Help patients with a colostomy out of bed on the first postoperative day and encourage them to begin participating in managing the colostomy.

Other Nursing care includes:

- ♣ Provide comfort measures and reassurance for patients undergoing radiation therapy.
- ♣ Prepare the patient for the adverse effects of chemotherapy and take steps to minimize these effects.
- ♣ Use strict aseptic technique when caring for I.V. catheters.

- ♣ Have the patient wash his hands before and after meals and after going to the bathroom.
- ♣ Listen to the patient's fears and concerns, stay with him during periods of severe stress and anxiety.
- ♣ Encourage the patient to identify actions and care measures that will promote his comfort and relaxation.
- ♣ Monitor the patient's bowel patterns.
- ♣ Monitors the patient's diet modification, and assess the adequacy of his nutrition intake.
- ♣ Direct the patient to follow a high fibre diet.
- ♣ Caution him to take laxatives or an antidiarrheal medication only as prescribed by the doctor.

SAQ 13.2

The questions includes:

- Do you have continuing pain?
- Are you experiencing peripheral neuropathy?
- What about your level of fatigue?
- What's your stress level?