

DIPLOMA IN REGISTERED NURSING

eLearning Training Program

Course Title: Surgery and Surgical Nursing

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Introduction

Welcome to a new course, Surgery and Surgical Nursing of the Registered Nursing Diploma. This course involves the study of surgical conditions and their treatments. This is a full course done in three phases that is surgery I, Surgery II and Surgery III. It includes General Surgery and Surgical Nursing, Operating Theatre Nursing, Orthopaedic Nursing, Ophthalmic Nursing, Ear, Nose and Throat conditions. It will equip the learner with the knowledge and skills in Surgery and Surgical Nursing, including basic principles of Operating Theatre Nursing and effects of anaesthetic agents to patients. It will let you also acquire knowledge on how to care for patients with surgical conditions, care for patients in all three phases of Surgery i.e preoperatively, intraoperatively and postoperatively. In this course, you will be required to do Theory and Practical aspects.

Course Aim

This course aims to equip you with knowledge and skills in surgery and surgical nursing and management of patients with surgical conditions.

Course Objectives

At the end of the course, you should be able to:

1. Apply the principles of Surgery and Surgical nursing in the management of patients undergoing surgery.
2. Describe the management of a client/patient with trauma, wounds and burns.
3. Describe common surgical conditions affecting the GIT, cardiovascular and respiratory systems .

SURGERY I

Course Content

Surgery I has three main units and these will be done in ten weeks of the second lecture block and has twelve weeks clinical practice

Unit 1: Introduction To Surgery And Surgical Nursing

This unit will introduce you to common concepts and terms used in surgery and surgical nursing, explain the principles of surgery, types of surgery, and the general pre and post operative nursing care of a patient who is to undergo and has undergone surgery.

Unit 2: Physiological Reaction To Injury

This unit will described the inflammatory process, trauma, haemorrhage and shock, fluid and electrolyte imbalance, wounds and wound types, factors promoting and delaying wound healing, burns types, classifications, pathophysiology and how you would manage a patient with various types of burns.

Unit 3: Management Of A Patient With Gastrointestinal Tract, Cardiovascular System And Respiratory System Surgical Conditions

This unit discusses a number of common surgical conditions of the digestive system from the mouth to the anal canal, cardiovascular system and respiratory system. These range from tumours, obstructive conditions, inflammatory diseases, injuries as well as the common procedures and investigations that are carried out on the above systems. You will be asked to practice some of the procedures occasionally as per training requirement of the programme for your proficiency in order to practice.

UNIT 1: INTRODUCTION TO SURGERY AND SURGICAL NURSING

1.1 Unit Introduction

Welcome to the first unit in surgery and surgical nursing of the Registered Nursing. In this unit we shall define the few terms that are commonly used in surgery and surgical nursing, the general principles of surgery, types of surgery, management of a patient undergoing surgery and this will cover pre-operative, intra-operative and post-operative management. Finally you will learn about infection prevention.

1.2 Unit Objectives

By the end of this unit you should be able to:

1. Define the common concepts and terms used in surgery and surgical nursing
2. Explain the principles of surgery and surgical nursing
3. Outline the types of surgery
4. Discuss the management of a patient undergoing surgery
- 5.

1.3 Definition of concepts and terms

Surgery

Surgery: A branch of medicine concerned with diagnosis and treatment of injury, deformity and, disease by manual and instrumental means.

Surgeon: This is a physician who is trained and qualified to perform operations and practice surgery.

Surgical Operation: Is a procedure in which the method of performing anything with instruments on the patient follows a definite routine.

A medical procedure involving an incision with instruments to repair damage or arrest disease in a living body.

Preoperative Phase: This is a period from the time when the decision is made for

A period during which the patient is admitted to the surgical unit where he/she is helped to prepare physically and emotionally for surgical operation

Intra

Operative Phase: This is the period the patient is brought to the operating room until admission to the recovery room after surgery
Post Operative Phase: This is the period of managing the patient after surgery that includes care in the operating room, recovery room as well as during the days following surgery.

Peri – Operative Phase: This is an encompassing term that incorporates the three phases of the patient's surgical experience i.e. preoperative, intra operative and post operative periods.

1.4 General Principles of Surgery

General Principles of Surgery provides an illustrative, instructive, and comprehensive review that depicts the rationale of basic operative principles essential to surgical therapy.

Surgical instruments

It consists of key points of surgical instruments such as information on proper handling of the equipment

Preparing equipment for surgery

This section introduces the methods of equipment sterilization. It includes information about how to prepare equipment for sterilization and how to ensure that proper sterilization is achieved

Preparing patient for surgery

Describing preparation of the operative site

Preparing the surgeon for surgery

Describing preparation of surgeon for surgery. i.e scrubbing, gowning and gloving

The principles of surgery that you will have to follow include the following;

- Make sure that all equipment to be used in a surgical procedure is sterilized or high level disinfected. Start with clean procedures and end with dirt ones
- Always begin with serious cases then proceed to the non urgent ones
- Start with children first and end with adults
- All the procedures must be done 30 minutes to an hour after cleaning the operating environment.

- Wash hands before and after each and every procedure
- Ensure that you put on protective garments before entering the operating room.

1.5 Types of Surgery

Surgery may be classified and performed in different ways and for different reasons. The types or classifications of surgery may include the following:

1. Emergency Surgery

This is a type of surgery done without delay in the interest of the patient's survival. The patient requires immediate attention as the disorder may be life threatening. Examples include severe bleeding (haemorrhage), intestinal or urinary bladder obstruction, fractured skull, gun shot or stab wounds, extensive burns etc.

2. Urgent Surgery

This is the type of surgery done within 24 – 30 hours. The patient requires Prompt attention because if delayed a bit longer may cause worsening (complications) in the condition and thus may require more complicated procedures; e.g. acute gallbladder infection, kidney or ureteral stones.

3. Required Surgery

This is the type of surgery done within a few weeks or months. The patient needs to have surgery at a coming stage as there is no immediate threat to life and complications are not eminent; e.g. prostatic hyperplasia without urinary bladder obstruction, thyroid disorders, cataracts etc.

4. Elective Surgery

This is a type of surgery which is usually planned and whereby failure to do it has no immediate catastrophic end. Thus the patient should be operated on anyway; e.g. repair of scars, simple hernia, vaginal repair etc.

5. Optional Surgery

This is a type of surgery done for personal preference. The decision entirely rests with the patient e.g. cosmetic surgery.

6. Diagnostic Surgery

This is a type of surgery done for diagnostic purposes; e.g. biopsy, exploratory laparotomy, etc.

7. Curative Surgery

This is a type of surgery done for cure purposes; e.g. tumour excision, removal of an inflamed appendix () etc.

8. Reparative Surgery

This is a type of surgery where repairing is done due to damage of the normal structure; e.g. repair of multiple wounds, ruptured uterus or urinary; bladder, etc.

9. Palliative Surgery

This is a type of surgery that is done to relieve the symptoms or effects of a surgical problem without necessarily total removal of the causative factors; e.g. relief of pain, insertion of a nasogastric tube for failure to swallow, gastric distension, etc.

10. Cosmetic/Reconstructive Surgery

This is a type of surgery done for the purpose of beautification or alteration in the natural make up of individuals. The indication is recognised by the person concerned; e.g. mammoplasty, facelift, etc.

Transplant Surgery This surgery is done to replace organs or structures that are diseased or malfunctioning.

Constructive Surgery: This surgery is done to restore function in congenital anomalies. Cleft palate repair (palatoplasty), closure of atrial-septal defect.

Exploratory Surgery: This is a type of surgery that is done to estimate the extent of the disease or confirmation of diagnosis. Examples: Exploratory laparotomy, pelvic laparotomy.

14. According to the field

This is a procedure identified by the field; e.g. gynaecological, obstetrical, Orthopaedics, etc.

1.6 Management of a Patient Undergoing Surgery

The management of a patient undergoing surgery involves three phases namely;

a) *Preoperative Phase.*

A period during which the patient is admitted to the surgical unit where he/she is helped to prepare physically and emotionally for surgical operation

b) *Intra Operative Phase:* This is the period the patient is brought to the operating room until admission to the recovery room

c) *Post Operative Phase:*

d) This is the period of managing the patient after surgery that includes care in the operating room, recovery room as well as during the days following surgery.

Let us now discuss the three phases in details

Pre-Operative Phase

During pre-operative phase you need to set nursing care goals and these include the following;

1. Decrease anxiety in the patient
2. Improve the nutritional status of the patient
3. Make the patient aware of the expected outcome of the surgery and his expected role pre and postoperatively

4. Prevent post operative complications through patient teaching.

Pre-operative phase involves Pre-Operative Care of a patient who about to under go surgery. Pre-operative care is defined as:

The joint care given to clients before surgical operations to ensure that they are emotionally and physically ready to undergo anaesthesia and surgery.

Usually it refers to drugs, surgical instruments/environment, investigations, and patient's physical and emotional preparation.

Pre-operative care has two main components and these are:

- a. psychological preparation
- b. physical preparation

A. Psychological preparation

As you attend to the patient take note of the psychological status of the patient. You have to prepare your patient psychologically in order to allay anxiety. Very few patients face surgery without anxiety. The concerns and fears vary from one person to another. Some may be anxious or afraid of pain and discomfort after surgery others fear disfigurement and incapacity while others fear loss of control or death. Some patients fear because they do not know what to expect (i.e. afraid of the unknown turns to be more threatening than the known). The patient's emotional state and physical condition should receive your equal consideration. Psychological emotions evoke physiological responses which may have an unfavourable effect especially if prolonged. The emotionally disturbed patient may experience a greater problem with urinary retention, vomiting, restlessness during the immediate post operative period. Therefore, during the preoperative phase you need to:

Assess the patient's concerns, his perception of surgery and usual patterns of dealing with stress identified. You can assess the level of the patients' anxiety by observation of behaviour such as hypersensitivity, increased talking, and repetition of questions, crying, physical withdrawnness, decreased social interaction and insomnia. The signs of stress in a preoperative care include:

- Increased heart and respiratory rate

- Increased blood pressure
 - Moist palms
 - Restless movements
- Encourage the patient to reveal his fears and concerns which you should know and show that they are real, acceptable, reasonable and expected. After recognizing the problems, you may initiate a discussion by saying, ***“I am sure you are aware about your impending operation. There may be something I may clarify for you if you would like to talk about it.”*** Unrealistic fears based on misinformation and misconception can be alleviated by providing factual information.
 - Any anticipated change in body appearance must be explained and advise the patient as to the available assistance and how he may manage his life. You may encourage the patient to see and talk with another patient who has had the same and successful operation.
 - Let the operating theatre nurse or the anaesthetist if possible visit the patient two days or the evening before surgery to explain what will be done in the operating theatre and assess the patient’s suitability for surgery. This tends to reduce the fear of the unknown to the patient. You should keep family members also informed and take time to have them informed of how to take care of the patient.

Although the physician is responsible for explaining the surgical procedure to the patient, the patient may ask the nurse questions about the surgery. You as a Nurse should be knowledgeable of the pathophysiology of the condition in order to give factual information to questions the client may ask. This will help to minimize incidences of giving parallel information to that coming from the Surgeon.

Consent form signing for Surgery

A signed consent form is a legal document that gives the explanation of the nature and intended purpose of the operation. This means that the patient has given the right to have an operation done on him. You take time to explain to the patient the indication of the operation using the simplest means available. You as a Nurse should verify that the patient understands everything the physician told them by asking the patient to explain what they have been told.

Patients who are mentally impaired, heavily sedated, or critically ill are not considered legally able to give consent. In this situation, the next of kin (spouse, adult child, adult sibling, or person with medical power of attorney) may act as a surrogate and sign the consent form

Unless the patient is under age (i.e. below 18 years) or is unconscious, the next of kin can sign the consent form. The consent form remains valid just for two weeks and hence you make the patient sign only later on in the preoperative phase of this elective patient.

B. Physical preparation

i. Patient Teaching

You have to teach the patient how to take deep breathing exercises and limb exercises. Deep breathing exercises increase chest expansion there by promotes gaseous exchange and prevent post operative pulmonary complications. The patient is also taught how to cough by supporting the area where the incision is to be made. Instruct him/her to take a deep breath and expel the air through the mouth. Coughing is encouraged post operatively to facilitate the removal of any secretions. Emphasis is placed on none smoking during pre and post operative periods as smoke irritates the respiratory tract and any irritation of the tract predisposes to respiratory infection.

You also encourage lower limb exercises to prevent deep vein thrombosis and pulmonary embolism. Early ambulation will be expected of the patient and that he is expected to get out of bed early, sit on a chair and walk around the room briefly. This promotes normal body function and reduces problems such as

vomiting, wind pain and urine retention. In case of drainage tubes, you explain to the patient that drainage tubes are anticipated post operatively under the Incisional site to drain accumulated blood/fluids .This prevents haematoma formation which can lead to wound gapping. Information about the post operative pain is also necessary and how you will control it.

Assessment/Observations/Investigations

Before treatment is initiated the patient is given a physical examination. During this time the vital signs of temperature, pulse, respirations and blood pressure are to be noted as part of baseline data for future comparisons. All surgical patients undergo diagnostic tests for the circulatory, pulmonary and renal systems. The best laboratory tests include:

- Urinalysis
- Haemoglobin count
- Grouping and cross matching in anticipation of blood transfusion intraoperatively or postoperatively.
- Haematocrit
- Bleeding time and clotting time
- Electrocardiography
- Chest X ray
- Blood sugar test to rule out diabetes mellitus

Take Note

Other Laboratory investigations may be considered such as Liver Function Tests depending on the condition of the patient.

Nutritional status

The nutritional status of a patient undergoing surgery has a direct relation to the success of surgery. The patient who is not well fed tolerates surgery poorly.

Protein deficiency delays wound healing and decreases resistance to infection because of the slow response of antibody reaction. Vitamin C also plays an important role in wound healing since it is necessary for laying down of collagen fibres. Optimum amount of Vitamin B complex are necessary for normal metabolic and maintenance of cellular enzymes. A deficient intake of carbohydrates depletes the liver of glycogen leaving the body without reserved sources of glucose during the period in which food intake is decreased or restricted leading to catabolism of body tissue. If the patient is not obese and can tolerate it, give him/her a high calorie diet, carbohydrate diet and vitamin supplements. Your role is also to feed those who cannot or monitor the intravenous line for those who are nil orally. Loss of body fluids results in electrolyte imbalance and dehydration predisposing the surgical patient to shock. Fluids have to be replaced and keep a record of intake and output. If able to weigh the patient, daily weighing is also necessary and make periodic evaluations to note the patient's progress and readiness for surgery. If the patient has dental caries they must be treated.

Immediate Preoperative Preparation

Immediate preoperative nursing entails care given to the patient few hours before the patient goes to the operating theatre for the operation.

Elimination

(a) Gastric preparation

The patient's stomach should be empty when he goes to the operating theatre to prevent the possibility of vomiting and aspiration of vomitus. All food and fluids are withdrawn or withheld for at least 6 – 8 hours before the scheduled time for surgery and an explanation is given to the patient. Essential oral medication may be given at this time with a small amount of water. If the patient's mouth is dry and uncomfortable, he is given a mouth wash. If the patient has taken food or fluids by mistake the surgeon or anaesthetist should be notified promptly. This will probably necessitate the postponement of the operation altogether or the passing of a nasogastric tube to empty the stomach.

(b) Bowels preparation

The doctor's orders may not include giving an evacuation enema. If the patient had normal bowel movement before the operation the evacuation enema may be unnecessary. Some surgeons prefer that all patients undergoing major surgeries should have an evacuation enema before the evening of operation. This is done to prevent constipation following food restriction when diet and fluids are restricted.

(c) Bladder preparation

The urinary bladder should be emptied to prevent urinary retention during induction and operation. In case of low abdominal or pelvic surgery, a full bladder may interfere with a surgical procedure by making the site less accessible and it may increase the risk of accidental injury to the bladder wall. The patient is asked to void just before preoperative medication is administered. If unable to void the staff in the operating theatre are informed and if necessary catheterization is done on the operating theatre room before surgery. If an indwelling catheter is needed, it is usually inserted in the operating theatre room unless otherwise ordered by the surgeon on the ward.

Local Site Preparation

Although the preparation details if sites differ according to the area being prepared, the basic principles governing are the same. Preoperative skin care is given in order to have the skin as free as possible of dirty particles, hair, cells, secretions and organisms. Shaving of the skin is done when ordered by the surgeon as other surgeons would rather have the patient go to the operating theatre unshaved. Operations on the skull or scalp require shaving of the whole head. If the operation is on the breast the shoulder or arm requires shaving from the elbow over the shoulder to the mid line of the back and the nipple line on the opposite side. The axillae must also be shaved completely. For abdominal operations the whole abdomen and lower thorax must be shaved in all cases. The pubis, groins and upper thigh must be included. For hernia operations the whole abdomen below the costal margin must be shaved. On the hip the

appropriate side of the abdomen, pubis, perineum and the whole of the thigh must be shaved. Lower limb operations require preparation of the whole leg.

Personal Care and Hygiene

The patient has to have a bath, shower or bed bath the evening before or morning of surgery using an antibacterial solution or preparation. And before surgery he is given a clean hospital gown. Clean the mouth, teeth, night before and on the morning of operation to make sure that all food particles are removed. Remove the dentures because they may become displaced during operation and interfere with respiration. All jewellery is removed and kept in a safe place. The hair is combed and neatly arranged back from the face without hair pins, no coloured lips or nail polish for easy checking for cyanosis.

Patient Identification

An identification bracelet should be applied and checked with the correct name, sex, age, date, diagnosis and possible procedure.

Premedication

The main purpose of premedication is to reduce anxiety so that the maintenance of anaesthesia will be smooth. A sedative is usually given a night before an operation to ensure a good night sleep.

Medical Records

All the charts of the patient (laboratory results, X ray films, doctors' and nurses' notes etc) are put together so that they can be taken together with the patient to the operating theatre.

Vi .Communication with family

Tell the family where to wait from and expected time of surgery and who to contact for update during long operations.

Transfer of the Patient to the Operating Theatre

When all is done and the patient is ready inform the operating theatre and put him on the stretcher covered warmly. He is taken to the theatre at the arranged time. A nurse escorts the patient and on arrival to the operating theatre she

introduces herself and her patient to theatre staff. Tell them the necessary information concerning his name, sex, age, diagnosis and possible operation. Show them the latest vital signs taken and the operation site.

Soon after the patient has been taken to the operating theatre, make a post operative bed in anticipation of the patient's return and organize all necessary resuscitation equipment and bed accessories e.g. suction machine, oxygen source, drip stand, TPR tray oral airways, needles, syringes of correct sizes, intravenous fluids, emergency drugs etc. The patient's bed postoperative bed should be near the nurse's station for easy observations.

Emergency Preoperative Nursing Care

Resuscitation

- Do quick assessment of level of consciousness and get brief history concerning pain where, when, how and previous food eaten
- Assess airway, breathing, circulation and hydration status.
- Attend to these immediately to restore normal body functioning.
- In most emergencies, investigations are done at the same time with resuscitative measures.

Airway: inspect for any blockage either by foreign body or secretions and make it patent by suctioning and repositioning.

- Clean the vomitus with a clean cloth gently and avoid trauma.

Breathing: observe the raising and falling of chest wall and listen to breathing sounds

- Count the respirations per minute for baseline data
- Observe for nasal flaring and cyanosis resulting from insufficient oxygen perfusion to the tissue due to obstructed airway
- Check blood oxygen saturation as baseline.
- Commence supplemental oxygen therapy by nasal catheter or mask at 5 Litres per minute.
- Initiate breathing with ambu bag where chest movements are absent and
- Do cardiac massage to stimulate cardiopulmonary activity.

- Intubate with endotracheal tube where necessary and connect patient to the mechanical ventilator for artificial respiration
- Insert an NG tube to decompress the abdomen in cases of abdominal distension.
- This promotes full lung expansion since distension tends to push abdominal organs to the thoracic cage.

Circulation: Check the pulse and blood pressure to rule out hypovolaemic shock

- Ascertain the level of dehydration by checking for skin turgor and sunken eyes or dry lips.
- Access the IV line and commence fluids infusion to restore intravascular volume and correct shock- give plasma expanders
- Intravenous fluids also correct fluid and electrolyte imbalance and provide nutritional maintenance during periods of no oral intake
- Continue monitoring the pulse and BP every 15 minutes
- The foot end of the bed is elevated to promote blood flow to the vital organs of the body such as lungs, brain and the heart.
- The patient is covered with extra linen to keep him or her warm.

In an emergency the preoperative preparation is limited to basic essentials. When the patient is in shock or is bleeding the haemoglobin is checked and blood grouping is done. The intravenous infusion is inserted using normal saline or plasma expanders (dextran) until compatible whole blood is available. If the patient has eaten a meal within 2 hours a nasogastric tube is passed to evacuate the stomach content. In case of intestinal obstruction a nasogastric tube or duodenal tube is passed and intermittent suction started in order to keep the stomach or duodenum free of fluid and gas. Specimen for urinalysis for urinalysis is taken when the patient asked to empty the bladder for surgery. If unable to pass urine then catheterization will be done and then urine taken. This is done to rule out diabetes mellitus. The consent is taken and ensure it is signed. Remove any jewellery and prostheses and reassure the family members.

Table 1:

	EMERGENCY SURGERY	ELECTIVE SURGERY
1.	<p>HISTORY TAKING</p> <p>Being there no time:</p> <p>Get ONLY relevant history for the patient's present condition that is useful for resuscitation and approach for surgery</p>	<p>HISTORY TAKING</p> <p>Being there more time:</p> <p>Get ALL the history patterning to the patient i.e.</p> <ul style="list-style-type: none"> ✓ Social history ✓ Environmental history ✓ Family history ✓ Past medical history ✓ Present medical history
2.	<p>RESUSCITATION</p> <p>Check the vital functions ensuring the ABCs immediately after getting relevant history directing your interventions towards the suspected and or confirmed anomalies with reference to the gotten history.</p> <p>Open an intravenous line at this time for intravenous fluids and or administration of blood.</p>	<p>RESUSCITATION</p> <p>The patient does not need any resuscitation at all but premedication may be given when the time is due i.e. a night before or morning of operation e.g. diazepam, atropine, antibiotics intravenously. This implies opening an intravenous line.</p>
3.	<p>PSYCHOLOGICAL CARE</p> <p>Give psychological care to the patient while preparing him for surgery if conscious. If unconscious emphasis is directed to the relatives both during preparing the patient and when he is in theatre.</p>	<p>PSYCHOLOGICAL CARE</p> <p>Psychological care can come from the doctor, nurse, anaesthetist or any paramedic as long as they are involved in the care of the patient.</p> <p>Fellow patients who successfully underwent similar operation can be called upon to speak to the patient</p> <p>Hospital chaplain/religious leaders can also</p>

		be called to offer spiritual support or care.
4.	<p>CONSENT FORM</p> <p>Quickly explain the importance of signing the consent to the patient if conscious.</p> <p>Let the patient sign if conscious, above 18 years and in a sound state mentally.</p> <p>Relative to sign the consent if the patient is unconscious</p> <p>If no relative available the surgeon can sign on the patient's behalf.</p>	<p>CONSENT FORM</p> <p>The consent form remains valid for 2 weeks so the patient can even sign a day before surgery or on the actual day of surgery.</p>
5.	<p>INVESTIGATIONS/ASSESSMENT</p> <p>Make a very quick appraisal of the patient's physical condition</p> <p>Consider haemoglobin count, grouping and cross matching</p> <p>Random blood sugar test may be done</p> <p>Emergency x ray or ultra sound if indicated may be done.</p>	<p>INVESTIGATIONS/ASSESSMENT</p> <p>All ordered investigations for both diagnosis and ruling out any anomalies must be done</p> <p>Weight can be checked to ascertain the patient's nutritional status and as baseline for certain drugs that require body mass.</p>
6.	<p>SKIN PREPARATION</p> <p>Shave the patient if the condition allows</p> <p>Clean the patient with antiseptic concentration on the incision site.</p> <p>At times shaving can be done even in theatre depending on the degree of the emergency</p> <p>Identify the patient.</p>	<p>SKIN PREPARATION</p> <p>Remove valuables before bathing the patient</p> <p>Bath the patient using antiseptic soap</p> <p>Clean the patient with antiseptic on the incision site</p> <p>Identify the patient.</p> <p>Remove prostheses and nail polish</p>

	Remove valuables immediately. Remove prostheses immediately	
7.	<p>BOWEL PREPARATION AND BLADDER CARE</p> <p>Consider nasogastric tube insertion for gastric aspiration unless otherwise</p> <p>Can give intravenous antibiotics for prophylaxis especially in abdominal surgery</p> <p>Counter check the doctor's orders.</p> <p>Catheterise using an indwelling catheter</p>	<p>BOWEL PREPARATION AND BLADDER CARE</p> <p>Starve the patient 6 – 8 hours before surgery from foods</p> <p>You administer enema/laxatives if not contraindicated.</p> <p>Administer prescribed antibiotics to sterilize the bowel</p> <p>Counter check the doctor's orders.</p> <p>Tell the patient to void 30 minutes – 1 hour before surgery</p> <p>Catheterise.</p>
8.	<p>GOWNING</p> <p>Gown the patient if the gown is within reach and ready</p>	<p>GOWNING</p> <p>Arrange for gown and gown the patient.</p>

Let us now discuss intra-operative phase, but before you proceed do the following activity and confirm the answers as you read the following discussion

ACTIVITY 1: In your notebook write down at least four medical staff that are involved in the intra-operative care of the patient under going surgery

Intraoperative phase

This phase begins when the patient is transferred to the operating room table and ends when he /she is admitted to postanaesthesia care unit. It involves management of the patient in the operating theatre. The purpose of

intraoperative care is to maintain patient safety and comfort during surgical procedures.

Some of the goals of intraoperative care include;

- Maintaining homeostasis during the procedure,
- Maintaining strict sterile techniques to decrease the chance of cross-infection
- Ensuring that the patient is secure on the operating table, and taking measures to prevent hematomas from safety strips or from positioning

Nursing activities during this phase include:

- Monitoring the patient's vital signs, blood oxygenation levels,
- Fluid therapy, medication, anesthesia, radiography, and
- Retrieving samples for laboratory tests.

Intraoperative care is provided by the following medical staff and they work as a team:

- Theatre Nurses
- Nurses, anesthesiologists,
- Nurse anesthetists,
- Surgical technicians,
- Surgeons

Precautions

As a nurse you need to make sure that you take note of the following precautions. Patients undergoing surgery most often are given some type of anesthesia. The administration of general anesthesia has a relaxing effect on the patient's body, which can suppress cardiovascular function or heighten cardiovascular irritability. It may also result in respiratory depression, loss of consciousness, paralysis, and lack of sensation. These effects mean that the patient is in a very vulnerable or critical position. It is your responsibility with the health care team in the operating room to maintain the patient's safety and yet facilitate surgery.

- Ventilation should be assessed by continuous auscultation of breath sounds, and oxygenation should be monitored by continuous pulse oximetry,
- Continuous electrocardiograph (ECG) showing the patient's cardiac function should be in place, and the patient's heart rate and blood pressure should be monitored at least every five minutes. Means to monitor the patient's temperature must be available immediately for use. In case of an emergency backup personnel who are experts in airway management, emergency intubation, and advanced cardiac life support (ACLS) must be available.
- An emergency kit containing the necessary supplies and equipment must be immediately accessible.
- The equipment should be checked daily to ensure proper function.
- In lengthy procedures, areas of the operating table that come into contact with the patient's bony prominences must be padded to prevent skin trauma and hematomas.
- During a surgical procedure many instruments, drapes, and sponges are used. Also, a multitude of care providers may be working in the operative field performing different tasks. It is the responsibility of the nurses working in the operating room to maintain an accurate count of all sponges, instruments, and sharps that may become foreign bodies upon incision closure. Nurses who fail to make accurate counts can be held legally liable.
- Most surgical procedures are invasive and compromise the patient's skin integrity. This increases the risk of infection and to decrease this risk, strict asepsis (sterile technique) must be followed at all times.
- The ventilation system in an operative suite must be efficient and the temperature maintained at 68 –73°F (20 – 23°C). The relative humidity should be maintained at 30%–60%.
- Health care personnel who work in the operating room must not be permitted to work if they have open lesions on the hands or arms, have eye infections, diarrhea, or respiratory infections.
- Scrub attire must be worn by all personnel entering the operating room.

- Fresh scrub attire must be washed and ironed daily and, if heavily soiled during one case, should be changed before the next case.
- Shoes should be changed often or cleaned. Head and facial hair must be completely contained in a lint-free cap or hood.
- Properly fitting disposable surgical masks must be worn at all times and discarded immediately after use.
- Sterile gloves and sterile gowns must be worn by those working in, and area proximal to the sterile field.
- Careful skin preparation with appropriate antiseptic solutions is preformed on the patient's arrival to the operating area.

Complications

Intraoperative complications are surgery related, anesthesia related, or position related.

- One complication which can be life threatening is an anaphylactic (allergic) reaction to anesthesia.
- Another anesthesia-related complication is called "awareness under anesthesia which occurs when the patient receives sufficient muscle relaxant (paralytic agent) to prohibit voluntary motor function but insufficient sedation and analgesia to block pain and the sense of hearing.
- Excessive bleeding during operation may result due to cutting of major blood vessels and or poor ligation.

General post operative nursing care

Post operative nursing care begins when the patient is taken from the operating theatre into the nursing ward and continues even after he is discharged. The focus of the nursing care plan may change from supportive to ambulative as the patient moves towards recovery.

The recovery room

This is the first unit the patient may be taken to immediately after the operation. Most hospitals have recovery rooms either within the operating theatre department or adjacent to it to which the patient is taken on completion of surgery. In few instances he may be returned directly to his ward.

Advantages of a recovery room

1. Constant observation is provided by staff experienced in immediate post operative care and whose attention is undivided.
2. Nearness to the operating theatre reduces the distance the patient has to be transported in a critical period.
3. The equipment necessary for emergencies is concentrated in the area and it is with immediate readiness.
4. One nurse may care for 2 – 3 patients, a situation which cannot be possible on the ward.
5. The patient remains in the recovery room until he fully regains consciousness and his vital signs are stable.

Most hospitals have an Intensive Care Unit, apart from recovery rooms in which critically ill patients are admitted.

Patients without complications after surgery are usually taken to the ward. In the ward to which the post operative patient is to go certain basic preparations are made. These basic equipments assembled by the bed side include the following:

- Sphygmomanometer
- Stethoscope
- Thermometer
- Emesis bowl
- Tissues
- Face flannel
- Recording charts
- Drip stand
- Suction apparatus

- Ambu bag
- Emergency tray
- Sterile syringes and needles
- Tourniquets
- Spirit or alcohol swabs
- Oral pharyngeal airway and endotracheal tubes

Receiving a patient from theatre

Once the operation is successfully done, the theatre crew will send a word to the ward for the nurses to go and collect the patient. As you go to collect the patient from theatre you have to carry with you a tray containing gloves tongue depressor and an emesis bowl in case of patient vomiting or airway occlusion by the tongue. When you reach theatre get hand over from the theatre nurse about further recovery management;

Ensure the patient is breathing by observing the raising and falling of the chest and you can achieve this by feeling warm air from his/her nostrils using the back of your palm

- Check and confirm the patients name and age
- Get details on the type of anaesthesia that was used and the type of surgery that has been done
- Find out from the theatre nurse about the amount of blood that the patient lost during theatre and if there was any replacement that was done.
- Ask if the patient was given any analgesia during surgery. Ask about the drugs that have been prescribed which are to be administered post-operatively.
- Get details about the drains and wounds.
-
- Get details on when the patient can eat and drink water
- Check for the baseline vital signs.

- Get hand over on the specific postoperative plan

Transfer of the patient from the operating theatre to the ward

When a bed is used to transport or carry the patient, he is placed in lateral or semi prone position. If it is a cot bed the cot rails/ sides are raised. If the transfer is on a trolley the dorsal recumbent position is more likely to be used for securing the patient as he is being transferred to the ward. Sufficient covers are used to ensure warmth and protection from draughts. The head is extended and an oral pharyngeal airway may be in place to facilitate breathing. Along with the immediate treatment orders the nurse receiving the patient receives a report on what has been done and receives handover of the patient's condition inclusive of anything special of which she should be alert.

Immediate Post-Op Care In The Ward

Immediate post-operative care is the care the patient is given from operation time up to recovery from anaesthetic effects.

It involves monitoring of general level of consciousness and protection of patient airway and prevention of shock.

This care can be given either in recovery room in theatre or acute bay in the general ward

Let us now look at the objectives of post-operative care

Objectives of post-operative care

The objectives of the post operative care are;

1. Assessing the cardiovascular respiratory functions, level of consciousness, physical abilities, and emotional status and promote comfort.
2. Maintain adequate ventilation
3. Maintain adequate circulation
4. Identifying and evaluating for potential or actual situation and initiate immediate emergency treatment promptly if indicated.
5. Protecting the patient from injury
6. Maintaining optimal nutritional balance

7. Preventing any possible complications
8. Ensuring quick recovery from the effects of anaesthesia and surgery

Environment

The operating theatre communicates with the ward on the pending transfer of the patient and if there is any need for additional items/equipments to be assembled by the receiving ward. Thus the above mentioned equipments are prepared and put where the patient will be admitted usually near the nurses' station or acute bay for easier observation. This environment should be quiet to ensure undue stress is avoided as the patient is recovering. It should be well lit, clean and have good ventilation. The bed should have rails and be in low position to avoid accidental falls and injuries.

Observations

- Immediately the patient is brought to the ward from theatre ensure that you do a quick assessment of the Air, Breathing and Circulation (ABC) so that you will be able to identify any problems which may be due to the effect of general anaesthesia as it is still at play posing great risk for respiratory complications.

Airway

- The airway will be assessed to see whether the patient is awake enough to take his/her own breaths and/or if there is anything blocking the mouth or nose.
- Ensure that the patient is placed in lateral or semi prone position without a pillow under the head as he/she is semiconscious. The head is hyperextended to allow free entry of air into and out of the lungs. This position also reduces the likelihood of the lower jaw and the tongue falling back to block the airway and reduces risks of aspiration should the patient vomit or have excessive mucous secretions
- If the patient is placed in supine position for surgical reasons, then the head should be tilted to the side to allow for free flow of secretions which may occlude the airway.

- The airway should be suctioned regularly to remove excess secretions so as to clear the airway.

Breathing

- Assess respiratory rate, oxygen saturation. Observe for any difficulties in breathing that may be due to blockage of airway by secretions or falling of the tongue backwards.
- Check oxygen saturation and if it is below 90% administer supplemental oxygen via nasal catheter or oxygen mask.
- Assess the adequacy of breathing and see whether it needs to be assisted with more aggressive interventions like a bag and mask (ambu bag) or intubation with an endotracheal tube and a ventilator.

Circulation

- You need to assess the adequacy of the blood pressure and determination of whether intravenous lines are needed for delivery of fluid or medications to support the blood pressure.
- Check If there is any bleeding that is obvious from the Incisional site, and attempts to control it with direct pressure should be instituted by reinforcing the dressing.
- Check random blood sugar (RBS) to make certain that hypoglycemia (low blood sugar) does not exist.
- Ensure you do Pulse Oximetry to monitor the patient's pulse and oxygen saturation in the blood.
- Record temperature, pulse, respiration, and blood pressure as baseline data.
- Note the level of consciousness on admission from theatre and monitor regularly signs of hypovolaemic shock.
- Monitor vital signs including Blood pressure, Respiration, Pulse rate , O₂ saturation and Temperature every after 15 minutes for the first hour and every after 30 minutes for the next 2 hours
- This should be followed by Hourly for the next 2 hours and if the patient's condition becomes stable observations should be done 4 hourly.

- While monitoring these vital signs in the subsequent care it is also important to compare the results against the baseline pre-operative and post anaesthetic vital signs readings.
- Keep on observing the level of consciousness, orientation and ability to move extremities this is to recognize neurological problems
- Observe Intravenous sites for patency and infusions for correct rate and solution
- Observe fluid input and urine output and record on fluid balance chart
- Observe the surgical site for any bleeding and check the wound drainage tubes that they are not kinked if any.

Care of the Urinary catheter

Ensure that the urinary catheter is in situ and it is well positioned, check for its patency and ensure that urine is draining well. Check for urine output and volume hourly. Observe the colour, consistency and concentration for urine.

Pain Management

- Assess pain level, pain characteristics (location and quality) and timing, type and route of administration of last pain medications
- Position the patient in such a way that there is no pressure on the operated site that may cause pain so as to enhance comfort and safety
- Check tightness of the incisional dressing because this may contribute to pain
- Administer analgesics as prescribed and assess their effectiveness in relieving pain
- Offer diversional therapy as the patient regains consciousness to distract his/her mind from pain at Incisional site and this may include; listening to soft music or reading magazine etc.

Subsequent Care This is the care the patient receives after recovering fully from the anaesthesia and the care continues in the general ward up to the time he/she is discharged to go home.

- In subsequent care you need to continue monitoring and managing the patient well to prevent complications that may arise as a result of poor management. The areas that need to be properly managed are: psychological care, nutrition, observations, position, maintenance of clear airway, maintenance of adequate circulation, control of pain, care of the wound, hygiene, elimination, infection prevention

Psychological care

You need to communicate to the patient throughout his/her hospitalization.

- Help the patient become oriented by telling him that his surgery is over and that he is back in his room.
- Reassure the patient in the immediate post-operative period that the medical team are trying their best to assist him/her to recover fast
Explain the procedure that was done and how he/she is progressing.
- Explain to the patient the reasons for all the tubes, lines and equipment to which they are attached and reassure him/her that this is quite normal and not an indication of impending disaster. The reason for doing this is to allay anxiety
- Discuss with patient any unexpected finding or complication encountered during the procedure.
- Ensure that you explain all the details about the operation to patient's relatives so that they too understand what has been done on the relative as this will facilitate their co-operation during management of the patient.
- Explain measures put in place to relieve pain as well as for prevention of complications so as to allay anxiety which could be due to pain.
- Provide information to patient and family so that they are aware of what is happening and this is to prevent the myths and misconceptions about surgery..
- Allow family members to visit the patient after you have completed the initial assessment so that the patient can feel part of the family.

Nutrition/fluids

- Upon waking from anesthesia, patients have an intravenous line, a urinary catheter, and a nasogastric tube in most abdominal incisions.
- Patient should be kept nil by mouth he/she should not be allowed to eat or drink immediately following surgery until bowel sounds return.
- This is to prevent paralytic ileus
- This generally takes between 2 and 3 days and is determined by listening to the abdomen with a stethoscope for bowel sounds (the passage of gas) and asking the patient if he/she has passed flatus.
- The patient is receiving fluids for nutrition and rehydration parenterally.
- Record the intake and output of fluids to prevent overload or under load.
- When bowel sounds return, clear liquids are offered.
- If they are tolerated, the nasogastric tube is removed and the diet is gradually advanced from liquids to soft foods, and then to more solid foods
- The nasogastric tube can be used for feeds if the patient is not taking enough by mouth to meet the body's caloric needs.
- As you offer nutrition ensure that the food contain proteins, carbohydrates, roughage and vitamins to facilitate quick recovery.
- Offer food rich in proteins to preserve muscle tissue and also to aid in healing. Some of the example of high-protein foods include eggs, meats, fish, seafood, poultry, milk, cottage cheese, yogurt and other milk products.
- Offer patient diet containing carbohydrates to provide him/her with energy
- The diet should also contain Vitamin C for quick wound healing as it helps to lay collagen fibres
- Ensure that other essential vitamins are provided for immune boosting hence make them part of patient diet.

Causes of constipation

- Diet restrictions before and after surgery can be responsible for causing constipation.

- Pre and post surgery recommendations like reducing fluid intake and minimizing consumption of solid foods can harden the stools and trigger painful bowel movement.
- **Pain Medication:** The primary reason for constipation after surgery is that the prescribed drugs given for pain relief can cause constipation as side effects.
- **Inactivity:** Getting up and walking or being active is one of the triggers for a bowel movement.
- Postoperative patients spend more time in bed resting leading to constipation
- **Anesthesia:** Anesthesia, though, also paralyzes the muscles: the patient's intestines are paralyzed during surgery along with the arms and legs. This stops the muscle contractions to push food along the intestinal tract. Until the intestines "wake up" there is no movement of feces.

Prevention of constipation

- Medications: the surgeon can prescribe medication for constipation such as a stool softener or an enema to relieve symptoms
- Patients may take a mild stool softener prescribed by the surgeon as a preventative measure, rather than waiting until symptoms develop in some cases.
- Fluids diet: Increasing patient's intake of fluids, avoiding caffeinated beverages and focusing on beverages (water and juice) can help keep you well-hydrated and decrease the risk of constipation.
- Fiber diet whole foods, such as fresh fruit and vegetables, will help decrease the risk of constipation.

Position

The position of the patient will depend on the type of surgery done. It should be such that it does not interfere with the patency of the airway in a variety of situations. Position the patient in the semi prone position until full recovery has taken place after which time the patient can assume a position he finds comfortable. Good positioning prevents secretions from accumulating along the

airway or the tongue from falling back to block the airway. A good position also reduces pain and helps to maintain the integrity of the skin.

Two hourly turnings should be done when the patient is unable to move himself in bed. The patient on traction can be assisted to sit up in bed or move slightly side to side to prevent pressure sore formation.

Maintenance of a clear airway

During the unconscious period in cases where general anaesthesia was used, the patient is placed in a semi prone or lateral position with no pillow under the head unless these positions are contraindicated by the nature of surgery. However, if spinal anaesthesia was used the patient will always be conscious even intra operatively. The above said positions after general anaesthesia use lessen the chances of blockage of the airway by secretions and relaxed the tongue and lower jaw falling back to block the pharynx. The head is hyper extended to facilitate free entry of air and expiration. The excessive secretions can also be removed by suctioning them with a catheter directed into the pharyngeal area. It is rotated and withdrawn slowly. If secretions are beyond the pharyngeal suctioning then a tracheal suctioning may be done. If there is need to give oxygen then give it whenever necessary. It can be given as a supportive measure to prevent hypoxia. If hypoventilation persists the concentration of the blood gases will be determined and mechanical respiratory assistance may be necessary. An unconscious patient may aspirate vomitus. This can be prevented by turning the head sideways and cleaning the mouth and pharynx of secretions by suctioning.

Maintenance of adequate circulation

Assess the patient's skin colour, blood pressure and pulse rate every 5 – 15 minutes, half hourly and hourly until these are stable. Also observe the surgical site for signs of bleeding. Hypotension, shock, cardiac arrhythmias and haemorrhage are common complications that may occur in the immediate post operative period and during the next few days. Hypotension results from

anaesthesia, reaction to drugs, cardiac arrhythmia, and inadequate ventilation and may also result from moving the patient. Following operation it is common for patient's blood pressure to be slightly lower than usual. Systolic pressures between 90 mmHg and below and a pulse rate below 60 beats or above 110 beats per minute require prompt intervention. The cardiac arrhythmia is also due to anaesthesia or can be secondary to cardiac surgery.

Observations

An immediate check is made of the respirations, pulse rate, blood pressure, colour of the skin and mucous membranes and condition of the skin (whether warm or cold, dry or moist) and level of consciousness if general anaesthesia was used.

Observe the wound for bleeding and drainage if there is a catheter and other forms of drainage, observe for colour and patency. These initial observations and the patient's post operative signs serve as an operative baseline data which assists the nurses in recognizing favorable and unfavorable changes in the patient's condition and nursing measures to use. Cardiac arrhythmia, weak pulse, a decrease in systolic or fluctuation in blood pressure, abnormal respiratory rate and volume and bleeding in the wound should be promptly reported to the surgeon. These vital signs should be taken and reported for the first 2 hours. Record intake and output fluid on the fluid balance chart until normal food and fluid intake and urinary habits have been resumed.

Protection of the patient from injury

Cot beds are used on the bed or trolley to protect the patient from falling down. As nurse you should remain with the patient until he is fully conscious and ensure that tubes and essential equipment are not dislodged. This is where general anaesthesia was used.

Control of pain and promotion of comfort

The common discomfort post operatively includes pain, nausea and vomiting, gas pains and apprehension. Surgical patients may experience nausea and vomiting after surgery as a result of toxic effects of anaesthesia. They can also cause pain and anxiety and due to handling of the abdominal viscera in abdominal surgery. Provide assistance to the patient by offering a vomitus bowl and a mouth wash after vomiting. An antiemetic may be prescribed and administered. Empty vomitus bowls promptly and if vomiting persists beyond 24 hours it should be reported as it may indicate a complication.

Care of drainage tubes

After putting the patient in bed comfortably, check in the file for the doctor's orders for specific treatment for example oxygen, intravenous infusion, appropriate drainage system, special positioning and observations. Drainage tubes that are to be connected to appropriate bottles or a suction system must receive prompt attention as they are usually clamped during transit from the operating theatre. If the tube is not quickly unclamped it may become blocked or sufficient pressure will build up in the body cavities to cause serious effects e.g. if a gastrointestinal tube remains clamped following gastric or duodenal surgery, abdominal distension will occur which will in turn cause leakage of secretions into the peritoneal cavity. This may result in peritonitis. Administer any ordered drug in the appropriate dose.

Flatulence and abdominal distension

A patient may experience abdominal pain after surgery. This may include distension of the abdomen and is caused by gas collection following surgery. Most gas is swallowed during nausea or when the patient is tense and fearful or may be due to handling of the intestines during surgery. It can also be caused by lack of food intake that may contribute to a reduction in peristalsis. The distension may be relieved by insertion of a rectal tube for a brief period or by a mild enema. In abdominal surgery foods are withheld until bowel sounds have returned. Keep on reassuring the patient.

Maintenance of nutrition, fluid and electrolyte balance

Blood transfusion may be given during major surgeries. Oral fluids and foods are restricted during the vomiting period and following abdominal operation. Intravenous infusions of electrolytes and glucose solutions are given to meet the patient's normal daily fluid, electrolyte and energy requirements and balance. As soon as vomiting stops sips of water are given and increased in amounts gradually as the patients tolerates. These are also increased progressively as the condition of the patient improves.

Promotion of normal elimination

The patient who is adequately hydrated will void immediately after 6 – 8 hours after surgery. A total urine output will be lower than fluid intake initially and usually because of the body fluids lost during surgery and due to vomiting and fluid retention. The post operative patient may have a temporal disability to void because of the insensitivity of the urinary bladder due to distension of the abdomen. Inhibition to pass urine may also be due to anaesthesia or due to trauma on the urinary bladder. The patient may have a desire to void but is unable because of spasms of the external sphincter. Restlessness or pain, complaints or pressure in the pelvic area or the presence of a palpable mass of fullness above the symphysis pubis, then suspect urine retention.

Distention and retention of urine predispose to urinary bladder infection. If the patient has urinary retention, then a retaining catheter is put for 2 – 3 days to avoid repeated catheterization which can predispose the patient to urinary tract infection and pressure from a full urinary bladder. There should be concern if the urinary output is less than 30ml per hour. Since bowels are usually empty at the time of surgery and that food intake is restricted for 2 – 3 days following abdominal surgery, bowel elimination is not an immediate concern. Advise the patient that delay is normal and that it will not be harmful. Some doctors however, order mild laxatives such as glycerine suppositories or a small enema

two days after surgery. Early ambulation of the patient helps in reestablishing normal bowel movement.

Wound care

The objective of wound care is to have the wound remain firm and uninfected and to heal with minimum scar tissue. On completion of surgery the wound is covered by a sterile dressing, the area is inspected frequently during the post operative period for signs of drainage or bleeding. If the dressing becomes wet with serous drainage, it is reinforced by application of sterile wound pads without disturbing the initial wound dressing. Should bright red blood be evident inform the surgeon promptly and reinforce the pad. After 2 – 3 days the surgeon may order the dressing to be removed and the wound left exposed or covered with a thin layer of gauze. The wound is left exposed to eliminate warmth and moisture which favour infection and cause maceration of the wound edges. Covering the wound is also good in that dehydration retards wound healing and dressings reduce loss of moisture. Sutures are removed between 5 – 7 days depending on the type of the suture used and the rate of healing. If clips or staples have been used to close the wound, these may be removed earlier.

Infection prevention

The universal application of standard precautions is the minimum level of infection control required in the treatment and care of all patients to prevent transmission of blood-borne viruses

Infection prevention ensures a high level of protection against transmission of infectious microorganisms including blood – borne viruses in the health care setting and are recommended for the care and treatment of all patients and in the handling of:

Blood including dried blood and all other body substances, secretions and excretions such as urine, stool etc.

You can achieve infection prevention by carrying out the following;

Hand hygiene

Hand-washing is generally considered the most important hygiene measure in preventing the spread of infection. Everybody should wash their hands before and after significant contact with any patient and after activities that may cause contamination such as;

- Before and after each clinical procedure
- Before and after eating
- After using the toilet
- Before and after using gloves
- After contact with used equipment
- Immediately following contact with body substances

Gloves

Gloves are a form of personal protective equipment. Clinicians and other health care workers should wear gloves whenever there is a risk of exposure to blood or body substances, and should change their gloves and wash their hands after contact with each patient and during procedures with the same patient if there is a chance of cross contamination.

Gloves must be used when

- Handling blood and/or body substances
- Performing venepuncture
- Touching mucous membranes
- Touching non-intact skin
- Handling contaminated sharps
- Performing invasive procedures
- Cleaning body substances spills or any equipment (instruments) or materials (linen) or surface that may have been contaminated by body substances

Other personal protective equipment;

- Protective eyewear and face shields must be worn during procedures where there is potential for splashing, splattering or spraying of blood or other body substances
- Impermeable gowns and plastic aprons should be worn to protect clothing and skin from contamination with blood and body substances
- Footwear should be enclosed to protect against injury or contact with sharp objects

Needle stick or sharps injury prevention

- Minimise handling of needles, sharps and clinical waste
- Not bend or recap needles or remove needles from disposable syringes
- Use safe needle-handling systems including rigid containers for disposal, which should be kept out of the reach of toddlers and small children
- Ensure 'sharps' containers are available at the point of use or in close proximity to work sites to aid easy and immediate disposal.

General Post Operative Complications

1. Wound infection

Wound infection is commonly manifested by fever, increased pulse rate (tachycardia), generalized malaise, redness, swelling and tenderness of the wound area. Spontaneous purulent drainage occurs unless if the infection is deep in which case the surgeon may remove a suture and probe the area to facilitate pus drainage. A pus swab is for culture and sensitivity to determine the causative organism and institute appropriate antibiotic treatment. An antibiotic or sulphonamide will be prescribed and administered if ordered. Frequent application of hot moist dressings may be ordered to increase the blood supply to the area and promote drainage of exudates. Even if the wound is infected, strict aseptic wound dressing technique is used to prevent introduction of secondary infection. When soiled dressings are removed they are immediately placed in a plastic bag for disposal. Precautions should be taken to prevent contamination of

beddings and other objects in the environment and prevent transmission of infection to other patients and staff.

2. Haematoma formation

A haematoma is a collection of blood usually clotted in tissues under the Incisional area. This may impair blood clotting mechanism. Patients receiving anticoagulant therapy for a period of a period of time preoperatively are more at risk of developing a haematoma. In this condition the wound edges are elevated and discoloured. If the haematoma is small and causing minimal discomfort it may be left to be absorbed. If the swelling interferes with vital functions causing discomfort and if impairing healing, the surgeon will evacuate the clot by needle aspiration or reopening the wound.

This is usually prevented by leaving drainage tubes in situ after an operation to drain accumulated blood from the Incisional area.

3. Dehiscence

Dehiscence is the separation of the edges of the incision caused by excessive strain on a wound such occurs in prolonged abdominal distension or severe coughing or wound infection (evisceration), malnutrition and general debilitation. Suturing or application of adhesive strips may be used to pull the edges of the wound together to allow healing.

4. Evisceration

Evisceration is the separation of all the tissue layers (skin, fascia and peritoneum) in an abdominal wound and the protrusion of a loop of the intestine onto the surface may occur. Evisceration is usually sudden and the patient experiences something giving way and a warm sensation on the skin surface due to the escape of peritoneal fluid. If this occurs the surgeon must be notified immediately and sterile dressings of normal saline are applied to the exposed intestines. If a large portion of the intestine is out or eviscerated, a sterile towel moistened with normal saline will be used to provide better protection. A binder may be applied for support. The patient in this condition is requested to lie very

still in bed with someone to remain with the patient to provide reassurance and a sedative may be ordered to allay anxiety. Induced vomiting or lavage is contraindicated as these will increase the intra abdominal pressure and more intestines will be eviscerated.

5. Respiratory complications

Most often are seen hypoventilation, atelectasis and embolism but whatever the pulmonary complication is, hypoxia is the common problem. It may be manifested by headache, restlessness, irritability, apathy, dullness and crowded consciousness. The pulse rate increases and arrhythmias may develop. Hypoventilation occurs frequently in the immediate post operative period as a result of respiratory centre depression caused by drugs or general anaesthesia. Then atelectasis can result due to the obstruction of the bronchial tubes by aspirated material or by a plaque of mucus. If the collapsed area is large, the patient becomes dyspnoeic and cyanosed. His respirations rapid (tachypnoeic) and shallow; the chest expansion is decreased on the affected side. The temperature and pulse rate will be elevated. On examination, there is percussion dullness and absence of sounds in the area. The trapped secretions tend to harbour organisms leading infection (pneumonia) in the collapsed lung. Pneumonia may develop independently of atelectasis. Any retained secretions in the alveoli and bronchial tubes readily become infected. The patient usually complains of cough and chest pains. The temperature, pulse and respiratory rates will be elevated and the sputum becomes purulent and stained with blood.

Respiratory complications can be prevented by:

- Recognizing early even mild respiratory infections and reporting promptly. Surgery must be arranged if the patient shows any early signs of respiratory infection.
- Offering a good nutritious diet as this contributes to the patient's resistance to infection and discouraging smoking in clients who smoke preoperatively.
- Ensuring the patient's stomach is empty before anaesthesia administration to reduce the danger of aspiration of vomit during and after surgery. The patient

should be positioned in lateral or semi prone position to prevent obstruction of the airway and to promote the drainage of secretions and vomitus during surgery/recovery from drugs. Use of suctioning whenever necessary to remove secretions from the mouth assists in the prevention of pulmonary complications. Deep breathing exercises, coughing and change of position also assist in the prevention of pulmonary complications. Early ambulation of the patient will also assist in the prevention of chest complications.

6. Haemorrhage

Bleeding may occur as a result of a slip of ligature. It may also be due to an increase in blood pressure opening up previously collapsed blood vessels or due to a dislodgement of a clot that had plugged a blood vessel. The bleeding may be seen at the site of operation or may be concealed (not seen) internally and only be manifested and recognized by change in the vital signs and the patient's general condition. Loss of blood causes a fall in blood pressure, a rapid thready pulse and deep rapid expiration. It also causes pallor, apprehension, restlessness etc. Dressings should be checked frequently on the site of operation for signs of bleeding and the body area checked for swelling/distension. If the patient is bleeding then reinforce the dressing or sometimes he may be taken back to theatre for ligation of bleeding vessels.

7. Hypotension

Hypotension or low blood pressure than normal may result in sudden changes in position in the immediate post operative period. To avoid this complication a change in position by the patient should be made slowly and the patient's responses monitored. Persistent or prolonged hypotension post operatively should be reported to the surgeon.

8. Shock

Shock may develop during or immediate following surgery or may develop slowly and become evident several hours after operation. It may be secondary to a

severe infection (bacteraemic shock) or respiratory complication that occurs later. Early signs of shock include decrease in blood pressure, restlessness, pallor, cold and clammy skin, rapid and weak pulse cyanosis etc. Shock a serious complication and a life threatening condition and as such prompt recognition and action are necessary to prevent the condition from occurring or becoming irreversible.

9. Deep Vein Thrombosis (DVT) and Thrombophlebitis

Deep vein thrombosis is formation of a clot in a vein due to stasis of blood and the development of is mostly in the lower limbs. Pressure on the calf and prolonged flexion of the legs should thus be avoided in order to prevent thrombosis as they slow circulation. Although a patient may find a pillow under his knees, this is dangerous as it promote venous stasis. Frequent foot and leg exercises may play an important role in the prevention of deep vein thrombosis in patients confined in bed. Thrombus formation is a silent process. There may be some tenderness in the calves of the legs that is accidentally discovered by pressure or felt on stretching the calf muscle. There are no evident signs and symptoms in this condition. In this condition, an anticoagulant is prescribed to prevent formation of a large thrombus. This is a very dangerous condition because the clot may carried along the blood stream and may eventually block a blood vessel causing an embolism which is quite fatal.

10. Cardiac Arrhythmia

This complication may occur due to anaesthetic agents or due secondary to surgery of the heart. Ventricular arrhythmias may lead to cardiac arrest and these require continuous monitoring and immediate intervention.

11. Cardiac Arrest

Cardiac arrest is a rare complication but requires emergency treatment. It may also occur due anaesthetic agents or operation involving the heart. The post operative patient should thus be closely monitored soon after a major operation

and especially in surgeries where general anaesthesia is used. A cardiac arrest trolley and emergency drugs should always be kept available in the recovery room.

12. Paralytic ileus

May occur following the operation. The bowel is normally in constant motion, digesting food and absorbing nutrients.

Disturbing the bowel, even by the surgeon's just touching it, can cause the motion to come to a standstill.

Fluid and gas may then cause the bowel to swell or distend

- A nasogastric tube is passed through the nose and into the stomach to relieve the distension.
- When bowel function returns to normal (evident by passing gas or having a bowel movement), the tube is removed.
- Until that time, food and liquid are not permitted by mouth, and hydration is maintained intravenously

1.7 Summary

In the above unit we defined the common terms and concepts used in surgery and surgical nursing, phases of the surgical patient, the basic principles of surgery and surgical nursing, the various types of surgery, the general preparation of a patient who is to undergo surgery and infection prevention. You were also given a tabular summary of the comparison between emergency and elective preoperative interventions you have to carry out on a patient who is to undergo surgery. A number of general possible complications a patient who has undergone may develop were also discussed.

1.8 Self -Assessment Questions

1. What are the reasons for surgery?
2. Which information must the nurse give before an operation to the patient?
3. What are the nursing activities and observations by pre operative care

4. What are the nursing activities and observations by intraoperative care
5. What are the nursing activities and observations you are to do in your post operative care?
6. How can you as a nurse prevent postoperative complications?

UNIT 2: PHYSIOLOGICAL REACTION TO INJURY

2.1 Unit Introduction

Welcome to the second unit of Surgery and Surgical Nursing Course. In our previous unit we looked at the basic components and in this unit we shall look at trauma and the inflammation process, haemorrhage and shock, and fluid and electrolyte imbalance. The unit will also specifically focus on tissue injuries caused by burns and their management.

The main objective of the unit is for you to be able to describe the management of a client/patient with an injury/wound.

2.2 Unit Objectives

By the end of this unit you should be able to:

1. Explain the process of inflammation
2. Describe the management of a patient with trauma
3. Describe the management of a patient with wounds
4. Explain the management of a patient with burns

2.3 Inflammation

Definition

ACTIVITY:

Take your note book and write the two types of inflammation

Inflammation is the process by which body tissues respond or react to injury or infection.

Inflammation can occur in the absence of infection while infection cannot occur without inflammation.

Inflammation is sometimes called 'natural' immunity which provides immediate protection against the effects of tissue injury and invading foreign proteins. The ability to produce inflammatory response is critical to health and well-being.

Inflammatory process must be tightly regulated by the immune system to avoid excessive tissue damage and spillover to normal tissue

Cardinal signs of inflammation

- Heat (calor)
- Redness (rubor)
- Swelling (tumor)
- Pain (dolor)
- Loss of function



Cellulitis: Severe bilateral inflammation and swelling of the legs

Figure 1: Severe bilateral inflammation and swellings of the legs

Types of inflammation

There are two types of Inflammation and these are

- Acute Inflammation
- Chronic inflammation.

Let us now look at the two types of inflammation in details one by one, and we shall start by looking at acute inflammation and then discuss chronic inflammation.

I now nvite you to pay attention as I discusss with you the two types of inflammation.

Acute Inflammation

Acute inflammation is a rapid response to an injurious agent that serves to deliver mediators of host defense which are leucocytes and plasma proteins to site of injury for the immediate commencement of the healing process and or stoppage of bleeding.

Causes

1. Infection and microbial toxins (bacterial, viral, fungal, parasitic)

2. Trauma which can be blunt or penetrating trauma
3. Physical and chemical agents e.g. thermo injuries, burns, frost bite (extreme coldness)
4. Foreign bodies e.g. swelling thorns, needle, pins etc
5. Immune reactions e.g. swelling due to bee bite

There are two main components of acute inflammation and these are:

1. Vascular changes and this involves:

- Vasodilation
- Vascular permeability

Increased adhesion of white blood cells

2. Cellular events

Cellular recruitment and activation of neutrophils (polymorphonuclear leukocytes)

a. Chronic Inflammation

Chronic inflammation is of longer duration and is associated histologically with the presence of lymphocytes and macrophages, the proliferation of blood vessels, fibrosis and tissue death (necrosis).

Causes

1. Persistent infections by certain microorganisms such as mycobacterium tuberculosis, Treponema pallidum causing tuberculosis and syphilis respectively.
2. Prolonged exposure to potentially toxic agents either exogenous or endogenous for example pulmonary silicosis (Sica in the lungs)
3. Autoimmunity – immune reactions develop against the individual's own tissues leading to auto immune disease or self-perpetuating immune reaction that results in tissue damage and inflammation e.g. rheumatoid disease, Systemic lupus erythematosus, Multiple sclerosis

4. Prolonged exposure to a rough surface causing chronic friction e.g. a jagged tooth.

Features of chronic inflammation

Chronic inflammation = long duration

Components:

- Lymphocyte, plasma cell, macrophage (mononuclear cell) infiltration
- Tissue destruction by inflammatory cells
- Repair with fibrosis and angiogenesis (new vessel formation)

Table 2A c

	Acute	Chronic
Causative agent	Pathogens, injured tissues	Persistent acute inflammation due to non-degradable pathogens, persistent foreign bodies, or autoimmune reactions
Major cells involved	Neutrophils, mononuclear cells (monocytes, macrophages)	Mononuclear cells (monocytes, macrophages, lymphocytes, plasma cells), fibroblasts
Primary mediators	Vasoactive amines, eicosanoids	IFN- γ and other cytokines, growth factors, reactive oxygen species, hydrolytic enzymes
<i>Onset</i>	Immediate	Delayed
Duration	Few days	Up to many months, or years
Outcomes	Resolution, abscess formation, chronic inflammation	Tissue destruction, fibrosis

Process of inflammation

- The mechanism of inflammation is basically the same regardless of the injuring agent. The intensity of the response depends on the extent and severity of injury and on the reactive capacity of the injured person. The

inflammatory response can be divided into a vascular response, a cellular formation of exudate and healing.

a. Vascular Response

After cell injury arteries in the area briefly undergo transient vasoconstriction. After the release of histamine and other chemicals by the injured cells, the vessels dilate. This vasodilatation results in **hyperaemia or redness** (due to increased blood flow into the area) which raises filtration pressure. Vasodilatation and chemical mediators cause endothelial cell retraction which increases capillary permeability. Movement of fluid from capillaries into tissue spaces is thus facilitated. Initially composed of serous fluid, this inflammatory exudate later contains plasma proteins, primarily albumin. The proteins exert oncotic (tissue) pressure that further draws fluid from the blood vessels. The tissue thus becomes oedematous.

As the plasma protein fibrinogen leaves the blood, it is activated to fibrin by products of injured cells. Fibrin strengthens a blood clot to trap bacteria, prevent their spread, and thus to serve as a framework for the healing process.

b. Cellular Response

The cellular response to injury results into slowing of blood flow through capillaries in the injured area as fluid is lost and the blood viscosity increases. Neutrophils and monocytes move to the inner surface of the capillaries (margination) and then, in amoeboid fashion, through the capillary wall (diapedesis) to the site of injury. Neutrophils and monocytes accumulate at the focus of injury by chemotaxis which is the directional migration of white blood cells. These phagocytose particles.

Neutrophils are the first leucocytes (white blood cells) to arrive (usually 6 – 12 hours) and have a shorter life span (24 – 48 hours). Monocytes usually arrive at the site within 3 – 7 days after the onset of inflammation. In the tissues monocytes transform into macrophages which have a longer life span as they

can multiply in the tissue and stay for weeks. They remain to clean the tissues of dirty material before healing can occur.

Lymphocytes arrive later at the site of injury. They function primarily by producing substances that aid in attacking foreign material. T – lymphocytes kill foreign cells directly or do so by releasing a variety of lymphokines which enhance the activity of phagocytic cells. They are T – lymphocytes and are responsible for delayed allergic reactions, rejection of foreign tissue, or destruction of tumour cells. This is the cellular immunity. B – lymphocytes are lymphocytes that are capable of differentiating into plasma cells. Plasma cells in turn produce immunoglobulins or antibodies – protein molecules that destroy foreign material by several mechanisms. This is the humoral immunity.

Eosinophils and basophils have a more selective role in inflammation. They function in hypersensitivity reactions. They work to neutralise histamine while basophils produce and store histamine and other substances involved in hypersensitivity reactions.

c. Exudate Formation

Exudate consists of fluid and leucocytes that move from the circulation to the site of injury. The nature and quantity of exudate depend on the type and severity of the injury and the tissues involved.

d. Cellular Healing

The reparative process begins at approximately the same time as the injury and is interwoven with inflammation. Healing proceeds after the inflammatory debris is removed. Healing may be by regeneration, in which gradual repair of the defect occurs by proliferation of cells of the same type (hyperplasia) as those destroyed, or by replacement, in which cells of another type, usually connective tissue, fill in the tissue defect, resulting in scar formation.

Signs and symptoms of inflammation

Local – Cardinal Signs and Symptoms

1. **Redness** – Is caused by dilatation of capillaries in the injured area allowing more blood.
2. **Warmth/Heat** – Is due to increased blood flow to the area bringing with it more heat from the central part of the body.
3. **Swelling** – Is caused by plasma which is poured in the underlying tissues by extravasation of intravascular fluid.
4. **Pain** – Is due to accumulation of toxins irritating the nerve endings and hormones released locally from the nerve fibres and stretching caused by excess fluid in the tissue which increases as the tension grows.
5. **Loss of Function** – Occurs as a result of pain, swelling and toxin effect on the tissue itself. The patient's natural desire is to rest and avoid using any painful part.

General – Systemic

1. General body malaise
2. Loss of appetite
3. Fatigue
4. Fever
5. Tachycardia
6. Oliguria
7. Constipation

2.4 Trauma

Trauma is the physical injury that causes damage to the body structure or alters the body function.

Trauma is an injury or wound that affects/disrupts the continuity of any tissue caused by external force or violence. It generally results in a physical effect on the body e.g. pain and loss of function.

Classification of trauma

There are two main classifications of trauma may be classified according to the severity and this can be as follows:

- Minor trauma
- Major trauma

The types of injury can involve various systems of the body e.g. skin, skeleton, nervous, respiratory, cardiovascular digestive, renal, reproductive systems etc. By knowing the normal anatomical structure and physiology of the various systems, it is possible to observe the changes that may occur due to injury to any tissue.

Pathophysiology of trauma

The body responds to traumatic injury both systemically and at the injury site. This response attempts to protect vital organs such as the liver, to allow further cell duplication and to heal the damage. The healing time of an injury depends on various factors including sex, age, and the severity of injury. Various organ systems respond to injury to restore [homeostasis](#) by maintaining perfusion to the heart and brain. [Inflammation](#) after injury occurs to protect against further damage and starts the healing process. Prolonged inflammation can cause [multiple organ dysfunction syndrome](#) or [systemic inflammatory response syndrome](#). Immediately after injury, the body increases production of glucose through [gluconeogenesis](#) and its consumption of fat via [lipolysis](#). Next, the body tries to replenish its energy stores of glucose and protein via [anabolism](#). In this state the body will temporarily increase its maximum expenditure for the purpose of healing injured cells

Cause

Trauma can be caused by any combination of external forces that act physically against the body and this can affect a person in different ways, both anatomically and physiologically. Trauma can affect different parts of the body and it can be caused by two types of objects and these are:

- **Blunt objects:** This may be caused by falls, assaults and sport. It can affect the head, spinal cord, thorax and abdomen.
- **Penetrating objects:** This is caused when a [foreign body](#) such as a bullet or a knife enters the [body tissue](#), creating an open wound or it may result from the foreign objects set in motion. It can affect internal organs such as intestines, liver, spleen and vascular system

Signs and symptoms of trauma

The symptoms of injury can manifest in many different ways including:

- [Altered mental status](#)
- Fever
- [Increased heart rate](#)
- Generalized [edema](#)
- Increased [cardiac output](#)
- Increased rate of metabolism

Let us now look at how to manage a patient with trauma.

Management

Immediate management at the scene of accident

Depending on the severity of injury, quick management and transport to an appropriate facility may be necessary to prevent loss of life or limb. The initial assessment is critical in determining the extent of injuries and what will be needed to manage an injury, and treating immediate life threats. The assessment involves a physical evaluation and this is done by assessing the Airway, Breathing and Circulation of blood (ABCs):

- A- Ensure that there is no airway obstruction- and this may be due to blood, teeth, tongue, or vomiting
- B- Ensure that the patient is breathing well- assess if the patient has pneumothorax and tension pneumothorax which will cause difficulties in breathing.

C- Ensure that the circulation is good: You have to look for signs of hemorrhage (external and internal) and hypovolemic shock Chest trauma-bleeding into pleural space Abdominal trauma-bleeding into abdominal Cavity, Pelvic fracture which may be indicated by patient bleeding into retroperitoneal space

Management in the hospital

Management of those with trauma often requires the help of many healthcare specialties including physicians, nurses, respiratory therapists and social workers. Cooperation allows many actions to be completed at once. Generally the first step of managing trauma is to perform a primary survey that evaluates a person's airway, breathing, circulation, and neurologic status. After immediate life threats are controlled a patient is either moved into an operating room for immediate surgical correction of the injuries, or a secondary survey is performed which is a more detailed head-to-toe assessment of the patient.

Indications for intubation include airway obstruction, inability to protect the airway, and respiratory failure. Examples of these indications include penetrating neck trauma, expanding neck hematoma, and being unconscious among others. In general, the method of intubation used is [rapid sequence intubation](#) followed by ventilation.

Assessment of circulation in those with trauma includes control of active bleeding. When a patient is first brought in, vital signs are checked, an [ECG](#) is performed, and, if needed, vascular access is obtained. In those with [cardiac arrest](#) due to trauma chest compressions are considered futile but still recommended. Correcting the underlying cause such as a [pneumothorax](#) or [pericardial tamponade](#) if present may help.

Investigations/ Diagnosis

Physical examination

Primary physical examination is undertaken to identify any life-threatening problems, after which the secondary examination is carried out. This may occur during transportation or upon arrival at the hospital. The secondary examination consists of a systematic assessment of the abdominal, pelvic and thoracic areas,

a complete inspection of the body surface to find all injuries, and a neurological examination. Injuries which may manifest themselves later may be missed during the initial assessment, such as when a patient is brought into a hospital's emergency department.[22] Generally the physical examination is performed in a systematic way that first checks for any immediate life threats (primary survey), and then taking a more in depth examination (secondary survey).

Imaging

- *Chest X-ray and pelvic X-ray:* These are commonly taken for those patients with major trauma. Depending on the mechanism of injury and presentation a focused assessment with sonography for trauma (FAST) exam may be done to check for internal bleeding.
- *CT scan:* This may be useful for those with relatively stable blood pressure, heart rate, and sufficient oxygenation. Full-body CT scans, known as pan-scans, may improve the survival rate of those who have suffered major trauma.

Intravenous fluids

High volume [intravenous fluids](#) are given to patients with poor perfusion due to trauma. This is appropriate in cases with isolated extremity trauma, thermal trauma, or head injuries. There should be limiting use of fluids for penetrating thorax and abdominal injuries, as they may allow mild hypotension to persist. The targets for blood pressure include a [mean arterial pressure](#) of 60 mmHg, a [systolic blood pressure](#) of 70–90 mmHg, or until adequate ability to think and peripheral pulses are present.

The solution of choice of intravenous fluids used for initial resuscitation is warmed Ringer's [Lactated solution](#). If blood products are needed, a greater relative use of [fresh frozen plasma](#) and [platelets](#) to [packed red blood cells](#) will be used to improve survival.

Medication

Medications may be used in conjunction with other procedures to stabilize a patient who sustained a significant injury.

Surgery

The decision whether to perform surgery is determined by the extent of the damage and the anatomical location of the injury. Bleeding must be controlled before definitive repair can occur. [Damage control surgery](#) is used to manage severe trauma in which there is a [cycle](#) of [metabolic acidosis](#), [hypothermia](#), and [hypotension](#). It involves performing the least number of procedures to save life and limb; Less critical procedures are left until the victim is more stable.

Complications of trauma

1. Inflammation
2. Degeneration
3. Circulatory disturbances
4. Infection
5. Haemorrhage
6. Haematoma formation
7. Airway obstruction if involving the respiratory tract

In the next section we shall discuss soft tissue injury. But before then, I now invite you to do the following activity

You can now proceed to the next section which discusses Soft Tissue Injury

Soft Tissue Injury

Definition:

This is the damage of muscles, ligaments and tendons throughout the body and usually it occurs from a sprain, strain, a one off blow resulting in a contusion or overuse of a particular part of the body resulting in pain, swelling, bruising and loss of function (Lovering, 2008).

Causes

Soft tissue injury is caused by direct or indirect trauma. Direct trauma may happen in connection with sports or other accidents, being struck by an object or falling.

Indirect trauma may result from overuse of the tissue. For instance, assembly line or factory workers often suffer from this type because of the many repetitive movements they have to do many times a day.

Types of soft tissue injury

Soft tissue injuries include:

- Ligament sprains (e.g. sprained ankle),
- Tendon strains,
- Repetitive stress injury
- Carpal tunnel syndrome.

Signs and symptoms

- Pain,
- Swelling,
- Bruising and
- Loss Of function

Treatment

Immediately after the event causing the injury apply ice packs on the affected area Ice 20 to 30 minutes each two to three hours so as to minimise swelling Encourage the patient to take rest to avoid pain and further damage Ensure you bandage and elevate the injured part. If patient can't move normally or if the pain and swelling are still present after a couple of days then patient will require further management and the treatment options might include:

- Physiotherapy exercises to promote healing, strength and flexibility
- Electrotherapy
- Manual techniques such as mobilization and massage
- In general, the injury will heal in phases: The first phase typically lasts 72 hours and is marked by swelling, redness, warmth and pain. The second phase is the repair phase and lasts 48 hours to six weeks. During this

time, the body will create scar tissue (collagen), and the patient may experience pain and/or discomfort. The third is most important phase and is called the remodeling phase because the collagen is remodeled to replicate the damaged tissue. This phase will last three weeks to one year or more. Severe injuries where the tissue has completely ruptured require surgery to sew the torn pieces back together.

Trauma to Internal Organs

Trauma to the internal organs can lead to internal bleeding. Usually, the bleeding results from obvious injuries that require rapid medical attention. Internal bleeding may also occur after a less severe trauma or be delayed by hours or days. Some internal bleeding due to trauma stops on its own. If the bleeding continues or is severe, surgery is required to correct it.

Causes of Trauma to Internal Organs

Trauma to the internal organs may occur after any significant physical injury. There are two main types of objects that can cause trauma to the internal organs, and either may cause internal bleeding:

- **Blunt object.** This kind of object causes blunt trauma and this happens when a body part collides with something else, usually at high speed. [Blood](#) vessels inside the body get torn or crushed either by shear forces or a blunt object. Examples are car accidents, physical assaults, and most falls.
- **Penetrating object.** This kind of object causes penetrating trauma and this happens when a foreign object penetrates the body, tearing a hole in one or more blood vessels. Examples are gunshot wounds, stabbings, or falling onto a sharp object.

Almost any organ or blood vessel can be damaged by trauma and cause internal bleeding. Some of the examples of internal injuries are:

- Head trauma with internal bleeding (intracranial hemorrhage)
- Trauma to the [lungs](#) (hemothorax)

- Trauma to the [heart](#) (hemopericardium and cardiac tamponade)
- Tears in the large blood vessels near the center of the body (aorta, superior and inferior vena cava, and their major branches)
- Trauma to the abdomen such as liver or spleen lacerations or perforation of other soft organs

Symptoms of Internal Bleeding Due to Trauma

Trauma to the internal organs causes internal bleeding that is obvious and serious. Patients naturally seek immediate medical help because of [pain](#). Sometimes, internal bleeding may occur after a less severe trauma. As the bleeding continues, symptoms appear and steadily get worse. Symptoms depend on the type of trauma and what body part was involved. For example:

- Abdominal pain and/or swelling can be caused by Internal bleeding from trauma in the [liver](#) or [spleen](#). These symptoms get worse as the bleeding continues.
- Light-headedness, [dizziness](#), or [fainting](#) can result from any source of internal bleeding once enough blood is lost.
- A large area of deeply purple [skin](#) (called ecchymosis) can result from bleeding into the skin and soft tissues.
- Swelling, tightness, and pain in the leg can result from internal bleeding in the thigh. Most often, this is caused by a fracture of the thighbone.

[Headache](#) and loss of consciousness could be the result of Internal bleeding in the [brain](#).

If the patient with trauma has any of the above mentioned signs tis/her condtion should be treated as a medical emergency.

Haemorrhage and shock

Haemorrhage (Bleeding)

Definition

Haemorrhage is loss of fresh blood from an artery, a vein or a capillary. simply bleeding.

Types/classifications of haemorrhage

1. Primary Haemorrhage

This is the type of bleeding that occurs at the time or within the first 24 hours of operation or injury.

2. Secondary Haemorrhage

This is the type of bleeding that occurs after 24 hours after operation usually due to an unsecure tying, infection or erosion of the blood vessels by drainage tube that results in the slipping of a ligature.

3. Reactionary Haemorrhage

This is the type of haemorrhage that occurs during the first few hours after an operation due to a rise of blood pressure from its normal level leading to dislodgement of a clot in an untied blood vessel. Haemorrhage can also be classified according to the kind of blood vessel involved from which the blood is coming. Thus it may be termed as

- **Capillary Haemorrhage**

This is a type of bleeding that occurs from a capillary. It is characterized by a slow general oozing of blood.

- **Venous Haemorrhage**

This is a type of bleeding that occurs from a vein. It is characterized by a quick bubbling of dark coloured blood

- **Arterial Haemorrhage**

This is a type of bleeding that occurs from an artery. It is characterized by appearance of blood in spurts with each heartbeat. It is brighter in colour. Haemorrhage can either be evident (revealed) or not seen (concealed).

Clinical manifestation

The clinical signs presented by a client who is bleeding depend on the amount of blood lost and the rapidity of its escape. Refer to notes on shock below

1. The client is apprehensive and restless
2. Thirsty

3. Cold skin moist and pale appearance
4. Rapid pulse rate
5. Temperature falls
6. Respirations are rapid and deep often of the gasping type (air hunger). If the haemorrhage progresses untreated, cardiac output decreases arterial and venous pressure and haemoglobin of the blood falls rapidly, lips and conjunctiva become pale.

Management

1. The patient is placed in shock position and sedatives or analgesics are administered as prescribed.
2. The wound should always be inspected for bleeding and if bleeding is evident, a sterile gauze pad and bandage is reinforced.
3. Blood transfusion of whole blood is done and intravenous fluids especially plasma expanders are also given.

2.7 Shock

Definition

- Shock is a circulatory condition in which there is loss of effective circulating blood volume and inadequate organ and tissue perfusion resulting in derangement of cellular functions.
- Shock is the body's response to decreased circulating blood volume that results into impairment in tissue perfusion which culminates eventually into cellular hypoxia.

Classification of Shock

1. Haemorrhagic/Haematogenous/Oligaemic shock

This is the type of shock that results from the loss of plasma or whole blood. This may be external (revealed) or internal (concealed). When more than 10% of the blood volume is lost **hypovolaemia** (low body blood volume) occurs.

Haemorrhage means loss of circulating whole blood. Normally, the blood pressure of the arteriole side of circulation is higher than that of the venous side.

2. Neurogenic/Psychic/Vaso vagal shock

This is the type of shock that results from extreme or excruciating pain or fear (anxiety) and it occurs immediately as a result of fright e.g. receiving bad news or sudden severe pain to a sensitive part. There is marked vasodilatation and reflex inhibition that results in a sluggish circulatory system depriving vital centers of blood supply. This simply means due to the fall in blood pressure, blood collects in the lower extremities because of reduced pressure leading to venous return impairment. This causes tissue hypoxia, fainting and finally death if not treated promptly.

3. Bacteraemic/Septic/Toxic shock

This is a type of shock that results by a change in the capillary endothelium permitting loss of blood plasma through capillary walls into the surrounding tissues by extravasation. There is no actual fluid volume loss from the body. It is due to e coli and organisms causing gas gangrene. These organisms produce toxins which cause vasodilatation that leads to a drop in the blood pressure.

4. Cardiogenic Shock

This is the type of shock that results when there is an interference with the pumping of the heart as might occur in myocardial infarction or cardiac tamponade. These lead to inadequate blood circulation to heart muscle.

Other Types Of Shock

- **Burns Shock**

This is the type of shock that results from loss of blood volume due to rapid plasma loss from damaged tissues and excessive red blood cell destruction. This is common in extensive burns as much of the skin and underlying tissue that prevent unnecessary fluid loss from the body are destroyed.

- ***Dehydration/Diarrhoea/Vomiting Shock***

This is the type of shock as the name implies results from extra vascular fluid loss.

- ***Pleural/Retroperitoneal/Mediastinal Shock***

This is the type of shock that occurs when there is sudden leakage of blood or alimentary secretions in these compartments (pleural cavity, peritoneal cavity or in the space behind the sternum).

- ***Anaphylactic/Histamine Shock***

This is a type of shock that follows an injection of a serum, e.g. antitetanus serum. It may happen in patients who are allergic to serum of those who at one time had the injection and were sensitized. It comes about due to substances released known as histamines which act on blood to cause them to dilate and the resultant low blood pressure secondarily causing anaphylactic shock.

Altered physiology of shock (Pathophysiology)

Shock is always either accompanied by loss or withdrawal of blood from the body's main vascular channels. This results in the fall in the cardiac output which eventually leads into low blood pressure and diminished oxygenation to tissues. There is vasoconstriction (narrowing of blood vessels) which is nature's first aid for shock. The arterioles become narrow thus the blood pressure is maintained. When this happens blood pressure is also maintained and hence oxygenation to tissues is as well maintained. This is a protective mechanism which works for a time; i.e. the time for the threat to life to stop. It is during this time that interventions to correct the cause can be put in place. The patient may completely recover giving a type of shock known as **Reversible Shock**. If the cause of the shock is not treated or the shock persists, then oxygen supply to tissues is diminished, tissues die and this leads to a type of shock called **Irreversible Shock**.

Clinical manifestation

1. **Pallor:** - This results from loss of effective circulating blood volume which initiates a metabolic and physiologic reaction that leads to poor perfusion and hence the pallor.
2. **Hyperventilation:** - This is caused by stress leading to alkalosis which follows acidosis. This makes the patient hunger for air and therefore hyperventilates or struggles to take more air to counteract the alkalosis.
3. Release of Pituitary Hormones lead to;
 - a. Adrenocorticotrophic Hormone (ACTH) release that stimulates the adrenal cortex to secrete glucocorticoid resulting in glucose in urine (**glycosuria**) or blood (**hyperglycaemia**).
 - b. Antidiuretic Hormone (ADH) release that stimulates the kidney tubules to absorb more water and leading to less urine production (**oliguria**).
 - c. Aldosterone Hormone (AH) release that stimulates sodium chloride (NaCl) retention leading to fluid collection in tissues (**oedema**).
4. Release of Adrenaline and Noradrenalin that promote vasodilatation of bigger vessels and capillary vasoconstriction to increase blood flow to vital organs centrally and reduce blood flow to peripheral vessels leading to a **cold and clammy skin** respectively.
5. Acidosis causes lungs to compensate with the resultant increased lung volume leading to fast breathing (**tachypnoea**) to reverse the acidosis.
6. The heart rate accelerates while the systolic blood pressure lessens (hypotension) due to reduced coronary perfusion. With more passage of time pulse and blood pressure become more and more unrecordable and cardiac arrest ensues.
7. Weak thready pulse and subnormal temperature resulting into hypothermia and the patient is described as having morbid and moribund.
8. Lip cyanosis, reduced salivary secretion and dry oral mucous membrane follow due to peripheral vasoconstriction causing less blood flow.

9. Apprehension and nervousness is experienced by the patient initially and if not reversed there is progressive loss of sensation and muscle fatigue becomes apparent. This leads to the patient being lethargic.

Table3TableFigureTableFigure

	Approximate deficit Volume (milliliters)	Decrease in blood volume (%)	Degree of severity	Signs
1.	0 – 500	0 – 10	None	None – Overcome by the body's compensatory reactions
2.	500 – 1200	10 – 25	Mild	<ul style="list-style-type: none"> ✓ Slight tachycardia ✓ Mild hypertension ✓ Mild peripheral vasoconstriction ✓ +/- Oliguria
3.	200 – 1800	25 – 35	Moderate	<ul style="list-style-type: none"> ✓ Thready pulse i.e. 100 – 120/min ✓ Systolic blood of pressure 90 – 100mmHg ✓ Diaphoresis ✓ Anxiety/Apprehensive ✓ Air hunger/hyperventilation ✓ Oliguria
4.	1800 – 2500	35 – 50	Severe	<ul style="list-style-type: none"> ✓ Thready pulse 120+/min ✓ Systolic blood pressure of 60mmHg ✓ Marked diaphoresis ✓ Little or no urinary output (Oliguria – Anuria)

Principles Of Management Of Shock; Summary

1. Identify and Remove the cause
2. Replace blood/fluids;
 - a. If due to haemorrhage
 - b. If due to burns;
 - i. Replace plasma
 - ii. Give dextran
 - iii. Give haemacells
3. Position of the Patient; elevate the lower extremities at about 20°. Keep knees and trunk horizontal and the head slightly elevated.
4. Keep the patient warm slowly but do not over heat
5. Relieve the pain by administering morphine or pethidine as prescribed
6. Administer vasoconstrictors as early as possible because if delayed this may cause damage to the liver, kidneys or brain. Commonly drugs used include;
 - ✓ Methidine 15mg
 - ✓ Noradrenalin intravenously 4ml in a litre of normal saline
 - ✓ Hydrocortisone (Hemissuccinate) 100mg intravenously

Oxygen therapy in shock

The value of oxygen therapy in shock is rather disputing but that certain condition in which is useful. Oxygen may be administered when an open airway is maintained and to assist increase the high concentration of blood oxygen.

Oxygen may be administered in such conditions and situations such as;

- a. Chest injuries
- b. Severe haemorrhage
- c. Gas gangrene, coal gas poisoning (carbon monoxide poisoning)
- d. Morphine intoxication
- e. Pulmonary oedema
- f. Spontaneous pneumonia

- g. Fat embolism
- h. Myocardial infarction
- i. Acute bronchitis and pneumothorax.

Oxygen may be administered by various ways. The best way to give it may be by a face mask and the correct amount of oxygen varies from 4 – 6 litres per minute depending on the source.

Nursing Management Of Shock

1. Keep the airway patent
2. Remove oral and tracheal secretions and institute resuscitative measures if necessary
3. Arrest haemorrhage in case of haemorrhagic shock. Place the patient in the most physiological position;
 - a. Elevate the head (pillow)
 - b. Keep the trunk horizontal
 - c. Elevate lower extremities at about 20 – 30° keeping knees straight.

Take Note

Do not use the Trendelenburg head down position because after the initial increase of blood to the head a reflex compensatory mechanism takes place causing vasoconstriction thereby decreasing blood supply to brain. The viscera tend to fall and press against the diaphragm causing increased resistance to breathing and poor ventilation. Call the medical officer who will ensure adequate venous return by carrying out a number of procedures.

Fluid And Electrolyte Imbalance

Trauma patients lose a significant amount of fluid through blood loss and third spacing, which is a lack of equilibrium between the intracellular and extracellular

fluid. The fluid remains extracellularly, but moves to areas that usually do not have fluid accumulation, like bowel lumen, subcutaneous tissues, retroperitoneal or peritoneal space, and the peritoneal cavity. Fluid accumulation in these areas exerts pressure on organs and removes fluid from the intravascular space, which requires sufficient volume to maintain cardiac output.

Surgical patients, either trauma or non-trauma, tend to begin surgery volume-depleted.

This is due to blood loss from trauma or because of dehydration caused by the long-term decreased fluid intake that occurs in disease states such as pancreatitis or cholecystitis. In contrast, post-operative patients tend to be fluid positive due to resuscitation during the procedure.

Fluid resuscitation is extremely important in patients with major trauma because they are at high risk for developing shock, and so increased insensible fluid losses in these patients need to be replaced. Fluid resuscitation is an important initial therapy in critically injured patients with volume losses. After resuscitation is complete, fluid administration should be decreased to replace sensible and insensible losses and maintain appropriate fluid balance. Replacement of fluid needs are determined based upon patient's condition.

Fluid and electrolyte replacement

Fluid replacement is a large part of therapy in patients with trauma who have lost a lot of blood. Initial fluid replacement begins with the resuscitation phase. Rapid administration of large volumes of fluid replaces fluid lost from the intravascular space and prevents further decompensation due to low circulating volume. This strategy is important in treating many conditions including shock, trauma and burns. After the resuscitation period, fluid administration is adjusted to replace ongoing sensible and insensible losses. Fluid replacement is provided in the form of either crystalloids or colloids. Crystalloids are fluids with a high volume of distribution. The main component of crystalloids is water, with additional electrolytes and/or dextrose

The next section discusses wounds But before then I would like you to pause a while and try remember the important issues that you have already covered in the earlier sections of this course, because what you are going to study is very much related to what was discussed earlier in this course.

Very good for remembering the important issues that you studied in the earlier section of this course. Let us now look at wounds.

2.5 Wounds

A wound is a cut or break in the continuity of any tissue caused by injury or operation.

Cause

It is caused by a transfer of any form of energy into the body which can be either to an externally visible structure like the skin or deeper structures like muscles, tendons or internal organs.

Types of wounds

Wounds can be generally be grouped into two categories or classes.

Closed wounds: These are wound types, which have an intact epithelial surface, and skin cover not completely breeched and examples are: Contusion, Bruise, Hematoma

Open wounds: These are wounds caused by injury which leads to a complete break of the epithelial protective surface and examples are: Abrasion, Laceration, Puncture, Missile injuries, Bites

However there are different types of wounds which include the following:

1. **Lacerated wound:** This is that type of injury that has rough or jagged edges e.g. that which is sustained in an RTA, barbed wire injury etc.
2. **Incisional wounds:** These are types of injuries made by sharp objects. They have edges that are evenly separated e.g. those wounds made by surgeons during surgery.
3. **Punctured wounds:** These are wounds that are caused by sharp pointed objects causing a small opening through the skin. These are commonly caused by such objects such as nails, knives, gun shots etc. they appear

small superficially but involving deeper structures such as nerves, blood vessels or viscera which may be damaged and contamination carried into deeper tissues.

4. **Contused wounds:** These are a type of wounds that involve superficial injuries without damage to the skin surface. They are commonly caused by blunt surface forces and are characterized by a considerable soft pad. These are known common causes of haematomas.
5. **Poisoned wounds:** These wounds are those type of wounds that involve direct contamination by the source of the injury such as snake bites, insect bites, dog bites especially where rabies organisms exists.
6. **Concussions:** These are a type of wounds that result from vigorous shaking such as the severe shaking of the head causing brain function derangement without structural damage.
7. **Abrasions:** These are wounds that result from rubbing a body tissue especially the skin against a rough surface leading to loss of superficial tissue due to friction. These are characteristically painful and superficial.

Wounds can also be classified surgically and these may be as follows;

1. Contaminated Wounds

These are wounds which are exposed to excessive amounts of bacteria. These wounds have a higher risk of infection e.g. unprepared colon surgery, dirty laceration etc.

2. Infected Wounds

These are wounds that have infected material in them. They usually have pus or slough on their surfaces. Common infecting organisms include streptococci, staphylococci etc.

3. Clean Wounds

These are wounds that have been rendered clean by cleaning with the use of disinfectants such as savlon, povidone iodine, methylated spirit, etc.

4. Debrided Wounds

These are wounds whose top infected (necrotic tissue and pus) tissue has been removed surgically by a process known as *SLOUGHECTOMY* or *DEBRIDEMENT*.

Processes of wound healing

Wound healing is a complex biologic process of restoring normal tissue continuity. There are integrated sequences of events leading to cellular proliferation and remodeling. Under normal conditions it starts immediately following the event of wounding and passes through basic mechanisms with the following four phases in all wounds.

Phases of healing

1-Coagulation phase:

2- This is the first phase of healing which is induced immediately following injury. It is characterized by vaso-constriction, clot formation and release of platelets and other substances necessary for healing and help as a bridge between the two edges. **Inflammatory phase:**

This phase takes place from time of wounding up to three days. It is characterized by classical inflammatory response, vasodilatation and pouring out of fluids, migration of inflammatory cells and leukocytes and rapid epithelial growth. **Proliferate Phase:**

This phase is also known as phase of fibroplasia, starts around the 3rd day of injury and stays for about three weeks. This is a phase during which important events occur for healing of the wound. It is characterized by fibroblast, epithelial and endothelial proliferation, Collagen synthesis, and ground substance and blood vessel production.

4. Maturation phase:

This phase is also known as phase of remodeling, this takes the longest period which may extend for up to one year. Equilibrium between protein synthesis and degradation occurs during this phase with cross linking of collagen bundles leading to slow and continuous increase in tissue strength of the wound to return to normal.

Types Of Wound Healing

Wound healing can be classified into three clinical types: Healing by first, second and third intention.

1. Healing By First Intention or Primary Union

This is a type of healing of clean wound closed primarily to approximate the ends. This type of wound healing takes place aseptically with minimum or no tissue destruction. The wound margins (edges) are neatly approximated with little granulation and scar formation.

2. Healing By Second Intention or Granulation

This is type of wound healing that occurs on wounds that result from trauma (laceration), ulceration, infection and with irregular wound edges. There is extensive tissue loss that makes wound edges difficult to approximate. This healing occurs in wide, contaminated wounds, which are not primarily closed. Healing takes place by granulation tissue formation, tissue contraction and epithelialization. Tissue growth starts from the depth to the surface upwards and from sides to the centre. Granulation becomes the primary feature of secondary intention wound healing and scarring.

3. Healing By Third Intention or Secondary Suture

This is also called healing by Tertiary Intention. This occurs in wounds which are left open initially for various reasons and closed later (delayed primary closure). In other ways it is a type of wound healing which occurs when there is delayed suturing of a wound or if there is a breakdown of the initial suture with massive infection and loss of tissue. It also involves bringing together two opposite granulation tissues together with the result of a deeper wider scar.

Factors that Promote Wound Healing

Factors that promote wound healing are many. The factors can promote the healing process of the wound either negatively or positively. In general terms, the

factors that promote repair can be categorized into local and systemic. Local factors are those that directly promote the characteristics of the wound itself, while systemic factors are the overall health or disease state of the individual that affect his or her ability to heal. Many of these factors are related, and the systemic factors act through the local effects affecting wound healing..

A. Local factors

These are factors that directly influence the characteristics of the wound itself.

- *Good Oxygenation*

Oxygen is important for cell metabolism especially for energy production and is important in all wound healing processes.

- *Good Blood supply*

Adequate blood supply to the affected area is essential. This will promote wound healing because blood carry all the necessary nutrients required in wound healing. Adequate supply/circulation of blood to and from the wound area in order to supply nutrients and oxygen to facilitate wound healing, and antibodies, phagocytes etc, as well as good venous drainage to remove unwanted by products of metabolism. This can be achieved by;

- a. Heat/warmth as prescribed
- b. Elevation of the affected part
- c. Exercises
- d. Administration of blood in order to increase the red blood cell count.

B. Systemic factors

1. *Young Age*

Children wounds heal faster than the elderly. Advanced age slows collagen synthesis by fibroblasts, impairing circulation requires long time for epithelialisation of the skin, and alters phagocytic and immune responses.

2. **Drugs**

a. **Antibiotics** decrease frequency of infection but decision to use systemic, local or any should be based on patient's condition, type, length and environment of surgery, wound contamination, and immune status.

b. NSAIDS

Anti inflammatory effects has a positive influence

3. Good Nutrition

Good nutrition boosts the immunity and there by promote wound healing. Good Nutrition; containing e.g.

- a. Vitamin C – which encourages formation of collagen fibres and new capillaries
- b. Protein – which improves or increases amino acid supply for tissue repair
- c. Zinc – which improves epithelialization

Let us now look at factors that delay wound healing **Factors That Delay Wound healing**

Healing of a wound can be affected by various conditions and these can be local or systemic factors. The following are examples of factors which down grade a healing process. **Local factors**

- Ischemia and decreased oxygen tension
- Presence of foreign bodies
- Closure under tension
- Infection
- Irradiation

Systemic factors

- Poor metabolic status as in systemic diseases like diabetes, cirrhosis, renal failure, malignancy...
- Poor nutritional State (hypo proteinemia vitamin and mineral deficiency)
- Decreased resistance due to immune suppression, chronic infection
- Drug therapy like steroids, cytotoxic agents

1. Poor Metabolic status

E.g diabetes mellitus: Diabetes mellitus decreases collagen synthesis, retards early capillary growth, impairs phagocytosis (as a result of hyperglycaemia), reduces supply of oxygen and nutrients secondary to the disease

2. Low Immunity

Poor general health causes generalized absence of factors necessary to promote wound healing.

3. Infection

Bacterial colonization of the wound may delay the healing process of the wound. Infection delays healing by;

- Mechanical separation of wound edges
- Decrease blood supply
- Prolong inflammatory and debridement phase
- Bacteria produce proteolytic enzymes

Bad Nutrition

Bad nutrition lowers the immunity and thereby delaying wound healing. Nutritional Deficiencies may include the following;

- a. Vitamin C deficiency – which delays formation of collagen fibres and new capillaries
- b. Protein deficiency which impairs or decreases amino acid supply for tissue repair
- c. Zinc deficiency which impairs epithelialization

Foreign bodies

The presence of a foreign body inhibits wound healing as the body's reaction to foreign body begins immediately after an injury leading to accumulation of exudate at the site of the injury. This leads to formation of foreign body giant cells, encapsulation of foreign object and chronic inflammation

1. Old Age

The physiological changes that occur with aging place the older patient at higher risk of poor wound healing. Reduced skin elasticity and collagen replacement influence healing. The immune system also declines with age, making older patients more susceptible to infection. Older people can also present with other chronic diseases, which affect their circulation and oxygenation to the wound bed.

2. Dehydration

This leads to an electrolyte imbalance and impaired cellular function. It is a particular problem in patients with burns

Drugs

- Corticosteroids retard wound healing particularly if given before inflammation begins. Corticosteroid therapy – impairs phagocytosis, inhibits fibroblast proliferation and function, depresses formation of granulation tissue, inhibits wound contraction etc.
- **Topical insulin** increases protein synthesis, cellular multiplication, wound contraction, and fat deposition.
- *Antibiotics* decrease frequency of infection but decision to use systemic, local or any should be based on patient's condition, type, length and environment of surgery, wound contamination, and immune status

Table 44 Factors

Local Factors	Systemic Factors
<ul style="list-style-type: none"> • Oxygenation • Infection • Foreign body • Venous sufficiency 	<ul style="list-style-type: none"> • Age and gender • Sex hormones • Stress • Ischemia • Diseases: diabetes, keloids, fibrosis, hereditary healing disorders, jaundice, uremia • Obesity

Local Factors	Systemic Factors
	<ul style="list-style-type: none"> • Medications: glucocorticoid steroids, non-steroidal anti-inflammatory drugs, chemotherapy • Alcoholism and smoking • Immunocompromised conditions: cancer, radiation therapy, AIDS • Nutrition

Management of a client with wounds

The primary goal of wound management is to aid the natural body process to produce optimal functional and cosmetic result. This requires an understanding of the basic principles of wound care and the process of healing. Failure to do this may result in delay of healing and unwanted secondary complications which may be distressing to the physician, patient and family and may lead to greater economic loss

As a wound heals many elements such as adequate nutrition, cleanliness, rest, and position determine how quickly the process occurs. Although post operative dressings are initially changed by a member of the surgical team, subsequent dressing changes in the immediate post operative period are usually done by a nurse. A dressing is applied to a wound for one or more of the following reasons;

1. To provide a proper environment for wound healing
2. To absorb excessive drainage
3. To splint or immobilise the wound
4. To protect new epithelial tissue from mechanical injury
5. To protect the wound from bacterial contamination and from soiling by faeces, vomitus, and urine etc.
6. To promote haemostasis, as in a pressure dressing
7. To provide mental and physical comfort of the patient.

Assessment

Determining when and how the wound occurred is important because a treatment delay exceeding 3 hours increase infection risk. Using aseptic technique, the clinician inspects the wound to determine the extent of damage to underlying structure. Sensory, motor, and vascular functions are evaluated for changes that might indicate complications.

The area around the wound should be kept clean i.e. hair around should be removed especially if it is anticipated that the hairs will interfere with wound healing and closure. The wound is irrigated with normal saline solution or polymer to remove surface dirt. Devitalized tissue and foreign matter are removed because these impede wound healing and may encourage infection. Any small bleeding vessels are clamped and tied. After wound treatment a non adhesive dressing is commonly applied to protect the wound.

Antibacterial agents such as povidone iodine (Betadine) or hydrogen peroxide are used on the wound but these should be allowed deeper into the wound. They are used initially in the treatment. Disinfectants are commonly and routinely used in the management of wounds and they include savlon, chloherxidine, hibitane etc.

Types Of Wound Dressings

Wound dressing is done according to the immediate assessment, the state of the wound, and objective of the surgeon concerned. Thus dressings may be described as;

1. Wet dressings
2. Moisture retentive dressings
3. Occlusive dressings
4. Pressure dressings
5. Medicated dressings

During your clinical experience you have to learn how to dress wounds using the specific methods as described in your procedure manual.

2.6 Burns

Introduction

Burns are tissue injuries resulting from direct contact with a flame, hot liquids, and gases or with surfaces, caustic chemicals (acids and alkali), electricity or radiation. Most commonly the skin is damaged which compromises its function as a barrier to injury and infection. *Refer to your Anatomy and Physiology notes for the skin and its functions.*

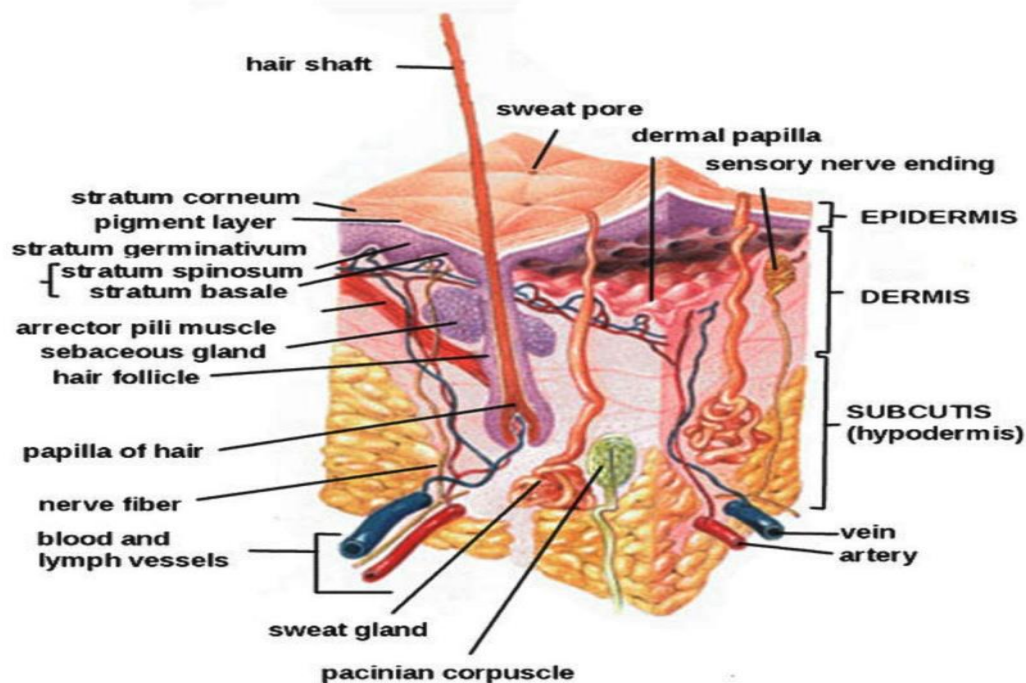


Figure 2: Anatomy of the Skin

Figure 3: Anatomy of the skin

Causes

1. Flame of fire
2. Steam or hot water
3. Chemicals
4. Lightening
5. Electricity
6. Friction (is an occasional cause)

Types of burns

1. Hot thermal burns
2. Electrical burns
3. Chemical burns
4. Cold thermal burns
5. Inhalation burns

Classification of Burns

The classification of burns is determined by the depth of the tissue injured and the extent of the body surface area involved. The depth gives the description of the physical appearance of the burns and the extent indicates the percentage of the body surface area that has been damaged. The depth of tissue damage and the destruction of a burn are indicated by the classification such as superficial, partial thickness or full thickness.

1. Superficial Burns (First Degree Burns)

These burns involve the destruction of only the superficial epidermal tissue. They are characterized by a bright red appearance (**erytherma**) there is no loss of the epidermis. The patient feels a lot of pain (**hyperalgesia**). Healing takes place between 2 – 10 days and the result of healing is a normal skin without scarring.

2. Partial Thickness Turns (Second Degree Burns)

These burns involve the epidermis and the upper layers of the dermal cells remain undamaged. This type of burns is usually painful and blisters form due to the separation of the epidermal and dermal layers caused by collection of fluid. Healing takes places spontaneously between 10 – 14 days. The healing is normal to slightly pilled or poorly pigmented skin. Skin grafting may be done at times to quicken recovery and provide a protective cover on the burn wound surface.

3. Full Thickness Burns (Third Degree Burns)

These burns are characterized by the destruction of the full skin thickness and its appendages i.e. hair follicles, sebaceous glands and underlying tissue e.g.

subcutaneous tissue, fat, tendons etc. they appear white and waxy or charred and do not change on capillary compression.

Full thickness burns are not painful because of the destruction of the sensory nerve endings though the patient may complain of pain due to the marginal tissue burn of the lesser depth burnt. In these types of burns spontaneous regeneration and replacement of skin is not possible following/due to damage of the whole skin and underlying tissues.

4. Complicated Burns (Fourth Degree Burns)

These burns involve the whole skin depth, underlying fat tissue, muscle, tendons and even bones. These are likely to occur when one is continuously exposed to intense heat. This may result in a condition called compartment syndrome, which threatens both the life and the limb of the patient. Grafting is required if the burn does not prove to be fatal and damaging marrow tissue. These burns are almost always fatal, and if the victim does survive, will definitely require amputation.

Pathophysiology

The pathophysiology of burns may be divided into four stages. These stages overlap each but in general they are as follows;

- ✓ Stage of neurogenic shock
- ✓ Stage of fluid loss
- ✓ Stage of infection and slough formation
- ✓ Stage of repair.

a. Stage Of Neurogenic Shock

This is the first stage of a burns episode and it may prove to be fatal (dangerous). In this stage, there is flight, terror and hysterical or tension reaction of the individual. There is a lot of pain produced by the irritation of a thousand of nerve endings in the skin. The tension and terror hypotension – flight factors in this stage precipitate the fall in blood pressure (**hypotension**) to shock levels from which the patient may never recover. This is especially true of the young and the very old.

b. Stage Of Fluid Loss – Shock

In this stage there are alterations in the vascular system. Immediately after a burn injury occurs, the capillary permeability is altered especially in the regions of burns but in severe or large burns, it affects the whole body. The plasma leaks out of the blood into the tissue. This leak is maximum during the first 8 hours after the burn injury and gets less so that capillary permeability returns to normal between 36 hours and 48 hours after the injury.

Fluids containing water, sodium, chloride, and colloids escape from the intravascular compartment into the interstitial spaces. This creates blisters and swelling called *burn edema*. In addition to fluid shifts and loss, the destruction of cells and tissues is also responsible for the loss of electrolytes.

Systemic Effects of the Stage of Fluid Loss

There is sluggish blood flow caused by the plasma portion of the blood which is escaping from the intravascular compartment as a result the blood becomes thick or haemoconcentrated. The haematocrit rises because there is less fluid to dilute the solid components of the blood. The sluggish blood flow results in a drop in the cardiac output, decreased tissue perfusion and hypoxia. Haemoconcentration results into haemolysis which leads to anaemia. This is the reason why anaemia is commonly seen in severe cases of burns.

c. Stage Of Slough and Infection Formation

This is the stage when the tissue devitalized by the burn (Eschar) separates from the underlying viable tissue by the process of *liquefaction*. This leaves a large open wound that is often infected. The infecting organisms vary in the upper of the body; the likely organism to be found are those from the nose and throat, the lower part of the body has colon bacilli as the infecting organism. The infection reveals itself gradually by an increase in fever.

NB: The burn wound itself is sterile immediately after injury and it soon colonised by bacteria, the commonest of which are the gramme positives e.g.

staphylococcus aureus, streptococcus pyogens etc; gramme negative bacteria e.g. klebsiella, pseudomonas etc.

d. Stage Of Repair

This stage is divided into repair of the burnt area and systemic repair;

i. Repair of the Burnt Area

Repair of the burn wound left by the burn cannot begin until the area is free from the sloughing tissue. When the entire thickness of the skin has been destroyed by the burn, repair must begin at the edges of the wound. This takes long in large burns and permits an overgrowth of granulation tissue to occur. To minimize this excessive overgrowth of granulation tissue, the burn wound is covered with skin grafts. Sometimes the burn wound may be covered with cadaver preserved in tissue banks. This provides an excellent temporally covering which must be replaced by grafts from the patient's own skin. Xenografts (pig skin) provide another method of temporal coverage. This biologic dressing is changed every third day. This may be used in conjunction with the patient's own skin (autograft).

• Systemic Repair

Systemic repair includes measures such as blood transfusion to overcome the anaemia that usually occurs in the later stages. The high calorie and protein diet adds in replacing the nutritional elements lost from the draining wound and decreased food intake during the acute phase of the condition and treatment.

Clinical features

1. *Pain*: This is usual but is most marked in superficial burns because the sensory nerve endings in the skin are exposed. In deeper burns, these nerves are destroyed and therefore there will be mild pain.
2. *Blisters*: These result due to the collection of fluid between the epidermis and the dermis. This is common in superficial burns.

3. *Acute Circulatory Failure*: This is present when the burns are moderately extensive and if more so it is more profound or severe. It occurs due to massive loss of body fluids because of the loss of the skin which plays a fluid conservative role.

Emergency Room Management Of A Burns Victim

Pre admission preparation

Once notified of admission of a severely burnt patient, preparation includes assembling of equipment and preparation of a special area or room for the patient. He will be admitted to a burns Unit and emergency equipment should be at hand, e.g,

- Catheterisation tray
- Intravenous solutions
- Sterile gloves
- Bed cradle
- Clean bed linen
- Tracheostomy set
- Suctioning and oxygen therapy equipment
- Blood withdrawing syringes and needles
- Cross matching bottles
- Laboratory forms
- Nasogastric tube, etc.

Clinical assessment of a burnt client

Assessment of a burn injury patient is necessary to help in the selection of the best method of treatment and to develop a guide for fluid management or replacement. The burn is assessed by determining the cause of the burn, the condition of the patient, the extent of the burnt surface and the depth of the burn. It is also necessary to know if the patient was in an open area, closed area or semi closed area at the time of injury in order to determine whether actual or

potential endotracheal injury has occurred after burn accident. Take a full assessment as follows;

- a. Make sure the patient is breathing and that the heart is beating. If not resuscitate the patient using the ABCs of resuscitation. Check for signs that will indicate airway obstruction e.g. dyspnoea, hoarseness of voice, stridor and prolonged expirations, etc.
- b. Take a full history of the patient from the patient himself or witness in terms of;
 - i. Name, age, sex (has a major effect on the outcome or prognosis as infants and the elderly are at highest risk) , date and time of injury etc
 - ii. Mechanism and nature of injury, source of and duration of exposure to injury,
 - iii. Associated injuries which may be present and result from blunt trauma sustained from falls or jumping in escape attempts or even from explosions etc.
 - iv. State of health as preexisting medical problems may affect the type of management.
- c. Assess the parts of the body involved i.e.;
 - i. Face and neck; the burns of the face and neck are likely to be associated with the inhalation of fumes and lead to damage to the respiratory tree and subsequent oedema. Oedema of these areas may result in airway obstruction. Observe the colour of sputum and the presence of burnt hair in the nasal passages. Burnt hair or sooty or bloody sputum demands that close observation must be made of the respiratory status of the patient. Also look for burns and sooty around the nose and mouth with burnt nasal hairs and beards. These are the signs that the patient must have respiratory injury. Even if the patient's breathing seems to be normal and the chest sounds are clear, there is danger still that the patient may develop problems in the next 48 hours in spite of his normal breathing. The signs that will show that there is an obstruction due to oedema are respiratory distress and stridor.

- ii. Extremities (both hands and legs); in these areas be alert for the presence of jewels and these must be removed.
- iii. Genitalia; the burns of the genitalia have a higher risk of infection. Pay extra attention for these areas.

Take the weight of the patient if he is able to stand.

- d. Assessment of a burn surface area percentage (Body Surface Area – BSA); an approximation is done by dividing the body into multiples of nine (9).

❖ For *adults* known as the “Rule of Nines” explained as follows is used;

- ✓ Head and neck – 9%
- ✓ Front trunk – 18%
- ✓ Back trunk – 18%
- ✓ Upper limbs – 18% (9% each)
- ✓ Lower limbs – 36% (18% each)
- ✓ Perineal area – 1%

❖ *Children* have different proportions and hence this rule is not accurate. But the approximations are as follows;

- ✓ Head and neck – 18%
- ✓ Front trunk – 18%
- ✓ Back trunk – 18%
- ✓ Upper limbs – 18% (9% each)
- ✓ Lower limbs – 27% (13.5% each)
- ✓ Perineal area – 1%

Take Note

For burns that are scattered the palm can be used to approximate the surface area burnt. The palm is taken as 1% of the patient’s body surface area. The depth of the burn can be difficult to determine, but the history helps. Definite partial thickness burns are pinky, wet and blistered. Pressing with a finger (while wearing sterile gloves) produces a pale patch due to emptying of blood in which when released goes back to pink again. Definite full thickness burns are white or

grey. They are dry and stiff when pressed on and sometimes thrombosed vessels are seen through the dead skin.

Investigations

Collect blood from the patient for full blood in order to determine the haemoglobin count, erythrocyte sedimentation rate (ESR), blood urea nitrogen (BUN) levels. Urinalysis reveals myoglobinuria, haemoglobinuria as they seep through the glomeruli due to circulatory disturbance. Radiography may be done to determine if there is bone involvement.

Medical and surgical treatment of burns

In burns, the main causes of death are shock and infection. Their prevention and treatment are main objectives of acute care. The shock due to burns occurs during the first 48 hours of injury (resuscitation phase) and from this time until the wound is healed (infection phase), there is the danger of infection.

The Objectives of treatment Include;

1. To maintain a clear airway, fluids and nutrition
2. To prevent shock
3. To prevent contamination and treatment of infection
4. To alleviate pain
5. To prevent contractures and deformities
6. To maintain maximum rehabilitation of the client

Guidelines And formula For Fluid Replacement For Burns Patients

The Evans Formula

According to the Evans' Formula, partial thickness and full thickness (i.e. 2nd, 3rd and 4th Degree Burns) and 50% body surface area burns irrespective of the degree, fluids are calculated as follows;

1. *Colloids*; (blood plasma and dextran) – $1\text{ml} \times \text{Kg body weight} \times \% \text{ of area burnt}$
2. *Electrolytes*; (Normal saline and Ringers Lactate) – $1\text{ml} \times \text{Kg body weight} \times \% \text{ of area burnt}$
3. *Glucose* (5% in water) – 2000ml for insensible loss A maximum of 10,000mls of total fluid may be given in a 24 hour period as follows;

Half is calculated and given in the first 8 hours after burns; the remaining half is spread evenly over the remaining 16 hours.

On the first day post burns; half of the colloids and half the electrolytes and **all** of the insensible loss are given.

On the second day post burns; an assessment is made based on the patient's response and vital signs, fluids can be regulated and given accordingly and as needed.

Parklands formula

Fluid Requirements = $\text{TBSA burned}(\%) \times \text{Wt (kg)} \times 4\text{mL}$

Give 1/2 of total requirements in 1st 8 hours, then give 2nd half over next 16 hours.

Example: Mr.Muleya weighing 40kg sustained 20% burns.Calculate his fluids replacement in the next 24 hours

His fluids replacement will be: $20 \times 40 \times 4 = 3200\text{mls}$

Therefore half of 3200mls which in this case is 1600mls will be given in first 8 hours of his admission and the remainder which is 1600mls will be given in the remaining 16 hours of admission to complete a 24 hour cycle.

Fluid volume, composition and rate of flow

The volume, composition and rate of fluids are based on the percentage of the body surface area burnt, the weight of the patient, the hourly urinary output, the arterial blood pressure, haematocrit reading and serum electrolyte concentration especially of potassium and sodium. An adult may require as much as 500mls per hour intravenously to maintain a urinary output of 30 – 60mls per hour.

Haematocrit concentrations are usually done 4 – 6 hourly. Maintain strict input and output charts while the patient is on fluid replacement therapy. Make sure intravenous fluids are running sufficiently to avoid overloading of the circulatory system. Overloading of the circulatory system may be shown by a urinary output of more than 100mls per within the first 48 hours. It will be shown by pulmonary oedema evidenced by dyspnoea and coughing in the patient. An indwelling catheter is passed as soon the patient is admitted so that the hourly urinary output may be noted. This serves as a guide in determining intravenous fluid requirement and also to provide information about the patient's general circulation status and renal function. The urinary output should thus be 25 – 30mls for an adult, 20 – 25mls for a child and 10 – 20mls for an infant. An output which is below normal should be promptly reported.

Drugs

- ***Analgesics*** are given intravenously in small doses every 1 – 2 hours to manage pain while guarding against hypotension, over sedation and respiratory depression.

Topical Antimicrobial Agents are the main stay of burn management against invading microorganisms. The most common organisms complicating burn injuries include; staphylococcus aureus, pseudomonas aeruginosa, enterococcus, enterobacteria group A streptococci and candida albicans. Systemic antibiotics are not usually administered prophylactically but are reserved for infection. The common antimicrobial in use include;

- *Silver Sulfadiazine Cream (Silvadine)*; is the commonly used among the antimicrobial agents as it is not irritating and has the fewest adverse effects.
- *Sulfamylon (Paraffin Gauze)*; has better gramme negative and anaerobic coverage as well deeper eschar penetration, but is painful and is readily absorbed systemically.
- i. ***Tetanus Toxoid***; This is administered as a prophylactic measure against tetanus infection. The dose is 0.5mls intramuscularly stat.
- ii. ***Stress Ulcer Prophylactic Agents***; These are given to patients who have major burns and receiving nothing by mouth; e.g. H2 blockers, sulcrafate, anti acids, or omeprazole.

Early irrigation and debridement

These are performed using normal saline and sterile instruments to remove all loose epidermal skin layers followed by the application of topical antimicrobial agents and sterile dressings. In general, it is safe to leave blisters intact because they permit healing in a sterile environment and offer some protection to the underlying dermis against contamination.

Types of dressings used for burns

a. Open or Exposure Method

This method is usually used to treat burns of the face, neck and perineal area and extensive burns of the trunk. It allows the patient with exudates to dry and form a hard crust in about 3 days which protects the wound. The success of the open or exposure method depends on keeping the environment free of microorganisms which may be very difficult to achieve.

b. Closed Method

This method is used primarily for burns of the feet and hands. The burnt area is highly cleaned and a topical microbial agent thinly applied followed by a dressing. The dressing is usually changed daily.

c. Moist Dressing

Moist dressings are usually applied to partial thickness burns to provide pain relief from air exposure. Cool water is applied to partial thickness burns dressed with gauze especially in infants who are at high risk of hypothermia. Cold water may cause vasoconstriction and lead to the extension of the depth and surface area of the burn.

Nursing Care Of A Patient With Burns**a. Environment**

The burns patient is best nursed or cared for in a burns center or unit as earlier mentioned above where aseptic are closely followed. The room should be free from all sources of infection, well ventilated with a good lighting system. Warmth should be provided especially for patients who have sustained more than 50% burns surface area and infants and young children. The major tissue i.e. the skin that prevents excess loss of heat is destroyed. Depending on the part that is burnt, the patient should not lie on the side affected as this may disturb the healing process. Provide a mackintosh and draw sheet to prevent soiling the linen. A bed cradle will also be provided to lift the linen off the wound and prevent contamination. In severe burns of the face, the patient may need oxygen therapy and when he presents with stridor prepare for tracheostomy trolley. The linen that the patient is using should be where possible surgically clean.

b. Observations

The first 72 hours is the most critical period for a burnt patient. Establish the baseline data of vital signs from which you will make comparisons with

subsequent findings of the vital signs. Vital signs are important to monitor because they will give you a picture of how the body is functioning like early signs of infection e.g. increased temperature, hypovolaemic shock evidenced by low blood pressure and weak thready rapid pulse. Observe for signs of respiratory distress such as labored breathing or stridor and report appropriately or even commence the patient on oxygen therapy. Monitor the input and out to ascertain the function of the kidneys and also monitor the hydration status. Monitor the wound for signs of infection such as pus formation and for signs of healing such as granulation tissue. Weigh the patient daily if able to.

Control of Pain

Assess the patient for pain periodically. Reassure the patient to reduce anxiety and give him the prescribed analgesics to relieve pain and reduce anxiety since pain causes shock. Analgesics may be necessary to be given at frequent intervals for 3 – 3 days to keep the patient comfortable. Analgesics should also be given prior to wound care. Teach the patient relaxation and breathing exercises to help him cope with pain. Change his position if possible supporting the extremities with pillows if they are not involved.

Emotional Support

Following a severe burn the patient and his family experience emotional disturbances. Long periods of the patient being alone should be avoided if you can. Talk to the patient and not about him while performing procedures or assessing wound healing. Listen to the patient's feelings. It is important to give the patient honest and realistic explanations of the prognosis. Arrange for the patient to talk to other patients with similar injuries and who are progressing satisfactorily when the condition allows. Do not give the patient false hopes.

Wound Care

Analgesia for dressing change is necessary for major burns. Valium 0.1mg per kg intramuscularly and ketamine 0.5mg per kg intramuscularly is a regimen that is usually well tolerated. Aseptic technique should be strictly observed.

Daily dressing changes while the wounds are exposed, the surgeon can properly assess the continued demarcation and healing of the injury.

Control of Infection

- Isolate the patient
- Nursing personnel with infection should not attend to the patient e.g. those with sore throat
- Restrict the number of visitors to only close relatives and explain their role regarding protection of the patient from infection e.g. wearing protective gowns when appropriate
- Be alert for reservoirs of infection and sources of contamination in the environment
- Wash hands before and after attending or contact with antibacterial agents
- Use sterile gloves for all care involving patient contact
- Assess the wound daily for local signs of infection i.e. swelling, redness around wound edges also and purulent discharge, dislodgement and loss of grafts
- Promote optimal hygiene for the patient including cleaning of the burnt area
- Pay particular attention to oral care
- Shave the area near the burnt area
- Pay particular attention and give special care of intravenous and urinary catheter sites

Position and Exercises

Turn the patient every 2 – 3 hour to prevent respiratory failure and secretory stasis. If the limbs are swollen, they must be elevated on pillows during the initial stage. Pay frequent attention to body alignment, flexion, contraction, outward rotation of thighs and foot drop should be prevented. The physiotherapist if

available usually supervises exercises. Range of motion exercises are encouraged especially during soaking and dressing of wounds.

Nutrition and Fluids

In addition to fluid therapy nutrition plays an important role in the recovery of a burnt patient. Ringers lactate is the fluid of choice for the replacement of fluids and electrolytes. For patients with severe burns, oral fluids are restricted for 24 – 48 hours because the initial hypovolaemia produces depletion of gastric motility leading to sluggish peristalsis. A nasogastric tube is inserted in this case for intermittent suctioning and oral intake introduced as the patient's condition improves, signs of bowel movement are evident and he can tolerate oral intake. Thus he is put on total parenteral nutrition (TPN) is initially started until after fluid resuscitation only. At this time fluid foods are introduced slowly. A high calorie, high protein and high vitamin diet is recommended to provide essential nutrients for tissue repair and production of antibodies and blood cells. Vitamin C is essential in tissue repair. Keep a record of calorie intake and supplement in between with protein, high calorie snacks.

Health Education

Help the patient to think positively about himself. Demonstrate and explain the wound care procedures to be continued after discharge e.g. washing of hands, applying the topical agent as prescribed. He should be taught on and observe for local signs of wound infection such as redness of normal skin around the burnt area, increased cloudy yellow pus or damage, increased pain, foul odour, elevated body temperature etc. provide written instructions concerning care after discharge.

Hygiene and Elimination

Ensure that the beddings are clean. Change the linen whenever they are soiled to prevent bad odour in the room. A deodorant or air freshener may be used in the room. It may be difficult to bath the patient with severe burns. Therefore

cleaning of selected areas only will be done, such as the face, axillae and the perineal area.

Ensure that the patient is not constipated by giving him enough fluids, turning him frequently and giving a diet rich in roughage when he resumes a normal dietary intake. Offer a bed pan and urinal when the patient wants to open bowels or empty his bladder. Assist a severely burnt patient onto the bed pan.

Rehabilitation

Rehabilitation of a burnt patient is carried out throughout the acute stages by paying good attention to body alignment, prevention of infection and contractures and also the maintenance of joint and limb movement as much as possible. Following recovery from burns, the patient may require reconstructive surgery and retraining before he can resume independence. And as such the patient and relatives require social guidance as well as financial and psychosocial support throughout the rehabilitation period. Retraining for a different occupation may be necessary in some cases. Some patients find it difficult to resume their previous social contacts and to take their place back in society. This is because of the scarring and gross disfigurement associated with severe extensive burns.

Complications of burns

These are mainly associated with burns and depend on the severity. They may be divided into immediate and later complications;

Immediate Complications

1. Shock
2. Hypothermia
3. Dehydration
4. Renal failure
5. Cardiac failure
6. Infection

Later Complications

1. Amputation
2. Anaemia
3. Toxaemia
4. Septicaemia
5. Liver damage
6. Infection (gas gangrene)
7. Duodenal (stress) ulcer
8. Contractures and deformities/keloid formation

2.9 Summary

In this unit we discussed inflammation, trauma/wounds, fluid and electrolyte imbalance, and management of a patient with burns. In the management of patients with these problems there is need to offer resuscitative measures to save lives depending on the severity of the condition. Therefore, as a nurse you have to be vigilant to identify the emergency needs of a patient with the above conditions.

In the next unit we shall look at tumours and their management

2.10 Self Assessment Questions

1. Why is it important when someone is burnt in the face or neck, to put directly a tube in the air pipe? (because of the oedema)
2. Why is it not advisable to remove the victim's clothes after burns?
3. Is the fluid and electrolyte balance important in the treatment of burns?
4. What is the first aid management of the patient with burns?
5. How can burns injuries be prevented?
6. What are five cardinal signs and symptoms of inflammation?

2.11 References

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UNIT 3: MANAGEMENT OF A PATIENT WITH SURGICAL CONDITIONS

3.1 Unit Introduction

In this unit we shall discuss a number of common surgical conditions of the digestive system from the mouth to the anal canal, cardiovascular system and respiratory system. These range from tumours, obstructive conditions, inflammatory diseases, injuries.

You will be required to do the common procedures and investigations that are carried out on the above systems.

3.2 Unit Objectives

By the end of this unit you should be able to:

1. Explain the management of a client with disorders of the mouth
 2. Describe the management of client with disorders of the oesophagus
 3. Describe the management of a client with gastric disorders
 4. Describe the management of a client with disorders of the intestines
 5. Describe the management of a client with disorders of the rectum and anal canal
 6. Explain the management of a client with disorders of the cardiovascular system
 7. Describe the management of a client with disorders of the respiratory system.
-

3.3.1 Disorders Of The mouth

- Neoplasms
- Dental infections
- Oral care procedures

Before proceeding review the following diagram,

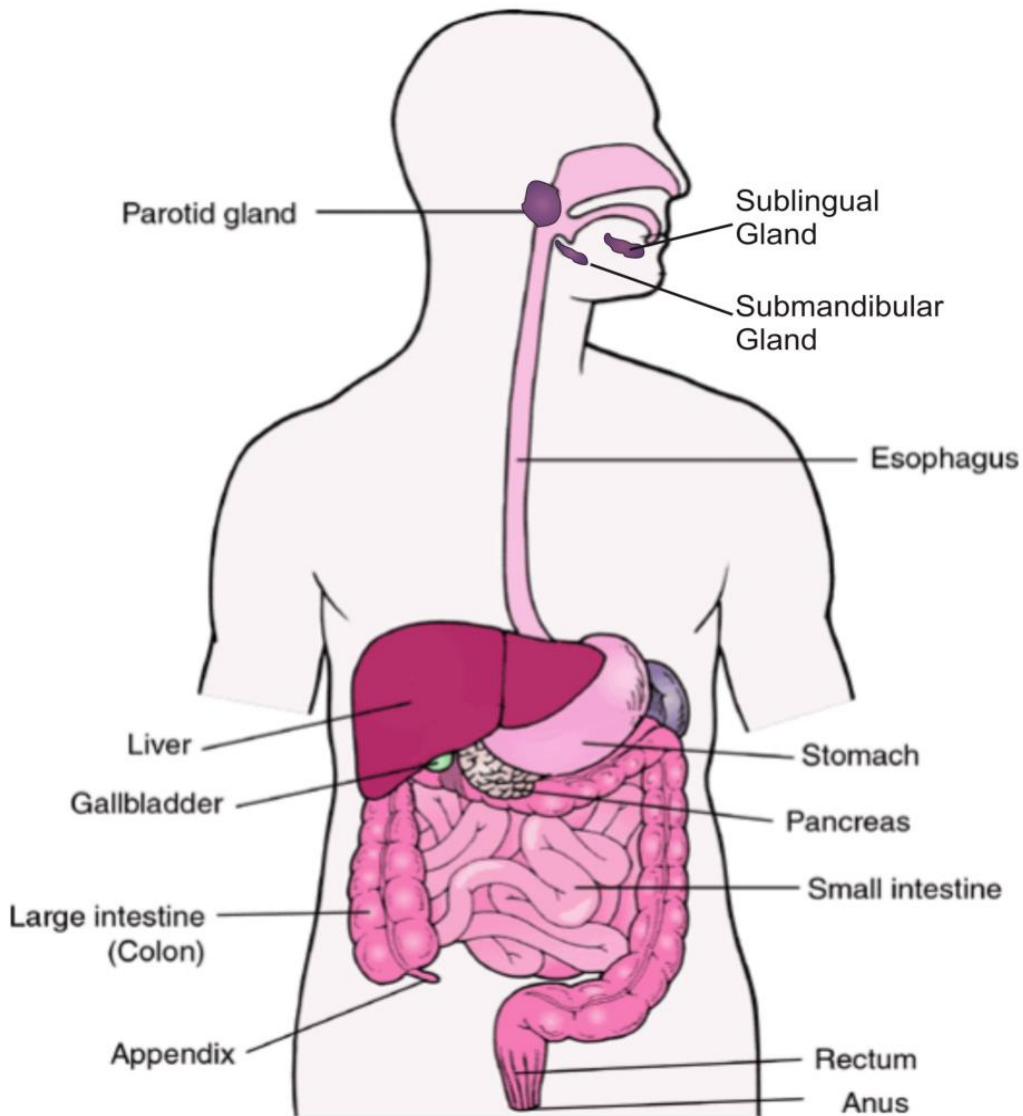


Figure 4:

The Gastrointestinal Tract

Oral Cancer

Oral cancer may occur on the lips, tongue, and floor of the mouth, buccal mucosa, hard and soft palates, pharyngeal wall and tonsils. It is more common after 40 years of age and it occurs in all ethnic groups. It is more common in men (male to female ratio of 2.1). The best example of oral cancer is squamous cell carcinoma and is the most common oral malignant tumor. Most of the oral malignancies occur on the lower lip in men.

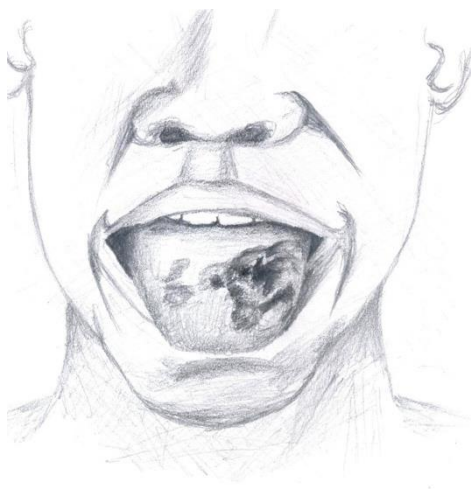


Figure 5: Diagram of Oral Cancer Figure 6: Diagram of oral cancer

Aetiology

The definite cause of oral cancer just like cancers affecting body parts is not known. However, there are a number of predisposing factors. They include use of tobacco, excessive alcohol intake and chronic irritation such as from a jagged tooth, or poor dental care, and constant over exposure of lips to ultraviolet radiation from the sun is also a factor.

Clinical Manifestations:

The common manifestations of oral cancer include leukoplakia (white patch or smokes patch), erythroplakia (red velvety patch on the mouth or tongue), ulcerations, a sore that bleeds easily and does not heal, and a rough area felt with the tongue.

Others are pain in the mouth, dysphagia (difficulty swallowing) and difficulty in moving the jaw (e.g. chewing and speaking).

1. Cancer of the lip appears as an undulated, painless ulcer on the lip.
2. Carcinoma of the tongue is first manifested by an ulcer or thickening of one area, soreness or pain on the tongue, later signs are increased salivation, slurred speech, dysphagia, toothache and ear ache.

Diagnostic Studies:

- Biopsy from affected site, for cytological examination
- Oral exfoliative cytology – involves scraping of lesions and spread the scraping on slide.
- Toluidine blue test. Toluidine blue is applied topically on affected site. Cancer cells take up the dye and can easily be identified.
- CT and MRI scans can also be done.

Surgical Management

Surgery is the effective mode of treatment. Most of the procedures are radical involving extensive resections. The procedures depend on the tumour size. Some of the possible procedures include;

1. *Partial mandibulectomy* removal of the mandible,
2. *Hemiglossectomy* - removal of half of the tongue,
3. *Glossectomy* - removal of the tongue, the buccal mucosa and floor of the mouth
4. *Radical neck dissection*. This may be performed because the tumour easily metastasizes to the cervical lymph nodes. A tracheotomy is usually performed along with the radical neck resection to facilitate ventilation. Drainage tubings are also inserted into the surgical area to remove fluid and blood. The nasal gastric tube may be inserted as well for feeding purposes.

Non Surgical Therapy: Chemotherapy and radiation therapy are used together in advanced cancer. Some of the chemotherapeutic agents are:-

- 5 – Fluorouracil (5-fu)
- Cyclophosphamide (cytoxan)
- Bleomycin
- Vinblastine
- Hydroxyurea (hydroxycarbamide)
- Cisplatin (platinol)

Palliative Treatment: Palliative treatment is indicated when;

The prognosis is poor and the cancer is inoperable or the patient decides against surgery. Palliation aims to treat the symptoms and make the patient more comfortable.

Gastrostomy may be performed for feeding purposes. In this case frequent oral care very important, frequent suctioning of the oral cavity also becomes necessary when swallowing is difficult.

Nutritional Therapy

After surgery the patient may not be able to take nutrients through the normal route of ingestion. This will be as a result of swelling, location of sutures or difficulty with swallowing. Parenteral fluids will be given for the first 24 to 48 hrs

After this time, tube feeding should be given through the nasal gastric tube placed during surgery. Sometimes a temporary feeding gastrostomy may be used. Cervical oesophagostomy and pharyngostomy may also be used.

As a nurse, observe for tolerance of the feeding and adjust the amount, time and formula if nausea, diarrhea or distention occurs. Explain to the patient about the tube feedings. If the patient can swallow, small amounts of water you can give him/her. Observe the patient for choking. Suctioning may be necessary to prevent aspiration if the patient is choked.

Nursing diagnosis of a patient with oral disorders.

May include the following:-

1. Impaired oral mucous membrane related to a pathologic condition, infection or trauma.

- a. Assist the patient with oral care
- b. Teeth brushing or flossing
- c. If the patient cannot tolerate teeth brushing and flossing use 1 teaspoon of baking soda to irrigate the mouth (warm water – 800mls), Half strength hydrogen peroxide or normal saline solution.

- d. Give prescribed drugs like **Nystatin** or antibiotics if mouth is common after radiotherapy (xerostomia, dryness of the mouth) to minimize this advise the patient to avoid dry, bulky, and irritating foods and fluids, alcohol and tobacco.
- e. Advise patient to be taking a lot of fluids when not contraindicated, synthetic saliva may be used, a moisturizing antibacterial gel or a saliva production stimulant such as sialogen may be helpful.

2. *Imbalanced nutrition, less than body requirements related to inability to ingest adequate nutrients*

- a. Take the patient's weight, age and level of activity (record) to determine whether nutritional intake is adequate.
- b. Monitor and record the amount of feeds given to the patient including fluids on a fluid balance chart.
- c. Depending on the condition of the patient, adequate feeds should be given. Amount and consistency are very important. A nasal gastric or gastrostomy feeding may be done.

3. *Disturbed body image related to a physical change in appearance resulting from the disease/ condition or trauma*

- a. Encourage the patient to verbalize the perceived image change in body appearance.
- b. Discuss actual and realistic body changes with the patient
- c. Offer support to the patient in grieving period to prevent depression.

Listen to the patient's concerns. This will assist you to come up with individualized care

4. *Fear of pain and social isolation related to disease or change in physical appearance*

- a. Oral lesions are painful
- b. Avoid food that are highly spicy, hot or cold
- c. Encourage mouth care
- d. Give analgesics such as viscous lidocaine 2% or others.
- e. Give the patient adequate information about pain control methods

5. Impaired verbal communication related to cancer and treatment

- a. Surgery may impair oral communication
- b. Assess the patient's ability to communicate in writing before surgery or sign language
- c. Use pen and paper or sign language
- d. A bell can be used
- e. Consult speech therapists if available to help in rehabilitating the patient

6. Risk of infection related to disease or treatment plan

- a. Watch out for leucopenia due to radiotherapy and chemotherapy. Leucopenia reduces immunity. Malnutrition also reduces immunity. It is common in those patients
- b. Blood samples should be taken to the lab for analysis for early detection of infection.
- c. Observe a septic techniques when doing dressing
- d. Give the patient adequate nutritious feeds to boost immunity such as fruits, juice etc.
- e. Put the patient on antibiotic cover

DISORDERS OF TEETH

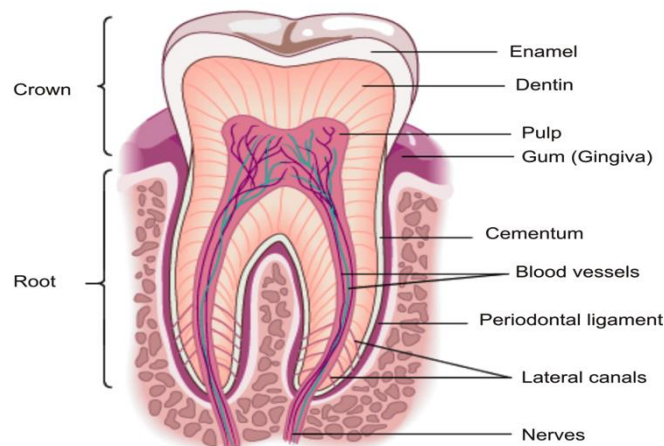


Figure 7: Diagram of a Tooth

The common disorders of the teeth are dental plaque and caries.

- a. **Tooth Decay** is an erosion process that begins with the action of bacteria on fermentable carbohydrates in the mouth which produces acid that dissolves the tooth enamel. It begins with a small hole in a fissure or in an area that is difficult to clean. If left unchecked, the affected area penetrates the enamel into the dentine and cavity. In the cavity, the blood vessels and nerves are affected, hence severe pain is experienced by patients. An abscess may also form either within the tooth or at the top of the root. Pain and soreness usually occur with an abscess and the patient's face may swell.

The extent of damage to the tooth depends on:

- the presence of dental plaque
- the strength of the acids and the ability of the saliva to neutralize them.
- the length of time the acids are in contact with the teeth.

the susceptibility of the teeth to decay.

Dental Plaque is a plug or gelatin like substance that adheres to the teeth.

Management:

- ✓ X-ray of the teeth is done to determine the extent of the disease.

Treatment:

1. Dental filling
2. Dental implants
3. Dental extraction

Preventive Measures

1. Practicing effective teeth
2. Drinking fluoridated water
3. Refraining from smoking
4. Controlling diabetes and using pit and fissure sealants

Patient Education on Prevention of Oral conditions

- Brush teeth using a soft toothbrush at least twice per day.

- Floss at least once daily
- Use an anti plaque mouth
- Visit the dentist at least every 6 months especially when you have mouth sores, tooth decay or a filling.
- Avoid alcohol and tobacco products
- Maintain adequate nutrition and avoid sweets
- Replace your tooth brush at first signs of wear every 2 months.

4. **Disorders Of The Oesophagus**

The common disorders include the following;

Oesophageal diverticulum

Oesophageal obstructions

-

OESOPHAGEAL TUMOURS

The prognosis for oesophageal tumors is very poor if diagnosed at late stages

Causes

The cause is not known but there are predisposing factors such as;

- irritation,
- poor oral hygiene

Signs and Symptoms

- Progressive dysphagia,
- Painful swallowing,
- Weight loss,
- Vomiting,
- Hoarseness,
- Coughing,
- Iron deficiency anemia,
- Occult bleeding or hemmorage

Management

This may be done by medical treatment and by doing surgery

Medical care: This involves the following:

- Palliative treatment and this is common
- Radiation and
- Chemotherapy

Surgery: The following surgical procedures may be performed in a patient with oesophageal tumours:

- Esophagectomy
- Esophagogastrostomy
- Esophagoenterostomy
- Gastrostomy

Specific Post-operative care

- Maintain NG tube after surgery
- Assess for signs of hemorrhage
- Monitor respiratory status
- Monitor adequacy of nutritional intake (give high protein, high calorie diet)
- Assess ability to swallow
- Allow patient to ventilate feelings

ACHALASIA

An achalasia is also called cardio spasm. It is a condition which affects the smooth muscles of the oesophagus. Peristalsis of the lower two thirds of the oesophagus is absent. Lower oesophagus sphincter pressure is increased, along with incomplete relaxation of the oesophageal sphincter. This leads to dilatation of the lower oesophagus. The resultant effect is obstruction of the oesophagus near the diaphragm, altered peristalsis due to impairment of the autonomic nervous system innervating the oesophagus, and the condition becoming chronic.

Signs and Symptoms

1. Dysphagia, is common following intake of fluids
2. Substernal chest pain occurs during or immediately after a meal.
3. Halitosis

4. Regurgitation of sour tasting food and liquids
5. Weight loss over time

Management

Treatment options are all directed at relieving the stasis caused by increased lower oesophageal sphincter (LES) pressure, non relaxing LES and aperistaltic oesophagus.

1. Give the patient a semisoft bland diet and let him eat slowly and drink fluid with meals
2. Sleeping with the head elevated
3. Oesophageal dilatation
4. Pneumatic dilatation of the LES with a balloon dilator
5. Surgical intervention, if necessary by an oesophagostomy can be performed.

Special investigations

FOREIGN BODIES OF THE OESOPHAGUS

Oesophageal foreign bodies are common in children. In elderly people dentures can easily dislodge and lodge in the oesophagus

Signs of a foreign body in the oesophagus

1. Pain in the chest
2. Inability to swallow either fluid or solid food
3. Perforation of the oesophagus

Management

1. A child should be tipped head down and given a sharp blow between the shoulder blades.

2. In adults a similar blow may dislodge the foreign body. The patient should be grasped from behind with the arms encircling the lower chest and the hands gripped together in the epigastrium. A sudden bearing can dislodge the foreign body. This is not an emergency.

CANCER OF THE OESOPHAGUS

Cancer of the oesophagus is common in men than in women. It is more frequently in old age. There is a higher incidence of squamous cell carcinoma in African Americans. The cause is not known but dietary factors have been implicated.

Pathophysiology

1. The cause of oesophageal cancer is not known.
 2. The predisposing factors are cigarette smoking, excessive alcohol intake, chronic trauma, poor oral hygiene and spicy foods.
 3. The two most risk factors are smoking and excessive alcohol intake
 4. Other risk factors include exposure to asbestos and metal and low intake of fresh of fresh fruits and vegetables.
-
1. The malignant tumours usually appear as an ulcerated lesion The majority of tumours are located in the middle and lower portions of the oesophagus. Obstruction of the oesophagus occurs in the late stages of cancer.

Clinical Features

1. **Progressive dysphagia** is the most common. Initially the dysphagia occurs only with meat, then later with soft foods and liquids.
2. **Pain**, develops later and is described as occurring in the substernal, epigastric or back areas increasing with swallowing. Pain may radiate to the neck, jaw, ears and shoulders.

3. **Sore throat**, choking and hoarseness may occur for tumours occurring in the upper third of the oesophagus.
4. **Weight loss**, is also common, due to inadequate food intake.
5. Where there is stenosis regurgitation of blood flecked oesophageal content is common.

Management

Investigations

1. Barium swallow with fluoroscopy will demonstrate narrowing of the oesophagus at the site of tumour.
2. Oesophagoscopy with biopsy is necessary to make definitive diagnosis.
3. Endoscopic ultrasonography, to detect tumour invasion into the muscle layer.
4. Bronchoscopic examination.
5. To detect malignant involvement of the trachea.
6. Computerized tomography (CT scanning) scanning. May be used to be more accurately assess the extent of the disease.

Therapeutic Options

1. Surgical resection of the tumour. (the approach may be abdominal or thoracic)
2. Oesophagectomy – Removal of part of the oesophagus.
3. Oesophagogastrostomy – Removal of a portion of oesophagus and anastomose the new portion to the stomach.
4. Oesophagoenterostomy –Resection of a portion and anastomose the remaining part to a segment of the colon.

Other forms of treatment may include:

1. Radiation
2. Palliative

3. Dilatation
4. Stent or prosthesis
5. Gastrostomy
6. Laser therapy

Palliative therapy consists of restoration of the swallowing function and maintenance of nutrition and hydration.

Nursing Management

Nursing Diagnosis.

Specific nursing diagnosis to a patient with oesophageal cancer includes:

1. Altered nutrition, less than body requirements related to dysphagia, weakness and radiation therapy
2. Pain related to tumour
3. Anxiety related to diagnosis of cancer, uncertain future and poor prognosis.
4. Altered health maintenance related to lack of knowledge of disease process and the therapeutic regimen, unavailability of a support system, and chronic debilitating disease.

3.5 Gastric Disorders

a. PYLORIC STENOSIS

Definition

Pyloric stenosis is narrowing of the pylorus, the opening from the stomach into the small intestine. It is a disorder that occurs when the opening (pylorus) between the stomach and the first part of the small intestine (duodenum) becomes partially or completely blocked. This means the gastric outlet is obstructed.

The condition occurs when the pyloric muscle (muscularis propria) has increased in size (hypertrophy) and its cells have abnormally multiplied (hyperplasia). The

hypertrophied pylorus results in inflammation, swelling (edema), and mononuclear cell infiltration.

Types of pyloric stenosis

1. *Primary acquired hypertrophic pyloric stenosis* (AHPS) can occur without any apparent cause (idiopathic).
2. *Secondary AHPS* results from other problems in the gastrointestinal tract.

Causes, Incidence, and Risk Factors

1. Conditions that may put an individual at risk for secondary AHPS include prolonged pylorospasm, pyloric ulcer, hiatal hernia, inflammation of the stomach (gastritis), gallbladder disease, and stomach cancer (gastric carcinoma).
2. Normally, food passes easily from the stomach into the first part of the small intestine through a valve called the pylorus.
3. In pyloric stenosis, the muscles of the pylorus are thickened. This prevents the stomach from emptying into the small intestine.
4. The cause of the thickening is unknown, although genetic factors may play a role. Children of parents who had pyloric stenosis are more likely to have this condition.
5. Pyloric stenosis occurs more often in boys than in girls, and is rare in children older than 6 months.
6. The condition is usually diagnosed by the time a child is 6 months old.

Symptoms

1. Vomiting is the first symptom in most children and it may occur after every feeding or only after some feedings. A child usually starts to vomit around 3 weeks of age, but may start any time between 1 week and 5 months of age. The type of vomiting is forceful (projectile vomiting). The infant is hungry after vomiting and wants to feed again. Other symptoms generally appear several weeks after birth and may include abdominal pain, belching, constant hunger,

dehydration (gets worse with the severity of the vomiting), failure to gain weight or weight loss, experiencing of wave-like motion of the abdomen shortly after feeding and just before vomiting occurs.

Diagnosis

1. The condition is usually diagnosed before the baby is 6 months old as revealed by history from the mother.
 - A physical exam may reveal signs of dehydration. On examination you may detect the abnormal pylorus, which feels like an olive-shaped mass, when touching the stomach area.
 - An ultrasound of the abdomen may be the first imaging test performed. Barium x-ray reveals a swollen stomach and narrowed pylorus. Blood chemistry panel -- often reveals an electrolyte imbalance

Treatment

1. Treatment for pyloric stenosis involves surgery to split the overdeveloped muscles; Pyloromyotomy – pyloroplasty
2. Balloon dilation does not work as well as surgery, but may be considered for infants when the risk of general anesthesia is high.
3. The patient is given fluids through a vein, usually before surgery.

Expectations (prognosis)

Surgery usually provides complete relief of symptoms. The infant can usually tolerate small, frequent feedings several hours after surgery.

Complications

Failure for the baby to gain weight or thrive is the most common complication of pyloric stenosis though the patient may also experience chronic constipation. Anaemia and dehydration may also develop.

Self help Activity

Refer to your procedure manual for these special investigations and procedures

- ✓ Barium meal
- ✓ Barium swallow
- ✓ Gastrotomy feeding
- ✓ Gastric lavage
- ✓ Nasogastric tube feeding
- ✓ Nasogastric aspiration

b. PEPTIC ULCERS

Definition

A peptic ulcer is an excavation (erosion) formed in the mucosal wall of the stomach, the pylorus, the duodenum or the oesophagus.

It usually involves a circumscribed (circular) area which may extend deeply as far as the muscle layer or even through the whole muscle layer up to the peritoneum. The area where it is found (location) also identifies the type of ulcer;

1. Gastric ulcer – stomach and pylorus
2. Duodenal – duodenum
3. Oesophageal – oesophagus

Peptic ulcers are more common in the duodenum than in the stomach while gastric ulcers tend to occur in the lesser curvature of the stomach near the pylorus.

Incidence

The disease occurs with the greatest frequency between the age of 20 and 60, but is relatively uncommon in the women of child bearing age, although it has been observed in childhood and even in infancy. More men than women are affected although there is some evidence that the incidence in women is

increasing. After menopause, the incidence of peptic ulcer in women is almost equal to that of men.

Aetiology

The aetiology of peptic ulcer is poorly understood. It is known that peptic ulcers occur only in the areas of the gastrointestinal tract that are exposed to hydrochloric acid and pepsin.

Predisposing or risk factors

1. Peptic ulcers seem to develop in persons who are emotionally tense though if this is the cause or effect is uncertain.
2. It also tends to portray some familial tendency as this seems to be a significant predisposing factor.
3. Blood group O has been attributed or associated with the development of peptic ulcers than the other blood groups, i.e. A, B, and AB.
4. Emotional stress
5. Eating irregularly and hurriedly
6. Smoking excessively

NB: In most cases the bacterium helicobacter pylori has been implicated as it is commonly found in the patients suffering from peptic ulcers.

Table:FigureTableFigure

Table 1: **Comparison between duodenal and gastric ulcers**

FigureFigure

#	VARIABLE	DUODENAL ULCER	GASTRIC ULCER
1	Age	Usually 50 years	Usually 45 and over
2	Sex	Male : Female 4:1	Male : Female 2:1
3	Blood Group	Most frequently blood group O	No differentiation
4	Social Class	More frequently in those subjected to stress and responsibility: executive leaders	More common among labourers

		in competitive fields	
5	Pain	Occurs 2 – 3 hours after a meal; patient often awakened between 01:00 and 02:00; pain is usually relieved by ingestion of food.	Occurs 30minutes – 1 hour after ingestion of food; pain is relieved by vomiting.
6	General Nutrition	Usually well nourished	Often malnourished
7	Acid Production	Hypersecretion (hyperchloridia)	Normal – hyposecretion (hypochloridia)
8	Vomiting	Uncommon	Common
9	Haemorrhage	Melena more than haematemesis	Haematemesis more common than melena
10	Malignancy Possibility	Never	Has 10% chance

Pathophysiology of Peptic Ulcers

Peptic ulcers occur in gastroduodenal mucosa because such tissue is unable to withstand the digestive action of gastric acid and pepsin. The erosion is due to an increase in the concentration or activity of acid – pepsin or decrease in the normal resistance of the mucosa. Any disturbance in the gastric secretion phases may be ulcerogenic.

1. Cephalic (Psychic) Phase

The first phase is initiated by stimuli such as the sight, smell or taste of food acting up on cerebral cortical receptors that in turn stimulate the vagal nerves. Essentially unappetizing meal has little effect on secretion where as a more tasty appetizing meal evokes a high secretion. This accounts for the traditional emphasis on serving a bland meal to the peptic ulcer patient. Today a bland diet has no significant effect on gastric acidity or ulcer healing. However, excessive vagal activity during the night when the stomach is empty is significant.

2. Gastric Phase

The gastric phase of secretion is mediated by the hormone gastrin. Gastrin enters the blood stream from the antrum and is carried to glands in the fundus and body of the stomach. Here it stimulates the production of gastric juice. Gastrin activity may be greater in patients with pyloric stenosis. The antrum of the patient with gastric ulcer contains less gastrin than that of the individual with a duodenal ulcer. Excess gastrin in blood can lead to marginal ulcers.

3. Intestinal Phase

During the intestinal phase a hormone secretin is secreted when hydrochloric acid enters the duodenum. Secretin in turn stimulates bicarbonate secretion from the pancreas, which neutralises the acid. Secretin also inhibits the gastric phase of gastric secretion.

Gastric mucosal barrier

In man gastric secretion is a mixture of mucopolysaccharides and mucoproteins secreted continuously by the mucosal glands. This mucus adsorbs pepsin and protects it against acid. Hydrochloric acid is secreted continuously but secretions increase owing to neurogenic and hormonal mechanisms that are initiated by gastric and intestinal stimuli. If hydrochloric acid are not buffered and neutralised by and if the outer layer of the mucosa did not offer protection, hydrochloric acid along with pepsin would destroy the stomach.

The impenetrability of the mucosa is called the Gastric Mucosal Barrier. It is the chief defense of the stomach against being digested by its own secretions. Other factors that influence mucosal resistance are the blood supply, acid base balance, integrity of the mucosal cells and epithelial regeneration.

NB: Take note that a person is likely to develop a peptic ulcer from one of two causes;

1. Hypersecretion of acid pepsin
2. Anything that decreases the production of gastric mucus or damages gastric mucosa is ulcerogenic.

Clinical Manifestations

Symptoms of duodenal (most common form of peptic ulcer) may last for a few days, weeks or months and may even disappear only to reappear often without an identifiable cause.

1. Pain

The patient with duodenal ulcer complains of pain burning in nature, sharply localized sensation in the midepigastrium or in the back. It is believed that the pain occurs when the increased acid content of the stomach and duodenum erodes the lesion and stimulates the exposed nerve endings. Pain precedes meals from 1 – 3 hours and becomes progressively more severe towards the end of the day. It may also awaken the individual between 12am and 3am. However, the flow of gastric acid is at its lowest at this time. Pain typically is relieved quite promptly by food or alkalis.

2. Pyrosis

Some patients experience a burning sensation in the oesophagus and stomach which moves up to the mouth, occasionally with sour **eructation**.

3. Vomiting

Although rare in uncomplicated duodenal ulcer, vomiting may be a symptom of peptic ulcer. It is due to gastric outlet obstruction caused by either spasm of the pylorus or mechanical obstruction. Vomiting may or may not be preceded by nausea; usually it follows about by ejection of the acid gastric contents.

4. Constipation and Bleeding

Constipation may be apparent in the patient with duodenal ulcer, probably as a result of diet and medications.

Management

The major goals for the patient include

- 1. Relief of pain
- 2. Reduction of anxiety and emotional stress

- 3. Compliance therapeutic regimen
- 4. Absence of complications

Assessment/Investigations

Peptic ulcer patients are usually known unless if they are coming to seek medical attention for the first time. If coming for first time, there may be need to establish their reason for coming to the clinic. In this case like any other patient coming to the clinic, certain things will be done.

1. History taking

This is done to ascertain the reason of the patient's reasons for coming to clinic to seek medical help. Ask the patient the signs and symptoms (such as gastric pain, vomiting etc) when they started, when they do occur, family history and any other relevant information which may be helpful in the management of the patient.

Investigations

- Gastric secretions for the helicobacter pylori bacterium usually done in chronic cases
- Haemoglobin count for clients with chronic bleeding peptic ulcers
- Stool for melena or presence of blood or vomitus for fresh blood
- White blood cell count for establishing or ruling out the presence of infection.

Non Pharmacological Treatment

Hospitalization if required at all can be limited to 2 – 3 days unless bleeding, perforation and severe nocturnal pain are present. Advise the patient on;

1. Rest and stress reduction
 2. Diet since there is little evidence that bland diets are more beneficial than regular meals. Diet compatibility is an individual's matter.
 3. Drug compliance at home
- a. Medical Treatment

1. Antiacids

The objective is to select the antacid that provides the safest and longest period of acid neutralization. Antacids may include;

- a. Sodium bicarbonate
- b. Magnesium trisilicate
- c. Aluminum hydroxide
- d. Magnesium milk

2. Anticholinergics

Anticholinergics are used as an adjunct to the antacids compounds. They are given to block vagal stimulation of parietal cells so as to reduce secretion. They may include;

- a. Probanthine
- b. Belladonna Tincture
- c. Bascopan (Hyoscine)
- d. Atropine

3. Hydrogen receptor antagonists

Cimetidine (Tagamet); is given orally with each meal and at bed time.

4. Proton Pump Inhibitors

- a. Omeprazole

5. Antibiotics

- a. Amoxyl

6. Other drugs

Sucralfate (Carafate) is a recent locally acting drug that has also been shown to have anti ulcer properties.

Complications Of Peptic Ulcer Disease

There are four major complications of peptic ulcer; haemorrhage, perforation, pyloric stenosis, obstruction and intractable ulcer.

1. **Haemorrhage**; is manifested by haematemesis, melena or both. This is as a result of erosion of blood vessel in the mucosal wall of the gastrointestinal wall involved.
2. **Perforation**; may occur unexpectedly without much evidence of preceding indigestion. Perforation into free peritoneal cavity (acute peritonitis) is a catastrophe and an indication that surgery is needed.
3. **Pyloric Obstruction**; occurs when the area distal to the pyloric sphincter becomes scarred and stenosed or is oedematous or from scar tissue that is formed when the ulcer alternatively heals and breaks down. This usually leads to obstruction.
4. **Intractability**; a type of peptic ulcer that continues to give problems and is resistant to all forms of treatment.

b. Surgical Treatment

Indications Surgery for ulcer disease is done when medical therapy has not been successful or when complications arise such as haemorrhage, perforation or pyloric stenosis/obstruction and intractability.

Surgical approaches for peptic ulcers

1. Vagotomy and Gastroenterostomy

These are popular methods of treatment a patient with a recurrent peptic ulcer. They involve cutting of the vagus nerve (vagotomy) and establishing gastric drainage. The drainage operation is necessary because vagotomy is often followed by gastric retention.

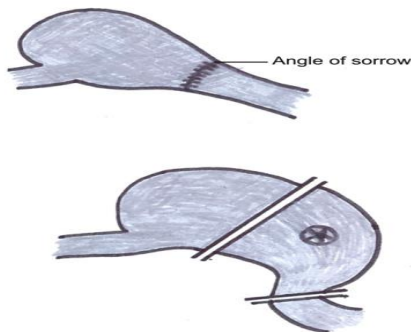
Vagotomy involves dividing the nerves that are known to stimulate gastric acid Hypersecretion in most cases of duodenal ulcers. The drainage operation may be in the form of a Gastroenterostomy or a pyloroplasty.

2. Vagotomy and Antrectomy

Since the ulcers are believed to result from the acid pepsin of the stomach, vagotomy and antrectomy are designed to lower the production of acid by the stomach to a point which further ulcerations will not occur. This may be done by removing the acid stimulating mechanism of the stomach; that is dividing the vagus nerves (vagotomy) and removing the antral portion of the stomach (antrectomy).

3. Partial Gastrectomy and Vagotomy

Partial gastrectomy may be done with or without vagotomy. The remaining segment of the stomach is anastomosed to the duodenum **(Billroth I) - gastroduodenostomy**



TableFigureTableFigureTable6

Types of gastric surgery

There are a number of types of surgery that may be carried out on the stomach. These include;

1. *Vagotomy* is the surgical ligation of the vagus nerve to decrease the secretion of gastric acid.
2. *Antrectomy* is the surgical removal of the antrum of the stomach.
3. *Pyloroplasty* is the surgical dilatation of the pyloric sphincter to increase the rate of gastric emptying.

4. *Gastroduodenostomy (Billroth I)* is the surgical removal of the lower portion of the stomach and anastomosis of its remaining portion to the duodenum.

5. *Gastrojejunostomy (Billroth II)* is the surgical removal of the stomach antrum and its distal portion and duodenum with anastomosis of the remaining stomach portion to the jejunum.

6. *Subtotal Gastrectomy* is the surgical removal of 60 – 80% of the stomach.

7. *Total Gastrectomy* is the surgical removal of the entire stomach.

8. *Oesophagojejunostomy* is a surgical procedure involving the anastomosis of the inferior part of the oesophagus to the jejunum.

Sleeve gastrectomy (vertical sleeve gastrectomy and stomach stapling) is the removal of a large part of the stomach to help with weight loss. The surgeon uses staples to create a smaller stomach and attaches the small intestine to the remaining stomach.⁷

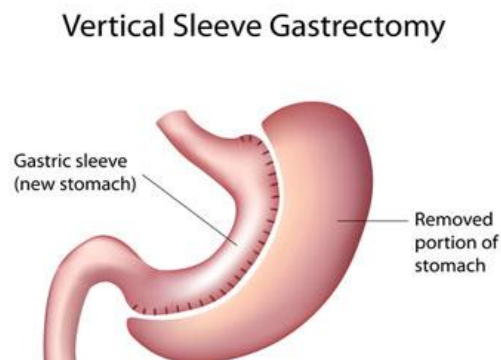


Figure 7: Figure

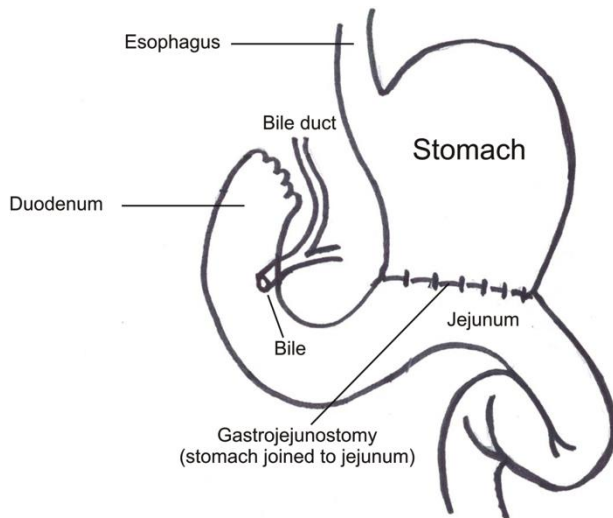


Figure 8: FigureTableTableTableTableFigure 9: Illustration of BillrothFigureTableFigureTable

c. GASTRIC CANCER

Introduction

Gastric cancer accounts for 15,000 deaths annually worldwide, mostly in persons over 40 and occasionally in younger people. Heredity appears to be a factor as does chronic inflammation of the stomach.

Clinical Manifestations

1. Early symptoms of gastric cancer disease are often in definitive and difficult, since most of these tumours start on the lesser curvature, where they cause little disturbances to the gastric functions.Later after they have spread to the cardiac orifice, or especially to the pylorus, the suffering may be distressing due to disturbance in gastric motility.
2. Weight loss (cachexia) as the disease progressesWeaknessAnaemia and sometimes icterus (jaundice)Pain is a late symptom

The most important early symptoms of gastric cancer include;

1. A progressive loss of appetite
2. The appearance of or change in gastrointestinal symptoms that have been increasingly apparent for a matter of weeks or months only

3. Vomiting if the tumour causes obstruction of the cardiac orifice; vomiting or a feeling of fullness will immediately follow a meal. If the tumour is near the pylorus, it eventually obstructs this channel and vomiting becomes a prominent symptom.
4. Occasional vomiting of coffee ground colour or signs of blood in stool.

Management

Diagnosis

1. History taking of the signs and symptoms usually takes the first place in the initial stages of coming up with a diagnosis.
2. If the tumour is located near the pylorus it may be palpable.
3. Gastric content aspiration revealing no free hydrochloric acid then gastric neoplasm should be suspected.
4. Biopsies by way of a gastroscope are most important
5. Cytologic studies verify the diagnosis

Surgical Treatment

There is no successful treatment of gastric carcinoma except surgical removal of the tumour. If the tumour can be removed while it is still localized to the stomach, the patient can be cured. Depending on the location, a number of surgical procedures may be done. These include;

1. Radical Subtotal Gastrectomy

This is a surgical procedure done where a portion of the stomach is removed and its stump is anastomosed to the jejunum as in gastrectomy (gastrojejunostomy).

2. Total Gastrectomy

This is a surgical procedure done where the whole stomach is removed and the inferior oesophagus anastomosed to the jejunum (oesophageal jejunostomy).

Preoperative management

1. Assessment

The patient undergoes laboratory analyses, radiological examination series and a general physical examination before surgery is attempted. This is done to assess his suitability for the procedure. The nurse prepares the patient for each of the diagnostic measures by explaining their nature and significance to him. Blood samples for haemoglobin count, bleeding and clotting time are analysed. Blood sugar examination to rule out diabetes mellitus is done. Urine samples are done and results noted. Chest X ray to determine whether there is metastasis to the lungs. Electrocardiography is done to assess the status of heart. These examinations are important to ensure that the patient is in the best condition.

2. Fluid and Nutrition

The nutritional and fluid needs of the patient are of major importance. In those patients with pyloric obstruction, there is usually prolonged vomiting with resultant weight and fluid loss. Every effort is made to restore an adequate nutritional level and maintain an optimal fluid and electrolyte balance.

3. Cleaning and emptying the gastrointestinal tract

Nasogastric suction often is required to empty the stomach, especially in patients with pyloric obstruction. The tube is inserted before the operation and left in place for intraoperative and post operative use. It is important that the colon be empty when the patient goes for surgery. This is ensured by an enema the day before operation.

4. Limiting fluid intake

The patient is usually limited to fluids during the 24 hour period preceding surgery.

5. Shaving and skin preparation

The abdomen should be prepared from the nipple line to the symphysis pubis although the incision is usually made in the upper right quadrant or the midline.

Psychological care

Explain the surgical procedure to the patient and relatives in totality what to expect after the operation such as nasogastric intubation. If the operation is an emergency because of haemorrhage, perforation or acute obstruction, adequate psychological preparation may not be possible. Modification in feeding post operatively is explained. The patient should fill the consent form after he has fully understood the procedure.

Immediate preparation

An intravenous line of normal saline should be commenced to open up the vein a day or on the morning of surgery. A urethral catheter is also inserted for easy monitoring of the urinary output. The patient should be kept nil orally 6 – 8 hours before surgery. Premedications should be administered 12 hours before surgery. All the necessary documents such as laboratory results, X – ray films etc should be put in the patient's file.

Post Operative Nursing Care (Specific)

1. Position

When recovering from anaesthesia is complete, the patient is placed in a modified fowler's position for comfort and for easy drainage of the stomach.

2. Avoiding pulmonary complications

Assess respiratory status and fluid balance. Assess pain level and administer post operative pain analgesics as prescribed and evaluate the effect. Pain medications are administered as prescribed so that deep breathing and productive coughing may be effective in preventing pulmonary complications. This will overcome the patient's tendency to take shallow breaths in fear of

incisional pain. The patient will be asked to take deep breaths and to cough hourly in the immediate post operative period. The nurse should listen with a stethoscope for the presence of lung expansion.

3. Checking nasogastric tube drainage

Drainage of the nasogastric tube may contain some blood for the first 12 hours but excessive bleeding should be reported. Since a nasogastric tube is in place and peristalsis has not yet returned, fluids by mouth are withheld. The nurse should evaluate the patient for the return of peristalsis by listening to the lower abdomen with a stethoscope. It is also important to observe for signs of distension and to contact the surgeon for any needed readjustment of the nasogastric tube.

4. Nose and mouth care

The nostrils can be cleaned with an applicator stick moistened with water followed by swabbing with another applicator stick dipped in mineral oil. To relieve dryness of the mouth, mouth washes are or may be given frequently. Cool water sponges to the lips are preferred to cracked ice clips since ice often intensifies thirst.

5. Fluids and nutrition

Parenteral fluids are given to meet fluid and nutritional needs as well as to compensate for the fluid lost in drainage and vomitus. Fluid input as well as output is recorded.

Following the return of peristalsis and the removal of the nasogastric tube, fluids by mouth may be restricted for several hours, and then begin sparingly. Small amounts of water are used at first, after which the amount is gradually increased as tolerated. Cold fluids usually cause distress. Therefore, warm weak tea with sugar and lemon is preferred.

Bland foods are gradually added until the patient is able to eat six small meals a day and drink 120mls of fluid between meals. The key to increasing the dietary

content is to offer increments gradually or as tolerated and to recognize that each person is different. If regurgitation occurs, the patient may be eating too fast or too much. It also may indicate that oedema along the suture line is preventing fluids and food from moving into the intestinal tract.

Often a patient who has had gastric surgery has been undernourished before the operation because of food intolerance or preoperative diagnostic testing. There may be significant protein deficiency which may require parenteral nutritional support for the first 5 – 6 post operative days. Mouth feeding is resumed as soon as the patient feels hungry and bowel sounds are elicited. Dysphagia may be noticed in those patients who have had truncal vagotomy which causes trauma to the lower oesophagus. The patient may be comfortable on a soft diet for the first 10 days to 2 weeks. Food should be served attractively to promote appetite. Weight loss is the common problem owing to diminished food intake since the patient experiences early fullness that in turn curbs his appetite. If gastric retention does occur, it may be necessary to reinstitute nasogastric suction.

Anorexia may also be due to the dumping syndrome which occurs in about a fifth of individuals following partial or those following total gastrectomy. Thus;

- Fluids should be taken before or between meals rather than with meals
- Smaller amounts but more frequent meals should be eaten
- Meal composition should be more dry than fluid filled
- Diets with small molecule carbohydrates such as sucrose and glucose should be avoided but may be consumed to tolerable levels.

Irrigate the nasogastric tube only as is ordered and do not reposition it. Monitor drainage for signs of bleeding. Monitor and maintain the position and patency of drainage tubes (nasogastric tube, indwelling urinary catheter and wound drainage).

6. Wound care

Wound dressing may have serosanguenous drainage because of drainage tubes left in the wound. Dressings are reinforced if necessary however, include drainage saturation is reported.

7. Ambulation

Usually on the first post operative day the patient is encouraged to get out of bed. Ambulation is then increased daily. Alleviate the patient's anxiety and provide emotional support.

8. Health Education

- a. Teach the patient to modify his environmental stressors along the suture line because of developing stress ulcers.
- b. Encourage him to remain under medical supervision.
- c. Encourage a nutritious diet with a gradual decrease in number of meals to three per day.
- d. Encourage the patient to be having regular weight checks
- e. Encourage the patient to be having yearly haematological studies and medical evaluation for evidence of pernicious anaemia.

Post operative complications

1. Haemorrhage

Being a major operation haemorrhage occasionally occurs after gastric surgery. The patient exhibits the usual signs and may vomit bright red blood in considerable amounts either from the incision site or through the gastrointestinal tract.

Management

When haemorrhage occurs, initiate antishock measures and notify the surgeon. Blood, blood substitutes and intravenous equipment are made available. Nursing of the patient is given concurrently with emergency therapy. Diazepam or phenobarbitone is effective in lessening patient apprehension. Nasogastric drainage or lavage is also helpful. Adrenaline may be given to produce vasoconstriction.

2. Shock

Shock just like haemorrhage is common especially in very ill patients. The most common type of shock is hypovolaemic shock.

Management

The restoration of normal temperature and administration of fluids are the prophylactic measures necessary.

3. Pulmonary complications

Pulmonary complications frequently follow upper abdominal incisions because of the tendency for patients to develop shallow respirations.

Prevention

The nurse should utilize foresight and initiate appropriate preventive measures to promote optimum oxygen and carbon dioxide exchange and adequate circulation.

4. Steatorrhea

This is the presence of undigested fat in stool. It is partially due to rapid gastric emptying which prevents adequate mixing of with pancreatic and biliary secretions. In mild cases it can be controlled by reducing the amount of fat intake and taking antimotility drugs e.g. Loperamide (Imodium).

5. Dumping syndrome

The term dumping syndrome designates an unpleasant set of vasomotor and gastrointestinal symptoms that occur after meals in about 10 – 50% of patients who have had gastrointestinal surgery or form of vagotomy.

Clinical Manifestations of Dumping Syndrome

- a. Sensation of fullness
- b. Weakness
- c. Faintness

- d. Dizziness
- e. Heart palpitations
- f. Diaphoresis
- g. Cramping pain
- h. Diarrhoea
- i. Rapid elevation of glucose followed by a compensatory reaction of insulin secretion. This results in a reactive hypoglycaemia which is also unpleasant for the patient.

Pathophysiology of Dumping Syndrome

Dumping syndrome may be mechanical as a result of surgery in which a small gastric remnant connects into the jejunum through a large opening. Foods that are high in carbohydrates and electrolytes have to be diluted in the jejunum before absorption can take place. Yet passage of food from the stomach remnant into the jejunum. The ingestion of food at meal times is another factor that causes the stomach contents to empty rapidly into the jejunum. The symptoms that occur are brought about by the rapid distention of the jejunal loop anastomosed to the stomach. The hypertonic intestinal contents draw extracellular fluid from the circulating blood volume into the jejunum to dilute the high concentration of electrolytes and sugar.

Nursing Strategies For Dumping Syndrome

In anticipation of the possibility of the patient's experiencing the dumping syndrome, intervention is directed toward proper dietary instructions. These include;

- i. The patient should be positioned in a semi recumbent position during meal time.
- ii. Following the meal, He should lie down for 20 – 30 minutes to delay stomach or upper gastrointestinal emptying.

- iii. Fluids with meals should be discouraged but may be given up to an hour before meal time or an hour following a meal.
- iv. Fats may be given to tolerant but carbohydrate intake should be kept low (sucrose and glucose are avoided).
- v. Antispasmodics may aid in delaying the emptying of the remnant gastrointestinal tract.

6. Gastritis and oesophagitis

With the removal of the pylorus which acted as a barrier against the reflux of duodenal contents, a bile reflux gastritis and oesophagitis may occur. This is manifested by a burning epigastric pain and the vomiting of bilious material.

Management

Binding agents such as *Cholestyramine*, *Aluminum Hydroxide gel* or *Metoclopramide Hydrochloride (Plasil)* are used.

7. Vitamin b12 (cyanocobalamin) deficiency

Total gastrectomy brings to an abrupt complete and final halt the production of the intrinsic factor, gastric secretion that is required for the absorption of vitamin B12 from the gastrointestinal tract. Therefore unless this vitamin is supplied by parenteral injection throughout the patient's life, he inevitably suffers from cyanocobalamin deficiency, which leads in time to a condition identical to that of a patient with pernicious anaemia. This complication is avoided by the regular monthly intramuscular injection

CONGENITAL PYLORIC STENOSIS

Definition

Pyloric stenosis is narrowing (stenosis) of the opening from the stomach to the first part of the small intestine known as the duodenum, due to enlargement (hypertrophy) of the muscle surrounding this opening (the pylorus, meaning "gate"), which spasms when the stomach empties.

Incidence

It most often occurs in the first few months of life, when it may thus be more specifically labeled as infantile hypertrophic pyloric stenosis. This condition typically develops in male babies in the first 2 to 6 weeks of life.

Signs and symptoms

This condition causes severe projectile non-bilious vomiting. The thickened pylorus is felt classically as an olive-shaped mass in the middle upper part or right upper quadrant of the infant's abdomen. In pyloric stenosis, it is uncertain whether there is a true congenital anatomic narrowing or whether there is merely a functional hypertrophy of the pyloric sphincter muscle.

HIATUS HERNIA

Definition

It is a protrusion of the lower esophagus and stomach upward through the diaphragm into the chest.

Types of Hiatal Hernia

There are two types and these are:

Sliding Hiatal Hernia: -gastroesophageal junction above the hiatus

Rolling Hiatal Hernia: (paraesophageal)-junction in place portion of stomach rolls up through diaphragm

Causes

Hiatal hernia may be caused by weakness in the lower esophageal sphincter, related to increased abdominal pressure, long term bedrest, and trauma

Signs and symptoms

- Feelings of fullness
- dysphagia
- eruption
- regurgitation
- heartburn

Drug therapy

The following drugs are used in the treatment of Hiatal Hernia:

- H2 receptor antagonists: Tagamet, Zantac, Pepcid- reduce stomach secretions

- Urecholine- increase LES tone
- Antacids- neutralize stomach acids
- Reglan, Propulsid- increase stomach emptying

Diet therapy

Ensure that the diet that the patient is taking you decrease the following:

- caffeine
- fatty foods,
- alcohol(reduce LES tone),
- acidic and spicy foods

Surgery

- Nissen Fundoplication
- Angelclik prothesis

Nursing Care:

Assessment, pain relief, watch for aspiration, nutrition, and educate the patient about his or her condition.

Special Investigations

Barium meal examinations are used to study the lower esophagus, stomach and duodenum Barium swallow X-ray examinations are used to study the pharynx and esophagus.

Special Procedures

3.6 Disorders Of The Intestines

ACUTE ABDOMEN

Definition

The term acute abdomen refers to a sudden, severe abdominal pain of unclear etiology that is less than 24 hours in duration.

The acute abdomen may be defined generally as an intra-abdominal process causing severe pain and often requiring surgical intervention

Types Of Abdominal Pains

Visceral pain

Comes from abdominal viscera, which are innervated by autonomic nerve fibres and respond mainly to the sensations of distensions and muscular contractions

The pain is typically vague, dull and nauseating

It is poorly localised and tends to be referred to areas corresponding to the embryonic origin of the affected structure.

Somatic pain

Comes from parietal peritoneum, which is innervated by somatic nerves, which responds to irritation from infections, chemical or other inflammatory processes

It is sharp and well localised.

Referred pain

This is pain perceived distant from its source and results from convergence of the nerve fibres at the spinal cord

Examples: scapular pain due to biliary colic, groin pain due to renal colic and shoulder pain due to blood or infection irritating the diaphragm. Myocardial infarction- pain is felt in the neck, shoulders, and back rather than in the chest the site of injury.

Referred pain is also called reflective pain

Causes Of Acute Abdomen

a. General causes

1. **Inflammatory**; peritonitis, appendicitis (perforated)
2. **Mechanical**; obstruction of intestines by worms, food bolus, volvulus, intussusception etc.
3. **Vascular**; perforated peptic ulcer, perforated diverticulitis, perforated appendix, perforated bowel etc.
4. **Neoplastic**; growths that obstruct movement of food along the gastrointestinal tract e.g. intraluminal intestinal growths.

5. **Traumatic**; ruptured spleen, ruptured aorta, ruptured ectopic pregnancy, ruptured ovarian cyst, ruptured urinary bladder etc.

6. Congenital defects

Signs and symptoms

1. Nausea and vomiting due to gastrointestinal disturbance and excessive peristalsis.
2. Boborygmy (exaggerated bowel sounds – mumbling sounds)
3. Abdominal tenderness on examination due to the disease process
4. Constipation or diarrhoea due to dehydration
5. Signs of shock due to excessive vomiting and or diarrhoea
6. Hard woody abdomen due to hyper excited peritoneum
7. Apparent abdominal contours due to actively peristaltic intestines
8. Guarding due to severe pain

Table 6Table 2: **Illustration of mechanical and non mechanical obstruction signs and symptoms**

FigureFigure

MECHANICAL (Small bowel)	MECHANICAL (Large bowel)	NON MECHANICAL
Colicky pain	Costipation	Diffused abdominal discomfort
Nausea and vomiting	Vomiting in a later stage	Abdominal distension
Constipation	Constant hypostatic pain	Hiccups
Distended abdomen	Nausea	Constipation
Borborygmin and rashes bowel sounds	Sudden onset of colicky abdominal pains after constipation	Frequent vomiting (gastric and bowel contnts)
Abdominal tenderness	Distended abdomen	Decreased bowel sounds
Rebound tenderness	Vissible loops of large bowels	
	Loud, high pitched borborygmi	

Specific Conditions Causing Acute Abdomen

INTESTINAL OBSTRUCTION

Intestinal obstruction is the disruption in the movement of gastrointestinal contents.

It is a common surgical emergency and because of its serious nature, it demands early diagnosis and speed relief. Intestinal obstruction may be complete in which case there is total disruption of the movement of intestinal contents or it can be incomplete where there is partial disruption. The former forms the acute form of the obstruction while the later forms the chronic form.

Types of Intestinal Obstruction

Dynamic In this type of intestinal obstruction there is an increased peristaltic process that works against an obstruction which may be in the lumen, such as a bolus of incompletely digested food material, solid stool as in constipation, a gall stone in the wall such as an inflammatory malignant stricture, intussusception (invagination of a loop of intestine up on itself) etc.

Adynamic

In this type of intestinal obstruction there is cessation of peristalsis and no true propulsive waves are present. This commonly occurs in paralytic ileus (due to denervation of the intestinal wall) or mesenteric vascular occlusion.

Pathology

At the onset, the intestine above the point of obstruction endeavours to overcome the obstruction by vigorous peristalsis. Increased peristalsis continues for a period of 48 hours to several days; the more distal the point of obstruction, does it remain vigorous. If the obstruction is not relieved a time is reached when increasing distension causes peristalsis to become less and less until it all ceases. The obstructed intestine becomes flaccid and paralysed.

For two or three hours following the obstruction, the intestine below the point of obstruction exhibits normal peristalsis and absorption from it continues until the residue of its contents has passed onwards. Then the empty intestine becomes

immobile, contracted and pale so it remains until the obstruction has been overcome or death ensues.

Distension occurs proximal to the obstruction and begins immediately after the obstruction occurs. It is caused by gas mostly swallowed from the atmospheric air (68%), diffusion from the blood into the bowel lumen (22%) and the products of digestion and bacterial activity (10%). The distension also results from intestinal fluid which is made up of various digestive juices.

A. Strangulation

Strangulation of the bowel occurs when a loop of the intestine is trapped by a hernia or band or involved in a volvulus (twisting upon itself) or intussusception (invagination) in such a way that its blood supply is progressively interfered with. This is dangerous as it leads to an immediate necrosis of the loop of intestine involved especially if the strangulation is not reversed.

Clinical Features of Acute Intestinal Obstruction

Colicky pain

Colicky pain is the first symptom and it commences suddenly and often without warning. It becomes increasingly severe then passes off gradually only to return at intervals of a few minutes.

Vomiting

The type of the vomiting and vomitus depend on the level of obstruction. This is to say that if the obstruction is situated at the level of the duodenum or jejunum the vomiting is usually projectile and gastric contents are characteristic vomits while if it is far beyond the ileum involving the large intestine (colon), faecal matter are characteristic.

Abdominal distension

In the early cases of obstruction of the small intestine abdominal distension is often slight or even absent. Centrally placed distension is present in fully

established cases of the ileum. Visible peristalsis may be present. Borborygmi are sometimes loud enough to be heard by the unaided ear.

Constipation

In complete intestinal obstruction after the contents of the bowel below the obstruction have been evacuated there is constipation and usually neither faeces nor flatus is passed.

Dehydration

Repeated vomiting and also loss of absorptive power by the distended intestine leads to dehydration so that when the patient is first examined, obvious signs of dehydration i.e. dry skin and tongue, and sunken eyes etc may be present.

PERITONITIS

Definition

Peritonitis is the inflammation of the peritoneum usually due to an invasion of the peritoneal cavity by bacteria though it as well can occur when there is leakage of gastric contents and blood.

The peritoneum is conveniently divided into *visceral peritoneum* surrounding the abdominal organs and *parietal peritoneum* lining the rest of the cavity and closer to the abdominal muscles. The parietal portion is richly supplied with nerves and when irritated causes severe pain accurately localized to the affected area. The visceral peritoneum on the other hand is poorly supplied with nerves and pain arising from there is vague and poorly localized.

Paths of Bacterial Invasion

- ***Direct Infection***

- Via perforation of some part of the gastrointestinal canal
- Through a penetrating wound of the abdominal wall
- Post operatively

- ***Local Extension***

- From an inflamed organ e.g. appendicitis or cholecystitis
- Migration through gut wall e.g. strangulated hernia
- From or via the fallopian tubes

- **Blood Stream**

- Part of general septicaemia (haematogenously)

Clinical Features of Peritonitis

Local peritonitis is bound up intimately with the causative lesion and the initial signs and symptoms are those of the lesion;

- Raised temperature
- Raised pulse rate
- Intense abdominal pain
- Rigidity of the abdominal wall over the area involved
- If the inflammation arises under the diaphragm, shoulder tip pain may be felt (referred)rectal or vaginal tenderness on examination

Diffused (Generalised) peritonitis

- Pain is cutting or burning and made worse by moving or breathing
- Vomiting may occur
- Tenderness
- Guarding
- Rigidit

ACUTE APPENDICITIS

Definition

Appendicitis is inflammation of the appendix.

Incidence

Acute appendicitis is rare before the age of two but becomes increasingly common during childhood and adolescence.

Types of Appendicitis

a. Non Obstructive Acute Appendicitis

In this type of appendicitis the inflammation usually commences in the mucous membranes less often in the lymph follicles like any inflammatory process. It terminates in one of the following;

- i. Resolution
- ii. Suppuration

- iii. Ulceration
- iv. Gangrene

b. Obstructive Acute Appendicitis

In this type of appendicitis obstruction can be in the lumen (due to faecal matter, foreign body or parasites etc) or in the wall. About one third of cases of acute appendicitis belong to this type.

Aetiology of Acute Appendicitis

i. Race and Diet

Appendicitis is particularly common in the highly civilized European, American and Australian countries while it is rare in the Asiatic, Africans and Polynesians. The rise of appendicitis amongst is due to departure from a simple diet rich in cellulose to one relatively rich in meat.

- **Social Status**

In England, acute appendicitis is more common among the upper and middle classes than in those belonging to the working class.

- **Familial Susceptibility**

This unusual but generally accepted fact can be accounted for by a hereditary abnormality in the position of the organ.

Obstruction of the lumen of the appendix when an acutely inflamed appendix has been removed, some form of obstruction to its lumen can be demonstrated in a large percentage of the cases. The obstructing agent is usually a faecolith (faecal matter), a stricture, especially a foreign body or round worm or thread worms.

- **The abuse of Purgatives**

It is abundantly clear that the ingestion of purgatives, particularly castor oil by patients with stomach ache and the violent peristaltic action which persists, favours and often determines perforation of an inflamed appendix.

- iv. Bacteria Cultures

These reveal that the infection is mixed and there is hardly a pyogenic organism. Common organisms are e. coli, enterococci, non haemolytic streptococci, anaerobic streptococci and clostridium welchii.

Clinical Features of Acute Appendicitis

a. Non Obstructive Acute Appendicitis

- i. Abdominal pain which shifts, as the first symptom around the umbilicus in epigastrium or it may be generalised
- ii. Upset of gastric function; protective pylorospasms occur and this may be manifested by anorexia, nausea, vomiting, brown furred tongue and foul breath, constipation but occasionally there may be diarrhoea
- iii. Localized tenderness at the site of the appendix. As soon as the pain has shifted there is localized tenderness either at Mc Burney's point or elsewhere.

b. Obstructive Acute Appendicitis

- i. Retrocaecal: - Rigidity is often absent because the caecum is distended with gas. Psoas spasms due to inflamed appendix being in contact with this muscle.
- ii. Pelvic: - When the appendix lies entirely within the pelvis there is usually complete absence of abdominal rigidity and often tenderness over Mc Burney's point is lacking as well.
- iii. Post Ileal: - Although this is rare it accounts for some of the cases of missed appendix. Here the inflamed appendix lies behind the terminal ileum.

Management

Acute abdomen is a surgical emergency and thus it requires quick surgical intervention. All preparations should thus be made within the shortest period.

Preoperative care

Pre operative Objectives

1. To ensure that Surgery is performed as soon as possible in order to decrease the risk of complications.
2. To correct or prevent fluid and electrolyte imbalance and dehydration by giving antibiotics and intravenous fluids before surgery
3. To relieve pain by giving analgesia, as patient awaits surgery
4. To prepare the patient physically, emotionally, psychologically so as to enable him withstand the effects of surgery and administration of anesthesia.

Physical preparation

Investigations should be done as quickly as possible and this includes getting a blood sample for haemoglobin count, bleeding and clotting time, grouping and cross matching. A portable abdominal X – ray should be done within the shortest possible time which might reveal the presence of gases in the abdomen. Do the vital observations for baseline data. Rehydration should be done via intravenous infusion with normal saline solution or ringers lactate to replace the lost fluids and electrolytes. A Ryles (nasogastric) tube should be inserted to deflate the abdomen and for post operative aspiration. A urethral catheter should be inserted to drain the urinary bladder and to prevent accidental injury to the bladder as it becomes an abdominal organ when full.

The patient should be shaved from the nipple line to the end of the thighs to prevent microorganisms from entering the incision site as hair harbours microorganisms. It is advisable to use a hair clipper for shaving to avoid cuts. If the patient had eaten as there is no time to starve him, the nasogastric tube is important to aspirate the gastric content and deflate the abdomen.

A. Psychological Preparation

Depending on the age, emotional care is directed towards allaying anxiety from the patient and relatives. It can be given directly to the patient or to the parents or guardians if under age. Briefly explain the importance of surgery and why it

should not be delayed. Ensure that the signs the consent form and if under age, the parent or relative should sign.

Immediate Preparation

Ensure that prescribed pre medications if any are given within the shortest period. Remove all dentures or prostheses, jewels, label them and keep them safely. Ensure that the laboratory results, radiological results are collected and put together in the patient's file, no time to bath the patient in such as emergency but just wipe or give him a cleansing bath change in theatre gown. Label the patient for identification. Wheel the patient to theatre on a theatre trolley. At the operating theatre hand over to the theatre staff or receiving nurse giving relevant details such as patient's name, age, sex, diagnosis and proposed surgery, what was done being an emergency, the latest observations etc.

Post operative nursing management of a client who has undergone an abdominal surgery (acute abdomen)

Depending on the type of anaesthesia used the patient may be brought onto the ward in an unconscious state or conscious. The aims of post operative nursing care include the following;

1. To prevent post operative complications
2. To promote quick recovery
3. To impart knowledge

Environment

The patient who has undergone an abdominal surgery will be in the general surgical ward or acute bay for close monitoring. All sources of infection should be eliminated. The patient who has undergone spinal anaesthesia should be flat in bed (spine) for a period of 4 – 8 hours when the anaesthesia has completely worn out. This is important to prevent post spinal anaesthesia headache or syndrome which is common in these post operative patients. Ensure that the patient has no pillow placed to the head. A patient who has undergone general

anaesthesia and is still unconscious should be put in the recovery position (left or right lateral) with the head tilted to one side. This ensures that secretions and the tongue which has a tendency to fall back do not block the airway. Ensure that all the tubings are in the functional position and patent. The room should be well ventilated and well lit to allow stale air out and for easy visibility respectively. In the room there should also be post operative devices such as suction machine and oxygen machine in case they might be needed. In the first few days a bed cradle may be used to lift off the linen from the incision site. This will allow for easy observation and also to prevent any pressure exerted on the wound.

Observations

Establish the baseline data of the vital signs which are; temperature, pulse rate, respiratory rate and blood pressure. These are important to determine the physiology of the body and to detect early any deviation from normal. Initially vital signs should be checked every 15 minutes and if they are stable every 30 minutes for a period of 2 hours and change to 6 hourly in the next 24 hours.

When they are normal they should be checked 12 hourly i.e. twice daily.

Temperature and pulse rate are important to detect early any post operative infection. However, it should be noted that anaesthesia can affect the hypothalamus and temperature regulation centre leading to altered body temperature. Checking the blood pressure is important also to detect any hypovolaemic shock especially if the patient is bleeding. Continue aspirating the gastrointestinal tract observing and recording the content. Aspiration of the gastrointestinal tract is important to prevent paralytic ileus and to enhance quick return of the peristalsis. Observe the intravenous line for any infiltration of fluids into the tissues or extravasation as well as signs of phlebitis. Observe the return of peristalsis by auscultating the abdomen. Observe the input and output of fluid to avoid fluid overload or under hydration, to monitor kidney function, exclude urine retention, consistence of urine and electrolyte balance etc. observe the pain using the pain rating scale to determine the amount and what kind of analgesia to give. Observe the incision site for any bleeding by marking the margins about 5 – 10mm away from the site using a marker and if blood reaches the mark it means

there is active bleeding hence reinforce with another bandage and inform the surgeon immediately.

Pain management

Assess the pain level as mentioned above. Reassure the patient and explain the physiology of pain. Ensure the patient is in a comfortable position to help relieve pain and promote rest. Give diversional therapy depending on the interest of the patient, age, literacy, and degree of pain to divert the patient's minds from focusing on the pain. Warm compresses to promote blood circulation should be done. It is also important to give the patient the prescribed analgesics before he complains of pain. The surgeon may prescribe morphine or pethidine intramuscularly and it should be given accordingly as ordered. Explain the action and importance of these pain medications.

Nutrition and fluids

Initially the patient is nil orally and will depend on parenteral fluids. Once peristalsis returns he will be started on surgical diet which starts with sips of plain water or fluids. If he does not vomit on day 1 post operatively start him with semi solid foods. The food should be mild or a bland diet none irritating to the bowels. The nasogastric tube normally will be removed in the next 24 hours or day 1 after surgery if there are no complications. Ensure that the diet is rich in proteins and vitamins especially vitamin C which is important in wound healing. Fluids are also important for hydration and to prevent constipation.

Wound care

Ensure that aseptic techniques are observed and used when managing the wound. Drains should be removed by the shortening procedure to prevent formation of fistulae if any. Sutures may be removed by the surgeon or under his order may be removed on alternate days, to prevent gapping of the wound especially in patients who are obese. Use the prescribed solution to dress the wound.

Hygiene measures

Initially in the first 24 hours the patient will not be disturbed however, oral care should be done to moisten the buccal mucosa and promote salivation.

When the patient has stabilised, bed baths are provided to remove dirt from the body, to refreshen the patient and improve his self esteem. Shower baths can be given as the patient improves.

Psychological care

Reinforce the preoperative teaching and allow the patient to verbalise his worries. Ensure that he does exercises when stable such as deep breathing, limb movement, coughing while supporting the incisional wound when appropriate or 1 day after surgery. This is done to prevent post operative complications as emphasized in the preoperative teaching.

Elimination

Ensure that the patient is not constipated and that there is no urine retention. The patient will initially be confined in bed postoperatively and hence he will have the indwelling catheter left in situ for a while to aid urinary elimination and as he is still under the effect of the anaesthesia and surgery. Early ambulation though is important as it aids in preventing constipation. Encourage the patient to be taking a diet rich in fibre when he has commenced taking orally to prevent constipation. Employ all the nursing measures to the patient with urine retention as a result of incisional pain.

Health education on discharge

1. Avoid weight lifting in the next 6 months to allow maximum healing.
2. Explain to the patient on the importance of review for close monitoring and ensuring complete recovery. If discharged with sutures, he has to visit the nearest health centre for suture removal.

3. Explain the importance of good nutrition for quick recovery, wound healing and general restoration of body energy reserves.
4. Emphasize on the need to be vigilant with hygiene so as to prevent contamination of the wound which may lead to infection and delayed wound healing.
5. Explain on the importance of visiting the health centre as soon as he experiences any abdominal disturbance even before the review date to identify and recommend early treatment.
6. Explain the importance of drug compliance to ensure completion of the course of antibiotics and prevent drug resistance, prevention of infection and ensure complete recovery

Complications of abdominal surgery

1. Haemorrhage
2. Post operative wound infection
3. Evisceration
4. Pulmonary complications
5. Dehiscence
6. Deep vein thrombosis
7. Adhesion formation leading to intestinal obstruction
8. Paralytic ileus
9. Hernia

HERNIA

ULCERATIVE COLITIS

Definition

Ulcerative colitis is a chronic inflammatory disease of the mucosa and less frequently submucosa of the colon, rectum and the distal ileum.

Aetiology

The cause of ulcerative colitis is unknown (idiopathic). The predisposing factors include the following;

1. Emotional Factors; i.e. stress which leads to less blood supply to the colon
2. Chronic infection of the larger bowel
3. Allergy; i.e. the body's reaction to an antigen
4. Autoimmunity

Incidence

Ulcerative colitis can occur at any age but is usually at peak periods 20 – 25 years and 55 – 60 years. It is more common in women than men and it is more common in young Jews.

Pathophysiology

In the early stages, the rectum and sigmoid colon is affected and become inflamed. As the disease progresses the bowel mucosa becomes oedematous, congested and thickened and later becomes ulcerated. The ulcers may bleed or perforate causing peritonitis.

Signs and Symptoms

1. Acute attack of diarrhea; the patient may experience motions of liquid stool per day containing blood, mucus and pus. Nocturnal diarrhea is common.
2. Weight loss over time
3. Fever; mild in nature over time
4. Dehydration; commonly associated with chronic attacks of diarrhea and sometimes vomiting.
5. Nausea, anorexia and vomiting accompanied with fatigue
6. Iron deficiency anaemia
7. Mild lower abdominal cramping pains
8. Abdominal distension and tenderness in severe attacks

Management

Assessment and diagnostic tests

1. History taking for signs and symptoms

2. Sigmoidoscopy; confirms rectal involvement
3. Barium enema; to evaluate the extent of the disease and detect complications such as strictures.
4. Biopsy; to rule out carcinoma
5. Stool for analysis; e.g. for blood, pus and mucus etc.

Non pharmacological treatment

- a. In severe ulcerative colitis, the patient should be kept nil orally and be fed parenterally. This is done to rest the gastrointestinal tract or for the patient awaiting surgery. For patients with moderate signs and symptoms, the y may be provided with supplementary feeding to provide adequate nutrition with minimal bowel irritation. Those with mild symptoms, give a low residue diet. As the patient's signs and symptoms subside, the diet may gradually advance to include other varieties of food.

1. **Pharmacological treatment**Antibiotics; may be ordered to prevent secondary infection
2. Anti inflammatory drugs; e.g. Adrenocorticosteroids may be given such as Prednisolone, Hydrocortisone and Sulfasalazine.

Surgery

This may be employed as a last resort especially in cases that do not respond to conservative management. Surgery may involve the resection of the diseased part of the bowel.

Nursing care

Psychological and emotional support

If the disease is of long term duration, the patient is usually cachexic, nervous and apprehensive and is inclined to be preoccupied with physical symptoms, depression, and hostile behavior. Empathetic communication and understanding need to be established by a therapeutic relationship. Stay with the patient when

he is acutely depressed/distressed. Find time to be with the patient and talk to him and listen to his concerns. Find out the activities the patient finds more helpful and include them in the nursing care. Allow the patient and his relatives to ventilate their concerns, fears and feelings. Allow time to ask questions and assist them where possible.

Comfort and rest

Complete bed rest for patients who are very ill is recommended. However, carry out some passive exercises. Ensure a quiet environment to encourage rest. Care should be given to bedridden patients especially on bone prominences to prevent pressure sores (decubitus ulcers). Sedatives and tranquilisers must be given if prescribed to prevent nervousness and calm the patient.

Diet and fluids

For acutely ill patients, maintain them on parenteral replacement of electrolytes, fluids and vitamins. Assess the need to vary the food types as the patient's condition improves. Determine which foods agree with the patient and modify the diet accordingly.

Observations

Monitor the input and output of fluids and record. Note frequency and volume of stools. Regularly send blood for haemoglobin and haematocrit levels and give blood whenever necessary. Observe for fever, signs of dehydration, electrolyte imbalance, hypokalaemia e.g. muscle weakness, paraesthesia etc, also for hypernatraemia e.g. tachycardia, fever, dry tongue etc. check for complications as well. Do observations of vital signs i.e. temperature, pulse rate, respiratory rate and blood pressure.

Medication

Give drugs as ordered and monitor the patient for desired effects as well as side effects.

Elimination

It is crucial that the number, amount and characteristic of the stools are kept. Antispasmodics e.g. Belladonna must be given with caution to slow peristalsis. Bed pans must be emptied as often as possible (every after use). Room deodorants should be used to dispel bad smell. The patient's perineum, buttocks and anal region are washed thoroughly several times in a day. Sitz baths are beneficial to the skin and circulation and should be done 2 – 3 times a day. If surgery is indicated, prepare for preoperative care as required. After surgery, provide the entire necessary post operative nursing.

Information, Education And Communication

1. Discuss with the patient and relatives the disease process and review the signs and symptoms. Explain any diagnostic procedures to be done and medications to be followed at home.
2. Describe the need to avoid infectious agents at home
3. Describe the dietary modifications needed at home. Caution the patient to avoid gastrointestinal stimulants such as nicotine, alcohol and smoking. Adequately reassure patients who are on restricted diets and on parenteral feeding.
4. Encourage the patient to come for regular reviews and physical examinations to rule out colorectal cancer.
5. Review the patient's medications with their desired actions, dosage and adverse reactions.

Complications

1. Nutritional deficiencies; the most common complication
2. Perineal sepsis; leading to anal fissure, anal fistula, perirectal haemorrhage and toxic mega colon etc.
3. Anaemia and coagulation defects; resulting from deficiency in vitamin K
4. Anal stricture

5. Anal stenosis
6. Perforated colon
7. Loss of muscle mass
8. Ascites

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7. Loss of muscle mass
8. Ascites

DIVERTICULUM

VOLVULUS

CARCINOMA OF THE COLON

Special investigations

Special procedures

Ileostomy care

Colostomy care

3.6 Disorders Of Rectum And Anal Canal **HAEMORRHOIDS**

Haemorrhoids are varicose veins (abnormally dilated tortuous superficial veins) occurring in relation to the anus. The anus and anal canal contain two superficial venous plexuses with the haemorrhoidal veins. When pressure on these veins is increased or venous return is impeded, they can develop varicose veins varicosities, thus becoming weak and distended.

Causes

Haemorrhoids develop when venous return from the anal canal is impaired by any of the following:

1. Straining to defecate in the sitting or squatting position increases venous pressure and is the most common cause of distended haemorrhoids;
2. Pregnancy increases intrabdominal pressure, rising venous pressure. Pregnancy also causes generalised smooth muscle softening due to increased levels of progesterone in pregnancy.
3. Prolonged sitting leading to pooling of the venous blood in the anal canal
4. Obesity as adipose tissue has less tissue attachment
5. Low fibre diet causing chronic constipation which further leads to straining when defecating
6. Heredity also seems to play a part in the development of haemorrhoids associated with congenital weakness of the vein walls or abnormally large arterial supply to the rectal plexus.
7. May be due to secondary or other conditions which should be borne in mind e.g. chronic constipation, chronic diarrhoea, portal hypertension etc.

Definition: Hemorrhoids may be classified into:

1. Internal hemorrhoids (Internal to the anal orifice)
2. External hemorrhoids (External to the anal orifice)
3. Interoexternal hemorrhoids (Prolapsing internal hemorrhoids)

FigureTableFigureTableFigureTable 9Internal Hemorrhoids

Internal hemorrhoids refer to dilatation of the sub mucosal internal venous plexus and draining superior hemorrhoidal veins. They develop within areas of enlarged anal lining (anal cushions') as they slide downwards during straining. Since the internal and external (subcutaneous perianal) venous plexus communicate (Porto-systemic anastomosis) engorgement of the internal plexus is likely to lead to involvement of the latter.

With the patient in the lithotomy position, internal hemorrhoids are frequently arranged in three groups at 3, 7 and 11 o'clock positions. This arrangement corresponds to the distribution of the superior hemorrhoidal vessels (2 on the right, one on the left) but there can be smaller hemorrhoids in between the three groups.

Etiology: Though most hemorrhoids are idiopathic, they may also be secondary to underlying causes, which include:

- Straining accompanying constipation
- Straining at micturition
- Recto Sigmoid mass

Clinical features:

Hemorrhoids are usually asymptomatic but can present with:

- Rectal bleeding: is the main and earliest symptom which is usually slight painless bright red occurring on passing stool as a splash into the toilet or toilet papers or covering the stool at the end of defecation.
- Prolapse of the varicose masses is a late manifestation. Hemorrhoids are graded based on the degree of prolapse and reducibility in to:
 - ⇒ First degree hemorrhoids: These are confined to the anal canal (do not prolapse out side the anal canal)
 - ⇒ Second degree hemorrhoids: These prolapse on defecation but reduce spontaneously or are replaced manually and stay reduced.

- ⇒ Third degree hemorrhoids: prolapse, even apart from defecation, and remain permanently prolapsed outside the anal margin. These give rise to a feeling of heaviness in the rectum
- A mucoid discharge frequently accompanies prolapsed hemorrhoids and is due to mucus secretion from the engorged mucus membrane.
- Pruritus ani-due to the discharge and perianal soiling accompanying prolapsed hemorrhoids.
- Pain- is not a significant feature of uncomplicated internal hemorrhoids.
- Anemia-due to persistent/profuse bleeding

Management of hemorrhoids:

On examination every patient should undergo at least:

- $\frac{3}{4}$ Complete abdominal and pelvic examination looking for underlying causes or aggravating factors.
- $\frac{3}{4}$ Rectal examination: Inspection may show prolapsing hemorrhoids (piles) with or without straining and/or redundant skin folds or skin tags.
- Digital rectal examination may show prolapsing or thrombosed hemorrhoids. Internal hemorrhoids are not felt unless they prolapse.

Investigations

Proctoscopy- this is used to visualize internal hemorrhoids and exclude other lesions

Any underlying or associated more important condition or disease should be excluded or treated accordingly before commencing specific treatment for hemorrhoids.

Hemorrhoids can be managed with:

Conservative measures which include:

- High fiber-diet for a regular soft and bulky motion
- Hydrophilic creams or suppositories
- Local application of analgesic ointment /suppository.

This is recommended and usually effective for many patients with early hemorrhoids particularly those secondary to other conditions and likely to regress

with removal of the underlying conditions (e.g. pregnancy and post partum hemorrhoids)

Haemorrhoids that are permanently prolapsed may be treated more aggressively by:

- **Sclerotherapy** which involves injecting a chemical irritant into the tissues surrounding the haemorrhoids to reduce inflammation and eventual fibrosis and scarring. It is used to treat recurrent bleeding and early prolapsed internal haemorrhoids. Enlarged or prolapsed haemorrhoids may also be treated with rubberband ligation. A rubber band is placed around the haemorrhoidal plexus and surrounding mucosa, causing the tissue to necrotize and slough off within 7 – 10 days.
- **Cryotherapy or Surgery** in which haemorrhoids are necrotized by freezing with a cryo probe, infrared photocoagulation or electro coagulation. Clients with chronic symptoms, permanent prolapse, chronic bleeding and anaemia or painful thrombosed haemorrhoids are surgically excised, leaving normal skin and surrounding tissues.

Haemorrhoidectomy

The following procedures need to be considered. Let us now consider its indications and the pre and post operative care of patient who undergo this surgery.

Indications

1. Chronic symptoms
2. Permanent prolapse
3. Chronic bleeding and anaemia
4. Painful thrombosed haemorrhoids

Preoperative care

a. Physical preparation

Haemorrhoids are a chronic condition and not an emergency. The patient should be on a light diet at least 3 days before surgery. Bleeding and clotting time should be done to determine bleeding disorders. Urinalysis to rule out urinary tract infections is done.

- ✓ Give an enema to evacuate the bowels at least a day before surgery. Ensure that any respiratory tract infections are treated as they impede postoperative healing.

b. Psychological preparation

1. Explain the nature of surgery to the patient and post operative exercises that will be done.
2. Ensure that the client signs the informed consent an important legal document.

c. Immediate preoperative care

1. Insert intravenous fluid as ordered
2. Remove all jewelries that may obscure proper post operative observations
3. Client should change into theatre gown
4. Give prescribed preoperative medication
5. Other activities are like for any other surgery

Post operative nursing care

Important specific post operative nursing care should be given to the patient addition to the general post operative care.

Assessment

1. Monitor vital signs every 4 hours for 24 hours initially
2. Inspect the rectal dressing every 2 – 4 hours for 24 hours
3. Monitor the urinary output

Pain control

1. Assist the patient to his position of comfort
2. Provide analgesics as prescribed
3. Keep fresh ice packs over the rectal dressing as ordered
4. Assist with sitz baths every 3 – 4 times a day
5. Provide a floatation pad for use when sitting.

Diet

1. As soon as bowel sounds are back give the patient a highly nutritious diet
2. Light meals should be given to facilitate bowel emptying
3. Give plenty of fluids as tolerated

Elimination

1. Give stool softeners as prescribed
2. Give an enema before the first post operative bowel movement
3. Do not remove the dressing before the surgeon sees the wound
4. Encourage the patient to open bowels whenever he has the urge to do so
5. When tolerated encourage fluid intake of at least 2000 per day

Information, education and communication to the patient and family

1. Take sitz baths after each bowel movement for at least 1 – 2 weeks after surgery
2. Drink at least 2 litres of fluid a day
3. Eat adequate dietary fibre and exercise moderately to prevent constipation that lead to straining on stooling
4. Take stool softeners as prescribed
5. Report to the physician as soon as possible the following symptoms;
 - ✓ Rectal bleeding
 - ✓ Continuing pain on defaecation
 - ✓ Fever greater than 38.3°
 - ✓ Purulent rectal discharge

6. To keep the perineal area clean at all times to prevent infection
7. To avoid standing in position for a long time
8. To open bowels as soon as he feels like doing so

be performed by expert hands to avoid /reduce complications

Sugery

Hemorrhoidectomy: This is indicated for:

- Third degree hemorrhoids
- Failure of non-operative treatment of second degree hemorrhoids
- Fibrosed hemorrhoids
- Interoexternal hemorrhoids with well defined external hemorrhoid

Complications of haemorrhoids

Complications of hemorrhoids include:

- **Profuse hematochezia**
- **Strangulation:** This may leads to an acute pain an unrelieved strangulation may lead to ulceration of the exposed mucus membrane.
- **Thrombosis:** which makes the mass swollen, dark, tense and feel solid and tender on examination. Unrelieved strangulation/thrombosis may lead to ulceration of the exposed mucus membrane.
- **Gangrene:** may lead to spreading infection/sepsis and Abscess formation.

Treatment of complications

- Immediate surgery under adequate antibiotic cover or
- Adequate pain relief,
- Bed rest,
- Encourage frequent hot sitz bath,
- Do warm saline compress with firm pressure followed by ligation or excision or anal dilation.

If Severe hemorrhage

- Resuscitation with IV fluids

- Local compression with adrenaline solution
- Pain relief when present
- Blood transfusion when needed

External Haemorrhoid

A thrombosed external haemorrhoid (perianal hematoma) is usually associated with considerable pain. It appears as an inflamed tense tender and easily visible on inspection of the anal verge.

Treatment:

- Relieving pain by local or oral analgesics
- Advise patient to avoid constipation
- Surgical evacuation of clot can be done under local anaesthesia

ANAL FISSURE (FISSURE IN ANO)

Anal fissure is an elongated tear (ulcer) in the lower anal canal, which lies along the long axis of the canal.

The upper end stops at the dentate line. It is located commonly in the posterior midline, occasionally along the anterior midline and rarely at multiple sites.

Etiology

The cause of anal fissure is not completely understood. Passage of hard fecal mass precipitates and aggravates the condition.

Classification

Anal fissure can be classified as acute or chronic based on its pathologic features.

- **Acute fissure:** is a deep skin tear at the anal margin extending in to the anal canal with edges showing little inflammatory indurations or edema .It is accompanied with spasm of the anal sphincter muscle.
- **Chronic fissure:** is characterized by Inflamed and indurated margins as a result of inflammatory fibrosis and contracture of the internal sphincter in long standing cases

NB: specific causes are much more common with a chronic fissure (e.g. syphilis, tuberculosis, Crohn's disease, and carcinoma.

Clinical features

A patient with anal fissure presents with:

- Pain is the commonest feature
- Characteristic sharp, severe pain starting during defecation and lasting an hour or more and ceases suddenly to reappear during the next bowel motion.
- Constipation: the patient tends to be constipated for fear of the pain on defecation.
- Bleeding: usually appearing as bright streaks on the stool surface or the toilet paper
- Discharge: common with chronic cases
- Manifestations related to underlying diseases and/or complications

Examination may reveal:

- Tightly closed anus due to the sphincter spasm
- Sentinel pile (skin tag) visible at the anal verge
- Lower end of the fissure on gentle parting of the buttocks

Digital examination

- This should be done using local anesthetic gel, a cotton wool soaked in local anesthetic.
- Fissure may not be palpable in early cases.

In fully established cases the fissure may be felt as a vertical crack in the anal canal. NB:- Big ulcers and fissures can be found in patients with HIV and other viral infections.

Management

Conservative management: This is recommended especially for a small acute and superficial fissure, which may heal spontaneously. It includes:

- A high fiber diet and high fluid intake with a mild laxative, such as liquid paraffin, to encourage passing of soft, bulky stools
- Administration of a local anesthetic ointment or suppository

Surgical Management

surgical Procedures include:

- • Lateral anal sphincterotomy
- • Fissurectomy and
- • Sphincterotomy: This procedure can be used for cases with a chronic fissure. It needs an experienced operator to reduce complications, which include hematoma formation, incontinence and mucosal prolapse.

Where the condition is chronic, surgery may be ordered this involves the removal of the non viable tissue and suturing is done. This involves surgical treatment, under general anaesthesia, where either an anal stretch (Lord's operation) or lateral sphincterotomy is done by incising the internal anal sphincter muscle. Both these operations aim to decrease sphincter tone and thereby restore normal blood supply to the anal mucosa. It is important to note that surgical operations involving a general anaesthetic can be painful postoperatively. Anal stretch is also associated with anal incontinence in a small proportion of cases and thus sphincterotomy is the operation of choice.

Chemical Sphincterotomy

Chronic fissures rarely heal because of poor blood supply caused by excessive sphincter spasm. Local application of medications to relax the sphincter muscle to allow the healing to proceed:

1. Nitroglycerine ointment and calcium channel blockers such as nifedipine ointment.
2. Topical nifedipine 0.3% with lidocaine 1.5% ointment and diltiazem 2%
3. A common side effect of nitroglycerine ointment is headache- caused by systemic absorption of the drug, which limits patient acceptability.
4. A combined surgical and pharmacological treatment, administered by colorectal surgeons, is direct injection of *Botulinum toxin* into the anal sphincter to relax it.

Prevention of anal fissures

For adults, the following may help prevent anal fissure:

1. Avoiding straining when defecating. This includes treating and preventing constipation by eating food rich in dietary fiber, drinking enough water, occasional use of a stool softener, and avoiding constipating agents such as caffeine.
2. Prompt treatment of diarrhoea may reduce anal strain.
3. Careful anal hygiene after defecation, including using soft toilet paper and/or cleaning with water.
4. In cases of pre-existing or suspected fissure, use of a lubricating ointment (e.g hemorrhoid ointments) can be helpful.
5. In infants, frequent nappy/diaper change can prevent anal fissure.
6. As constipation can be a cause, making sure the infant is drinking enough water (i.e. sufficiently diluted juices) may thus help avoid fissures.
7. In infants, once an anal fissure has occurred, addressing underlying causes is usually enough to ensure healing occurs.

ANAL FISTULA (FISTULA IN ANO)

Definition:

A fistula in ano is a track, lined by granulation tissue, which connects the anal canal or rectum internally with the skin around the anus externally.

Causes (risk factors) - It results from:

- Usually an untreated or inadequately treated anorectal abscess
- Granulomatous infections and inflammatory bowel diseases
- May give rise to multiple external openings and include e. g. Tuberculous proctitis, Crohn's disease

Classification: Anal fistula can be grouped into two according to the levels of internal opening:

Low level: with an internal opening below the anorectal ring.

High level: with an internal opening at or above the anorectal ring

Clinical features

Seropurulent discharge with perianal irritation

An external opening (frequently single) seen as a small elevated opening on the skin around the anus with a granulation.

An internal opening may be felt as a nodule on digital rectal examination (almost always single) irrespective of the number of external openings.

Signs of underlying/associated diseases

Management

- Emergency treatment for abscesses
- Treatment of underlying cause
- Surgery for fistula in ano
- Preceded by:
 - Pre-operative bowel cleansing (enema)
 - Examination under anesthesia

Low level fistulas

- Laying open the entire fistulous tract, fistulotomy
- Wound care

High level fistulas

- Protective colostomy to prevent infection and facilitate healing
- Staged operation that has to be performed by an expert and the patient needs referral to hospital.

ISCHIORECTAL ABSCESS

This is one of the common anorectal abscess located in the ischiorectal fossa

Clinical features:

- Severe pain
- Fever
- Constitutional symptoms such as sweating and anorexia
- Features of proctitis and constipation

Physical findings (rectal examination) include:

- A lump visible and palpable at ischiorectal fossa which is tender brownish induration palpable on the affected side.
- Rectal tenderness,
- rectal tender mass

Management:

The abscess needs drainage as soon as it is diagnosed followed by irrigation, packing with saline soaked gauze and sitz bath twice daily till the wound heals. Antibiotics should be used together with surgical treatment. They are needed when there are systemic manifestations and in immunocompromized patients. Analgesics to relieve pain and laxatives to prevent constipation should be given.

CANCER OF THE RECTUM

The rectum is the lower part of the colon that connects the large bowel to the anus. The rectum's primary function is to store formed stool in preparation for evacuation. Like the colon, the 3 layers of the rectal wall are as follows:

- **Mucosa:** This layer of the rectal wall lines the inner surface. The mucosa is composed of glands that secrete mucus to help the passage of stool.
- **Muscularis propria:** This middle layer of the rectal wall is composed of muscles that help the rectum keep its shape and contract in a coordinated fashion to expel stool.
- **Mesorectum:** This is a fatty tissue that surrounds the rectum.

In addition to these 3 layers, another important component of the rectum is the surrounding lymph nodes (also called regional lymph nodes). Lymph nodes are part of the immune system and assist in conducting surveillance for harmful materials (including viruses and bacteria) that may be threatening the body. Lymph nodes surround every organ in the body, including the rectum.

The most common type of rectal cancer is adenocarcinoma, which is a cancer arising from the mucosa. Cancer cells can also spread from the rectum to the lymph nodes on their way to other parts of the body.

Like colon cancer, the prognosis and treatment of rectal cancer depends on how deeply the cancer has invaded the rectal wall and surrounding lymph nodes.

However, although the rectum is part of the colon, the location of the rectum in the pelvis poses additional challenges in treatment when compared with colon cancer.

Causes

The actual cause of rectal cancer is unknown. Rectal cancer usually develops over several years, first growing as a precancerous growth called a polyp. Some polyps have the ability to turn into cancer and begin to grow and penetrate the wall of the rectum.

However, the following are risk factors for cancer of the rectum:

- • Increasing age
- • Smoking
- • Family history of colon or rectal cancer
- • High-fat diet and/or a diet mostly from animal sources
- • Personal or family history of polyps or colorectal cancer. Family history is a factor in determining the risk of rectal cancer. If a family history of colorectal cancer is present in a first-degree relative (a parent or a sibling), then endoscopy of the colon and rectum should begin 10 years before the age of the relative's diagnosis or at age 50 years, whichever comes first.

Signs and symptoms

Rectal cancer can cause many symptoms that require a patient to seek medical care. However, rectal cancer may also be present without any symptoms.

The following are the symptoms to be aware of include the following:

- Bleeding: Seeing blood mixed with stool is a sign to seek immediate medical care. Although many people bleed due to hemorrhoids, a doctor should still be notified in the event of rectal bleeding.

- Prolonged rectal bleeding (perhaps in small quantities that is not seen in the stool) may lead to anemia, causing fatigue, shortness of breath, light-headedness, or a fast heartbeat.
 - Obstruction: A rectal mass may grow so large that it prevents the normal passage of stool. This blockage may lead to the feeling of severe constipation or pain when having a bowel movement.
 - Abdominal pain or cramping may occur due to the blockage.
 - The stool size may appear narrow so that it can be passed around the rectal mass. Therefore, pencil-thin stool may be another sign of an obstruction from rectal cancer.
- A person with rectal cancer may have a sensation that the stool cannot be completely evacuated after a bowel movement.
 - Weight loss: Cancer may cause weight loss. Unexplained weight loss (in the absence of dieting or a new exercise program) requires a medical evaluation

Exams and Tests

Appropriate colorectal screening leading to the detection and removal of precancerous growths is the only way to prevent this disease. Screening tests for rectal cancer include the following:

Fecal occult blood test: Early rectal cancer may damage blood vessels of the rectal lining and cause small amounts of blood to leak into the feces. The stool appearance may not change. The fecal occult blood test requires placing a small amount of stool on a special paper that is provided by a doctor. The doctor then applies a chemical to that paper to see if blood is present in the stool sample.

Endoscopy: During endoscopy, a doctor inserts a flexible tube with a camera at the end (called an endoscope) through the anus and into the rectum and colon. During this procedure, the doctor can see and remove abnormalities on the inner lining of the colon and rectum.

If rectal cancer is suspected, the tumor can be physically detected through either digital rectal examination (DRE) or endoscopy.

- A digital rectal examination is performed by a doctor using a lubricated gloved finger inserted through the anus to feel the cancer on the rectal wall. Not all rectal cancers can be felt this way, and detection is dependent on how far the tumor is from the anus. If an abnormality is detected by a digital rectal examination, then an endoscopy is performed for further evaluation of the cancer.
- Flexible sigmoidoscopy is the insertion of a flexible tube with a camera on the end (called an endoscope) through the anus and into the rectum. An endoscope allows a doctor to see the entire rectum, including the lining of the rectal wall.
- • Rigid sigmoidoscopy is the insertion of a rigid optical scope inserted through the anus and into the rectum. Rigid sigmoidoscopy is usually performed by either a gastroenterologist or a surgeon. The advantage of rigid sigmoidoscopy is that a more exact measurement of the tumor's distance from the anus can be obtained, which may be relevant if surgery is required.
- A colonoscopy may be performed. For a colonoscopy, a flexible endoscope is inserted through the anus and into the rectum and colon. A colonoscopy allows a doctor to see abnormalities in the entire colon, including the rectum.
- Because the depth of the cancer's growth into the rectal wall is important in determining treatment, an endoscopic ultrasound (EUS) may be performed during endoscopy. An endoscopic ultrasound uses an ultrasound probe at the tip of an endoscope that allows a doctor to see how deeply the cancer has penetrated. In addition, a doctor can measure the size of the lymph nodes around the rectum during an endoscopic ultrasound. Based on the size of the lymph nodes, a good prediction can be made as to whether the cancer has spread to the lymph nodes.
- Once an abnormality is seen with endoscopy, a biopsy specimen is obtained using the endoscope and sent to a pathologist. The pathologist can confirm that the abnormality is a cancer and needs treatment. A person may experience small amounts of bleeding after a biopsy is performed. If this

bleeding is heavy or lasts longer than a few days, a doctor should be notified immediately.

- A chest x-ray and a CT scan of the abdomen and pelvis are most likely performed to see whether the cancer has spread further than the rectum or surrounding lymph nodes.

Routine blood studies are performed to assess how a person might tolerate the upcoming treatment.

In addition, a blood test called CEA (carcinoembryonic antigen) is obtained. The CEA is often produced by colorectal cancers and can be a useful gauge of how the treatment is working. After the treatment, the doctor may regularly check the CEA level as one indicator of whether the cancer has returned. However, checking the CEA level is not an absolute test for colorectal cancers, and other conditions may cause a rise in the CEA level. Likewise, a normal CEA level is not a guarantee that the cancer is no longer present.

Medical Treatment

The treatment and prognosis of rectal cancer depend on the stage of the cancer, which is determined by the following 3 considerations:

- How deeply the tumor has invaded the wall of the rectum
- Whether the lymph nodes appear to have cancer in them
- Whether the cancer has spread to any other locations in the body (Organs that rectal cancer commonly spreads to include the liver and the lungs.)

The stages of rectal cancer are as follows:

- Stage I: The tumor involves only the first or second layer of the rectal wall and no lymph nodes are involved.
- Stage II: The tumor penetrates into the mesorectum, but no lymph nodes are involved.
- Stage III: Regardless of how deeply the tumor penetrates, the lymph nodes are involved with the cancer.
- Stage IV: Convincing evidence of the cancer exists in other parts of the body, outside of the rectal area.

Localized rectal cancer includes stages I-III. Metastatic rectal cancer is stage IV.

The goals of treating localized rectal cancer are to ensure the removal of all the cancer and to prevent a recurrence of the cancer, either near the rectum or elsewhere in the body.

If stage I rectal cancer is diagnosed, then surgery is likely to be the only necessary step in treatment. The risk of the cancer coming back after surgery is low, and, therefore, chemotherapy is not usually offered.

Sometimes, after the removal of a tumor, the doctor discovers that the tumor penetrated into the mesorectum (stage II) or that the lymph nodes contained cancer cells (stage III). In these cases, chemotherapy and radiation therapy are offered after recovery from the surgery to reduce the chance of the cancer returning. Chemotherapy and radiation therapy given after surgery is called adjuvant therapy.

If the initial exams and tests show a person to have stage II or III rectal cancer, then chemotherapy and radiation therapy should be considered before surgery. Chemotherapy and radiation given before surgery is called neoadjuvant therapy. This therapy lasts approximately 6 weeks. Neoadjuvant therapy is performed to shrink the tumor so it can be more completely removed by surgery. In addition, a person is likely to tolerate the side effects of combined chemotherapy and radiation therapy better if this therapy is administered before surgery rather than afterward. After recovery from the surgery, a person who has undergone neoadjuvant therapy should meet with the oncologist to discuss the need for more chemotherapy.

If the rectal cancer is metastatic, then surgery and radiation therapy would only be performed if persistent bleeding or bowel obstruction from the rectal mass exist. Otherwise, chemotherapy alone is the standard treatment of metastatic rectal cancer. At this time, metastatic rectal cancer is not curable. However,

average survival times for people with metastatic rectal cancer have lengthened over the past several years because of the introduction of new medications.

Medications

The following chemotherapy drugs may be used at various points during therapy:

- **5-Fluorouracil (5-FU):** This drug is given intravenously either as a continuous infusion using a medication pump or as quick injections on a routine schedule. This drug has direct effects on the cancer cells and is often used in combination with radiation therapy because it makes cancer cells more sensitive to the effects of radiation. Side effects include fatigue, diarrhea, mouth sores, and hand-and-foot syndrome (redness, peeling, and pain in the palms of the hands and the soles of the feet).
- **Capecitabine (Xeloda):** This drug is given orally and is converted by the body to a compound similar to 5-FU. Capecitabine has similar effects on cancer cells as 5-FU and can be used either alone or in combination with radiation therapy. Side effects are similar to intravenous 5-FU.
- **Oxaliplatin (Eloxatin):** This drug is given intravenously once every 2 or 3 weeks. Oxaliplatin has recently become the most common drug to use in combination with 5-FU for the treatment of metastatic rectal cancer. Side effects include fatigue, nausea, increased risk of infection, anemia, and peripheral neuropathy (tingling or numbness of the fingers and toes). This drug may also cause a temporary sensitivity to cold temperatures up to 2 days after administration. Inhaling cold air or drinking cold liquids should be avoided if possible after receiving oxaliplatin.

Irinotecan (Camptosar, CPT-11): This drug is given intravenously once every 1-2 weeks. Irinotecan is also commonly combined with 5-FU. Side effects include fatigue, diarrhea, increased risk of infection, and anemia. Because both irinotecan and 5-FU cause diarrhea, this symptom can be severe and should be reported immediately to a doctor.

Bevacizumab (Avastin): This drug is given intravenously once every 2-3 weeks. Bevacizumab is an antibody to vascular endothelial growth factor (VEGF) and is given to reduce blood flow to the cancer. Bevacizumab is used in combination with 5-FU and irinotecan or oxaliplatin for the treatment of metastatic rectal cancer. Side effects include high blood pressure, nose bleeding, blood clots, and bowel perforation.

Cetuximab (Erbix): This drug is given intravenously once every week. Cetuximab is an antibody to epidermal growth factor receptor (EGFR) and is given because rectal cancer has large amounts of EGFR on the cell surface. Cetuximab is used alone or in combination with irinotecan for the treatment of metastatic rectal cancer. Side effects include an allergic reaction to the medication and an acne-like rash on the skin. Clinical trials are underway to evaluate this antibody for the treatment of localized rectal cancer. Medications are available to alleviate the side effects of chemotherapy and antibody treatments. If side effects occur, an oncologist should be notified so that they can be addressed promptly.

Surgery

Surgical removal of a tumor is the cornerstone of curative therapy for localized rectal cancer. In addition to removing the rectal tumor, removing the fat and lymph nodes in the area of a rectal tumor is also necessary to minimize the chance that any cancer cells might be left behind.

However, because the rectum is in the pelvis and is close to the anal sphincter (the muscle that controls the ability to hold stool in the rectum), rectal surgery can be difficult. With more deeply invading tumors and when the lymph nodes are involved, chemotherapy and radiation therapy are usually included in the treatment course to increase the chance that all microscopic cancer cells are removed or killed.

Four types of surgeries are possible, depending on the location of the tumor in relation to the anus.

Transanal excision: If the tumor is small, located close to the anus, and confined only to the mucosa (innermost layer), then performing a transanal excision, where the tumor is removed through the anus, may be possible. No lymph nodes are removed with this procedure. No incisions are made in the skin.

Mesorectal surgery: This surgical procedure involves the careful dissection of the tumor from the healthy tissue. Mesorectal surgery is being performed mostly in Europe.

Low anterior resection (LAR): When the cancer is in the upper part of the rectum, then a low anterior resection is performed. This surgical procedure requires an abdominal incision, and the lymph nodes are typically removed along with the segment of the rectum containing the tumor. The two ends of the colon and rectum that are left behind can be joined, and normal bowel function can resume after surgery.

Abdominoperineal resection (APR): If the tumor is located close to the anus (usually within 5 cm), performing an abdominoperineal resection and removing the anal sphincter may be necessary. Lymph nodes are also removed during this procedure. With an abdominoperineal resection, a colostomy is necessary. A colostomy is an opening of the colon to the front of the abdomen, where feces are eliminated into a bag.

Other Therapy

Radiation therapy uses high-energy rays that are aimed at the cancer cells to kill or shrink them. For rectal cancer, radiation therapy may be used either before surgery (neoadjuvant therapy) or after surgery (adjuvant therapy), usually in conjunction with chemotherapy.

The goals of radiation therapy are as follows:

- Shrink the tumor to make its surgical removal easier (if given before surgery).

- Kill the remaining cancer cells after surgery to reduce the risk of the cancer returning or spreading.

- Treat any local recurrences that are causing symptoms, such as abdominal pain or bowel obstruction.

Typically, radiation treatments are given daily, 5 days a week, for up to 6 weeks. Each treatment lasts only a few minutes and is completely painless; it is similar to having an x-ray film taken.

The main side effects of radiation therapy for rectal cancer include mild skin irritation, diarrhea, rectal or bladder irritation, and fatigue. These side effects usually resolve soon after the treatment is complete.

Chemoradiation is often given for stages II and III rectal cancer. Preoperative chemoradiation is sometimes performed to decrease the size of the tumor

COLORECTAL CANCER

Colorectal cancer is cancer of the colon and rectum. Cancer of the colon and rectum has now become the most common type of intestinal cancer. Microscopically, the neoplasm is a columnar cell carcinoma originating in the epithelial cells that line the colon, in the crypts of **Lieber Kuhn** or the rectum.

Rigid sigmoidoscopy

Risk factors

1. Age; it normally affects individuals above 50 years of age and both sexes are equally affected. Colorectal cancer is more likely to occur as people get older. More than 90 percent of people with this disease are diagnosed after age 50. The average age at diagnosis is 72.
2. History of rectal polypscolorectal polyps; Polyps are growths on the inner wall of the colon or rectum. They are common in people over age 50. Most polyps are benign (not cancer), but some polyps (adenomas) can become cancerous. Finding and removing polyps may reduce the risk of colorectal cancer
3. Presence of adenomatous polyps or history of familial adenomatous polyposis (FAP) is a rare, inherited condition in which hundreds of polyps

form in the colon and rectum. It is caused by a change in a specific gene called APC.

4. Personal history of cancer: A person who has already had colorectal cancer may develop colorectal cancer a second time. Also, women with a history of cancer of the ovary, uterus (endometrium), or breast are at a somewhat higher risk of developing colorectal cancer
5. Personal history of chronic inflammatory bowel disease such as diverticuli, ulcerative colitis or Crohn's disease. A person who has had a condition that causes inflammation of the colon (such as ulcerative colitis or Crohn's disease) for many years is at increased risk of developing colorectal cancer.
6. Diet high in cholesterol; studies suggest that diets high in fat (especially animal fat) and low in calcium, folate, and fiber may increase the risk of colorectal cancer. Also, some studies suggest that people who eat a diet very low in fruits and vegetables may have a higher risk of colorectal cancer.
7. Cigarette smoking: A person who smokes cigarettes may be at increased risk of developing polyps and colorectal cancer.

Clinical manifestations

As in the case of cancer elsewhere in the gastrointestinal tract, these develop gradually. The chief signs and symptoms include;

1. Alteration in bowel habits
2. Dyspepsia (Indigestion) and abdominal distension
3. Abdominal pains
4. Anorexia, nausea and vomiting
5. Passing of blood in stools as a later symptom
6. Anaemia
7. Loss of weight (cachexia)
8. Per rectal bleeding
9. Urinary bladder symptoms which might result in colon vesicle fistula
10. Tenesmus
11. Presence of a lump felt per abdomen or rectally on examination.

12. Obstruction and perforation

Stages of ca colon/rectum

Stage 0: The cancer is found only in the innermost lining of the colon or rectum. Carcinoma in situ is another name for Stage 0 colorectal cancer.

Stage I: The tumour has grown into the inner wall of the colon or rectum. The tumor has not grown through the wall.

Stage II: The tumour extends more deeply into or through the wall of the colon or rectum. It may have invaded nearby tissue, but cancer cells have not spread to the lymph nodes

Stage III: The cancer has spread to nearby lymph nodes, but not to other parts of the body.

Stage IV: The cancer has spread to other parts of the body, such as the liver or lungs.

Management

Investigations and diagnostic tests

1. History taking of the signs and symptoms as presented by the patient.
2. Abdominal and rectal examination
3. Faecal occult blood testing
4. Sigmoidoscopy
5. Barium enema followed by radiology
6. Colonoscopy

Surgical Treatment

The choice of treatment depends mainly on the location of the tumour in the colon or rectum and the stage of the disease.

Treatment for colorectal cancer may involve surgery, chemotherapy, biological therapy or radiation therapy. Some patients may have a combination of treatments. Side effects may not be the same for each person, and they may change from one treatment session to the next.

Preoperative preparation

Surgery is the usual option for colorectal cancer and the operation is elective. Therefore, general preoperative nursing care should be considered.

A. Psychological care

The diagnosis of cancer as well as the impending surgery usually evokes anxiety and grief in the patient. The nurse should expect this and include family members and friends in an effort to support the patient's coping behaviour.

The whole surgical team should be fully involved in the surgical preparation of the patient. Explain to him what is going to be done and the colostomy to be performed. Explain with the help of a diagram to illustrate the function of and how the colostomy looks like. Explain the difficulty associated with controlling of bowel movement initially and that over time he may learn to control. The type of colostomy, whether it be permanent or temporal should be fully explained to the client. Involve the spouse in the preparation. Let the family members and the client express their worries and help them to pass through a normal grieving process. Ensure that the patient understands the extent of surgery and have him sign the informed consent form for surgery.

B. Physical preparation

Blood tests should be done for haemoglobin count, clotting and bleeding time and cross matching. Blood sugar test to rule out diabetes, chest X – ray to determine possibility of metastasis to the lungs. Establish the baseline data of vital signs to compare and determine any deviation from normal. Blood pressure is particularly important to rule out hypertension. Assess the weight of the patient to determine his nutritional status and to use it to calculate the dosage of anaesthesia. Treat all pre existing infections such as respiratory tract infections as they may affect the post operative period.

Usually a high calorie and, low residue diet is given for several days before surgery if the patient's condition permits. If an emergency does not exist, the patient is prepared for several days, he is given an intestinal anti infective agent

(to kill the intestinal normal flora and prevent infection) such as *Kanamycin*, *Erythromycin* or *Neomycin* also as intestinal or bowel sterilers. These are given by mouth to reduce the bacterial content of the intestines and to soften and decrease the bulk of the content of the bowel. In addition, mechanical cleansing of the bowel may be done by laxatives, enemas or colonic irrigation.

C. Immediate preoperative preparation

This ranges from within 24 – 48 hours before surgery. Ensure that the patient is shaved the whole abdomen and perineum. Insert an indwelling urinary catheter and commence an intravenous line for fluids for hydration. Place all relevant documents such as laboratory results, radiological films, consent form etc in the patient's file. Starve the patient 6 – 8 hours before surgery and cleansing enema to be given 8 hours before surgery.

COLOSTOMY

A colostomy is an artificial opening made into the large bowel in order to divert faeces (and flatus) to the exterior, where they may be collected in an adhesive bag. Figure 2 shows a colostomy and a colostomy pouch.

Stoma: this is the new opening in the abdomen where waste material from the colon is expelled.

Ostomy: refers to surgical opening (stoma) from an area inside the body to the outside. It brings the opening of an internal organ to the outside surface of the body. In this case “**col**” is for the colon.

A colostomy can be temporal or permanent, depending on the indication.

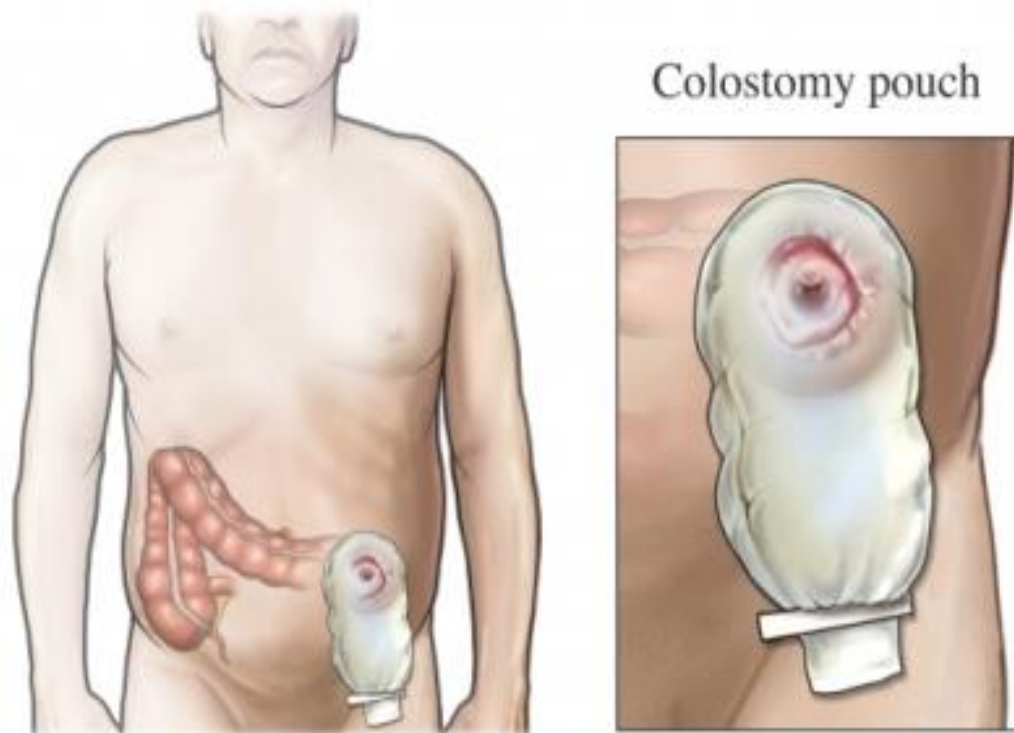


Figure 10: Colostomy

Temporal colostomy

This type of colostomy is established to relieve a distal obstruction of the sigmoid colon either by a carcinoma or diverticulum. Other indications include;

- Vesicle colic fistulae
- Protection of a low colorectal anastomosis after anterior resection to prevent faecal peritonitis developing after traumatic injury to the rectum or colon

- In facilitation of a post operative treatment of a high fistula in ano

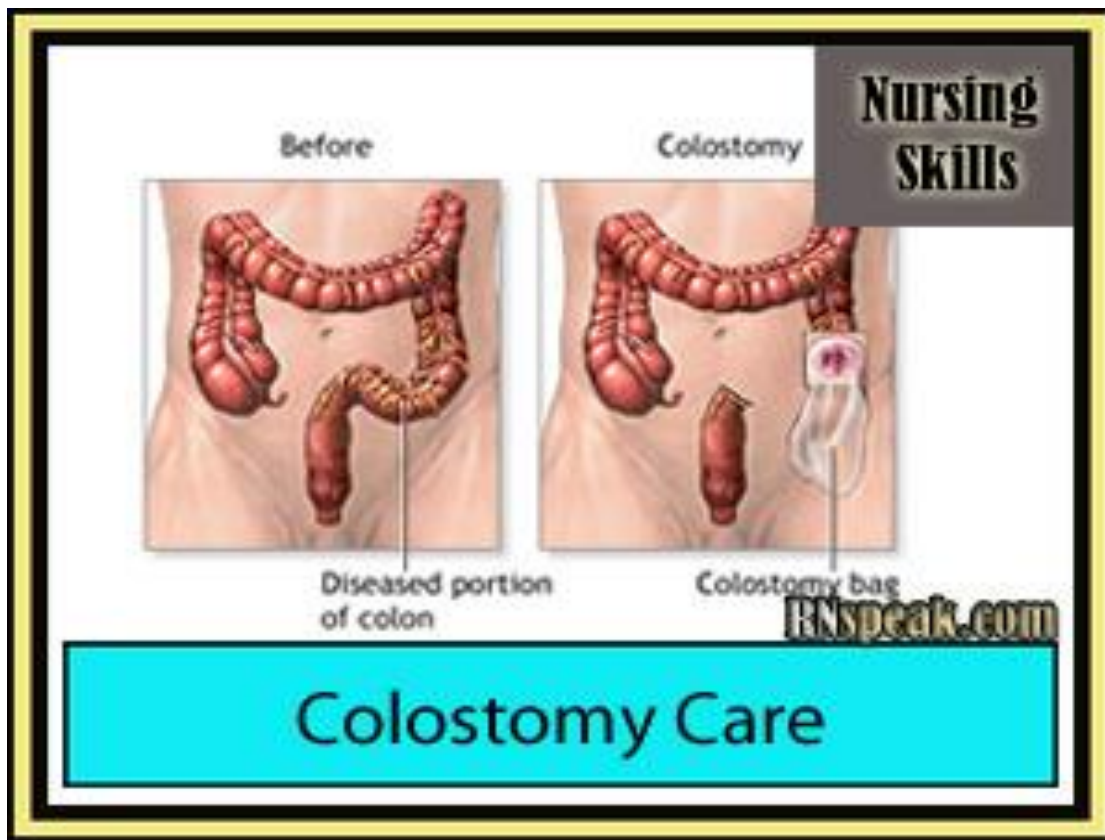


Figure 11: Colostomy Care

How a colostomy is created

1. An abdominal opening is created
2. The intestines are brought out through the skin
3. The intestine is sutured to the skin
4. The stoma is complete

Indications for a Colostomy

1. Infection of the abdomen, such as, perforated diverticulitis or an abscess
2. Injury to the colon or rectum e.g. gunshot wound
3. Partial or complete blockage of the large bowel (intestinal obstruction)
4. Cancer of the colon or rectum

5. Wounds or fistulas in the peritoneum i.e the area between the anus and the vulva or area between the anus and the scrotum.
6. Hirschsprung's Disease (conditions in which the nerves controlling bowel function are abnormal).
7. Imperforate Anus

Types of colostomy

The three main types of colostomy are:

1. Descending or sigmoid colostomy.
2. Transverse
3. Ascending

There are many differences among the three including:

1. Where on the abdomen the stoma is placed, the make up and consistency of the waste material when exiting the body.
2. Types of conditions or diseases most commonly responsible for undergoing the procedure.

Let us look at each type in further detail starting with the descending colostomy.

Descending or sigmoid colostomy

This is the most frequently performed type of colostomy. It takes place in the sigmoid or descending colon, the last third section of the organ. This type of colostomy is created when the sigmoid colon is incised and brought to the surface of the abdomen. Because of its location, the waste material that is expelled through the stoma tends to be firmer and less watery. Patients over time may even develop a routine or a schedule in which they can reliably predict their bowel movements, thus only having to wear their appliances or bags at

certain times of the day, although this is not the case for all patients. The diagrams in Figure 12 show a descending sigmoid colostomy.

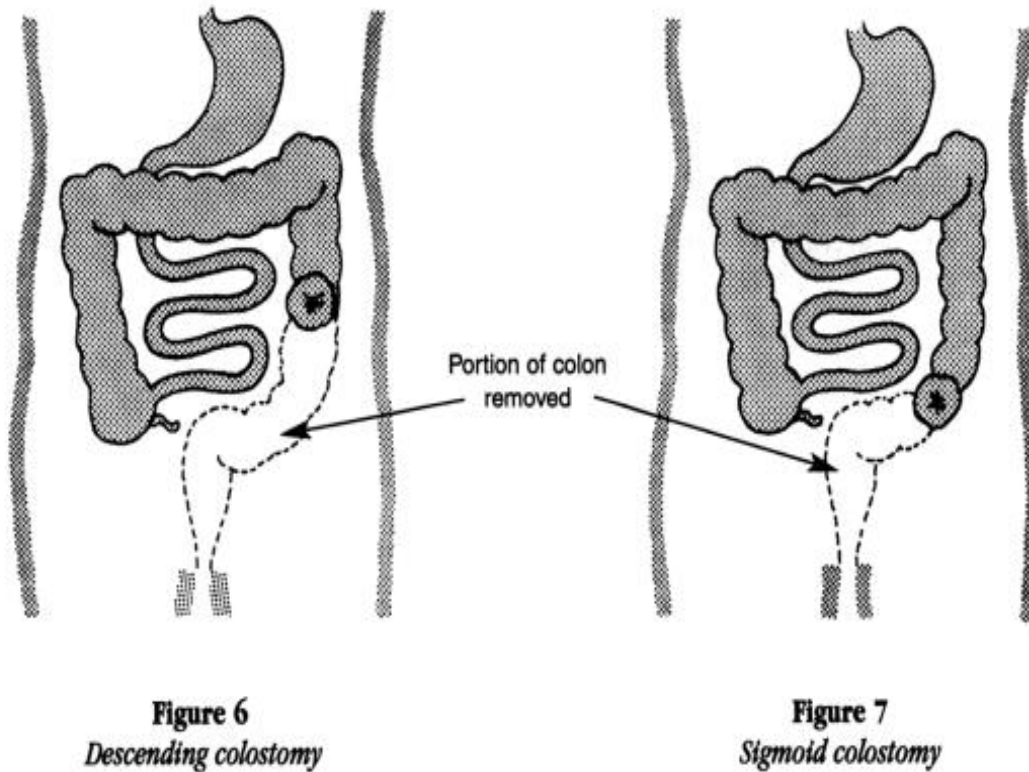


Figure 12: Descending or sigmoid colostomy

Indications:

1. Cancer of rectum or sigmoid colon.
2. Left sided tumours of the colon
3. Diverticulitis.
4. Trauma (injury),
5. Congenital defects.
6. Bowel obstruction
7. Paralysis.

Discharge:

1. Resembles normal bowel movements.

2. Regulated in some persons, not in others.

Management:

1. Natural evacuation or irrigation.
2. Protective cover or closed-end pouch if regulated.
3. If not regulated, use open-end drainable pouch.

A descending colostomy can either be of a single or double-barrel variety. The single barrel is more common and the stoma is located on the lower left side of the abdomen.

Transverse Colostomy

This variety takes place in the transverse colon. The stoma will be located from the middle of the abdomen to the right side of the abdomen. Since this takes place further up in the colon than a descending or sigmoid variety, the waste material will be more loose or watery. A pouch will usually have to be worn full time.

Indications:

1. Diverticulitis.
2. Trauma (injury).
3. Birth Defects.
4. Cancer/descending or sigmoid colon.
5. Bowel obstruction.
6. Paralysis.

Discharge:

1. Semi-solid.
2. Unpredictable.
3. Contains some digestive enzymes.

Management:

1. Skin protection.
2. Drainable pouch.
3. Closed-end pouch for convenience or special moments.

Types of transverse colostomies

There are two varieties of transverse colostomies, namely:

- Loop transverse colostomy

Double-barrel transverse colostomy:

Loop Transverse Colostomy: The stoma on this type of colostomy may look very large but that is because it has two openings. One opening is to expel waste material and the other is to drain naturally occurring mucus that is used by the colon for self protection. Despite being partially dissected, the damaged or diseased part of the colon that is being bypassed may still produce this mucus. It may either pass out of the second opening in the stoma or it may work its way down the remainder of the colon and rectum and be passed through the anus. 13

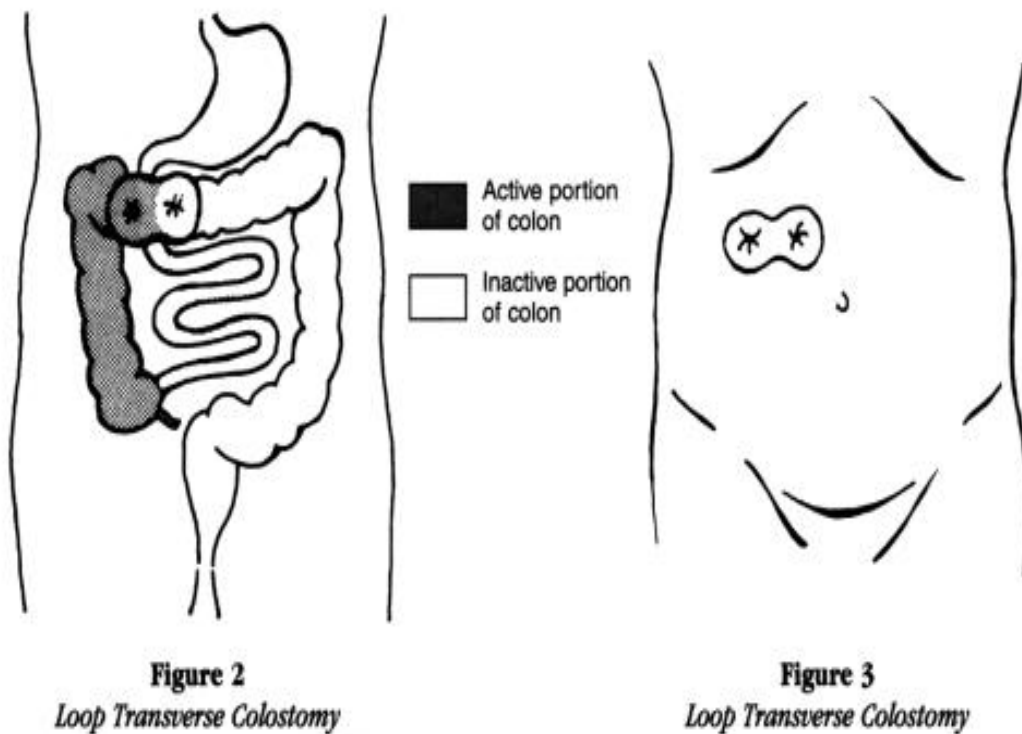


Figure 13: Loop Transverse Colostomy

Double-Barrel Transverse Colostomy

- In this procedure the colon is divided into two sections by the surgeon and two distinct stomas are formed on the surface of the abdomen.
- Each opening is brought to the surface as a separate stoma.
- This still serves the same function of the loop variety by having separate avenues to excrete wastes material and mucus.
- It is used in emergency such as Intestinal obstruction or perforation as it can be done quickly

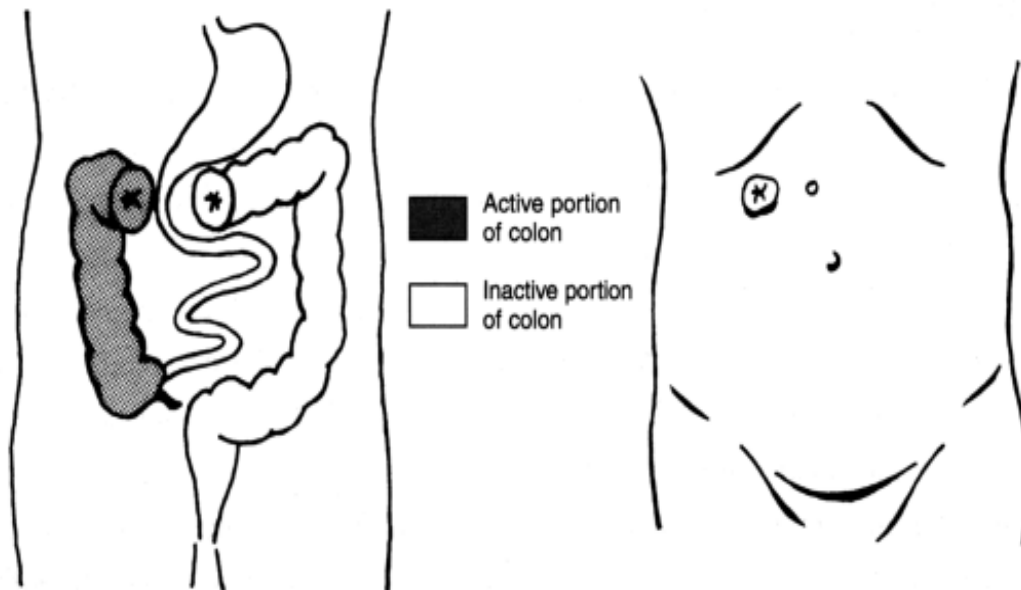


Figure 4
Double-Barrel Transverse Colostomy

Figure 5
Double-Barrel Transverse Colostomy

Figure 14 : Double-Barrel Transverse Colostomy

Ascending colostomy

1. This type of bowel diversion procedure is done at the very start of the colon near the small intestine.
2. It is done for right sided tumours of the colon
3. Waste material expelled from the stoma is very loose and usually contains digestive enzymes in liquid form.
4. These are used to break down food and waste material and pose a greater risk for skin and stoma irritation so special care must be taken.
5. It is also the least common of the three types that are performed

A temporary colostomy is made by bringing a loop of bowel to the surface (**Loop Colostomy**) where it is held in position by a rod and passed through the mesentery when firm adhesion of the colostomy to the abdominal wall has taken place after seven days, the rod can be removed. Most loop colostomies are

therefore made in the transverse colon and if the disease involves the left side of the colon, the right half of the transverse colon is preferred so that the entire left side is left available for any subsequent formal operation. **Double Barrel Colostomy** is a colostomy which was designed so that it could be closed by crushing the intervening spur by an enterostome. The colon is divided so that both ends can be brought separately to the surface. This ensures that absolute rest is given to the distal segment of the colon and rectum.

A. Permanent colostomy

This type of colostomy is usually formed after excision of the rectum for a carcinoma by the abdominal perineal technique. It is formed by bringing the distal end of the divided colon to the surface in the left iliac fossa where it is stitched in place immediately by sutures placed between the colonic margin and the surrounding skin.

Complications of colostomy

1. Prolapse
2. Retraction
3. Necrosis of distal end
4. Stenosis of the orifice
5. Colostomy hernia
6. Bleeding
7. Colostomy diarrhoea due to infective enteritis
8. Paralytic ileus
9. Intestinal obstruction

Postoperative nursing care

Possible nursing diagnoses are as follows;

1. Pain related to surgical incision
2. Risk of ineffective airway clearance related to depressed respiratory function, pain and bed rest

3. Activity intolerance related to pain and weakness.
4. Self care deficit related to op fatigue and pain.
5. Impaired skin integrity related to incision and drainage sites
6. Risk for wound infection related to susceptibility to bacterial invasion
7. . Risk of altered nutrition, less than body requirments related to decraesed intake and increased need for nutrients.
8. Body image disturbance related to colostomy.
9. Psychological disturbance related to nature of the condition and uncertainty of the outcome.
10. Need for close observations
11. Risk of ineffective compliance to therapeutic regiment related to insufficiency knowledge on wound care, dietary changes, medication and possible complication.

Immediate care

This begins when the patient has been transferred from the operating room to the recovery room.

1. Monitor vital signs every 15 minutes the every 30 minutes until they are stable
2. Monitor the surgical incision site to detect significant and rule out bleeding
3. Asses the mental state and level of consciousness
4. Orient he patient to time, place and persons repeatedly
5. Give emotional support because the patient is in a vulnerable and dependent position
6. Assess the hydration status by monitoring intake and output to detect cardiovascular or renal complications
7. Assess the patient's pain level and careful administration of analgesics, providing comfort without compounding the potential side effects of anaesthesia.

Care of a client with a colostomy

1. Assess the location of the stoma and the type of colostomy performed. Stoma location is an indicator of the section of bowel in which it is located and a predictor of faecal drainage to expect.
2. Assess the stoma appearance and surrounding skin condition frequently.
3. Position a collecting bag or drainage pouch over the stoma. Initial drainage may contain more mucus and serosanguineous fluid than faecal material. As the bowel starts to resume function, the drainage becomes faecal in nature. The consistence of the drainage depends on the stoma location in the bowel.
4. If ordered, irrigate the colostomy by instilling water in to the colon similar to an enema procedure. The water stimulates the colon to empty.
5. When colostomy irrigation is ordered for a client with a double barrel or loop colostomy, irrigate the proximal stoma. The distal bowel carries no faecal contents and does not need irrigation. It may be irrigated for cleaning just prior to re – anastomosis.
6. Empty the drainage pouch or replace the drainage bag as needed or when it is more than a third full
7. If the pouch is allowed to overfill, its weight may impair the seal and cause leakage
8. Provide stomal and skin care of the client with a colostomy as for a client with an ileostomy. Good skin and stoma care is important to maintain skin integrity and function as the first line of defense against infection.
9. Use *caulking agents* such as stomahesive or karaya paste and skin barrier wafar as needed to maintain a secure ostomy pouch. This may particularly important for the client with a loop colostomy.
10. A small needled hole high on the colostomy pouch will allow flatus to escape. This hole may be closed with a band aid and opened only while the client is in the bath room for odour control. Ostomy bags may balloon out disrupting the skin seal if excess gas collects.

Pain management

The client will have pain related to surgery. Following an abdominal perineal resection, phantom rectal pain related to severing nerves during the wide excision of the rectum may develop. The primary tumour itself and potentially metastatic tumours may impinge on the nerve and other organs causing pain. In the early post operative period, an epidural infusion or major analgesics are given to manage pain.

1. Assess frequently for adequate pain relief
2. Ask the client to rate his pain
3. Assess the analgesic's effectiveness 30 minutes after administration
4. Monitor for pain relief and adverse effects
5. Assess the incision for inflammation or swelling, for drainage, catheters and tubes for patency
6. Assess the abdomen for distension, tenderness and bowel sounds
7. Administer analgesics prior to an activity or procedure, adequate pain relief reduces muscle tension, allowing for more comfortable participation in activities
8. Assist with adjunctive relief measures such as positioning, diversional activities, management of environmental stimulants
9. Splint incision with a pillow and teach the client how to self splint when coughing and deep breathing.

Nutrition

1. Assess nutrition status using data such as height and weight, skin fold measurement, body mass index (BMI). Refer to dietician or nutritionist for dietary management.
2. Assess readiness for resumption of oral intake after surgery or procedures using data such as statements of hunger, presence of bowel sounds, passage of flatus and minimal abdominal distension.
3. Monitor and document food and fluid intake
4. Weigh the client on a daily basis
5. Maintain total parenteral nutrition and central intravenous line as ordered

6. When oral intake resumes, help the client develop a meal plan that incorporates food preferences and coincides with the client's schedule and environment

Psychological support

1. The client needs to adjust to the diagnosis of cancer as well as the loss of a major body part
2. Work to develop a trusting relationship with the client and his family
3. Listen actively encouraging the client and family to express their fears and concerns
4. Assist to identify strengths, past experiences and support systems
5. Demonstrate respect for cultural, spiritual and religious values and beliefs, encourage use of resources to cope with losses
6. Encourage discussion of the potential impact of loss on individual, family members, family structure and function
7. Refer to cancer support groups social services of as appropriate

Risk for sexual dysfunction

Colorectal cancer and ostomy surgery increases the risk for sexual dysfunction, defined as a change in sexual function so that it becomes unsatisfying, unrewarding and inadequate. An ostomate experience, an altered body image and may develop low self esteem. The client may feel undesirable and fear rejection. He may be concerned about odours or pouch leakage during sexual activity.

1. Provide opportunities for the client and the family to express feelings about the cancer diagnosis, ostomy and aspects of other treatments
2. Provide consistent colostomy care
3. Encourage expression of sexual concerns, provide privacy and care givers who have established trust with the client and family and are comfortable in discussions about sexual concerns.

Health education

1. Give a full package of information whether the colostomy is permanent or temporary
2. Need to involve significant others during the session of giving information
3. Demonstrate to the client how to change the colostomy bag and how to have it secured. Teach the client how to clean the ostomy using soapy water and to have the area around the ostomy dry at home.
4. Teach him to apply a barrier cream such as Vaseline to prevent skin excoriation and irritation of the skin around.
5. Supply the client with adequate colostomy bags and tell him that others could be brought.
6. Inform him that as much as possible he should prevent constipation, if he feels constipated, he should irrigate or pass enema water through the ostomy.
7. To reduce odour he should use a vented colostomy bags and also to apply deodorants.
8. On the night or evening that they might plan sexual intercourse with the spouse, the colostomy or colon should be as emptier as possible and bag well secured to prevent leakages during sexual activity.
9. Involve the dietician or nutritionist so that they are given proper information on modification of the diet.
10. He should avoid heavy lifting to prevent stoma hernia
11. Advise elimination re training like sitting on the toilet every morning to train the bowels
12. He should be emptying the bag when it is three quarters full.

HIRSCHPRUNG'S DISEASE

Special Investigations

Special Procedures

Thank you. This is the end of this part.

Self t Help Activity

During your clinical practice ensure that you demonstrate and understanding colostomy and how to do colonic lavage and colostomy care.

3.6 DISORDERS OF THE RECTUM

a. Haemorrhoids – piles

What are haemorrhoids?

Haemorrhoids are varicose veins (abnormally dilated tortuous superficial veins) occurring in relation to the anus.

The anus and anal canal contain two superficial venous plexuses with the haemorrhoidal veins. When pressure on these veins is increased or venous return is impeded, they can develop varicose veins varicosities, thus becoming weak and distended.

Causes

Haemorrhoids develop when venous return from the anal canal is impaired;

8. Straining to defaecate in the sitting or squatting position increases venous pressure and is the most common cause of distended haemorrhoids
9. Pregnancy increases intrabdominal pressure, rising venous and is a second important cause. Pregnancy also causes generalised smooth muscle softening due to increased levels of progesterone in pregnancy.
10. Prolonged sitting leading to pooling of the venous blood in the anal canal
11. Obesity as adipose tissue has less tissue attachment
12. Low fibre diet causing chronic constipation which further leads to straining when defaecating

13. Heredity also seems to play a part in the development of haemorrhoids associated with congenital weakness of the vein walls or abnormally large arterial supply to the rectal plexus.
14. May be due to secondary to other conditions which should be borne in mind e.g. chronic constipation, chronic diarrhoea, portal hypertension etc.

Types of haemorrhoids

1. Internal haemorrhoids: Are haemorrhoids that occur above the internal anal sphincter and are covered by mucous membrane.
2. External haemorrhoids: Are haemorrhoids that occur outside and below the external anal sphincter and they are covered by the skin.

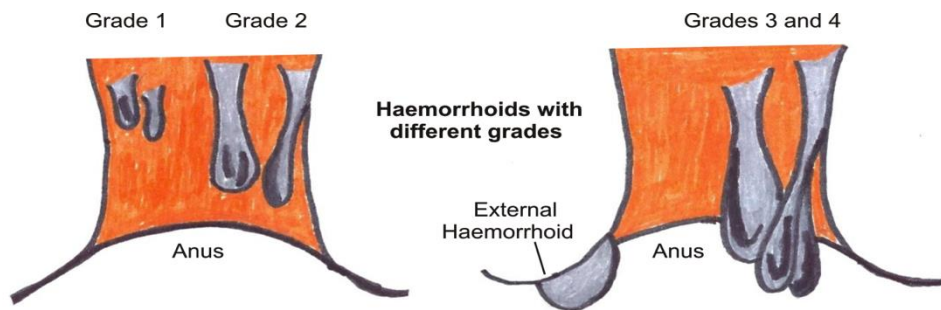


Figure 13: Two types of Haemorrhoids

Clinical features

1. **Bleeding:** As the name haemorrhoids implies, is the principle earliest symptoms. The bleeding is bright red and occurs during defaecation. Haemorrhoids that bleed but do not prolapse outside are called *First Degree Haemorrhoids*
2. **Prolapse:** Is a much later symptom. In the beginning the protrusion is slight and occurs only on stool. Haemorrhoids that prolapse on defaecation but return or need to be replaced manually and then remained reduced are called *Second Degree Haemorrhoids*. Those that are permanently prolapsed are called *Third Degree Haemorrhoids*.

3. **Discharge:** A mucoid discharge is a frequent accompaniment of prolapsed haemorrhoids. Pruritis follows the discharge.
4. **Pain:** Is absent unless complication supervenes, such as thrombosis of external haemorrhoids.
5. **Anaemia:** can be caused by persistent profuse bleeding from haemorrhoids.

Management of haemorrhoids

a. Diagnostic tests

1. On inspection there may be no evidence of internal haemorrhoids. When the patient strains, internal haemorrhoids may come into view transiently, or if they are of the third degree, they prolapse and remain prolapsed.
2. Digital examination: Internal haemorrhoids cannot be felt unless they are thrombosed.
3. Proctoscopy: A proctoscope is passed to its fullest extent and the obturator removed. The instrument is then withdrawn. Just below the anal rectal ring internal haemorrhoids if present, will bulge into the lumen of the proctoscope.
4. Stool occult blood and sigmoidoscopy are performed to rule out cancer of the colon and rectum which may aggravate haemorrhoidal symptoms or produce similar manifestations.
5. If liver disease with portal hypertension is suspected, liver function studies are ordered and done.

b. Treatment

The treatment of haemorrhoids is conservative unless complications such as permanent prolapse or thrombosis occur. Haemorrhoids that are not permanently prolapsed or acutely thrombosed generally are treated conservatively. A high fibre diet and increased fluid intake to increase stool bulk, improve its softness and reduce straining is effective for most clients with internal or external haemorrhoids. Bulk forming laxatives such as Psyllium Seed (Metamucil) or stool softeners such as Docusate Sodium (Colace) may be prescribed to relieve constipation and reduce straining as well. Suppositories and local ointments such as preparation H or Nupercaine have an anaesthetic and astringent effect, reducing discomfort and irritation of surrounding tissues.

Table 3.7 Disorders Of The Cardiovascular System

- In this section we will look at disorders of the cardiovascular system. These include; constrictive pericarditis, gangrene, peripheral vascular disease, varicose veins and deep vein thrombosis

CONSTRUCTIVE PERICARDITIS

Introduction

The normal pericardium is a fibroelastic sac surrounding the heart that contains a thin layer of fluid. When larger amounts of fluid accumulate (pericardial effusion) or when the pericardium becomes scarred and inelastic, one of the three *pericardial compressive syndromes* may occur:

1. **Cardiac tamponade** – Cardiac tamponade, which may be acute or subacute, is characterized by the accumulation of pericardial fluid under pressure

2. **Constrictive pericarditis** – Constrictive pericarditis is the result of scarring and consequent loss of the normal elasticity of the pericardial sac. Pericardial constriction is typically chronic, but variants include subacute, transient, and occult constriction.
3. **Effusive-constrictive pericarditis** – Effusive – constrictive pericarditis is characterized by underlying constrictive physiology with a coexisting pericardial effusion, often with cardiac tamponade. This usually results in a mixed hemodynamic picture with features of both constriction and tamponade.

In both typical constrictive pericarditis and effusive-constrictive pericarditis, cardiac filling is impeded by an external force. The normal pericardium can stretch to accommodate physiologic changes in cardiac volume. However, after its reserve volume is exceeded the pericardium markedly stiffens. In severe pericardial compressive syndromes, the pericardium becomes virtually inelastic, resulting in minimal ability to adapt to volume changes.

Risk factors/causes

The causes of constrictive pericarditis include:

1. Infections:
2. Tuberculosis
3. Incomplete drainage of purulent pericarditis
4. Fungal and parasitic infections

Inflammatory and autoimmune factors

1. Chronic pericarditis
2. Postviral pericarditis
3. Postsurgical
4. Following pericarditis associated with acute myocardial infarction
5. Following post-myocardial infarction (Dressler's) syndrome
6. In association with pulmonary asbestosis
7. Prior mediastinal radiation therapy

8. Chronic renal failure
9. Connective tissue disorders
10. Neoplastic pericardial infiltration

Pathophysiology

Constrictive pericarditis is due to a thickened, fibrotic pericardium that forms a non-compliant shell around the heart. This shell prevents the heart from expanding when blood enters it which results in significant respiratory variation in blood flow in the chambers of the heart. During inspiration, the negative pressure in the thoracic cavity cause increased blood flow into the right ventricle.

This increased volume in the right ventricle in turn causes the interventricular septum to bulge towards the left ventricle, leading to decreased filling of the left ventricle. This will cause decreased pressure generated by the left ventricle during systole due to the Frank – Starling Law.

During expiration, the amount of blood entering the right ventricle will decrease, allowing the interventricular septum to bulge towards the right ventricle, and increased filling of the left ventricle and subsequent increased pressure generated by the left ventricle during systole. This is known as *ventricular interdependence*, since the amount of blood flow into one ventricle is dependent on the amount of blood flow into the other ventricle.

Clinical features

Symptoms of chronic constrictive pericarditis include;

1. Difficulty breathing (dyspnea) that develops slowly and gets worse
2. Fatigue, excessive tiredness
3. Long-term swelling (oedema) of the legs and ankles
4. Swollen abdomen
5. Weakness

Diagnosis

The diagnosis of constrictive pericarditis is often difficult to make.

Imaging will demonstrate a thickened pericardium and an increased early diastolic filling with reduced filling in mid-diastole. In contrast, with restrictive cardiomyopathy there is an increased resistance to ventricular filling due to increased myocardial stiffness.

Investigations

1. Imaging (Ultrasound. CT scan) features of restrictive cardiomyopathy demonstrate an increased left ventricular thickness with infiltration of the myocardium.
2. Chest X-Ray - pericardial calcification (common but not specific), pleural effusions are common findings.
3. Echocardiography – the principal echographic finding is an exaggerated anterior motion of the septum with the atrial filling. Since the posterior ventricular wall is unable to expand, an increase in left ventricular volume with the atrial systole produces a marked displacement of the septum.
4. Pulmonary catheterization shows all 4 heart chambers having equal diastolic pressures.

Treatment

The definitive treatment for constrictive pericarditis is pericardial stripping, which is a surgical procedure where the entire pericardium is peeled off from the heart. This procedure has significant risk involved, with high mortality rates. This high risk of the procedure is attributed to adherence of the thickened pericardium to the myocardium and coronary arteries. In patients who have undergone coronary artery bypass surgery with pericardial sparing; there is danger of tearing a bypass graft while removing the pericardium. If any pericardium is not removed, it is possible for bands of pericardium to cause localized constriction which may cause symptoms and signs consistent with constriction. Due to the significant risks involved with pericardial stripping, many patients are treated medically, with judicious use of diuretics.

GANGRENE

Introduction

Gangrene is a serious and potentially life-threatening condition that arises when a considerable mass of body tissue dies (necrosis). This may occur after an injury or infection, or in people suffering from any chronic health problem affecting blood circulation.

The primary cause of gangrene is reduced blood supply to the affected tissues, which results in cell death. Diabetes and long-term smoking increase the risk of suffering from gangrene.

There are different types of gangrene with different symptoms, such as dry gangrene, wet gangrene, gas gangrene, internal gangrene and necrotizing fasciitis.

Treatment options include debridement (or, in severe cases, amputation) of the affected body parts, antibiotics, vascular surgery, maggot therapy or hyperbaric oxygen therapy

Causes of gangrene

Gangrene is caused by infection or ischemia, such as by the bacteria *Clostridium perfringens* or by thrombosis (a blocked blood vessel). It is usually the result of critically insufficient blood supply e.g., peripheral vascular disease and is often associated with diabetes and long-term tobacco smoking. This condition is most common in the lower extremities.¹⁵¹⁰



Figure 14: Diagram of Gangrene of the foot

Types of gangrene

1. Dry gangrene

Dry gangrene begins at the distal part of the limb due to ischemia, and often occurs in the toes and feet of elderly patients due to arteriosclerosis. It is mainly due to arterial occlusion. There is limited putrefaction and bacteria fail to survive. Dry gangrene spreads slowly until it reaches the point where the blood supply is adequate to keep tissue viable. The affected part is dry, shrunken and dark reddish-black, resembling mummified flesh. The dark coloration is due to liberation of hemoglobin from hemolyzed red blood cells, which is acted upon by hydrogen sulfide (H_2S) produced by the bacteria, resulting in formation of black iron sulfide that remains in the tissues. The line of separation usually brings about complete separation, with eventual falling off of the gangrenous tissue if it is not removed surgically, also called **autoamputation**

Early signs of dry gangrene include the dull ache and sensation of coldness in the affected area along with pallor of the flesh.

2. Wet gangrene

Wet gangrene occurs in naturally moist tissue and organs such as the mouth, bowel, lungs, cervix, and vulva. Bedsores occurring on body parts such as the sacrum, buttocks, and heels — although not necessarily moist areas are also categorized as wet gangrene infections. It is characterized by numerous bacteria and has a poor prognosis (compared to dry gangrene) due to septicemia. In wet gangrene, the tissue is infected by saprogenic microorganisms (**Clostridium perfringens or Bacillus fusiformis**) which cause tissue to swell and emit a fetid smell. Wet gangrene usually develops rapidly due to blockage of venous or arterial blood flow and the affected part is saturated with stagnant blood, which promotes the rapid growth of bacteria.

The toxic products formed by bacteria are absorbed, causing systemic manifestation of septicemia and finally death. The affected part is edematous, soft, putrid, rotten and dark. The darkness in wet gangrene occurs due to the same mechanism as in dry gangrene. Wet gangrene is coagulative necrosis progressing to liquefactive necrosis

3. Gas gangrene

Gas gangrene is a bacterial infection that produces gas within tissues. It is caused by bacterial exotoxins – producing clostridial species, which are mostly found in soil and other anaerobes (e.g., bacteroides and anaerobic streptococci). The toxins destroy tissue and generate gas at the same time. It is a deadly form of gangrene usually caused by clostridium perfringens bacteria. Infection spreads rapidly as the gases produced by bacteria expands and infiltrate healthy tissue in the vicinity. Because of its ability to quickly spread to surrounding tissues, gas gangrene should be treated as a medical emergency.

Treatment

Treatment is usually surgical debridement, wound care and antibiotic therapy although amputation is necessary in many cases.

Most amputations are performed for ischemic disease of the lower extremity. Antibiotics alone are not effective because they may not penetrate infected tissues sufficiently.

- i. **Hyperbaric oxygen therapy (HBOT)** treatment is used to treat gas gangrene. The HBOT increases pressure and oxygen content to allow blood to carry more oxygen to inhibit anaerobic organism growth and reproduction.
- ii. **Growth factors**, hormones and skin grafts have also been used to accelerate healing for gangrene and other chronic wounds.

PERIPHERAL VASCULAR DISEASE (PVD):

Introduction

Peripheral vascular disease is a disease of blood vessels outside the heart. The disease affects the peripheral circulation, as opposed to the cardiac circulation. PVD comprises diseases of both peripheral arteries and peripheral veins.

PVD is sometimes incorrectly used as a synonym for peripheral artery disease (PAD). Intermittent claudication due to inadequate blood flow to the leg is an example of peripheral artery disease (PAD) while varicose veins and spider veins are examples of peripheral vein disease.

PVD refers to atherosclerotic blockages found in the lower extremity. PVD also includes a subset of diseases classified as microvascular diseases resulting from episodal narrowing of the arteries (Raynaud's phenomenon), or widening thereof (erythromelalgia), i.e. vascular spasms



Figure 15: Picture of Peripheral Vascular Disease

Classification

Peripheral artery occlusive disease is commonly divided in the Fontaine stages, introduced by René Fontaine in 1954 for ischemia:

- i. *Mild pain when walking – claudication*, incomplete blood vessel obstruction;
- ii. *Severe pain* when walking relatively short distances (intermittent claudication).
- iii. *Pain while resting – rest pain*, mostly in the feet, increasing when the limb is raised;
- iv. *Biological tissue loss gangrene* and difficulty walking.

A more recent classification by Rutherford consists of three grades and six categories:

1. Mild claudication
2. Moderate claudication
3. Severe claudication
4. Ischemic pain at rest
5. Minor tissue loss
6. Major tissue loss

Causes of PVD

1. *Smoking* – tobacco use in any form is the single most important modifiable cause of PVD internationally. Smokers have up to a tenfold increase in relative risk for PVD.

2. *Exposure to second-hand smoke* from environmental exposure has also been shown to promote changes in blood vessel lining (endothelium) which is a precursor to atherosclerosis.
3. *Diabetes mellitus* –causesbetween two and four times increased risk of PVD by causing endothelial and smooth muscle cell dysfunction in peripheral arteries.
4. *Dyslipidemia* (high low density lipoprotein (LDL) cholesterol, low high density lipoprotein (HDL) cholesterol) - elevation of total cholesterol, LDL cholesterol, and triglyceride levels each have been correlated with accelerated PAD.
5. *Hypertension* – elevatedblood pressure is correlated with an increase in the risk of developing PAD, as well as in associated coronary and cerebrovascular events (heart attack and stroke).
6. *Risk of PAD* also increases in individuals who are over the age of 50, male, obese, or with a family history of vascular disease, heart attack, or stroke.
7. *Atherosclerosis* is often generalized, meaning it affects arteries throughout the body. Therefore, patients with heart attacks are also more likely to develop strokes and peripheral vascular disease, and vice versa.

Symptoms

1. Claudication - pain, weakness, numbness, or cramping in muscles due to decreased blood flow
2. Sores, wounds, or ulcers that heal slowly or not at all
3. Noticeable change in color (blueness or paleness) or temperature (coolness) when compared to the other limb (termed unilateral dependent rubor; when both limbs are affected this is termed bilateral dependent rubor)
4. Diminished hair and nail growth on affected limb and digits.

Diagnosis/Investigations

1. Upon suspicion of PVD, the first-line study is the ankle brachial pressure index (ABPI/ABI). When the blood pressure reading in the ankles is lower than that in the arms, blockages in the arteries which provide blood from the

heart to the ankle are suspected. An ABI ratio less than 0.9 is consistent with PVD; values of ABI below 0.8 indicate moderate disease and below 0.5 imply severe ischemic disease, alternatively 0.4 is used as a threshold. If ABIs are abnormal the next step is generally a lower limb doppler ultrasound examination to look at site and extent of atherosclerosis.

2. Other imaging can be performed by angiography, where a catheter is inserted into the common femoral artery and selectively guided to the artery in question. -
3. X-ray .While injecting a radiodense contrast agent an X-ray is taken. Any flow limiting stenoses found in the x-ray can be identified and treated by atherectomy, angioplasty or stenting.
4. Computerized tomography (CT) scanners provide direct imaging of the arterial system as an alternative to angiography. It provides complete evaluation of the aorta and lower limb arteries without the need for an angiogram's arterial injection of contrast agent.

Treatment

Treatment is dependent on the severity of the disease; the following steps can be taken

1. Smoking cessation (cigarettes promote PVD and are a risk factor for cardiovascular disease).
2. Management of diabetes if present.
3. Management of hypertension if present
4. Medication with aspirin, reduce clot formation and cholesterol levels.
5. Regular exercise for those with claudication helps open up alternative small vessels (collateral flow) and the limitation in walking often improves. Treadmill exercise (35 to 50 minutes, 3 to 4 times per week) has been reviewed as another treatment with a number of positive outcomes including reduction in cardiovascular events and improved quality of life.

Surgical intervention

1. *Angioplasty* (PTA or percutaneous transluminal angioplasty) can be done on solitary lesions in large arteries, such as the femoral artery, but angioplasty may not have sustained benefits.
2. *Plaque excision*, in which the plaque is scraped off of the inside of the vessel wall.
3. *Bypass grafting* may be needed to circumvent a seriously stenosed area of the arterial vasculature. Generally, the saphenous vein is used, although artificial material is often used for large tracts when the veins are of lesser quality.
4. *Sympathectomy* may be done – removing the nerves that make arteries contract, effectively leading to vasodilatation.
5. When gangrene of toes has set in, *amputation* is often a last resort to stop infected dying tissues from causing septicemia is done.

VARICOSE VEINS – VARICOSITIES

Definition

Varicose veins also called varicosities are abnormally dilated, tortuous superficial veins caused by incompetent venous valves.

Most commonly varicose veins occur in the lower trunk; however they can occur elsewhere in the body. If they occur in the anal region they are called haemorrhoids, in the veins of the oesophagus they are called oesophageal varices, etc.

They are common in individuals with occupations requiring prolonged standing, sitting, such as sales people, barbers, beauticians, elevator operators, nurses, dentists etc. Among the possible associated occupations varicose veins can generally occur in relation to hereditary weakness in the walls of the veins.

Causes

Varicose veins are caused by weakened valves and veins in the legs.

1. Varicose veins often run in families.

2. Aging also increases the risk.
3. Being overweight or pregnant or having a job involves standing for long periods of time increases pressure on leg veins. This can lead to varicose veins.

7



FigureTableTableTableFigureTableTableFigure 16: Picture of varicose veins in the inner aspect of the legTableFigure17

Pathophysiology

Varicose veins may be primary (without involvement of deep veins) or secondary (resulting from obstruction of deep veins). A reflux of venous blood in the veins results in venous stasis. If only the superficial veins are affected, the individual may have no symptoms but cosmetically, the appearance of dilated veins may be unappealing.

Signs and symptoms

1. Dull aches
2. Muscle cramps
3. Increased fatigue of muscles in the lower limbs
4. When deep venous obstruction results individuals may demonstrate signs and symptoms of chronic venous insufficiency such as;

- Oedema
- Pain
- Pigmentation
- Ulcerations
- Susceptibility to infections

Management

Diagnosis of varicose veins

1. Physical examination of the legs and feet. Varicose veins are easy to see, feel/check legs for tender areas, swelling, skin color changes, sores, and other signs of skin breakdown.
2. A common diagnostic test for varicose veins is the *Brodie Trendelenburg Test*. This test will demonstrate backward flow of blood through incompetent valves of the superficial veins and of the branches that communicate with the deep veins of the legs. With the patient lying down, the affected leg is elevated to empty the veins. A tourniquet is then applied around the upper thigh to occlude the veins and the patient is asked to stand. If the valves of the communicating veins are incompetent, blood flows into the superficial veins from the deep veins. If upon release of the tourniquet blood flows rapidly from above into the superficial veins the inference is that the valves of the superficial veins are also incompetent. This test is used to determine the type of treatment to be recommended for the varicose veins.
3. *The Perthe's Test* is a diagnostic procedure that easily indicates whether the deeper venous system and communicating veins are competent. A tourniquet is applied just below the knee and the patient is requested to walk. If the varicose veins disappear, the deep venous system and communicating vessels are competent. If the deep vessels do not empty and become even more distended on walking, incompetency or obstruction is inferred.
4. *Doppler flow meter*: This detects the retrograde flow of blood in the superficial veins with incompetent valves following compression of the leg proximally.

5. *Phlebography* involves the injection of a radiographic contrast medium into the leg veins so that vein anatomy can be visualized during various leg movements
6. *Plethysmography* allows the measurement of changes in vein's blood volume.

Surgical treatment

Surgery for varicose veins requires demonstrated patency of deep veins. Once this is established, ligation of the saphenous vein is accomplished under general anaesthesia. The vein is ligated high in the groin where the saphenous vein meets the femoral vein. An incision is then made in the ankle and a metal or plastic wire is passed the full length of the vein, *stripping* as it passes.

Sclerotherapy

This is done by the use of an irritating chemical such as 3% sodium tetracetyl sulphate (sotradecal) is injected into the vein, which irritates the vein wall and produces localized phlebitis and fibrosis, thereby obliterating the vein lumen. This treatment may be done for small varicosities or may follow vein ligation or stripping.

Sclerotherapy is palliative and not curative treatment. Following the injection of the sclerosing agent, elastic compression bandages are applied to the leg. These are worn for approximately 6 weeks. Walking is important for maintenance of blood flow in the extremity and should be emphasized.

If the patient experiences a burning sensation in the injected leg for one or two nights, a mild sedative and walking will relieve the problem. The bandage should be removed for the first time under the direction of the physician. Because bathing may be a problem during this time, a plastic bag may be placed over the bandaged leg and secured above the bandage to allow the patient to shower.

Post operative nursing care

Elastic compression of the leg is maintained continuously for about one week after vein stripping. Exercise and movement of the legs and elevation of the bed are necessary. Walking may be started 24 – 48 hours after surgery standing still and sitting are contraindicated. Analgesics are given to assist the patient with effective movement on the affected part. Bandages are inspected for bleeding particularly at the groin since the greatest risk of bleeding occurs there. Sensations of pins and needles or hypersensitivity to touch in the involved extremity may indicate a temporary or permanent nerve injury resulting from surgery. This is because the saphenous vein and saphenous nerve are in close proximity to each other in the leg.

The patient will require long term elastic support of the leg after discharge from the hospital and plans should be made to provide adequate supplies. Exercises of the legs will also be necessary and development of an individualized plan will require consultation with the patient and physician.

DEEP VEIN THROMBOSIS – DVT

Thrombosis is clotting in a blood vessel. Any condition that produces a slowing of the venous circulation creates a predisposition to the formation of a clot in the veins. Such slowing venous circulation is frequently seen in patients who are confined to bed for a long time particularly if they do not move about in bed. It is for this reason that venous thrombosis often develops in patients after major operations especially in elderly people who are more reluctant to alter their position in bed.

Women taking the contraceptive pill have an increased liability to deep vein thrombosis probably because the pill contains oestrogens which disturb the normal clotting mechanism. Pregnancy is another cause of venous thrombosis. Congestive heart failure causes thrombosis also because of the resultant slowing of the venous circulation.

Causes

1. Venous stasis due to immobility, obesity, pregnancy, paralysis, operation and trauma imply an element of venous obstruction or stasis.
2. Intimal damage – external trauma to a vein e.g. during hip replacement operation can provide a starting point for thrombosis.
3. Hypercoagulability – primary hypercoagulable states are those in which an identifiable abnormality of haemostasis is present. These include deficiencies in anti thrombin III, protein C, protein S, polycythaemia rubra is also associated with a tendency to thrombosis. Secondary hypercoagulable states are such as pregnancy and in the puerperium and malignancy.

The most important risk factors are;

1. History of previous deep vein thrombosis
2. Advanced age
3. Malignant disease
4. Varicose veins
5. Obesity
6. Oestrogen containing contraceptives
7. Polycythaemia

Diagnostic Tests

1. Consider medical history, and symptoms, as well as perform a physical exam.
2. Lung scan
3. Venography (phlebography) – to identify thrombi or obstruction in veins of lower extremities.
4. Radionuclide scan – an imaging technique that uses a small dose of a radio opaque chemical (isotope) called a tracer detect cancer, trauma, infection or other diseases. The isotope is injected into vein
5. Doppler Ultrasonography – to evaluate the network of arteries and veins and measure blood flow through the blood vessels.
6. Impedance plethysmography – measures variations in the electrical resistance due to changes in blood volume in deep vein thrombophlebitis.

Signs and Symptoms

1. Early DVT sometimes gives rise to a warm patch and dilated superficial veins over the affected area.
2. The principle symptoms are pain and swelling. Swelling at the ankle or lower calf indicates that the thrombus is at the popliteal level.
3. Arteriole spasms may accompany extensive DVT and causes a swollen white leg. If the limb is both swollen and cyanosed it may on to form venous gangrene.
4. Ongoing calf and thigh measurements should be taken at the same sites and these sites should be marked with a pen because of an increase in the circumference of the calf or thigh.
5. Active dorsi flexion of the foot often produces calf pain.
6. Some individuals with DVT have no symptoms until a pulmonary embolism occurs.
7. Because superficial veins are closer to the surface, inflammation may be noted on inspection if superficial thrombophlebitis is present signs include redness, warmth and tenderness along the course of the veins. The affected superficial veins feel hard and thread and are sensitive to pressure.

Treatment

Aims: -

- i. To relieve acute symptoms
 - ii. To protect against pulmonary embolism
 - iii. To facilitate resolution and thereby reduce the likelihood of long term post thrombotic damage to the limb.
1. If the thrombus is confined to the calf and the patient is fully mobile, an elastic stocking and physical exercise can be encouraged.
 2. The foot of the bed is elevated if there is marked swelling, additional elevation is provided with extra pillows or a foam wedge. Active movement of the ankle and toes is encouraged. Mobilization is started as soon as swelling has resolved.
 3. Heparin intravenously 5,000 units and followed by continuous infusion of 1,500 – 3,000 units per hour by a syringe pump.

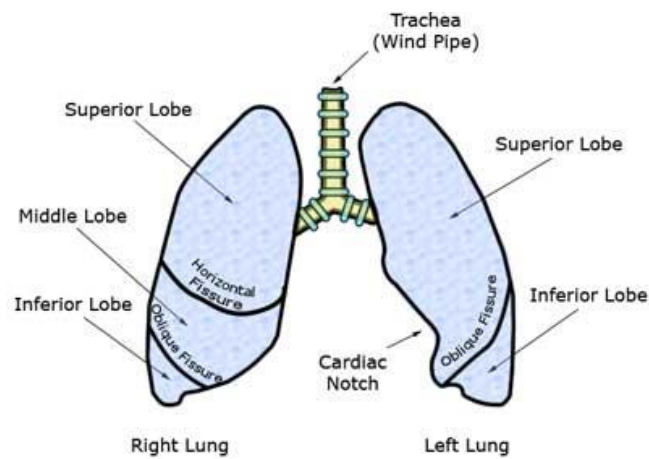
Prevention of Deep Vein Thrombosis

1. Surgical Care;
 - a. Use regional anaesthesia
 - b. Accurate fluid replacement
 - c. Effective pain control and early ambulation
2. Flow in the deep veins can be accelerated and thrombus prevented by application of graduated compression (anti embolism) stockings.
3. Active exercises and early ambulation should be encouraged.
4. Low dose subcutaneous calcium or sodium heparin 5,000 units 8 or 12 hourly
5. Dextran 70 in a starch solution which reduces blood viscosity and coagulability.

SPECIAL INVESTIGATIONS

4.8 Disorders Of The Respiratory System

The human body has are made up of two lungs that are themselves made up of several sub – sections known as 'lobes'. The Lobes are big areas of lung tissue (*also called lungparenchyma*) that are divided by lines or 'fissures'. The right lung has three lobes, called the superior (meaning top), inferior (meaning bottom) and middle lobes. The left lung only has two lobes, the superior and inferior lobes, partially because there is less room due to the presence of the heart in the left side of the chest. Air from the atmosphere into the chest normally enters through the nostrils though the mouth does also allow air to enter. Then it goes through the trachea, bronchi and finally into the right and left lungs. In the lungs the bronchi divide into bronchioles, terminal bronchioles and alveolar ducts before finally terminating into sac like structures called alveoli. It is at the alveolar (through the alveolar and capillary membranes) level where gaseous exchange (i.e. oxygen and carbon dioxide) takes place.⁸



FigureTableFigureTableFigureTable18

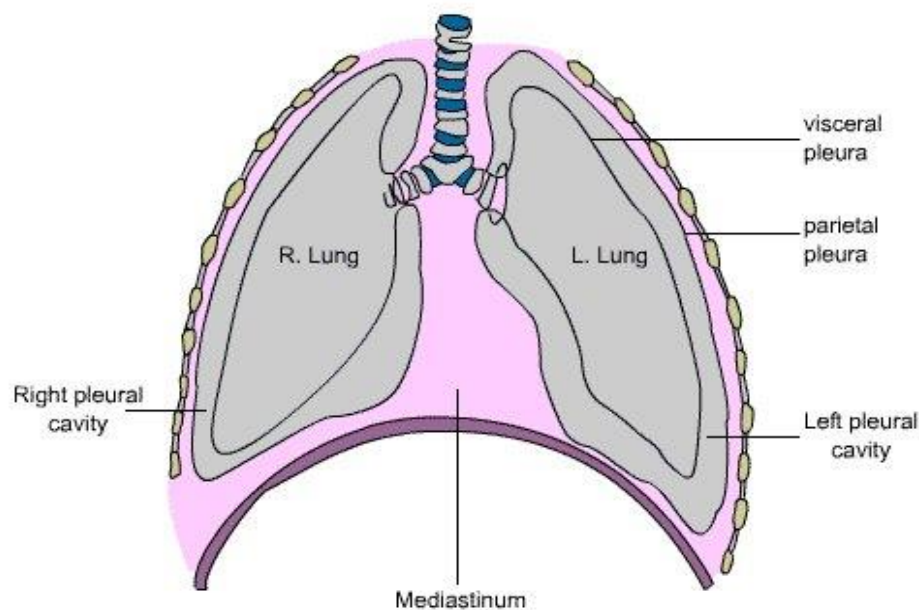


Figure19

Brief description of the respiratory tract

The human lungs are made up of two lungs that are themselves made up of several sub – sections known as 'lobes'. Lobes are big areas of lung tissue (*also called lungparenchyma*) that are divided by lines or 'fissures'. The right lung has three lobes, called the superior (meaning top), inferior (meaning bottom) and middle lobes. The left lung only has two lobes, the superior and

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normal breathing mechanism operates on the principle of negative pressure (i.e. the pressure in the chest cavity is lower than the pressure outside) causing air to move into the lungs during inspiration and vice versa. The pleural space shown in Figure 193 normally contains some small amount of fluid for lubrication of the surfaces of the lungs to enhance their expansion and reduce friction during respiration.

Definition of terms

1. *Pleurisy*: This is the inflammation of the pleura, a thin membrane composed of two layers covering the lungs (the inner closer to the lung tissue called the *viscerallayer* and the outer closer to the chest wall called the *parietal layer*)
2. *Pleural Effusion*: This is the abnormal collection of fluids in the pleural space (pleural cavity).
3. *Pneumothorax*: This is the collection of excess air in the pleural space or cavity.
4. *Haemothorax*: This is the collection of blood in the pleural cavity.
5. *Haemopneumothorax*: This is the collection of both air and blood in the pleural cavity.
6. *Empyema*: This is the presence of pus in the pleural cavity indicating infection.
7. *Chylothorax*: This is the presence of milky fluid in the pleural cavity usually resulting from an injury to the main lymphatic duct (thoracic duct).
- Chest injuries may include and lead to the following with their brief management.

CHEST INJURIES

When a knife or other foreign object enters the chest, the major problem is not only to injury to the chest wall but also the structures within the chest.

Penetration of the lungs can cause leakage of air from the lungs to the pleural cavity (*pneumothorax*) and blood into the pleural cavity (*haemothorax*). As air or fluid accumulates in the pleural cavity, it builds up pressure which causes the lungs to collapse (atelectasis) and may even cause a mediasterno shift, that is compression of the opposite lung and the heart. The patient then has serious difficulties in breathing (*dyspnoea*) and may go into shock. If the chest injury involves the heart, there may be bleeding in the pericardium, leading to pericardial effusion and the blood may be removed by aspiration. Bleeding or accumulation of fluid between the two layers (*parietal and visceral layers*) causes pressure on the heart that occurs when blood or fluid builds up in the space between the heart muscle (myocardium) and the outer covering sac of the heart (pericardium). This is known as *cardiac tamponade* where the heart cannot expand sufficiently.

Table 6 below gives the main signs and symptoms of chest injuries.

Table 6: Signs and symptoms of chest injuries

	Specific	Non - Specific
1	Unequal chest wall movement that is paradoxical	Dyspnoea
2	Surgical emphysema of the neck and chest	Central cyanosis
3	Palpable rib fractures	Hypotension
4	Bruising on the chest wall	Sweating
5	Tracheal deviation	Restlessness

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Take Note

If there is bruising over the left lower rib and upper abdomen, consider a possibility of ruptured spleen, this may be associated with a ruptured liver.

1. Fractured ribs

The most common fractured ribs are the 4th – 8th ribs. These are caused by blows, crushing injuries, or strain caused by severe coughing or sneezing spells.

There are two types of rib fractures namely;

- Where there is a sudden anteroposterior compression
- When there is a “bursting out” at the site of maximum convexity displacement being outwards.

Management of fractured ribs

Clinically, many rib fractures are trivial in a fit and ambulant patient, but pain on coughing or deep breathing respiration is usually present. Pressure between the sternum and the vertebral column and over the fracture site produces pain. If the lung is punctured, surgical emphysema will be detected.

Radiography of the chest confirms the presence of a fracture and may demonstrate damage to deeper structures.

Treatment

- Simple analgesics often suffice, if they fail, injection of the fracture site or intercostal nerve with a local anaesthetic is effective.
- Extensive crushing injuries may necessitate a tracheostomy (operation of incising the skin over the trachea and making a surgical incision in the trachea in order to permit air passage) with if necessary assisted respiration by a machine. Strapping support for the chest relieves the pain results from an indirect violence.

- If a sucking wound is present, it must be sutured as a first aid measure, covered with a wet or Vaseline gauze or wet gauze dressing.
- Foreign bodies in the lungs must be removed as soon as the patient's condition allows and this requires excision in the operating theatre.

2. Haemopneumothorax

Blood and air aspiration via a needle; thoracentesis or an intercostals catheter (thoracostomy tube) is inserted and drainage initiated to accomplish more complete removal of blood and air. This results in the re – expansion of the lungs and permits monitoring of blood loss. The chest catheter is sutured in position and connected to a water seal drainage bottle.

PLEURAL EFFUSION

Pleural effusion a collection of fluid in the pleural space which is usually secondary to other diseases. Normally the pleural cavity/space contains a small amount of fluid (5 – 15mls), which acts as a lubricant that allows the pleural surfaces to move without friction. Pleural exudates may be clear, cloudy, blood tinged or frank blood.

Causes

Pleural effusion commonly occurs as a complication of the following conditions;

1. Congestive cardiac failure – CCF
2. Severe tuberculosis infection
3. Severe pneumonia
4. Pulmonary infections (particularly viral infections)
5. Nephritic syndrome
6. Pulmonary embolism
7. Bronchogenic carcinoma
8. Connective tissue disease (blood)

Pathophysiology

In certain disorders fluids may accumulate in the pleural space to a point where it becomes clinically evident (500mls). This almost always has a pathologic significance. The effusion can be composed of a relatively clear fluid or it can be blood or purulent. An effusion of clear fluid may be transudate or an exudate. A transudate (filtrate of plasma that moves across intact capillary walls) occurs when factors influencing the formation and the absorption of pleural fluid are altered, usually by imbalances in hydrostatic or oncotic pressures. The finding of transudative effusion generally implies that the pleural membranes are not diseased. The most common cause of transudative effusion is congestive cardiac failure, nephritis and cirrhosis of the liver.

An exudate (extravasation of fluid into tissues or cavities) usually results from inflammation by bacterial products or tumours involving the pleural surfaces.

Classification of pleural fluids

1. Serous

- a. Transudates (Hydrothorax); - It is pale yellow and does not clot. It is mainly caused by left ventricular failure, liver cirrhosis, and hypoalbuminaemia.
- b. Exudates (Effusion); - It is yellow to brown and clots spontaneously. It is mainly caused by tuberculosis and malignancy.

2. Purulent effusion – Empyema

It has characteristics of pus and is mainly caused by pneumococcus and streptococcus.

3. Haemorrhagic fluid

- a. Blood Tinged Exudate; - It is caused by tuberculosis, rupture of pleural adhesions, haemophilia and contusion of lung and chest wall.
- b. Frank Blood; - This is caused by haemorrhage from tumour implant, spontaneous haemopneumothorax and trauma to the thorax.
- c. Chocolate Coloured Fluid (Degenerating red blood cells); - This is caused by amoebic abscess of the liver rupturing into the pleural cavity.

4. Opalescent fluid

- a. Chylothorax; - This pleural fluid has many large fat globules caused by rupture of the thoracic duct following trauma, filariasis and tuberculosis.
- b. Chyloform;- The pleural fluid contains fat which is not derived from the thoracic duct and is caused by tuberculosis of the lungs or pleura and cancer.
- c. Pseudochylothorax; - This is caused by sarcoidosis and amyloidosis.

Signs and symptoms

1. Acute onset with attack of pleuritic pain as pyrexia of unknown origin.
2. Pain in the early stage due to dry pleurisy replaced by dull ache.
3. Dyspnoea which depends on the rate of collection of fluids. The more the fluid the more the dyspnoea and vice versa.
4. Cough which is usually dry
5. Loss of weight
6. Symptoms of toxæmia (malaise, anorexia, fever, etc)
7. Diminished mobility of chest on the side
8. Bulging of intercostal spaces on the affected side if large effusion in a thin person.
9. Diminished or absent breath sounds
10. Heart sounds may be elicited in case of large effusion on the left side
11. Sternomastoid sign (trills sign); sternomastoid muscle on the side of mediasternal displacement may be prominent.

Diagnosis

1. Assessment of the area of pleural effusion reveals decreased or absence breath sounds, a dull flat sound when percussed. In an extremely large pleural effusion an assessment reveals a patient in acute respiratory distress. Tracheal deviation away from the affected side.
2. Chest x ray
3. Ultrasonography
4. Computer tomography scan
5. Thoracentesis

6. Pleural fluid for culture and sensitivity, gram stain, acid fast bacillus stain for tuberculosis, red and white blood cell count, chemistry studies (glucose, amylase, lactic dehydrogenase, protein), cytologic analysis for malignant cells and pH.
7. Pleural biopsy may also be performed

Treatment

1. Specific treatment is directed at the underlying cause e.g. CCF, pneumonia and cirrhosis of the liver
2. Thoracentesis to remove the excess fluid and to obtain specimen for analysis and to relieve dyspnoea. The patient may be treated with chest tubes connected to an under water drainage system or suction to evacuate the pleural space and re expand the lung. If the underlying cause is malignancy the effusion tends to recur within a few days or weeks. Chemical irritating agents such as doxycycline, minocycline or talc are instilled in the pleural space. After the agent is instilled, the chest tube is clamped and the patient is assisted to assume various positions, to ensure uniform distribution of the agents to maximize its contact with the pleural surfaces.
3. Surgical pleurectomy
4. Diuretic therapy.

PNEUMOTHORAX

Pneumothorax It occurs when air gets in the area between the lung and chest wall. When this happens the lung cannot fill up with air, breathing becomes difficult, and the body gets less oxygen. A collapsed lung can occur spontaneously in a healthy person or in someone who has lungs compromised by trauma, asthma, bronchitis, or emphysema.

Types of Pneumothorax

There are four types of pneumothorax, namely:

1. Simple/Closed pneumothorax
2. Open pneumothorax
3. Tension pneumothorax

Traumatic pneumothorax

4. Let us look at each type in further detail starting with simple pneumothorax.

- ***Simple pneumothorax***

A simple pneumothorax also called *spontaneous pneumothorax* occurs when air enters the pleural space through a breach of either the parietal or visceral pleura. It is caused by rupture of a bleb on the visceral space and is mostly seen in underweight male cigarette smokers.

- ***Open pneumothorax***

Open pneumothorax occurs when air enters the thorax through an opening in the chest wall such as may occur in a stab wound or gunshot. If it is a direct result of trauma it is referred to as *traumatic pneumothorax*.

- ***Traumatic pneumothorax***

This occurs when air escapes from a laceration in the lung itself and enters the pleural space. It can occur with a blunt trauma e.g. rib fracture or penetrating injury i.e. gunshot, stab wound, invasive thoracic procedures, etc.

- ***Tension pneumothorax***

This is a rapid accumulation of air in the plural space causing a severely high intrapleural pressure with resultant tension on the heart and great blood vessels. It may occur as result of open or closed pneumothorax. Air is drawn in the chest from a lacerated wall or small lung. The air that enters is trapped and cannot be expelled during expiration. In effect it becomes a one way valve and with each breath, tension develops (positive pressure). The reverse in intrathoracic pressure characteristic causes the lungs to collapse and the heart and blood vessels and the trachea to shift towards the unaffected side of the chest (medial Sternal Shift). This causes both the respiratory and circulatory function to be

compromised. Cardiac output will be decreased and there will be impairment of the peripheral circulation.

Tension pneumothorax is a medical emergency with both the circulatory and respiratory system being involved. The patient will present with air hunger agitation, increasing hypoxemia, central cyanosis, hypotension and tachycardia²⁰



TableTableTableFigure 17: Tension Pneumothorax²⁰

Management of a pneumothorax

Thoracentesis is done to relieve pressure or tension within the chest. If the lungs expand and there is no continuous leakage, drainage may be unnecessary. If the lung is still leaking as evidenced by an inexhaustible volume of air reaccumulating during thoracentesis, then a constant outlet of air must be provided by a thoracostomy tube placed intercostally and connected to a proper chest drainage apparatus. This prevents further build up of air pressure in the chest.

TableTableTableFLAIL CHEST

A flail chest is a type of chest injury whereby there is loss of stability of the chest with subsequent respiratory impairment. This is usually as a result of multiple rib fractures.

Pathophysiology of a Flail Chest

- a. When a flail chest occurs, one portion of the chest has lost its bony connection to the rest of the rib cage
- b. During inspiration, the detached part of the chest will be pulled in and drawn upwards (outwards) on expiration. This is called PARADOXICAL MOVEMENT of the chest wall.
- c. Normal breathing mechanisms are impaired to a degree that seriously jeopardizes ventilation.
- d. It is generally associated with lung contusion. The patient experiences some pain, cyanosis, dyspnoea and paradoxical chest movements.

Management of a flail chest

- a. Stabilize the flail of the chest with hands, i.e. apply a pressure dressing and turn the patient on his injured side or place a 10 pounds sand bag at the site of the flail.
- b. If respiratory failure is present prepare the patient for immediate endotracheal intubation and ventilation or Positive End Expiratory Pressure (PEEP) ventilation. This treats the underlying pulmonary contusion and serves to stabilize the thoracic cage for healing of fractures, and improves the alveolar ventilation i.e. restoring thoracic cage stability and intrathoracic cage stability volume thereby decreasing the work of breathing.
- c. There are other supportive measures that can be done and these include the following:
 - Administering diuretics to reduce oedema
 - Correct respiratory and metabolic acidosis with intravenous sodium bicarbonate
 - Utilize pulmonary artery pressure monitoring

SUCKING CHEST WOUND

A sucking chest wound is an opening in the chest wall, large enough for air to pass freely in and out of the thoracic cavity with each attempted respiration. In this type of injury, not only is the lung collapsed but the structures of the mediastinum (heart and the great vessels) are also pushed towards the injured side with each inspiration and in the opposite direction on expiration. This is termed as *mediosterno flutter* and produces serious circulatory embarrassment.

Management of sucking wound

- a. In an emergency (first aid) anything large enough may be used to fill the hole. Things such as a clean handkerchief or the heel of the hand can be used.
- b. In hospital, the opening is plugged by sealing it with sterile gauze impregnated with petrolatum jelly. A pressure dressing is applied by circumference strapping.

EMPHYSEMA

HAEMOTHORAX

After the sucking chest wound, let us move on to the last surgical condition of the respiratory system, that is cancer of the lungs.

CANCER OF THE LUNGS

Primarily lung cancer is the leading cause of death in men and women who have malignant disease in the USA. It most commonly occurs in individuals more than 50 years of age who have a long history of smoking.

What is cancer of the lungs?

1. Lung cancer is the malignance of the lung parenchyma that begins in the lungs, the two organs found in the chest used for breathing.

2. Most lung cancer begins in the cells that line the bronchi.

Main Types of Lung Cancer

There are two main types of lung cancer and these are:

1. **Non-small cell lung cancer (NSCLC)** which is the most common type of lung cancer.
2. **Small cell lung cancer** makes up about 20% of all lung cancer cases.
3. If the lung cancer is made up of both types, it is called mixed small cell/large cell cancer.

However, if the cancer started from somewhere else in the body and spread to the lungs, it is called metastatic cancer to the lung.

1. Causes of lung cancer

2. Lung cancer is the deadliest type of cancer for both men and women and is more common in older adults.
3. Cigarette smoking is the leading cause of lung cancer where the more cigarettes one smokes per day and, the greater the risk of developing lung cancer (However, lung cancer has occurred in people who have never smoked).
4. Tuberculosis and inflammatory conditions of the lungs
5. High levels of air pollution
6. High levels of arsenic in drinking water
7. Radon gas
8. Asbestos inhalation
9. Family history of lung cancer
10. Radiation therapy to the lungs
11. Exposure to cancer-causing chemicals such as uranium, beryllium, vinyl chloride, nickel chromates, coal products, mustard gas, chloromethyl ethers, gasoline, and diesel exhaust

Signs And Symptoms Of Lung Cancer

Many times, lung cancer is found when an x-ray is done for another reason.

1. Dyspnoea
2. Cough that doesn't go away
3. Coughing up blood
4. Shortness of breath
5. Wheezing
6. Chest pain
7. Loss of appetite
8. Losing weight without trying
9. Fatigue
10. Hoarseness or changing voice
11. Palpable lymph nodes in the neck and axillary

Investigations

1. History taking to find out if the patient smokes and for long he has smoked.
2. Chest x-ray will reveal tumours and evidence of metastasis.
3. Sputum cytology test
4. Blood work
5. CT scan of the chest
6. MRI of the chest
7. Positron emission tomography (PET) scan
8. Bronchoscopy combined with biopsy
9. Pleural biopsy
10. CT scan directed needle biopsy
11. Mediastinoscopy with biopsy
12. Open lung biopsy

Treatment

1. The earlier the cancer is found, the better the chances of survival.

2. Lung cancer is a deadly disease and nearly 60% of people with lung cancer die within a year. However, some people are cured and go on to live many years.
3. Treatment depends on the specific type of lung cancer.
4. Each type is treated differently either with
 - Chemotherapy
 - radiation
 - Surgery.

Surgical Treatment

Lobectomy

Definition

1. A lobectomy is the surgical removal of one lobe of the lungs when the pathology is localized , usually to remove an infected area. Lobectomy can be;
2. Bilobectomy is the removal of two lobes,
3. A pneumonectomy is the removal of an entire lung.

Lobectomy is usually used for the treatment of non-small cell lung cancers, especially if caught early enough that they have not spread very far.

1. If there are hilar nodes involved then a pneumonectomy may be necessary.
2. The general state of a person's health, as a healthier patient who may be able to cope with surgery is also considered.
3. Lobectomy may not be appropriate for the treatment of small-cell cancers, as they require far more aggressive treatment as well as patients with advanced lung cancers that have spread to other parts of the body.
4. However for some patients, especially those with isolated metastases (areas of spread) in their brain or adrenal glands, surgery may still have some benefit.

Pre Operative Nursing Care

Pre operation management is the same as for general surgery but emphasis is put on assessment of respiration.

AIMS

1. To treat the cause
2. To allay anxiety
3. To prevent complications

The nursing interventions are aimed at reducing the client's anxiety levels. Anxiety results from fear of cancer and its prognosis as well as from fear of surgical procedure. You must explain everything to the patient in simpler terms and answer the concerns of the patient to relieve anxiety and gain cooperation. You must correct false impressions that may make the patient. The client and family are taught about the anticipated surgical procedure. Explain about the likely use of chest tubes and drainage system. Also explain the oxygen therapy the patient will be on and the use of pain relievers. Emphasise on the importance of deep breathing exercise and turning in bed to promote drainage of secretions. You should emphasize on the importance of range of motions to promote blood circulation prevent DVT.

Post Operative Nursing Management

The immediate post op care is aimed at

1. Maintenance of a clear airway
2. Promoting spontaneous breathing
3. Pain relief
4. Prevention of complications

Observations

Vital signs are done every 15 minutes until the patient is stable and then they will be done half hourly for several hours. Observe for signs of dyspnoea, cyanosis and chest pain and breath sounds. Also observe for respiration patterns and note how the chest rises and falls on both sides of the chest. Observe the incisional site for bleeding and signs of shock and any blockage in the drainage tube tubes. Check if

the drainage tubes are patent and if the fluids in the water bottle seal component rises and falls. If there is no raising and falling of the fluids then check for patency of the tubing. Measure and document the amount of drainage from the patient.

Immediate care

Upon receiving the patient in the recovery room or I.C.U. following surgery, the nurse;

1. Institutes oxygen therapy and suction as indicated. Oxygen is attached to the endotracheal tube. After extubation oxygen is given by canular usually 6litres/minute. An oxygen mask is not used because of the need to have the patient cough and raise secretions frequently.
2. Haemodynamic monitoring; the patient is usually attached to a cardiac monitor and central venous pressure line may be bused for haemodynamic monitoring.
3. The patient is kept flat in bed or with head elevated slightly 20 °until blood pressure is stabilized to preoperative levels. Once blood pressure is stabilized, the patient can usually breathe best in semi fowler's position with a pillow under the head and neck.
4. Vital signs are taken every 15 minutes until the patient is well recovered from anaesthesia and then every hour until the condition has stabilized. A persistently low blood pressure is reported to the surgeon because it may induce cardiac disorders, haemorrhage, pain and hypoxia.
5. Make certain thoracotomy tubes are correctly attached to the chest drainage apparatus.
6. Examine the dressing on the incision area for bleeding and or drainage, and look for evidence of sub emphysema.
7. Check the flow rate of intravenous blood or fluid replacement.
8. Check for the level of consciousness
9. Observe and auscultate the patient's chest for indication of complications (e.g. retraction of rib cage during ventilator movements, paradoxical respiration, easy or difficulty of ventilation, presence of stridor or rales.

10. Observe the general condition (skin, nail bed, mucous membrane colour, skin texture, respiratory pattern, body position, movement or lack of movement of facial muscles and extremities)

Care of the drainage tubes

Two catheters are usually placed in the chest following resectional surgery. The anterior catheter is placed in the second intercostal space to permit escape of air rising in the pleural space. The posterior tube (other catheter) is placed posteriorly through the 8th or 9th intercostal space to drain off serosanguinous fluid accumulating in the lower portion of the pleural space. The catheters are secured to the patient's skin with sutures.

Airway maintenance

The closed chest drainage system must always be placed lower than the client's chest. Chest drainage systems must be placed upright on the floor or hung from the bottom of the bed. If the drainage tube is to be moved always keep the chest drainage tube system below the level of the client's chest. The chest tubes may be double clamped very briefly during momentary movement of the apparatus above the level of the apparatus above the chest level of the patient's chest. Ensure that the patient is not lying on the tubes to promote drainage. Maintain an open air way as this provides for adequate ventilation and gas exchange. Endotracheal suctioning until the patient can raise secretions effectively. Endotracheal secretions are present in excessive amounts in post thoracotomy patients due to trauma to the tracheal bronchial tree during surgery, diminished lung ventilation and cough reflex. Therefore, maintain an open air way as this provides for adequate ventilation and gas exchange. Endotracheal suctioning until the patient can raise secretions effectively. Endotracheal secretions are present in excessive amounts in post thoracotomy patients due to trauma to the tracheal bronchial tree during surgery, diminished lung ventilation and cough reflex. Encourage deep breathing and coughing exercises. Help splint the incision during coughing. This helps to achieve maximal lung inflation and to

open closed air ways. Coughing is painful hence the incision needs to be supported. Administer humidification and mini nebulizer therapy as ordered. Secretions must be moistened and thinned if they are to be raised from the chest with the least amount of effort.

Fluids and nutrition

During or immediately following chest surgery, the patient is given a blood transfusion followed by whatever intravenous fluids the surgeon orders. These must run slowly (unless specifically ordered) to prevent overloading of the vascular system with resultant pulmonary oedema. Once the patient is fully conscious, is not nauseated and is generally doing well, clear fluids are usually permitted. Diet then progresses to a soft and then a general diet as tolerated. Fluid intake is increased to liquefy tracheal bronchial secretions so that they can be easily expectorated. Record intake and output and evaluate for fluid imbalance.

Psychological care

Explain all procedures in simple terms to gain the patient's cooperation. Mobilize resources (human resources, family, clergy social worker etc) to help the patient cope with outcomes of surgery (diagnosis, change in functional abilities etc). A multi disciplinary team approach promotes the patient's strength and coping mechanisms.

Pain management

Following chest surgery, pain may cause the patient to experience neurogenic hypotension also, the patient who is not give adequate pain relief may be unable to perform the essential post operative activities of coughing, deep breathing, turning, exercising, sitting up and ambulating. The patient in severe pain, breathes shallowly and rapidly and tries to avoid chest movements. As a result of this inactivity, secretions are retained and the lung does not re expand. Atelectasis and pneumonia rapidly ensue. During the first few days of post operative care, the patient may require medication for pain relief such as morphine sulphate or demoral. Care should be taken to avoid over medicating the patient with narcotics

because they depress the cough reflex and respirations and produces bronchial spasms and thickening secretions. Pain can also be relieved by correct positioning and turning the patient for comfort

Positioning

The position should be changed at regular intervals. Remaining in the same position tends to promote the retention of bronchial secretions in the dependent portion of the lung. Elevation of the foot of the bed assists in the drainage of bronchial secretions from the caudal portions of the lungs into the trachea. This position interferes with respirations because of the weight of abdominal contents upon the diaphragm. After thoracic operations most patients can breathe more comfortably and with less effort when they are in semi erect position in bed. For the act of coughing, it is always best to have the patient sit up since this aids in taking a deep breath before a good expulsive cough. In general the patient should be allowed to assume the position in which he is more comfortable and he should not be allowed to remain in the same position for hours at a time. Patients with drainage tube care should be taken to prevent kinking or compression of the tubes.

Renal function

The urinary output should be closely observed and accurately recorded. A patient whose renal function was normal preoperatively should excrete at least 30mls of urine per hour after operation and 720mls in 24 hours. Renal and glomerular filtration rates have been shown to decrease from 31 – 77% during general anaesthesia. Inadequate replacement of blood loss or insufficient intravenous fluid replacement may decrease urinary flow because of hypovolaemia or dehydration. When the patient is unable to void post operatively he should be catheterized without hesitation.

Exercises

Deep breathing and coughing exercises are important because they help to move tracheal bronchial secretions out of the lung, assist with re expanding of the lung, and improve pulmonary circulation. Deep breathing and coughing exercises should be done after 20 – 30 minutes after pain medication. Splint the thoracic incision or painful chest by placing the hands anteriorly and posteriorly around the incised area. Splinting decreases stretching of the chest incision and minimizes pain during the forceful ventilator movement of deep breathing and coughing.

Postural drainage in the trendelenburg position, percussion and vibration help remove secretions from the lungs by gravity. Assist the patient with normal range of motion exercises and function of the shoulder and trunk. Teach breathing exercises to mobilize the thorax. Skeletal exercises to promote abduction and mobilization of the shoulder. Assist out of bed to chair as soon as pulmonary and circulatory systems are stable. These are necessary to regain normal mobility of the arm and shoulder and to speed up recovery and minimize discomfort. The patient is encouraged progressive activities according to development of fatigue.

Health education

1. Encourage the patient to practice arm and shoulder exercises at least five times a day at home.

Exercises accelerate recovery of muscle function and reduce long term pain and discomfort.

2. Instruct the patient to practice assuming a functionally erect position in front of a full length mirror.

Practice will help restore normal posture.

3. Instruct the patient in the aspects of home care;

- a. Practice breathing exercises at home as effective breathing is necessary to prevent splinting of

the affected side, which may lead to atelectasis.

- b. Alternate activities with frequent rest periods weakness and fatigue are common for the first 3 weeks.

- c. Avoid heavy lifting until complete healing has occurred because chest muscles may weaker than
- a. normal for 3 – 6 weeks.
 - b. Avoid undue fatigue, increased shortness of breath or chest pain because undue stress mayprolong the healing process.
 - c. Prevent cold or lung infection because the lung is more susceptible to infection during the recovery phase.
 - d. Keep following up appointments with the physician because this allows timely follow up assessment for continuity of care and complete healing.

Post operative complications

These are as discussed for thoracotomy above

EMERGENCY MANAGEMENT OF CHEST INJURIES

The main objective of the emergency management of chest injuries is the restoration of the normal function as quickly as possible.

The order of priority is determined by the result of clinical assessment of the patient. The main steps include:

- Evaluating the status of the patient's respiration
- Watch the uncovered chest movement and monitor the pulse to have a rough estimate of ventilation.
- Assess for signs of obstruction, sternal retraction, wheezing
- Check the neck for position of the trachea

- Check for subcutaneous emphysema
- Establish and maintain an open airway and ventilation, aspirate if there are any secretions from the throat or nose
- Prepare the patient for tracheostomy if necessary. A tracheostomy helps to maintain a clear and dry trachea – broncho tree from secretions and helps the patient to breathe without difficulty. The use of a cupped tracheostomy when connected to a ventilator sucking wounds should be closed to prevent air entry into the chest cavity.
- Control haemorrhage
- Treat for shock due to blood loss or cardio pulmonary function improvement. This can be done by administering intravenous fluids.
- Collect blood for full blood count, cross matching and grouping.
- Monitor vital signs.
- Do urinary examination and maintain input and output charts.
- Monitor thoracic drainage, provide information about the rate of blood loss whether the bleeding has stopped or not or whether the surgical interventions are working.

For patients with crushing injuries, the nursing care is the same after surgery as for any other patient who has undergone chest surgery. The common problem of chest surgery is pain interference with breathing. If pain cannot be stopped then intercostal nerve block may be done by the doctor to relieve pain. The patient may be elevated or placed in a propped up position. Sudden sharp pain, dyspnoea, blood clots etc must be reported to the surgeon. Analgesics are prescribed. The patient should be encouraged to take deep breathing exercises during this period.

The Under Water Seal Drainage

Introduction

A chest tube is a long hollow tube inserted between the ribs and into the pleural space. An underwater seal drain (UWSD) is the specialized drain, which is attached to the chest tube. Chest tubes are normally inserted under a local

anaesthetic or under a general anaesthetic if the patient is undergoing chest surgery.

Indications for Insertion of a Chest Drain include:

1. Post operatively e.g. cardiac surgery, thoracotomy
2. Pneumothorax
3. Haemothorax
4. Haemopneumothorax
5. Chylothorax
6. Pleural effusions

Rationale for insertion of a chest tube

1. To overcome the accumulation of air or fluid in the pleural cavity that might impair ventilation.
2. Allow drainage of the problem substance
3. Restore normal intra-pleural pressure
4. Permit expansion of lungs
5. Promote adequate gas exchange

Because the negative pressure within the pleural cavity exerts a suction force that keeps the lungs expanded, any chest trauma that upsets this pressure may cause lung collapse. Consequently, after chest trauma, one or more chest tubes may be surgically inserted and then connected to the thoracic drainage system. The water seal drainage acts as a one way valve through which air or fluid can leave the patient's chest. It allows air or fluid to escape from the pleural space but doesn't do so for these substances to re – enter. Specifically, the thoracic drainage may be ordered to remove accumulated air, fluids, (fresh blood, pus, serous fluid or even blood clots) from the pleural space to prevent positive pressure in the chest cavity, restore and re expand a partially or totally collapsed lung and encourage the more entry of air as the patient breathes (i.e. restore the positive to negative pressure build up).

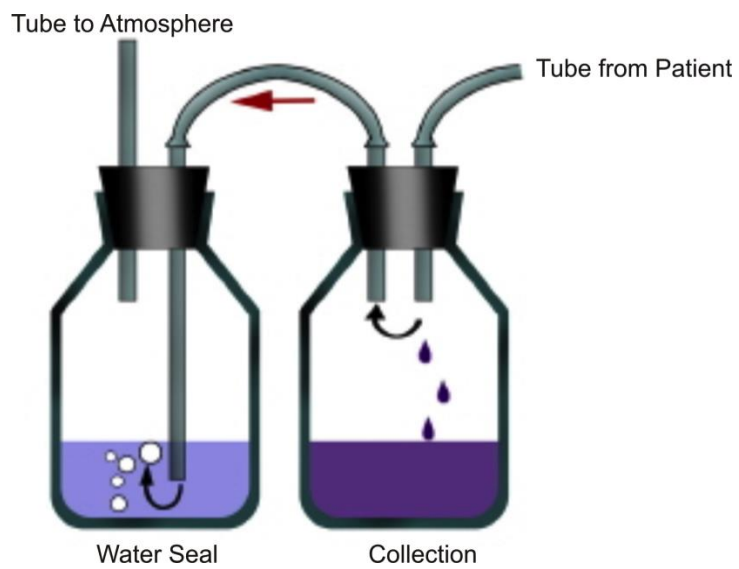
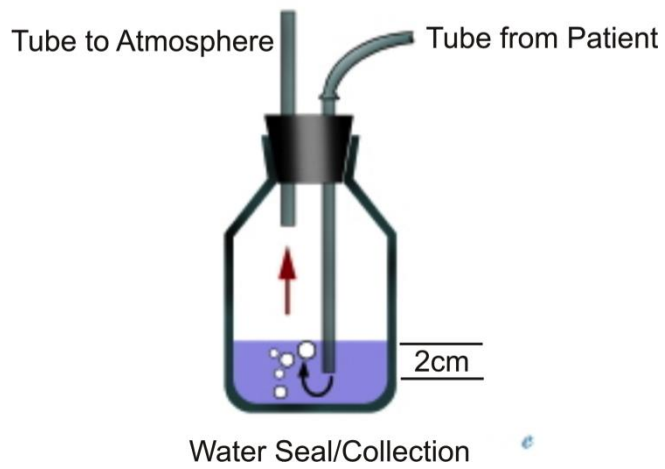
- There are three types of thoracic drainage systems (under water seal drainage systems) and which are commercially prepared systems. These include *one* bottle, *two* bottle and *three* bottle systems.

For all the three, the principle of operation or technique is the same and they all use sterile water (usually one litre) though in certain instances depending on the infectiousness of the substance being removed such as in pus or pleural fluid from severe tuberculosis infection, a disinfectant may be added. Adhesive tapes, sterile clear plastic tubing; rubber cups and or even a suction source if ordered are also included.

When the patient exhales (breathes out) positive pressure in the lungs forces out air to escape from the pleural cavity through the chest tube into the bottle and air bubbles out through the water and vented out into the atmosphere. And when the patient inhales (breathes in) negative pressure in the chest pulls water equal in pressure to that in the pleural thoracic cavity. Pressure in the chest with normal respiration rarely exceeds 2cm of water therefore, as long as the bottle is more than 2cm below the patient's chest, there is no danger of water entering into the pleural space.

The usual recommended height of the water seal drainage is 60 – 90cm below the patient's chest. The stem to which the chest tube is connected must not be submerged more than a few centimeters below the water seal surface. The intra thoracic pressure must be greater than the length of the tube and the surface of the water in order for drainage to occur.

The intra thoracic pressure is normally about 5mm of water on expiration. The depth of the tube must be less (2 – 3cm). When air is the only substance to be evacuated from the chest's pleural space, a water seal bottle alone is sufficient for pneumothorax. If blood or other fluids are to be removed, then a second bottle is to be required. When a patient has a large amount which has to be drained (such as post thoracotomy), suction may be applied to the system in order to hasten the process. The suction is generated from an external force such as a suction machine.²¹



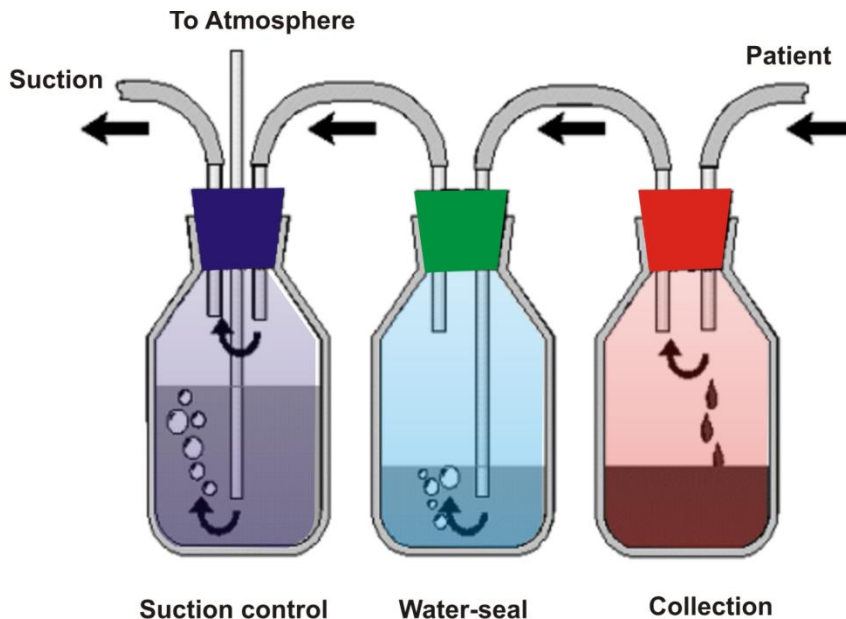


Figure 2124: Water collection

Maintenance of the Drainage System

Following the placement of a chest tube, the physician sutures the chest tube to the side and secures it with a tape and the nurse checks the drainage at regular intervals. The bottle should be placed well below the patient's chest to facilitate drainage by aid of gravity and prevent back flow of the drainage. The extra tubing can be coiled and taped or pinned to the below bed sheet to prevent kink formation. Care should be taken to allow the patient have enough room for turning to other positions.

Chest tube Striping/Milking

The goal of milking the chest tube is to mechanically dislodge clots or debris and move them towards the collection drainage bottle. The nurse must rely on her good judgment on whether to milk the chest tube or not. If air is the only substance to be drained, the tubes do not need to be milked. Serous drainage is unlikely to clot but fresh blood. The drainage may be maintained by keeping the tubing straight without kink sections as demonstrated by normal temperature, decreased breath count and improvement in the X – ray. If treatment stops too soon, a relapse therapy may be done 6 – 16 weeks.

Observations on the Drainage System

Each bottle should be inspected frequently at regular intervals carefully in relation to the patient's condition. The water level in the seal bottle should be checked and sterile water put. Gentle fluctuation in the level should rise in the tube during respiration. This movement of fluid in the tube reflects changes in the intra pleural pressure during respiration (inspiration and expiration). Greater fluctuations indicate an increase in the work of breathing and the nurse should assess the cause of breathing excessively. The fluctuation in the water seal stem will be reversed (i.e. flow level will fall with inspiration and vice versa) when the patient is being mechanically ventilated since ventilation occurs in response to positive and not negative pressure.

A chest tube placed in the media sternum or pericardium following surgery will not fluctuate in respiration as there is less variation in the pleural pressure. If no fluctuations are seen the patient should be asked to take a deep breath in which case the fluctuation may be seen. But if still the fluctuations are not seen present or apparent, it may be due to tube blockage or the lung may be re – expanded and is pressing against the chest tube eyelets. The probable cause is determined by clinical assessment of the patient and taking chest x rays to check whether the lung has expanded or not.

Observe the drainage and collection of for amount, colour and character with the frequency appropriate to the patient's condition. The level of the drainage should be marked on the bottle at intervals e.g. at least every after 2 – 3hours. All patients coming from theater with drainage tubes must have a set of cramps at the bed side in case of accidental disconnection which may occur during transfer or movement of the patient from the trolley on the bed. If the patient has an air leak from the lung into the pleural cavity clamping of the tube may cause the occurrence of pneumothorax. Thus clamping of the chest tube as a principle is always a bad idea with a tension pneumothorax as the air entering the pleural space is trapped and builds up exerting pressure against the lung tissue, reducing the cardiac output which may finally cause death. Therefore, the chest

tube should be clamped only for a few seconds. When tubes are clamped, clamps should be left in clear view so that the nurse should not forget to remove them. The chest tube may also be clamped according to the surgeon's order prior to its removal. During this time the patient should be observed for reoccurrence of symptoms and reconnect them if symptoms manifest. If the chest tube becomes disconnected both ends should be cleaned and both tubes reconnected again. If the bottle is broken or cracked, the end of the chest tube may be submerged in sterile water to provide a seal until the tube can be reconnected. If the tube itself comes out of the patient's chest, petrolatum gauze should be applied to the tube and the surgeon notified.

Other specific nursing measures

1. The nurse administers antibiotics and intravenous therapy as prescribed and indicated to facilitate drainage of the abscess if the underwater seal drainage is meant for the treatment of empyema.
2. She tells the patient to take deep breathing and coughing exercises to help expand the lungs.
3. The nurse ensures proper nutritional intake and a diet high in protein and calories. She also offers some emotional support because the treatment may take a long to complete.
4. Other nursing interventions are the same as for other surgical conditions which may include considering the environment, position, psychological care, general observations, exercises, rest, hygiene, elimination, medication etc.

Removal of chest tubes

Chest tubes are removed when there is no fluctuation of fluid in the glass rod or when x ray films confirm re expansion of the lungs. Most patients have their chest tubes removed in about 72 hours post operatively. If there is persistent air space in the apex of the lungs, the upper tube may be left longer. Surgeons are usually concerned about leaving chest tubes in situ for a very long time because of the risk of ascending tube infection. The patient should be given medication for

pain 30 minutes before the tube removal. He is asked to exhale deeply and the tube is removed. If a purse string suture was used, it is untied and a dry sterile dressing is placed over the site. The dressing is covered securely by adhesive tape.

Complications of chest injuries

1. Surgical emphysema
2. Haemothorax
3. Empyema
4. Pneumonia
5. Respiratory failure
6. Pneumothorax
7. Haemoptysis
8. Aspiration
9. Atelectasis
10. Cardiac failure
11. Haemorrhage

SPECIAL INVESTIGATIONS

SPECIAL PROCEDURES

Unit 3 Summary

In this unit we discussed a number of common surgical conditions of the digestive system from the mouth to the anal canal, cardiovascular system and respiratory system. These range from tumours, obstructive conditions, inflammatory diseases, injuries, foreign bodies. You will be asked to practice some of the procedures occasionally as per training requirement of the programme for your proficiency in order to practice.

Activity

Read and make short notes on the following investigations;

- Cardiography
- Doppler ultrasound
- Electro cardiogram (ECG)

Self Assessment questions

Q1. Mention at least five disorders of the mouth?

Q2. List at least three disorders of the intestines?

Q3. Define colostomy?

Q4. List at least five complications of colostomy?

Q5. Mention one common apparatus that may be used in the management of chest injuries?

Answers to Self Assessment questions

Q1.gingivitis

Vincent's infection

Oral candidiasis or thrush

Herpes simplex

Stomatitis

Parotitis/mumps

Oral cancer

Tooth decay

Dental plaque

Q2. Acute abdomen

Intestinal obstruction

Peritonitis

Appendicitis

Q3. Colostomy

A colostomy is an artificial opening made into the large bowel in order to divert faeces (and flatus) to the exterior, where they may be collected in an adhesive bag. A colostomy can be temporal or permanent, depending on the indication.

Q4.Complications Of Colostomy

12. Prolapse
13. Retraction
14. Necrosis of distal end
15. Stenosis of the orifice
16. Colostomy hernia
17. Bleeding
18. Colostomy diarrhoea due to infective enteritis
19. Paralytic ileus
20. Intestinal obstruction
21. Under Water Seal Drainage

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