LECTURES

IN

GENERAL SURGERY

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CONTENT

WOUNDS

Definition: Discontinuity of tissues produced by external violence.

Etiology:

(1) Blunt (closed): due to crushing or motor car accidents

(2) Penetrating (open): due to stabs or bullets.

Pathology:

**** TYPES:***

(1) Closed wounds: In which the skin surface is intact.

(2) Open wounds: In which the skin continuity is interrupted.

CLOSED WOUNDS

(1) Abrasions:

(2) Contusion (ecchymosis):

- Treatment:

* Fomentations (Cold in the 1st 24 hours - Hot after 24 hours).
* The contused area is cleaned with antiseptics.
* A local anti-inflammatory ointment is applied.
* A dressing is applied.
* Elevation of the contused area is advisable to minimize edema.

(3) Hematoma:

1. Localised collection of blood in the fascial planes due to rupture of a sizeable vessel.

- Sequelae of a hematoma:

1. Resolution: by absorption.
2. Organization: by fibrosis.
3. Calcification (e.g. Myositis ossificans).
4. Infection, suppuration & abscess formation.
5. Cyst formation (e.g. chronic subdural hematoma).
6. False aneurysm if it communicates within injured artery.

- Treatment: Antibiotics + Fomentations + Pressure bandage if small & aspiration or open evacuation if large.

OPEN WOUNDS

(1) Incised Wounds (tidy)	**(2) Lacerated Wounds (untidy)**
- Caused by sharp cutting instrument	- Caused by blunt heavy instrument
- Little or no tissue damage.	- Severe tissue damage.
- Clean cut edges.	- Crushed edges.
-The blood vessels are cleanly cut, hence severe bleeding	- The blood vessels are crushed, hence little bleeding.
- Little or no infection.	- More liable to infection.

(3) Crushed & Devitalized Wounds:

- More extensive type of lacerated wounds.

- These wounds include war injuries, road traffic and industrial accidents.

- Crush syndrome commonly occurs.

(4) Penetrating Wounds:

a. Perforating: Possess an inlet & an outlet.

b. Punctured: possess an inlet but no an outlet.

c. Transfixion: e.g. acquired A-V fistula.

- These wounds may be made with any form of penetrating weapon, from needle to bullet.

- The wound is small on the surface but usually deep.

- External bleeding is seldom severe.

- These wounds are deceptive & dangerous because an internal organ, or a deep artery, may have been cut.

Complications:

I. General:

(1) Shock: Neurogenic, oligaemic & septicaemic.

(2) Crush syndrome (Traumatic Anuria):

II. Local:

(1) Infection:

*****Pyogenic: Staphylococcus, Streptococcus, Proteus, and Pyocyaneus.

*Specific: Gas gangrene, Tetanus.

(2) Gangrene: Infective, vascular.

(3) Injury of important structures.

(4) Complications of scar: hypertrophic scar or keloid.

(5) Wound dehiscence.

Crush syndrome;

-Causes: Major trauma causing crushing of the muscles as occurs after air raids, earthquakes, prolonged tourniquet.

-Pathology:

* As a result of massive crushing of muscles, oligaemic shock occurs, due to extravasation of blood into adjacent muscles.

* Myohaemoglobin enters the circulation & acute renal tubular necrosis results.

* The crushed muscle swells considerably & being confined within unyielding deep fascia, tension develops, impeding circulation & increasing extent ischemic damage. The limb feels tense & pain is severe.

-Treatment:

(a) Early cases:

* First aid treatment: 5Rs.

*Alaklinise the urine by I.V. sodium bicarbonate.

*Flush the kidneys with mannitol I.V. drip.

*Fasciotomy to relieve tension.

(b) Late cases: Amputation & dialysis may be life saving.

Clinical picture:

- History of trauma followed by pain.
- Wound either closed or opened.
- Complications.

Investigations: to detect other associated injuries Plain x-ray, U/S and CT scan

Treatment:

1. First aid measures:5 Rs.

- Reassurance
- Rapid history taking about type, time and nature of trauma.
- Resuscitation

Air way patency, **B**reathing normally, **C**irculation adequate by arrest of bleeding (see haemorrhage), and correct shock (antishock), **D**isability by splinting fractures and **E**xposure of the patient and seek for hidden injuries.

- Research for other possible injuries for associated visceral, arterial, nerve or tendon injuries.
- Remember 3As (antitetanic, anti-gas gangrene and antibiotics).

2. Definitive

I. Management of life-threatening conditions

II. Management of the wound.

A. Wounds without skin loss:

(1) Within 8 hours:

a) Clean incised wounds: Primary suture: Suture of all structures including tendons & nerves.

b) Lacerated wounds: Wound excision + lry suture.

Wound excision: The area should be shaved of hairs for 1-2 inches around the wound & cleaned with an antiseptic (eyebrows should not be shaved). Then:

DO	**DO NOT**
-Incise the skin generously. -Incise the deep fascia. -Identify neurovascular bundle. -Remove all foreign bodies. -Excise all dead muscle. (Dark in colour does not	-Excise too much skin. -Practise keyhole surgery -Remove bone. -Repair tendons or nerves

c) Crushed wounds: Wound excision + Delayed lry suture:

After excision of the wound, it is left open & lightly packed with sterile dry gauze + Systemic antibiotics + Repeated dressings. After 4-5 days the wound is re-examined in the operating theatre. If there is no active inflammation & the wound looks clean, the skin edges are drawn together.

(2) From 8-24 hours:

a) Incised wounds: Delayed lry suture.

b) Lacerated & crushed wounds: Wound excision + Systemic antibiotics & repeated dressings. If:

- It becomes clean within *4-5* days: Delayed lry suture.
- It has been left to granulate & is found after 10-14 days to be clean: 2ry suture (Paring the edges, undercutting, then suturing).

(3) After 24hours: Debridement + Systemic antibiotics & repeated dressings. No attempt at excision as this will break the body defence against infection & will open new planes for infection. When the wound becomes clean, it can be closed by 2ry suture.

B. Wounds with skin loss: refer to plastic surgery

HEALING OF WOUNDS

♣♣ **Mechanism:** 3 phases:

(1) inflammatory phase:

- Take ***2-5 days*** in clean wounds or extend up to ***3 weeks in septic*** wounds.
- During this phase:
    * The blood vessels in the wound undergoes initial vasoconstriction.
    * Then vasodilatation follows and the capillary permeability is increased.
    * Exudation of red and white blood cells and plasma into wound.
    * Clot is formed with a fibrin network over the wound.
    * Dead tissues are removed by macrophages.
- The wound has no tensile strength so that its integrity depends entirely on the retaining sutures.

(2) Proliferative phase:

- Lasts up to ***3 weeks*** in clean incised wounds.
- During this phase:

* *Fibroblast migration & capillary ingrowth* (granulation tissues):

New capillary buds and fibroblasts start to infiltrate the wound.

* *Collagen synthesis*:

- Fibroblasts will synthesize collagen fibers and the ground substance.
- Collagen is deposited first as immature protocollagen, which will undergo hydroxylation to mature collagen. This step requires oxygen, ferous irons and ascorbic acid.
- Collagen fibers undergo cross linkage producing thicker fibers.

* *Wound contraction*:

- Mechanical reduction in the size of the defect that starts 2 days after the injury and is largely completed by the 14^{th} day.

NB: The gain in tensile strength during the proliferative phase (10% of the normal after 3 weeks) allows removal of skin sutures without wound disruption ranging from 2-3 days in the face & 7-10 days on the trunk.

(3) Remodeling phase:

- Starts after the 3rd week & continues for up to 6 months.
- During this phase:

* After 3 weeks, the rate of collagen breakdown ↓ → collagen is cleared through this final clear up process.
* Scar tissue formation:
  - Remodling of the habhazard arrangement of collagen fibers.
  - The fibers are arranged along the lines of tension of scar.
  - Slow final gain of tensile strength (80% of the normal after 6 month) but the original strength is never gained.
  - As the wound gradually regains its tensile strength, it contracts so that the eventual scar is much smaller than the original wound.

FACTORS AFFECTING WOUND HEALING:

1.General:

(1) Age: healing is slow in elderly persons due to reduced rate of protein turnover.

(2) Nutritional state

- Hypoproteinaemia leads to diminished synthesis of collagen and ground substance.
- Vitamin deficiency:
  - Vitamin C deficiency is responsible for lack of maturation of procollagen.
  - Vitammin A deficiency leads to deficient epithelization.
- Fluid & electrolyte imbalance: CA, zink, CU and MG deficiency affect

healing.

(3) Preexisting long illness as in ureamia, jaundice, diabetes and malignancy delay wound healing.

(4) Drug intake:

- Cortisone administration inhibits the inflammatory response of wound healing & formation of fibroplasts.

(5) Irradiation inhibits granulation tissue formation due to ischaemia which results from end arteritis obliterans.

II. Local:

(1) Sepsis delay wound healing because:

- Fibroplasts compete with bacteria for oxygen and nutrition.

- Bacteria secrete collagenolytic enzymes, which destroy collagen fibers.

(2) Poor vascularity.

(3) Presence of sloughs.

(4) Presence of foreign bodies

(5) Tension in tissue planes.

(6) Movement and shearing forces damage blood supply of granulation tissue.

(7) Adhesion of the wound to a bony surface prevents wound contraction, e.g. wounds over shin of tibia and chronic venous ulcers.

Types of wound healing:

(1) Healing By Primary Intention:

- This is the healing of clean surgical wounds, which are well coapted.

There is little amount of granulation, fibrosis is minimal & epithelium proliferates to cover the coapted edges.

This results in a fine linear scar with a minimum of contract & disfigurement.

(2) Healing By Secondary Intention:

- This is the healing of a septic wound or with tissue loss, preventing approximation of the edges.
- Granulation is extensive filling the cavity from depth to surface, than epithelialisation from the edges occurs with fibrosis
- This results in a weak ugly scar with much contracture & deformity.

(3) Healing By Tertiary Intention:

This is the healing after secondary sutures have been applied to a wound left to granulate to hasten healing & lessen fibrosis, aiming to obtain a fine linear scar similar to that of primary intention.

complications of wound healing

1) Deficient scar formation (most important)

Wound Dehiscence (rupture of wound) most common after abdominal surgery e.g. Burst abdomen

2) Excessive formation of repair components

- Keloid
- hypertrophic scar (excess collagen)

3) Exaggerated contraction

Keloid

Definition:

It is excessive amount of vascular connective tissue that extends beyond original wound or operation to invade surrounding tissues and continue to grow after 6 months. Later, it matures into fibrous tissue.

Etiology: unknown but it is common in:

a. Negroes b. Pregnant c. TB patients.

Clinical picture:

- It may follow any type of wounds especially burn & vaccination wounds.
- It is very common over sternum and deltoid area.
- It appears as an itchy, firm, pink and raised patch of connective tissue with claw like processes, which invades surrounding tissues with marked disfigurement. Later, it becomes pale and shrinks.

Treatment (extremely difficult)

- Intralesional steroid injection (Triamcinolone or Kenacort)
- Intralesional excision of keloid then resurfacing the area by a thin skin graft.

(Keloid itself has no tendency for recurrence but surrounding healthy tissue does)

- Excision with pre- & post-operative irradiation in the hope that this would prevent recurrence, but the results of this are uncertain.

Differential diagnosis: From hypertrophic scar

- It doesn't extend beyond original wound.
- It doesn't continue to grow after 6 month.
- It doesn't recur after excision.

Hypertrophic scar

Definition: Exaggerated normal maturation process.

Etiology: unknown but it is common in children and deep burns.

Clinical picture: raised red firm scar never to continue to worsen after 6months & resolves eventually.

Treatment:

Elastic pressure.

Steroidal injection.

Silicon gel.

PERI-OPERATIVE CARE

Preoperative preparation

History

Complaint and its duration.

Past Medical History

- ✓ Diabetes, insulin/ oral hypoglycaemic
- ✓ Respiratory disease
- ✓ Cardiac disease
- ✓ Previous operations
- ✓ Drugs, warfarin, aspirin, oral contraceptive pills, steroids, immunosuppression
- ✓ Allergies

Family History

- ✓ Similar condition
- ✓ Consanguinity
- ✓ Malignancies

Physical examination

- ✓ General look
- ✓ Vital signs (pulse, blood pressure, temperature, respiratory rate)
- ✓ General examination
- ✓ Local examination

Investigations

Complete blood count

Kidney function tests

Blood sugar

Others, according to the case

Special problems

1) Obesity
2) Malnutrition
3) Anaemia
4) Diabetic patient
5) Elderly
6) Impaired kidney function
7) Jaundiced patient
8) Thrombo-embolic disease

POST OPERATIVE COMPLICATIONS

POSTOPERATIVE BLEEDING

Etiology:

1. Inadequate surgical haemostasis is the commonest cause.

2. Haemorragic diathesis not detected preoperatively. The PT, PTT and TT are not very sensitive and may be normal even when the deficient factor concenteration is greater than 20% of normal level.

3. Acquired intraoperative coagulopathy:

    a- DIC.

    b- Massive blood transfusion (thrombocytopenia, depletion of clotting factors e.g., VIII and V, when the blood is not very fresh, and hypothermia if blood is not properly warmed).

Management:

1. PT, PTT, and platelet count are ordered.
2. Fresh frozen plasma 3-4 units
3. Platelet transfusion may be necessary to raise platelet count above 50.000/ul.
4. Correction of hypothermia, and acidosis.
5. Proper surgical haemostasis.

POST - OPERATIVE JAUNDICE

Etiology:

1. Haemolytic jaundice:

- Absorption of haematoma: retroperitoneal haematoma.
- Incompatible blood transfusion or excessive transfusion.

2. Hepatocellular jaundice:

- Stress over imposed on pre-existing liver pathology (operative-drugs-anaesthetis).
- Accidental ligation of major blood supply to the liver (arterial or portal).
- Viral hepatitis (at least 2 months incubation period).

3. Cholestatic jaundice:

- Post operative cholestatic jaundice.
- Extra-hepatic biliary tract obstruction (stricture- missed stone- pancreatitis).
- Trans-peritoneal absorption of bilirubin after biliary leak.

POST - OPERATIVE NAUSEA AND VOMITING

Etiology:

1. Pain
2. Hypotension
3. Hypoxiaemia
4. Headache and raised ICT
5. Vestibular stimulation.
6. Oropharyngel and gut stimulation.
7. Opioid drugs.
8. Anaesthetic drugs.

All act on vomiting center in which acetylcholine is the transmitter but opoid and anaethetic drugs act also on CTZ in which dopamine and 5-HT are the transmitters.

Management:

1. General:
   - Hydration and maintenance of adequate blood pressure
   - Avoiding excessive movement in the immediate postoperative phase.
   - Reducing the patient anxiety
2. Specific
   - Anticholinergic agents: hyosine/cyclizine
   - Antidopaminergic agents: domperidone/ metaclopramide
   - 5-HT antagonists: ondnsetron.

POSTOPERATIVE PAIN

Definition of pain:

Unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Why should we treat the pain?

1. Humanitarian aspect.
2. Good quality patient cares.
3. Reduce clinical morbidity.
4. Physiological reasons:

Treatment of postoperative pain:

I. Non pharmacological:

1) **Preoperative counseling:**
2) **Transcutaneous electrical nerve stimulation (TENS):**
3) **Acupuncture:**
4) **Others:**

Massage, hypnosis or application of superficial heat or cold.

II. Pharmacological:

1. Paracetamol (antipyretic, analegesic):

* Indications:

- It is effective in mild to moderate pain.
- Adjunct to opoids in severe pain.

* Contraindications:

- Acute liver disease, alcoholic induced liver disease.
- Glucose 6 phosphate dehydrogenase enzyme deficiency.

* Preparations:

It is given orally, rectally. In some Europian counteries the drug is given IV as the precursor proparcetamol, 2 g of which is converted to 1 g of paracetamol.

2. NSAIDs (antipyretic, analegesic and anti-inflammatory):

* Mechanism of action:

- NSAIDs inhibit cyclo-oxygenase enzyme of which there are 2 isoenzyemes COX1 and COX2 ------- block synthesis of PG (inhibit transduction).
- COX1 synthesize PG responsible for GIT and renal protection.
- COX2 synthesize inflammatory PG responsible for pain initiation.
- There are 2 types of NSAIDs; selective COX2 inhibitors (no gastric or renal injury) and non selective COX1 and COX2 inhibitors.

* Indications:

- It is effective in mild to moderate pain.
- Adjunct to opoids in severe pain (they decrease opoid requirement and improve quality of opoid analgesia).

* Preparations: oral, rectal, injection (im or iv).

* Side effects:

- Gastric ulceration.
- Nephrotoxicity (risk factors include concomittant use nephrotoxic drugs as gentamicine, increased intraabdominal pressure as laparoscopy, hypovolaemia, and age > 65 years).
- Impaired haemostasis: NSAIs inhibit production of PG thromboxane A2 within platelets ---- reduced platelet aggregation.
- Asprin-induced asthma: NSAIDs ----- bronchospasm.
- Drug interactions with oral anticoagulants.

3. Opoids (analegesic):

* Mechanism of action (mimic endogenous opoids) :

- Opoids activate opoid receptors in the spinal cord and other higher brain centers as periaqueductal grey, the nucleus raphe magnus and the thalamus

(OP1, OP2 and OP3) ----- decrease activity of the dorsal horn relay neurone that transmit painful stimuli ------ reduce transmition of these stimuli to higher centers.

- Opoid activate opoid receptors in the cerebral cortex ----- reduce perception of pain.

* Side effects:

Activation of the opoid receptors also produce unwanted effects as:

- Respiratory depression (more with morphine as it is slow lipid-soluble than fentanyl as it is high lipid-soluble opoid)
- Hypotension and bradycardia.
- Nausea and vomiting. - Postoperative constipation.
- Postoperative urinary retention - Euphoria and dysphoria.
- Miosis interfering with pupillary signs of anesthesia.
- Abuse potential.

* Preparations:

Orally, IM (onset of analgesia after 20 min and peak after 60 min), IV onset of analgesia after 5 min) or intrathecal (epidural or subarachnoid space), intra-articular, inhalational, subcutanous, sublingual transdermal, and rectal (peak after 3 h).

@The oral route is not recommended initially after major surgery due to:

Postoperative nausea, vomiting and delayed gastric emptying.

Postoperative ileus in intra-abdominal surgery.

First-pass metabolism in the liver ----- insufficient plasma concenterations of the drug.

@ Intravenous opoid patient controlled analgesia (PCA):

- PCA is superior to both IM and continous infusion routes because it allows the patient to self administer small doses of opoid when pain occurs through available PCA machine.

- PCA is suitable for:

When oral route is contraindicated (after major surgery with GIT anastomosis).

When IM injections are contraindicated (coagulopathy).

With marked incident pain (during dressing).

During acute episodic pain (vaso-occlusive sickle cell crisis).

- PCA is relatively contraindicated in:

History of drug abuse.

Major metabolic disorders (sepsis, severe fluid and electrolyte abnormalities).

End stage hepatic and renal disease.

Severe COPD.

a. Sleep apnoea.

4. Tramadol (a synthetic analegsia):

* Mechanism of action:

- Opoid anlagesia as it acts as a week agonist at some opoid receptors.

- Non opoid analgesia as it acts on noradrenergic and serotoninergic pathways.

It produces analgesia with minimal side effects of opoid.

* Preparations: parentral

* Side effects: dizziness, nausea, dry mouth and sweating.

5. Local anaethetics and regional anasthesia:

a. Local anaesthetics:

b. Epidural analgesia:

* Mechanism of action:

- Injection of LAs into epidural space ----- block nerve root transmission of pain or opoids which binds to opoid receptors of the spinal cord after its diffusion from epidural space).

- Continous epidural analegesia through indwelling epidural catheter is the most common catheter technique to relieve acute postoperative pain.

- The epidural infusion consists of combination of low dose LA (bupivacaine 0.1%) and opoid (fentanyl 0.0002%). Such low dose is synergistic.

* Indications:

a. Surgery (intraoperative and postoperative).
b. Trauma (especially fracture rib and pelvis).
c. Labor pain.
d. Acute ischaemic pain.
e. Severe angina not controlled by conventional means).

* Contraindications:

@ Absolute:

a. Patient refusal.
b. Allergy to Las drugs.
c. Infection at the site of insertion..
d. Lack of resuscitation equipment or skills.

@ Relative:

a. hypovolaemia.
b. Coexsisting neurological disease.
c. Coagulopathy.
d. Compartemental syndrome.

* Benefits:

a. Effective analgesia (espescially thoracic and abdominal surgery).
b. Reduction of opoid requirment.
c. Reduction in the stress response after surgery.
d. Reduction of DVT and pulmonary embolism.
e. Reduction in mortality and morbidity postoperatively.
f. Earlier GIT function after major abdominal surgery.

* Complications:

1. CVS:

- LAs --- sympathetic block ----- hypotension due to prepheral VD.
- LAs --- bradycardia and reduced contractility ---- reduced COP ----- hypotension if cardiac sympathetic fibers (T1-T4) are involved.

2. Respiratory:

Motor block of the intercostal muscle --- respiratory depression & arrest.

3. Dural puncture by epidural needle or catheter:

- If not recognized ----- total spinal block which may require cardiorespiratory support.
- Postdural puncture headache due to leakage of CSF.

4. Infection: meningitis.

5. Spinal haematoma:

6. Spinal abscess: as spinal haematoma with general constitiona symptoms and leucocytosis.

MAJOR TRAUMA AND THE MULTIPLE-INJURY PATIENT

CHAPTER CONTENTS

Introduction

Trauma is a common cause of mortality both in civilian life and during war time. It is the leading cause of death (or individuals of age 1-44 years, and ranks third in causing mortality in all ages. In addition, it is a major cause of morbidity. For every trauma death, two people suffer permanent disabilities.

Major trauma commonly causes multiple injuries in different parts of the body.

Mechanism of injury (There are two major types of injuries)

1. Penetrating injuries

    a. Low velocity injuries. e.g. knives, The injury is usually focused over a small area.

b. High velocity injuries. The common example is firearm injuries that are caused by rifles.

2. Blunt Injuries

    a. Direct blows

    b. Fall from a height

    c. Road traffic accidents (RTA)

Causes of trauma mortality

Deaths following trauma can be classified into 3 groups according to the timing after the accident.

Immediate deaths

These follow fatal injuries and occur within few minutes after the accident so that little can be done for the victims. Examples of these injuries include major trauma to the brain or upper spinal cord, injuries of the heart or major blood vessels or rupture of the major airway.

Early deaths

These occur within few hours after the accident and so, with proper and rapid management, the patients have a chance of survival. These cases include intracranial hemorrhage, massive intra-abdominal or intrathoracic hemorrhage, or major fractures.

Late deaths

These occur some weeks after the injury, generally due to sepsis or multiple organ failure.

Organized trauma care

• Victims of major trauma are best treated by a well-organized and trained trauma team.

• Accident and emergency departments should have an equipped resuscitation area set aside to receive major trauma victims.

• In mass casualty accidents, e.g., train accidents or earthquakes, the concept of
triage as important. Triage means sorting of patients, i.e., their ranking according to both their clinical need and the available resources **to** provide treatment. It may take two forms.

- If the number of casualties does not exceed the facilities all critically injured are treated.
- If the number of casualties exceeds facilities, then the critically injured most likely to survive are treated first.

The American College of Surgeons developed the Advanced Trauma Life Support (ATLS) which is an internationally accepted protocol for the management of major trauma victims. ATLS protocol has three elements

I. Primary survey resuscitation.

II. Secondary survey,

III. Definitive treatment of individual injuries.

Primary survey/ resuscitation

The objective is to identify and treat any immediately life-threatening condition.

Steps

In sequence the five steps of the primary survey are A. B. C. 0. E A. Airway (and cervical spine control).

B. Breathing.

C. Circulation with haemorrhage control.

D. Disability (brief neurological assessment).

E. Exposure and Environment.

A. Airway (and cervical spine control)

The patient's airway is evaluated and protected if necessary, while concomitantly controlling movement of the cervical spine. In general, if the patient is capable of unstrained speech, his airway is patent. All patients receive supplemental oxygen by mask upon arrival.

A. Clear the airway

1. Vomit, blood or foreign material should be removed manually (finger sweep) or with a rigid sucker.
2. This is followed by chin lift or jaw thrust

Protect the airway

• An oropharyngeal or nasopharyngeal airway tube prevents the tongue from falling back and occluding the airway in an unconscious person.

• Tracheal intubation

• Cricothyroidotomy

• Tracheostomy is rarely needed in the emergency room management.

Cervical spine control

The cervical spine should be considered unstable (pending radiological diagnosis) in the following situations;

• Clinical examination reveals bony abnormalities or cervical tenderness.
• Multisystem trauma, a blunt injury above the clavicle, or an altered level of consciousness from trauma or from drug/ alcohol intake.

• Maxillofacial trauma.

Cervical spine immobilization is done using a backboard and a rigid collar. If a collar is not available, manual in-line immobilization is necessary

Radiological evaluation is done later after stabilization of vital systems.

B. Breathing

Assessment

1. Inspection for air movement, respiratory rate. cyanosis, tracheal shift, jugular venous distention, open chest wounds, asymmetric chest expansion arid use of accessory muscles of respiration.

2. Palpation for subcutaneous emphysema and flail segments.

3. Percussion for hyperresonance or dullness over either lung field.

4. Auscultation for upper airway sounds (strider, wheezing, or gurgling) and for lower airway sounds present over lung fields.

The immediately life threatening thoracic conditions and their treatment are

1. Tension pneumothorax Needle decompression followed later by intercostal chest tube.

2. Cardiac tamponade. Needle pericardiocentesis (followed later by operative pericardiotomy and control of source of bleeding

3, Flail chest caused by fractures of adjacent ribs. This is commonly associated with lung contusion, Treatment is by intubation and positive pressure ventilation.

4. Massive haemothorax. Initial treatment is by chest tube insertion to allow lung expansion. Later thoracotomy may be needed if bleeding continues.

5. Open pneumothorax. Initial treatment is by an occlusive dressing fixed at 3 sides only followed by Insertion of a chest tube

C. Circulation

Shock

1. Hemorrhagic, Commonest. Tension pneumothorax reduces venous return and worsens this shock

2. Cardiogenic. Tamponade and myocardial trauma,

3. Neurogenic. Spinal cord injury.

Action

1. Bleeding is controlled with direct pressure if possible.

2. Two large bore (16 gauge) peripheral IV lines are inserted. A central line may also be added.

3. Blood samples are sent for typing, cross matching, hemoglobin, haematocrit and blood chemistry.

4. Ringer's lactate solution is infused as a start

5. blood transfusion.

D. **Disability** (neurological assessment)

Common causes of neurological deficits related to trauma are

- Head injury.
- Hypoxia.
- Shock.
- Alcohol or drugs abuse.

AVPU evaluation based on patient's best response.

A. Alert and interactive

V. Vocal stimuli elicit a response

P. Painful stimuli are necessary so evoke a response

U. Unresponsive

This provides only brief neurological information. A more detailed assessment using the Glasgow Come Scale (GCS) is performed during the secondary survey.

E. Exposure and environment

Cloths, All clothes of the trauma victim are removed using sharp large scissors. **Warmth** Keeping the emergency room warm and using blankets to prevent hypothermia,

Insert

• Urethral catheter (Foley) to monitor urine output. This is contraindicated if there is blood at the urethral meatus as it indicates urethral injury Trial of a catheter insertion in this case is usually unsuccessful and may even compound the injury.

• Nasogastric tube (Ryle's) decompresses the stomach and prevents vomiting and aspiration.

Radiological assessment

• For blunt trauma cervical spine, AP chest and AP pelvis X-rays are mandatory.

•For penetrating trauma, AP chest and X-.ay at trauma site if applicable.

• After resuscitation other X-rays or CT scans are performed as indicated.

History (AMPLE)

A. Allergies

M. Medications

P. Past medical history

L. Last meal *(time)*

E. Events of injury.

Secondary survey

The secondary survey is to be done once resuscitation efforts **are** under way and preliminary **X.** rays have been evaluated.

Objectives

1. Examination of the patient from hoed to toe and front to beck.

2. Taking a complete medical history.

3. Integration of all clinical, laboratory, and radiological information,

4. Formulation of a management plan.

It includes examination of

1. Head

2. Face

3. Spine

4. Neck

5. Chest

6. Abdomen

7. Perineum, including rectal examination in all patients and vaginal examination in females.

8. Limbs for fractures and for soft tissue injuries including vessels, nerves, and tendons.

9. Nervous system

Definitive treatment of individual injuries

Trauma care principles

• There is a need for rapid evaluation of the trauma patient Time wasted costs lives.
• The absence of a definitive diagnosis should never impede the application of lifesaving measures.

• Management in the first 'Golden Hour' is crucial to both the short and long term survival of the patient. It is also critical in determining the morbidity that the patient will endure.

• There is a need to establish management priorities. The things which will kill the patient first are always the things which should be checked and treated first. Things which will kill the patient later are managed later. Thus, airway problems are managed and treated before breathing problems, which in turn are treated before circulatory problems.

BLOOD TRANSFUSION

♣♣ Types of transfusion:

(A)Whole Blood:

1- Direct Transfusion:

- From donor to recipient by means of a 3-way syringe
- This method is rarely used nowadays *except* in infants & children with haemolytic or haemorrhagic disorders.

2- Fresh Blood:

- The blood is withdrawn into citrate bottles or bags & used within 6 hours
- Fresh blood provides those elements which are rapidly lost during storage (white cells, platelets & factors V & VIII).

3- Banked Blood → Composition of Banked Blood →

- One unit (500 cc) of refrigerated (4^{0C}) whole blood in citrate-phosphate-dextrose (***CPD***) solution contains 450 cc of human blood + 63 cc of the anticoagulant CPD solution.
- Value of CPD solution:

1- Maintains a higher PH, a lower potassium level & a higher 2,3-diphosphoglycerate (2,3-DPG) level in stored blood

2- Maintains a better functional state & longer erythrocyte survival time.

Product	***Storage life***
Whole blood	21 days
Red cell concenterates	21 days
Fresh frozen plasma	1 year at –40 C
Platelets concenterates	1-3 days
Factor VIII, Factor IX	2 years

Heparin:

- Blood is collected in heparin for special use, such as in *extracorporeal circulation*.
- Blood collected in heparin has a fast rate of glycolysis & deterioration.
- It may be administered safely for ***only 48 hours after collection***.

(B)Blood Components

1. Packed RBCs:

The transfusion of packed red cells is very useful in anaemic patients, in the elderly and in cardiac patients as it improves the oxygenation ability without overloading the circulation or transfusing the plasma of stored blood which contains most of the free potassium, excess acids, ammonia, citrate, antigens & allergens.

2. Fresh plasma:

- This is the component of the blood remaining after packed red cells are separated.
- It is rich in platelets and coagulation factors.

3. Fresh frozen plasma:

- Plasma removed from fresh blood, is rapidly frozen and stored at –40 C.
- It is a good source of all coagulation factors.
- It is useful to correct the coagulation disorders in haemophilia, Christmas disease and in liver failure.

4. Platelet concentrates:

- The amount obtained from one unit of blood will increase the circulation number of platelets by 10.000 to 15.000/ul.

- As the half life of platelets is short, they should be freshely prepared.
- They are very useful in patients with thrombocytopenia.

5. Plasma protein fraction.

6. Platelet-rich plasma.

7. Cryoprecipitate:

This is prepared from fresh frozen plasm and is very rich in factor VIII and fibrinogen. It is stored at – 40C.

♣♣ Precautions before blood transfusion:

(1) Banked blood is stored at 4^{oC} & should be warmed before transfusion to decrease the incidence of *heart arrhythmias* & prevent *hypothermia* of the patient

(2) Medications should never be added to the blood used in transfusions or to solutions in immediate contact with it.

(3) Fluids intended to proceed or follows blood transfusion in the infusion set should be isotonic without calcium (calcium will clot citrated blood).

- *Physiologic saline* (0.9%) & *balanced electrolyte solutions* are the only solutions that can precede or follow blood transfusion
- *Dextrose 5%* in water will clump RBC & on prolonged contact will injure them

(4) Blood left out of refrigerator for > 30 min. should not be used for transfusion

(5) Blood typing & cross matching are performed to avoid incompatible blood transfusion

♣♣ Preinfusion compatibility testing:

1- Blood typing: The ABO and RhD groups of the *patient* & *donor* are determined.

2- Antibody screening:

- The patient's serum is screened for atypical antibodies that may cause haemolysis of transfused red cells →

IgM → by direct agglutination test

IgG → by indirect antiglobulin test

- If there is a positive result, the blood group specificity of the antibody should be determined using a comprehensive panel of typed red cells.

3- Crossmatching: → to exclude ABO incompatibility →By

- Direct agglutination test
- Indirect antiglobulin test.
- Immediate spin crossmatch: the patient's serum is incubated with the donor red cells → followed by centrifugation → examination for agglutination

♣♣ Indications for blood transfusion:

(1) Whole Blood: (Fresh blood is usually effective)

1- To correct the blood volume as acute haemorrhage whether external, internal or during surgical operations.

2- To replace the infant's blood with RH-negative blood in erythroblastosis foetalis (exchang-transfusion).

3- To provide antibodies & raise the general resistance in severe infection such as septicaemia, pyaemia & gas gangrene. Fresh blood or plasma should be used.

4- To provide the deficient factors in haemophilia & obstructive jaundice.

(2) Packed Red Cells:

Anaemias

Haemolytic conditions

Certain blood diseases such as leukaemias & Hodgkin's disease

(3) White Cells:

Leucopenia,

Agranulocytosis

Aplastic anemia

(4) Plasma:

Burns

Hypoproteinaemias, such as nutritional oedema

Ascities

(*Since the use of plasma is associated with a high risk of hepatitis, plasma protein fraction & human serum albumin are more popular nowadays*)

(5) Patelets:

Thrombocytopenia

(6) Coagulation factors:

Severe case of haemostatic disorders after determination the deficient factors

COMPLICATIONS OF BLOOD TRANSFUSION

1. Immunological complications

- Incompatible red cells —. Acute haemolytic reaction
- Incompatible white cells - Pyrogenic reaction
- Incompatible platelets —. Purpura
- Reaction to a protein in the plasma —. Allergic reaction

a. Acute haemolytic reaction Most often these reactions are due to the presence of antibodies in the recepient's blood against one or more of the antigens of the donors red cells. Occasionally transfused plasma contains a high titre of antibodies against the recipient's RBCs. Clinically haemolytic reactions present after the transfusion of less than 50 ml by fever, chills, constricting pain in the chest, dyspnoea and pain in the flanks. Examination reveals tachycardia and hypotension. In anaesthetized patients the only manifestations of haemolytic reactions are sudden tachycardia, hypotension and bleeding tendency. A major haemolytic reaction will lead to haemoglobinuna, jaundice and acute renal failure due to acute tubular necrosis. Consumption coagulopathy will lead to generalized bleeding tendency.

   Delayed haemolytic reaction may occur 5-10 days after transfusion in patients who have been immunized to a foreign antigen by a previous transfusion or pregnancy. It presents by unexplained pyrexia or jaundice.

Management

- Stop the transfusion immediately.
- Send the donor's blood and a sample of the patient's blood for repeat typing and matching.
- Correct shock by infusion of crystalloid solution (Lactated Ringer) and IV corticosteroids.
- Insert a Foley catheter and check that there is an adequate urine output. An osmotic diuretic as mannitol may be needed. Keep an

alkaline urine to protect against acute renal failure. IV Infusion of sodium bicarbonate may be indicated.

- Should the patient develop acute renal failure, he must receive the appropriate treatment.

b. Pyrogenic reactions. These are the commonest unpleasant consequences of blood transfusion. The patient develops chills, fever, headache, nausea and vomiting. These reactions are due to the presence of recipient antibodies against some components of the donor's white blood cells. Transfusion is stopped and the patient Is given IV aspirin or paracatamol.

C. Post-transfusion purpura may develop in patients who have been previously sensitized to a foreign platelet antigen.

d. Allergic reactions may develop due to immunoglobulin antibody in the recipient complexing with a protein present the donor's plasma. These range from mild itching and urticaria to a severe reaction with laryngeal edema and collapse. These reactions are common in those patients who received many transfusions in the past. Treatment is by antihistaminics and corticosteroids. If the reaction is severe, blood transfusion should be stopped.

2. Congestive cardiac failure. This is liable to occur in elderly persons especially it a large volume of blood is administered too rapidly. It is recommended to transfuse packed red cells rather than whole blood to correct anaemia in elderly persons.

3. Transmission of Infection

• Viral hepatitis (B or C) This is now the most feared complication. The virus can be transmitted by whole blood or blood products. It is obligatory to test donors for hepatitis viruses.

• AIDS/HIV Infection can be transmitted by blood or by its products.

• Syphilis This is now rare. Spirochaetes cannot survive at the blood bank temperature for more than 4 days.

• Malaria The disease is transmitted only by red cells, not by blood components.

• Septicaemia Bacteria can survive, but they cannot multiply significantly in refrigerated blood. However, lithe blood Is allowed to warm, bacteria can grow and Gram-negative endotoxins can cause seplicaemic shock.

4. Hyperkalaemia With prolonged storage of blood, there is progressive loss of potassium from erythrocytes into the plasma. Transfusion of several units of aged blood may produce cardiac arrhythmlas or even arrest due to hyperkalaemia.

5. Citrate intoxication Excess citrate will bind to the recipient's calcium leading to hypocalcaemia which augments the effects of hyperkalaemia on the myocardium. It more than 2 units of blood are administered, It is important to administer 10 ml of 10% calcium gluconate for each two units of blood.

6. Air embolism.

7. Transfusion related acute lung Injury (TRALI) This is the result of incompatibility between donor's antibodies and recipient granulocytes. It gives a clinical picture similar to ARDS.

8. Complications of massive blood transfusion This implies transfusion of 2500 ml of blood at one time or 5000 ml or more over 24 hours.

• Hypothermia. A special warming unit should be used to warm the blood before transfusion as hypothermia can cause acidosis or cardiac arrest.

• Hyperkalaemia.

• Hypoclcaemia.

• Coagulation failure. This is due to the dilution of dotting factors and platelets when large volumes of stored blood are being used to replace blood losses, because stored blood is poor in platelets, factor VIII and factor V. In these situations it is recommended to transfuse one unit of fresh frozen plasma and platelets for every unit of stored blood.

• Diminished O_2 carrying capacity of red blood corpuscles.

SCREENING AND EARLY DETECTION OF CANCER BREAST

Indications:-

For high risk group

** Disadvantages:-

- Expensive & the possible hazard of repeated exposure to diagnostic X-rays; the latter danger is minimized by special low -dose equipment & the mammography **done every 2 years**.

I- Education program:-

Periodic self-examination of the breast (the most important):

- Each female > 20 years should examine herself in front of a mirror (1 week after menses) for:

a. Change in size or level of the breast.

b. Dimpling of skin & retraction of nipple.

c. Palpable mass in the breast or in the axilla.

II- Screening program:-

- Every year → any patient > 50 yr

→ any patient > 40 yr with +ve family history

→ any patient > 35 yr with past history of cancer breast

A- Physical examination:-

- Good history- general and local examination

< 30 yr → every 3 yr

30-50 yr→ every 2 yr

> 50 yr → every 1 yr

B- Mammographic examination: (It is a sensitive but non specific test)

At 40 yr → base line mammography

40-50 yr → every 1-2 yr

> 50 yr → every 1 yr

C- Genetic study:-

BRCA1, BRCA 2, P53

NIPPLE DISCHARGE

Etiology:

I- Physiological:

1. New born
2. Serous discharge: during pregnancy.
3. Milky discharge: during lactation.

II- Pathological:

1- Bloody discharge:

1- Duct papilloma (**most common cause**)

2- Duct carcinoma

3- Trauma

4- Bleeding tendency

5- Fulminate streptococcal infection

2- Necrotic discharge: Degenerative carcinoma

3- Serous, green, brown or black discharge: fibroadenosis

4- Purulent discharge: breast abscess.

5- Milky:

- Galactorrhea
- Galactocele
- Contraceptive pills

6- Greenish or creamy paste discharge: Mammary duct ectasia.

Duct ectasia is most common cause of nipple discharge in ***females > 55y***

Duct papilloma is most common cause of nipple discharge in ***females < 55y***

Clinical picture:

A- History:

a. Age of patient.

b. Uses of OCs.

c. Drugs as phenothiazines, tricyclic antidepressants, metoclopramide.

d. Diseases: hypothyroidism, pituitary adenoma.

B- Examination:

- Nature and side of discharge
- Associated mass or pain

Nipple discharge is suspected to be pathological if:-

1- Spontaneous

2- Bloody or serous

3- Unilateral

4- Localized to a single duct,

Investigations:

1- Localization test: By differential pressure to localize the offending duct.

2- Benzedine test: To detect occult blood in the discharge.

3- Sonomammography: To detect impalpable mass.

4- Ductography: To diagnose duct papilloma and duct carcinoma.

5- Ductoscopy

6- Cytology and biopsy of mass if present.

7- Serum prolactin level. If persistent elevated, search for pituitary adenoma.

INTESTINAL FISTULA
(FAECAL FISTULA)

♣♣ Definition:

** **Fistula**: means abnormal track between two epithelialized surfaces.

** **Faecal fistula**: means abnormal track ( ) the intestinal lumen and skin delivering the intestinal contents to the exterior

♣♣ Etiology:

I. Congenital: due to persistent patent vitillo-intestinal duct.

II. Acquired:

A- Traumatic = post-operative (the commonest)

1- Leakage at the suture line (intestinal anastmosis) due to:

a. Poor vascularity

b. Anastomosis under tension

c. Distal obstruction

d. Presence of specific pathology as Crhon's.

e. Presence of generalized disease, which impairs healing.

2- Iatrogenic injury to the intestinal wall.

3- Pressure necrosis by neglected drainage tubes, missed sponges or instruments

4- Operations on inflamed bowels e.g. Crohn's, T.B., irradiation.

B- Inflammatory: Crhon's, U.C., T.B., Typhoid and actinomycosis.

C- Neoplastic: in advanced malignancy.

NB: Inflammatory or malignant fistulas are called **spontaneous fistula**.

NB: Colostomy and ileostomy are **surgically made faecal fistula**.

♣♣ Pathology: (Types)

I. According to communication:

1. Internal fistula:

The communication occurs between 2 parts of GIT or adjucent organs.

2. External fistula (fecal fistula):

The communication occurs between intestine and skin or another external surface epithelium.

II. According to the length:

1. Direct fistula: with **short track**, it may be

a. Mucous lined: which lined by mucous membrane and never closes.

b. Granulation tissue lined: so it may close spontaneously.

2. Indirect fistula: with **long, tortuous track**

- Extending an abscess cavity to a distant intestinal loop.
- It is usually partially epithelized.

III. According to the output:

1. High output fistula: output > 500 ml/24h.

- It is usually connected to proximal bowel e.g. duodenum or jejunum.
- It results in much fluid and electrolytes deficit and marked malnutrition.
- Has high digestive power of the discharge leads to skin excoriation.

2. Low output fistula: output < 500 ml/24h.

- It is usually connected to distal bowel e.g. colon.
- It results in minimal fluid and electrolytes deficit and mild malnutrition.
- Skin excoriation is mild.

♣♣ Complications:

1- Fluid and electrolytes deficit.

2- Malnutrition: hypoproteinaemia, anaemia, avitaminosis and weight loss.

3- Skin excoriation and maceration.

4- Psychic troubles.

♣♣ Clinical picture:

1- **Time**: Enerocutanous fistula becomes clinically evident between 5^{th}-10^{th} postoperative days

2- **Fistula is usually preceeded by** manifestations of intra-abdominal abscess e.g. fever, abdominal pain, tenderness, prolonged ileus, and wound infection.

3- **The abscess then drains purulent or bloody discharge** and then intestinal contents begin to discharge from the fistula→

High fistula → usually discharges bile stained, undigested food

Low fistula → discharges semisolid faeces.

4- **Diagnosis is obvious when drainage of enteric material comes** through abdominal wound or drain

5. **Complications**.

** When leak is small, it may be difficult to distinguish a fecal fistula from feculent pus → in such cases, passage of flatus & charcoal test indicates presence of a fistula

♣♣ Investigations:

I. To confirm diagnosis:

1- Passage of flatus.

2- Charcoal test or methylene blue test: taken orally discovered in discharge after few hours.

3- Fistulogram or barium follow through or enema, it also shows the length of the track, the loop of origin and distal obstruction if present.

4- Abdominal ultrasound to detect abscess cavities.

5- Abdominal CT following administration of central contrast.

II. To detect complications: (to asses the general condition)

1. Central venous pressure.
2. Blood electrolytes
3. Compelete blood picture
4. Serum albumin.
5. Liver function tests
6. Renal function tests.

III. To detect cause:

1- Examination of discharge to exclude TB or actinomycosis.

2- Biopsy to exclude specific infections or malignancy.

3- Radiography: plain and contrast may show distal obstruction or specific pathology.

♣♣ Treatment:

I. Conservative treatment:

(> **50%** close spontaneously within **2-3 weeks** under conservative treatment)

1. Fluid and electrolyte replacement:

In high fistulas, fluid and electrolyte losses are severe and their accurate replacement by IV therapy takes first priority.

2. Maintenance of nutrition:

Adequate nutrition is necessary, the objective being an intake of **>3000 cal /d.**

a. **Parentral nutrition** is indicated in-patients with high output, or proximal fistulae (no oral feeding).

b. **Enteral nutrition** is indicated in-patients with low output, or distal

fistulae as they can make use of their intestine for absorption.

3. Control of fistula:

a. disposible ileostomy bag is used to collect the discharge and avoids excoriation of skin.

b. The skin surrounding fistula should be protected from erosion by digestive enzymes by frequent application of zink oxide ointment.

c. Pressure dressing is applied to prevent prolapse of the bowel.

4. Control of infection:

Abscess and pockets of suppuration around fistula should be freely drained and appropriate antibiotics and intestinal antiseptics are adminsterated.

5. Suppression of intestinal secretions:

By somatostatine 0.1 mg subcutaneous / 8h until fistula closes or for 2-3 w.

II. Surgical treatment:

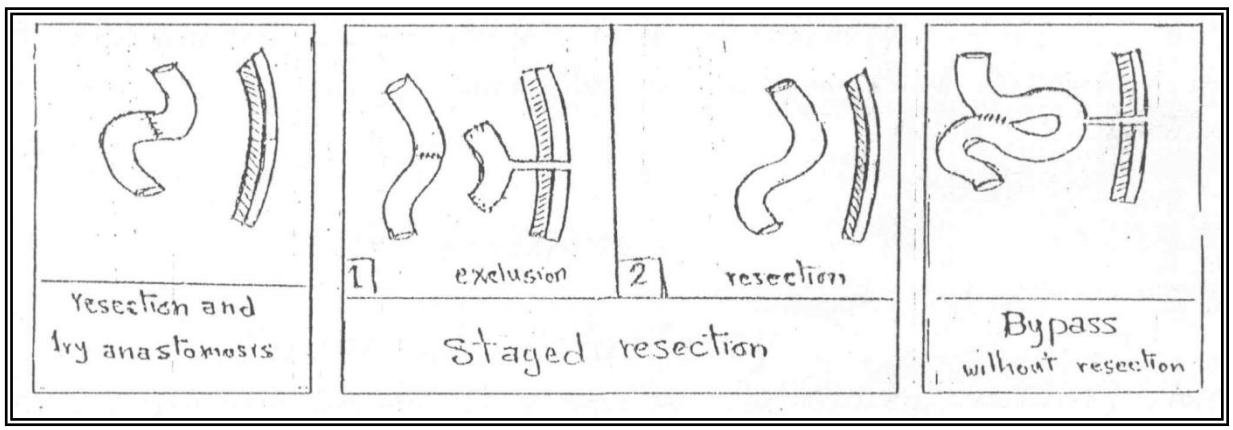
Indications:

Failure of spontaneous closure with conservative treatment over **4-6 weeks**

Procedures:

1- Resection of track together with the fistulous bowel segment and 1ry anastmosis

2- If resection of the segment was difficult or hazardous, bypass without resection or staged resection may be indicated.



Causes of failure of spontaneous closure: (FRIEND)

F: Foreign body within the fistulous tract.

R: Radiation enteritis.

I: Infection/inflammation at the fistula origin (Crohn's disease)

E: Epithelization of the fistula tract.

N: Neoplasm at the fistula tract.

D: Distal obstruction of the intestine.

PREOPERATIVE PREPARATION OF THYROTOXIC PATIENT

1. Sedatives: barbiturates

2. Inderal in full dose.

3. Antithyroid drugs in full dose except in RSG (Why?)

4. Lugol's iodine (5% iodine + 10% KI in water) or supersaturated potassium Iodide (SSPI):

(For 2 weeks (not more) with neomercazole immediately before operation)

1- It blocks oxidation (organic iodine formation).

2- It blocks release of thyroid hormones by **inhibition of protease enzyme** that releases T_3 & T_4 from thyroglobulin i.e. It constipates the gland.

3- It blocks stimulant effect of TSH on the gland, so it ↓ the vascularity

These ↑storage of colloid & ↓ vascularity of goitre (**Wolff- Chaikoff effect**)

**** Dose:**

- 5 drops TDS gradually increased to 15 drops TDS.
- Its effects appear **within 24 hours**, maximum effect is reached within 10-15 days but its effect decreases afterwards (tolerance) as the gland use iodine → aggravate thyrotoxicosis → **iodine escape phenomena**
- So, it cannot be used for long term therapy and used only in:

a- Preoperative preparation to decrease vascularity and toxicity

b- Treatment of thyroid crisis.

** **Side effects:**

1- Allergy (skin rash)

2- Parotid swelling (excessive salivation)

3- Causes fibrosis around gland

COMPLICATIONS OF THYROIDECTOMY

1. Intraoperative complications
    1) Shock
    2) Primary haemorrhage
    3) Injury to important structures

2. Early postoperative complications
    a. Reactionary haemorrhage
    b. Nerve injury
        i. Recurrent laryngeal nreve
        ii. External laryngeal nreve (loss of high pitched voice)
        iii. Internal laryngeal nreve(chocking)
    c. Hypoparathyroidism due to;
        i. Removal of parathyroid glands or interruption of their blood supply
    d. Respiratory distress due to
        i. Laryngeal edeme
        ii. Bilateral recurrent laryngeal nerve injury
        iii. Tracheomalacia
        iv. Haematoma
    e. Thyrotoxic crises (thyroid storm)
        i. High temperature
        ii. Tachycardia
        iii. Heart failure

iv. Increased blood pressure
v. Disturbed conscious level
vi. Convulsions

3. Late postoperative complications
    a) Hypothyroidism
    b) Recurrence of goitre
    c) Recurrence of thyrotoxicosis
    d) Keloid scar

INDICATIONS FOR SPLENECTOMY

1) Traumatic injury of the spleen
2) Haematological diseases:
    a. Hereditary spherocytosis and other haemolytic anaemias.
    b. Idiopathic thrombocytopenic purpura (ITP).
    c. Some patients with thalassemia
    d. Few patients with sickle cell anemia
3) Lymphomas (Staging laparotomy in case of Hodgkin's lymphoma.)
4) Radical surgery for stomach, esophagus and pancreas
5) Splenectomy and devascularization for portal hypertension with esophageal varices
6) Hypersplenism
7) Splenic cysts (hydatid cyst)
8) Splenic abscess
9) Splenic tumors
10) others:
    1) Tuberculosis of spleen.
    2) Gaucher's disease.
    3) Chronic myeloid leukaemia.
    4) Felty's syndrome.
    5) Schistosomiasis.
    6) Splenic artery aneurysm.
    7) Splenic infarction.

COMPLICATIONS OF SPLENECTOMY

(A) During the operation:

1- Shock.

2- Haemorrhage from the spleen, its pedicle, or adhesions of diaphragm.

3- Injury of important structure as colon, pancreas, and stomach.

(B) After the operation:

General:

1-Post-splenectomy fever: Cause is unsettled, may be due to: a subphrenic collection, b. Proliferation of R.E.S.

2-Vomiting and hicough.

3-Acute gastric dilatation and paralytic ileus.

4- Pulmonary complications e.g. atelactasis.

5-DVT due to thrombocytosis and increased blood viscosity.

****Local:***

\- Haemorrhage: Reactionary due to slipping of the ligatures.

2- Infection:

3-Acute pancreatitis: Due to injury of tail of pancreas.

4-Colonic and gastric fistula: Due to their injury.

5- Burst abdomen: Due to postoperative distension with injury of the pancreas liberating enzymes that digest suture material.

6-Splenosis peritonii: In cases of ruptured spleen.

7-Cholaemia and ascites: In liver insufficiency.

8- Haematemesis: If splenectomy is done alone in the presence of oesophageal varices and portal hypertension.

9-Hypertrophy of missed splenculi.

COMPLICATIONS OF APPENDICECTOMY

Intraoperative complications

- ***Shock***
- ***Haemorrhage***
- ***Injury of important structures (caecum)***

Postoperative complications

1) Wound infection

Wound infection is the most common postoperative complication, occurring in 5–10 per cent of all patients. This usually presents with pain and erythema of the wound on the 4th or 5th postoperative day, often soon after hospital discharge. Treatment is by wound drainage and antibiotics when required. The organisms responsible are usually a mixture of Gram-negative bacilli and anaerobic bacteria, predominantly Bacteroides species and anaerobic streptococci.

2) Intra-abdominal abscess

Approximately 8 per cent of patients following appendectomy will develop a postoperative intra-abdominal abscess. In an era of hospital discharge 24 to 48 hours following appendectomy, patients should be advised prior to discharge that a spiking fever, malaise and anorexia developing 5–7 days after operation is suggestive of an intraperitoneal collection and that urgent medical advice should be obtained. Interloop, paracolic, pelvic and subphrenic sites should be considered. Abdominal ultrasonography and CT scanning greatly facilitate diagnosis and allow percutaneous drainage. Laparotomy should be considered in patients suspected of having intra-abdominal sepsis, but in whom imaging fails to show a collection, particularly those with continuing ileus.

3) Ileus

A period of adynamic ileus is to be expected after appendicectomy, and this may last a number of days following removal of a gangrenous appendix. Ileus persisting for more than 4 or 5 days, particularly in the presence of a fever, is indicative of continuing intra-abdominal sepsis and should prompt further investigation. Rarely, early during postoperative recovery, a Richter's type of hernia may occur at the site of a laparoscopic port insertion and may be confused with a postoperative ileus. A CT scan is usually definitive.

4) Respiratory

In the absence of concurrent pulmonary disease, respiratory complications are rare following appendicectomy. Adequate postoperative analgesia and physiotherapy, when appropriate, reduce the incidence.

5) Venous thrombosis and embolism

These conditions are rare after appendicectomy, except in the elderly and in women taking the oral contraceptive pill. Appropriate prophylactic measures should be taken in such cases.

6) Portal pyaemia (pylephlebitis)

This is a rare but very serious complication of gangrenous appendicitis associated with high fever, rigors and jaundice. It is caused by septicaemia in the portal venous system and leads to the development of intrahepatic abscesses (often multiple). Treatment is with systemic antibiotics and percutaneous drainage of hepatic abscesses as appropriate. A screen for underlying thrombophilia should be considered.

7) Faecal fistula

Leakage from the appendicular stump occurs rarely, but may follow if the encircling stitch has been put in too deeply or if the caecal wall was involved by oedema or inflammation. Occasionally, a fistula may result

following appendicectomy in Crohn's disease. Conservative management with low-residue enteral nutrition will usually result in closure.

8) Adhesive intestinal obstruction

This is the most common late complication of appendicectomy. At operation, a single band adhesion is often found to be responsible. Occasionally, chronic pain in the right iliac fossa is attributed to adhesion formation after appendicectomy. In such cases, laparoscopy is of value in confirming the presence of adhesions and allowing division.

9) Incisional hernia

COMPLICATIONS OF CHOLECYSTECTOMY.

Intraoperative complications

- Shock
- Haemorrhage
- Injury of important structures,
  - Accidental ligation of the CBD or hepatic artery
  - Injury of the duodenum

Postoperative complications:

A. -Early…

- Biliary leak/ biliary peritonitis
- Wound infection, septicemia
- Subphrenic collection/ subphrenic abscess

B. -Late…

- Postcholecystectomy jaundice

  a- Missed stone in CBD.

  b- Stricture or ligation of CBD.

  c- Liver cell failure (due to ligation of hepatic a.),

  d- Incompatible blood transfusion e- Viral Hepatitis. f- Halothane toxicity.

- Postcholecystectomy syndrome: Persistence of symptoms postoperatively.

  a- Stricture of CBD. b- Missed stone in CBD. c- Long cystic duct stump (only if contains a stone).

  d- Biliary dyskinesia.

  e- Wrong diagnosis: e.g. Duodenal ulcer.

PREOPERATIVE PREPARATION FOR COLO-RECTAL SURGERY

Colonic preparation

- Low residue diet for 72 hours
- Bowel wash with saline; gut irrigation using oral polyethylene glycol with electrolytes taken in two litres of water in 2 hours to clear the entire bowel. It acts by osmotic hygroscopic action. It is also achieved by oral intake of mannitol for 2-3 days.
- Bowel antiseptics like neomycin 1 gram three times/day prior to surgery is given.
- *Total gut irrigation* is done by passing nasogastric tube through which normal saline is infused. It is infused (8 litres of saline) until clear saline is passed per anum.
- [*On-table colonic lavage* can be done by passing a tube through performed appendicectomy opening (purse string suture is placed) and another opening in distal colon just proximal to obstruction and saline is irrigated from first to second tube continuously to proper cleaning of the colon].

INTESTINAL STOMA

Definition of Stoma

Stoma is an artificial opening or ‘mouth like’ to the exterior, the abdominal wall so as to drain the content from the tubular structures inside, like bowel or ureter. It is done for diversion of urine or faecal matter in case of malignancy, trauma, and sepsis or after surgery.

Types

_ ***Ileostomy***

_ ***Colostomy***

_ ***Cutaneous ureterostomy—***

_ ***Ileal urinary conduit—***

_ ***Vesicostomy—***

Preparation and counseling of the patient for stoma

_ To certain extent stoma of any type causes psychological and physical trauma to the patient, as it is nonphysiological, distressing and socially not acceptable.

_ Patient should be explained about the procedure and should be convinced and consoled about the stoma.

_ Detailed meaning, explanation and after care of the stoma should be discussed.

_ Indication for the stoma and consent for the same should be taken.

_ Reassurance about the stoma, its care, and its position should be diagrammatically explained to the patient and his close relative.

_ In case of obstructive disease, stoma is done as an inevitable procedure to relieve the obstruction, often it may be temporary.

_ Proper bowel preparation by bowel wash, gut irrigation is required before surgery.

_ *The surgeon selects the site of the stoma*.

_ Stoma is usually sited midway between anterior superior iliac spine and umbilicus.

_ It should be away from the belt line.

_ It should be away from the scar, creases, and bony points.

_ Patient should be assessed for proper size, adequacy for stoma in lying down, sitting, and standing positions.

_ Proper stoma appliances should be decided after thorough check-up and discussion with patient and patient's relative.

_ Stoma site should be marked properly before surgery.

_ Ileostomy is usually sited in the right iliac fossa, colostomy in left iliac fossa.

_ Allergy for the particular appliances should be checked for.

_ The patient should consult stoma therapist.

Postoperative Care for the Stoma

1) Stitches are removed in 6-10 days.
2) Dressing should be done first over the stoma and after placement
3) of appliance, laparotomy wound is dressed otherwise stoma appliance will not sit properly.
4) Patient should be observed for any complications.
5) Once wound has healed patient can take bath by removing the appliances.
6) After bath skin is dried up and stoma appliances can be fi t again.
7) Patient should be taught about the stoma care and its appliances.
8) Care and prevention of skin excoriation due to leak is also looked into.
9) Psychotherapy is given for the patient.
10) Skin should be absolutely dry prior to placing the stoma appliances.

Stomas

_ May be colostomy or ileostomy

_ May be temporary or permanent

_ Temporary or defunctioning stomas are usually fashioned as loop stomas

_ An ileostomy is spouted; a colostomy is flush

_ Ileostomy effluent is usually liquid, whereas colostomy effluent is usually solid

_ Ileostomy patients are more likely to develop fluid and electrolyte problems

_ An ileostomy is usually sited in the right iliac fossa

_ End-colostomy is usually sited in the left iliac fossa

_ Whenever possible, patients should be counselled and sited by a stoma care nurse before operation

Stoma complications

_ Skin irritation

_ Prolapse

_ Retraction

_ Ischaemia

_ Stenosis

_ Parastomal hernia

_ Bleeding

_ Fistulation

COMPLICATIONS OF HAEMORRHOIDECTOMY

_ Early
Pain
Acute retention of urine
Reactionary hemorrhage
_ Late
Secondary hemorrhage
Anal stricture
Anal fissure
Incontinence

1. Hemorrhage. This may be reactionary or secondary. Reactionary hemorrhage is treated by giving morphia injection and applying local pressure by a piece of gauze. If the bleeding persists; surgical ligation of the bleeding point is mandatory. Secondary hemorrhage is more serious as there is secondary infection and the tissues are very friable Conservative measures are tried at first, but if they fail, surgical ligation of the bleeding by underrunning sutures is performed. In some patients if sutures fail to stop the bleeding, a pack around a large rectal tube is inserted in the anal canal for 2-3 days.

2. Retention of urine. This is a common problem after many anal operations especially in elderly males. Conservative measures are tried at fist. An analgesic is prescribed for the pain, it there is an anal pack, it is removed, the patient is asked to get out of bed, a warm bath is advised, If these measures fail, catheterization is advised.

3. Anal stricture. To avoid this complication, intact areas of anal skin and mucosa should be left between the raw areas of excised hemorrhoids. Two

weeks postoperatively a digital rectal examination is performed to check that there is no tendency to stenosis. if present, gradual anal dilation is started.

4. Recurrence is liable to occur in young patients and is usually due to enlargement of daughter piles. injection treatment is advised.

5. One of the cutaneous wounds may not heal completely and leads to a **fissure**. Conservative treatment is usually successful. If it fails internal sphincterotomy solves the problem.