

Principles of medicine and surgery

Lecture 8

head injury,

<u>osteomyelitis</u>

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Head injury

The Glasgow Coma Scale (GCS) provides a practical method for assessment of impairment of conscious level in response to defined stimuli.

Eyes open	Spontaneously	4
	To verbal command	3
	To painful stimulus	2
	Do not open	1
Verbal	Normal oriented conversation	5
	Confused	4
	Inappropriate/words only	3
	Sounds only	2
	No sounds	1
	Intubated patient	T
Motor	Obeys commands	6
	Localises to pain	5
	Withdrawal/flexion	4
	Abnormal flexion	3
	Extension	2
	No motor response	1

Severity of head injury is classified according to the Glasgow Coma Scale (GCS) into :

Minor head injury	GCS 15 with no loss of consciousness (LOC)
Mild head injury	GCS 14 or 15 with LOC
Moderate head injury	GCS 9-13
Severe head injury	GCS 3-8

Road traffic accidents are the leading cause of head injury, being responsible for up to 50% of cases. Other common mechanisms of injury include falls from height and assault.

1. Brain concussion

Concussion is defined as a closed brain injury that result in loss of consciousness, but is generally used in describing mild head injury without imaging abnormalities; loss of consciousness. Symptoms include confusion, amnesia and lethargy.

2. Brain contusion

Brain contusion is a bruise on the brain . It can cause bleeding and swelling

3. Skull vault fractures

- Closed linear fractures of the skull vault are managed conservatively. Open or comminuted fractures should be considered for debridement and prophylactic antibiotic therapy.
- Depressed skull fractures involve inward displacement of a bone fragment. They occur when small objects hit the skull at high velocity.

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4. Basal skull fracture

A basal skull fracture is a break of a bone in the base of the skull. Clinical signs of skull base fracture include bleeding or cerebrospinal fluid (CSF) leak from the ears or nose, and bruising behind the ear or around the eyes.

5. Extradural hematoma

Extradural hematoma is a neurosurgical emergency. It results from rupture of an artery, vein or venous sinus, in association with a skull fracture. The injury is a fracture to the thin temporal bone, with associated damage to the middle meningeal artery. Transient loss of consciousness is typical, and the patient may then present with headache. Extradural hematoma needs urgent transfer to the neurosurgical facility, for immediate evacuation in deteriorating or comatose patients or those with large bleeds, and for close observation.

6. Acute subdural hematoma

High-energy injury mechanisms can result in the rupture of cortical surface vessels with significant associated primary brain injury. This results in expanding hematoma with rapid deterioration. Acute subdural hematoma requires evacuation, typically by craniotomy.

7. <u>Subarachnoid hemorrhage</u>

☐ Trauma is the commonest cause of subarachnoid hemorrhage and this is managed conservatively. Symptoms include severe headache, nausea, vomiting, brief loss of consciousness. Diagnosed by CT scan of brain.

<u>Osteomyelitis</u>

- Acute osteomyelitis: is a condition that occurs when pathogenic bacteria causes inflammation in the bone and surrounding tissues.
- Chronic osteomyelitis: it's long term bone infection occurs in patient with multiple diseases
- Risk factors of osteomyelitis:
- 1) Diabetes mellitus
- 2) Immunocompromised patient
- 3) Recent injury
- 4) Rheumatoid arthritis
- 5) Long terms use of steroids
- 6) Poor blood supply
- Use of implants for joint replacement and fracture fixation

- Signs and symptoms of osteomyelitis:
- 1. Pain and/or tenderness in the infected area.
- 2. Swelling, redness and warmth in the infected area
- 3. Fever, chills and irritability
- 4. General discomfort
- 5. Drainage of pus through the skin.
- 6. Difficulty or inability to use the affected limb
- Diagnosis of osteomyelitis:
- Medical history and physical examination

- Complete blood count (CBC): increased white blood cells (WBC) count
- ➤ **Biomarkers**: Raised inflammatory markers (erythrocyte sedimentation rate) (ESR),

 C-reactive protein (CRP) but they are neither sensitive nor specific.
- > Imaging:
- 1. Plain x-rays
- 2. Ultrasound
- 3. Computed tomography (CT) scan
- 4. Magnetic resonance imaging (MRI)

Treatment of osteomyelitis:

- High-dose intravenous antibiotics like Cephalosporins, co-amoxiclav or a combination of flucloxacillin and gentamicin may be used. Intravenous antibiotics are usually converted to oral therapy after cultures and continued for at least 4 weeks.
- The limb should be splinted and analgesia given.
- Surgery may be used in chronic osteomyelitis
- Complications of osteomyelitis:
- 1.Bone abscess and necrosis
- 2. Cellulitis
- 3. Spread of infection
- 4. Septicemia



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Lecture 9

Warfare injury

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Gunshot wounds

- Bullets cause injury by:
- 1. Direct laceration of vital structures
- 2. Cavitation, causing injury of blood vessels and devitalisation of tissue
- 3. Secondary contamination.
- The nature and extent of ballistic wounding is related to the energy transfer between bullet and tissue and the characteristics of the organs affected.

- Types of injury in modern warfare:
- 1) High energy transfer bullet wounds
- 2) Fragmentation injury
- 3) Blast injury
- 4) Burns
- Typical characteristics of war wounds:
- 1) Contaminated
- 2) Contain devitalised tissue
- 3) Affect more than one body cavity
- 4) 75% affect the limbs

Treatment of warfare wound

- Initial measures: Initial measures for treating war injury are similar to those for any severe injury. Start the treatment with ABC (Airway, Breathing, Circulation) and stop the hemorrhage. Intravenous opiate analgesia and antibiotics should be given.

 Grossly contaminated wounds containing devitalised tissue are at risk of infection with *Clostridium tetani*, and antitetanus serum and tetanus toxoid should be available.
- Wound assessment: after resuscitation, a careful top to toe survey must be done.

 Care must be taken to identify any penetrating injury. Each wound must then be assessed and recorded. Wound assessment should include:

- 1) Site and size of the wound
- 2) Presence of a cavity and degree of contamination
- 3) Anatomical structures that may have been injured
- 4) Distal perfusion
- 5) Presence of fractures
- Wound excision: Wound excision involves removal of dead and contaminated tissue that, if left, would become a medium for infection. For limb wounds, a pneumatic tourniquet should be used if possible to reduce blood loss. All dead and contaminated tissue should be excised,

Dead muscle is dark in color, shows little tendency to bleed, and does not contract to forceps pressure. Bone fragments that have no soft tissue attachment should be removed; if left in the wound they will become infected and lead to osteomyelitis. Injured nerves or tendons should be marked (with suture) for later repair. At the end of the procedure the wound should be washed with copious quantities of saline and then left open. Apply a dry, bulky, sterile dressing.

Delayed primary closure: Once wound excision has been done the patient can be returned to the ward for continued monitoring and analgesia. Dressings should be left in place and removed only when the patient returns to theatre for delayed primary closure.

Amputation surgery: some severe injuries may result in surgical amputation of limbs.

Excision of all dead and contaminated tissue should be done.



Principles of medicine and surgery

Lecture 1

burn, plastic surgery

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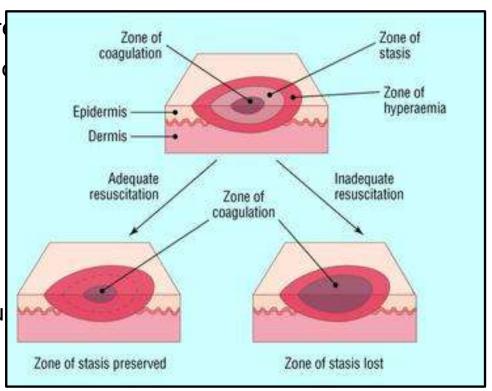
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Burn

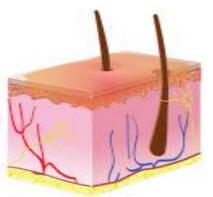
- <u>Burn</u>: is an injury to the skin and other tissues caused by thermal, chemical, electrical injury.
- Causes of burn :
- 1) Dry heat
- 2) Flame
- 3) Hot liquids
- 4) Electrical contact
- 5) Chemical burn by acid and alkali

- Local response of the body to the burn: there is 3 areas as following
- 1. Zone of coagulation: this occurs at the point of maximum damage. In this zone there is irreversible tissue loss due to coagulation the constituent proteins.
- 2. **Zone of stasis**: the surrounding zone of stasis is characterized by decreased tissue perfusion.
- 3. Zone of hyperemia: in this outermost Zone tissue perfusion is increased. The tissu here will invariably recover unless there is severe sepsis or prolonged hypoperfusion.



Classification of burn according to the depth

- 1. First degree (superficial) characterized by:
- The epidermis is involved
- Appearance is erythematous
- Painful
- 2. <u>Second degree (partial thickness)</u> divided into:
- a) Superficial partial second degree characterized by :
- epidermis and papillary dermis are involved
- Appears as red moist blisters
- Very painful



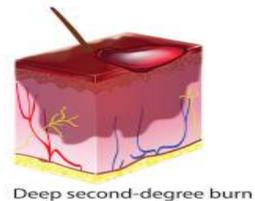
First-degree burn



Superficial second-degree burn

Deep partial second degree characterized by:

- Epidermis and papillary dermis and part of reticular dermis are involved
- Appears as a pink and white dry blisters
- Less pain
- 3. Third degree (full thickness) characterized by:
- Full thickness skin is involved (epidermis and dermis)
- Appearance is white and dark in color, skin is dry, thrombosed vessels may be seen under denaturated skin





Third-degree burn

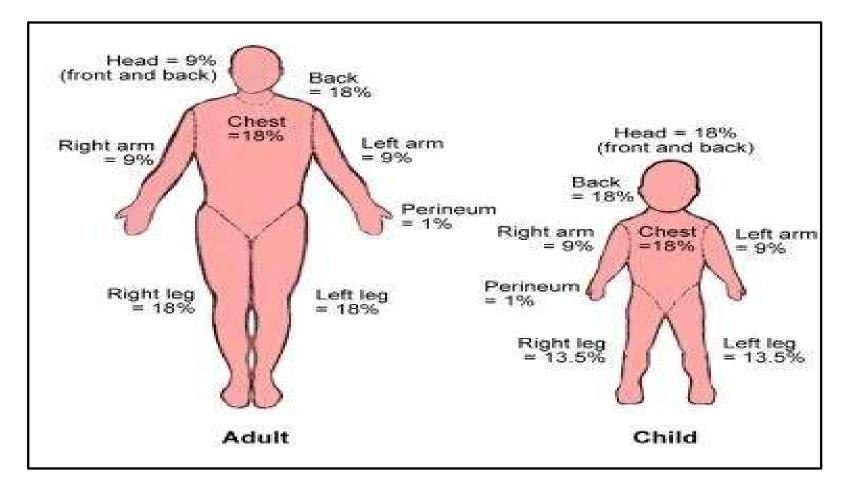
painless and insensitive

- 4. Fourth degree characterized by:
- Full thickness skin and subcutaneous tissues (fat , muscle , bone) are involved
- Appearance is the same as third degree with affection of subcutaneous tissue
- Painless and insensitive

Indication for admission to the hospital

- 1) Chemical and electrical burns
- 2)Burns involving inhalation injury
- 3)Second and third degree burns greater than 10 % TBSA (Total Body Surface Area) in patients younger than 10 or older than 50 years of age
- 4) Third degree burns greater than 5 % TBSA in patients of any age
- 5) Second and third degree burns to greater than 20 % TBSA in all other ages

Assessment of burn surface area by wallance rule of nines:



Management of the burns in hospital

- * Assessment of the ABC (Airway , Breathing , Circulation)
- * Administration of supplemental oxygen
- Establishment of (IV) lines
- Take blood and send it for complete blood count and crossmatch
- Placement of foleys catheter
- Fluid resuscitation using Parkland formula is done:
- ✓ The preferred crystalloid fluid is Ringer lactate.
- ✓ Total fluid requirement in ml per 24 hours = 4 ml×(total burn surface area (%))×(body weight (kg))
- ✓ 50% of the calculated amount is given in first 8 hours . The other 50% is given in next16 hours.

- Pain relief by giving the patient Morphine IV (not in neonates) 0.1 mg/kg/dose 4-6 hourly.
- Antibiotic prophylaxis is given if there are signs of infection
- Nutritional support by giving high calorie and high protein diet with vitamins too .
- Psychological support of the patient
- Surgical procedure such as fasciotomy can be used for deep constricting burns .
- Local wound care by wound debridement and remove the dead tissues, daily wash by water and soap, application of antimicrobial drug such as silver sulfadiazine.

Complications of burn

- 1. Shock
- 2. Acute renal failure
- 3. Wound infection
- 4. Sepsis
- 5. Pneumoina and Acute respiratory distress syndrome (ARDS)
- 6. Fluid and electrolyte imbalance
- 7. Scaring and contracture

Plastic surgery

- Plastic surgery: is a branch of surgery concerned with improving the function or appearance of parts of the body through reconstructive or cosmetic medical procedures.
- The most common plastic surgery procedures are:
- Correction of cleft lip and palate
- ► Plastic surgery in burn patient (eg. Skin graft)
- Hair transplantation
- Liposuction (lipoplasty)
- Nose reshaping (rhinoplasty)
- Abdominoplasty



Lecture 2

Shock (types , pathophysiology , Management)

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Shock

- Shock: is a systemic state of low tissue perfusion that is inadequate for normal cellular respiration.
- Shock is the most common and therefore the most important cause of death in surgical patients.

Pathophysiology of shock

- Cellular: As perfusion to the tissues is reduced, cells are deprived of oxygen and must switch from aerobic to anaerobic metabolism. This will produce lactic acids, the accumulation of lactic acid in the blood produces a metabolic acidosis.
- Microvascular: As tissue ischemia progresses, there will be injury of the capillary endothelial cells. Spaces between endothelial cells allow fluid to leak out and tissue edema occurs, exacerbating cellular hypoxia.

- Cardiovascular system: As preload and afterload decrease, there is release of catecholamines in the circulation. This results in tachycardia and systemic vasoconstriction (except in sepsis).
- Respiratory system: the metabolic acidosis and increased sympathetic response result in an increased respiratory rate.
- Renal system: Decreased perfusion pressure in the kidney leads to reduced filtration at the glomerulus and a decreased urine output. The renin-angiotensin-aldosterone axis is stimulated, resulting in further vasoconstriction and increased sodium and water reabsorption by the kidney.

Types of shock

1. <u>Hypovolemic shock</u>

- Hypovolemic shock is due to a reduced circulating volume.
- Hypovolemia is probably the most common form of shock, and to some degree is a component of all other forms of shock.
- Causes of hypovolemic shock
- 1)Hemorrhage
- 2) Poor fluid intake (dehydration)
- 3) Excessive fluid loss due to vomiting or diarrhea
- 4) Urinary loss (e.g. diabetes mellitus)
- 5) Evaporation

2. Cardiogenic shock

- Cardiogenic shock is due to primary failure of the heart to pump blood to the tissues.
- Causes of cardiogenic shock :
- 1) Myocardial infarction
- 2) Cardiac dysrhythmias
- 3) Valvular heart disease
- 4) Blunt myocardial injury
- 5) Cardiomyopathy

3. Obstructive shock

- In obstructive shock there is a reduction in preload due to mechanical obstruction of cardiac filling.
- Common causes of obstructive shock include :
- 1) Cardiac tamponade
- 2) Tension pneumothorax
- 3) Massive pulmonary embolus
- 4) Air embolus
- In each case, there is reduced filling of the left and/or right sides of the heart leading to reduced preload and a reduction in cardiac output.

4. Distributive shock

- Distributive shock describes the pattern of cardiovascular responses characterizing a
 variety of conditions, including septic shock, anaphylaxis and spinal cord injury.

 Inadequate organ perfusion is accompanied by vascular dilatation with hypotension,
 low systemic vascular resistance, inadequate afterload and a resulting abnormally high
 cardiac output.
- In anaphylaxis, vasodilatation is due to histamine release
- In high spinal cord injury there is failure of sympathetic outflow and adequate vascular tone (neurogenic shock).
- The cause in sepsis is related to the release of bacterial products (endotoxin) and the activation of cellular and humoral components of the immune system. There is maldistribution of blood flow at a microvascular level with arteriovenous shunting and dysfunction of cellular utilization of oxygen.
- In the later phases of septic shock there is hypovolemia from fluid loss into interstitial spaces and there may be concomitant myocardial depression.

Severity of shock

- 1) <u>Mild shock</u>: Initially there is tachycardia, tachypnea, a mild reduction in urine output and the patient may exhibit mild anxiety. Blood pressure is maintained although there is a decrease in pulse pressure. The limbs are cool and sweaty with prolonged capillary refill times (except in septic distributive shock, the limbs will be warm and short capillary refill times, despite profound shock).
- 2) <u>Moderate shock</u>: As shock progresses, renal perfusion is reduced and urine output decreases below 0.5 mL/kg per hour. There is further tachycardia, and now the blood pressure starts to fall. Patients become drowsy and mildly confused.
- 3) <u>Severe shock</u>: In severe shock, there is profound tachycardia and hypotension. Urine output decreases to zero and patients are unconscious with laboured respiration.

- Monitoring for patients in shock :
- **✓** ECG
- ✓ Pulse oximetry for oxygen saturation
- ✓ Blood pressure
- ✓ Heart rate
- ✓ Urine output

Management of shock

- Ensure a patent airway and adequate oxygenation and ventilation (ABC).
- <u>Fluid therapy:</u> the first-line therapy is administration of intravenous fluids through short, wide-bore catheters. Crystalloid fluids (normal saline, Hartmann's solution, Ringer's lactate) are used in shock. If blood is being lost, the ideal replacement fluid is blood, although crystalloid therapy may be required while awaiting blood products.

Hypotonic solutions as

(dextrose etc.) are poor volume expanders and should not be used in the treatment of shock unless the deficit is free water loss (e.g. diabetes insipidus) or patients are sodium overloaded (e.g. cirrhosis).

• <u>Vasopressor or inotropic therapy</u>: Vasopressor agents (<u>phenylephrine</u>, <u>noradrenaline</u>) are indicated in distributive shock states (sepsis, neurogenic shock). Whereeve the vasodilatation is resistant to catecholamines, <u>vasopressin</u> may be used as an alternative vasopressor.

In cardiogenic shock, inotropic therapy as **Dobutamine** is the drug of choice.



Principles of medicine and surgery

Lecture 3, 4

traumatology

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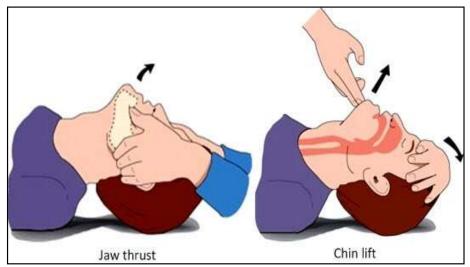
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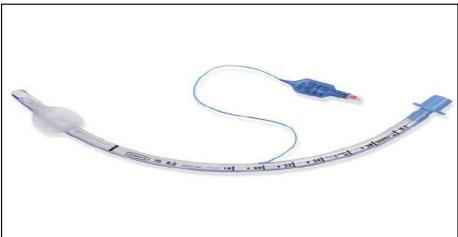
Trauma : is an injury (such as a wound) to living tissue caused by an extrinsic agent .

Initial assessment of trauma

- The initial assessment of an injured patient must quickly identify and treat immediately life-threatening injuries, then potentially life-threatening injuries, this process is divided into 4 phases:
- 1. <u>Primary survey</u>: The goal of the primary survey is to identify and treat immediately life-threatening injuries and begin to resuscitate the patient or restore normal homeostasis. This process includes the following

Airway: a patent airway should be maintained . voice hoarseness , pain when speaking , cyanosis, agitation and tachypnea are signs that suggest airway injury. There are several maneuvers that can be considered to restore patency of a compromised airway, **chin lift** or **jaw thrust** are two simple maneuvers that may reopen the airway and help restore satisfactory oxygenation and ventilation, the cervical spine must be kept immobile when moving the jaw or chin in a patient with the possibility of a cervical spine injury. The most definitive way to secure the airway is to place an endotracheal tube through the mouth, past the vocal cords and into the trachea.





Endotracheal tube

- ➤ <u>Breathing</u>: breathing is determined by inspecting the chest for symmetrical movement and auscultating for breath sounds.
- ▶ <u>Circulation</u>: determines if the patient is in shock (symptoms of shock include hypotension, tachycardia, tachypnea, oliguria, cold extremities and diminished peripheral pulse. Treatment involves Initially administration of intravenous solutions such as 0.9% normal saline or Ringer's lactate solution
- 2. <u>Secondary survey</u>: the purpose of the secondary survey is to identify and treat additional injuries not treated during the primary survey.

- 3. <u>Adjunctive investigations</u>: CT scan, abdominal ultrasound to detect intra abdominal free fluid, plain radiograph of chest and cervical spine and pelvis may be performed for further evaluation.
- 4. <u>Definitive care</u>: The definitive care phase may also include transfer to a higher level of care for more severely injured patients

Head trauma

Head trauma is responsible for approximately one-half of all traumatic deaths. Injuries to the head can involve all cranial structures: skin and soft tissues, bone, and brain. Injuries to these structures include lacerations, contusions, hematomas. Cerebral venous

blood flows into the dural sinuses through bridging veins, which can be torn and result in a subdural hematoma (blood collection between dura mater and brain). The meningeal artery lies between the skull and the dura. Fractures of the overlying bones of the cranial vault can lacerate these arteries and cause an epidural hematoma(blood collection between bone and dura mater). Injuries to the blood vessels of the pia as well as the underlying brain can cause subarachnoid hemorrhage or cerebral contusion.

A complete neurologic examination is performed that focuses on the level of consciousness, pupillary function, sensation, and the presence of lateralizing extremity weakness. Hypertension, bradycardia, and a slow respiratory rate are generally indicative of increased Intracranial pressure (ICP) after severe traumatic brain injury.

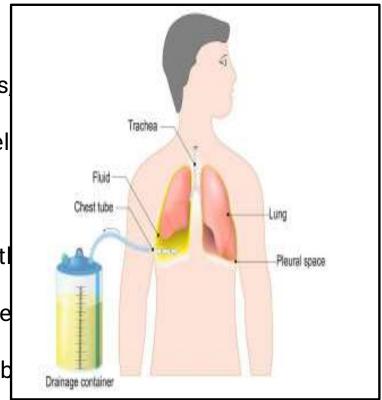
- The best method for initial evaluation of head injury is a non contrast head CT . The CT scan may show bleeding inside or outside of the brain, brain swelling, hydrocephalus, and skull fractures.
- Epidural hematomas are generally treated by surgical evacuation when large or associated with decreasing mental status. Subdural hematomas may be treated surgically when they result in significant mass effect. Subarachnoid hemorrhages are most commonly treated without operation due to risk of injuring overlying intact brain.

Thoracic trauma

- Simple pneumothorax: occurs when gas enters the pleural space, causing collapse of the same lung. Pleural gas may be introduced from the atmosphere in a penetrating injury through a wound. Physical examination typically reveals diminished breath sounds on the affected side. Diagnosis is made by plain chest x-ray ,treated by chest tube placement for reexpansion of the lung.
- Tension pneumothorax: is an immediately life threatening injury that results when gas accumulates under pressure within the pleural space after blunt or penetrating thoracic trauma. There is diminished or absent breath sound. Diagnosis is done by chest x-ray. Treated by needle thoracostomy in the second intercostal space along the midclavicular line. This Needle thoracostomy is then followed by formal chest tube thoracostomy and pleural drainage as definitive management.

• Hemothorax: results when blood or clot accumulates

within the pleural space. The source of hemorrhage may be from the pulmonary parenchyma, great vessels mediastinal structures, or chest wall. Intercostal vessel lacerated after blunt or penetrating injury may bleed significantly. On physical examination, decreased breat sounds. Chest x-ray will confirm the diagnosis in stable patients, and treatment involves placement of a large b chest tube to drain the pleural space



Cardiac tamponade: is an immediately life-threatening event that may occur in the setting of penetrating or blunt precordial injury. The most common cause is a stab wound to the sternal region, with resultant cardiac injury. Blood escaping from the heart accumulates within the pericardial sac, resulting in cardiac compression and shock. The clinical picture of muffled heart sounds, jugular venous distension, and hypotension in a patient with a penetrating precordial injury should create a high suspicion for cardiac injury with tamponade. Treatment of cardiac tamponade is based on volume resuscitation to increase cardiac output, and immediate surgical decompression to release the tamponade and repair the underlying cardiac injury.

Rib fractures: are one of the most common injuries of the chest, and may be a result of motor vehicle accidents, falls and sports-related trauma. Rib fractures may be diagnosed on physical examination by noting point tenderness, and may or may not be seen on plain radiographs of the chest. The location of rib fractures is important, as associated injuries are common. As mentioned previously, upper rib fractures may be associated with aortic or great vessel injury. Midthoracic rib fractures may be associated with pulmonary contusion or hemopneumothorax. Lower rib fractures have an association with diaphragmatic or intra-abdominal injury. Management of rib fractures primarily involves adequate analgesia.

Abdominal trauma

- There are 2 types of abdominal trauma :
- 1) Penetrating trauma includes stab wounds and gunshot wounds
- 2) Blunt trauma includes falls and motor vehicle accidents
- Liver trauma: blunt liver trauma result in hematoma, laceration and liver avulsion.

 Diagnosis is done by CT scan.
- Spleen trauma: the spleen is frequently injured in blunt abdominal trauma. Diagnosis is done by CT scan. Most low-grade splenic injuries can be managed nonoperatively

by careful observation and monitoring of hemoglobin . Recurrent hemorrhage or development of peritonitis signals or failure of non-operative management should be followed by laparotomy. Splenic injury with active bleeding and hypotension generally requires operative management. Surgery include total splenectomy .

The small bowel and mesentery: small bowel and mesentery are frequently injured by penetrating trauma from knife and gunshot wounds. Repair is generally involves one layer closure with suture.

Pelvic fracture

- Pelvic fractures are typically classified by mechanism of injury: anterior—posterior compression, lateral compression, or vertical shear. lateral compression is the most common and the most stable. The anterior-posterior compression fracture pattern is also known as the open book pelvic fracture.
- Pelvic fractures may be suspected based on history and physical findings. If the patient is conscious, pain is usually present, particularly with movement. There may be bruising to the lower abdomen, hips, or lower back. The bony pelvis should be manually palpated gently to illicit tenderness or deformity

Trauma to the extremity

- Hemorrhage from major vascular injury should be treated initially with direct pressure, rather than tourniquets.
- Secondary survey includes a detailed neurovascular examination of each extremity, with careful evaluation of peripheral pulses, capillary refill time, skin temperature, sensation, motor function, and range of motion. Palpation may elicit tenderness suggestive of fracture or soft tissue injury. Deformity typically is associated with fractures, dislocations, or both.
- X-ray imaging is indicated for any extremity deformity, bone tenderness, or joint swelling.

- Splinting of fractures is an important technique that should occur during the secondary survey. While reduction of fractures and dislocations is usually done by an orthopedic surgeon
- It is important to note that femur fractures may be associated with significant blood loss into the soft tissues of the thigh, and the patient should get blood transfusion as necessary
- Open or compound fractures should be treated with operative debridement of devitalized tissue, copious irrigation to remove dirt and other contaminants, fracture reduction, and administration of broad-spectrum intravenous antibiotics.
- Dislocations should be splinted first then reduction of the dislocation can be done.



Principles of medicine and surgery

Lecture 5

Ectopic pregnancy, Abortion,

Caesarean section and hysterectomy

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Ectopic pregnancy

- Ectopic pregnancy: is a complication of pregnancy in which the embryo implants outside the uterine cavity. Most ectopic pregnancies occur in the Fallopian tube, but implantation can also occur in the cervix, ovaries, and abdomen. An ectopic pregnancy is a potential medical emergency, and, if not treated properly, can lead to death.
- Etiology and risk factors:
- 1) Fallopian tube blockage
- 2) Previous ectopic pregnancy

- 3) Previous fallopian tube infection
- 4) Previous surgery in fallopian tube
- 5) Endometriosis
- Signs and symptoms: abdominal pain, amenorrhea (absence of menstrual period), vaginal bleeding
- Investigation and imaging studies: hemoglobin, blood group and Rh, crossmatch,

 Beta human chorionic gonadotropin (BHCG), laparoscopy and ultrasound
- Medical treatment : by giving methotrexate
- Surgical treatment: by using laparoscopic surgery or laparotomy

Abortion (Miscarriage)

- Miscarriage: pregnancy that ends spontaneously before the fetus has reached a viable gestational age 24 weeks.
- <u>Causes</u>: chromosomal abnormalities, uterine abnormalities, maternal diabetes mellitus
- Investigation and imaging studies : ultrasound , BHCG , serum progesterone
- Medical treatment : by giving Mifepristone
- Surgical treatment: evacuation of retained products of conception using suction

evacuation or sharp curettage

Caesarean section

- Caesarean section: is a surgical procedure in which incisions are made through the mother's abdomen and uterus to deliver one or more babies.
- Indications for caesarean section:
- 1) Previous caesarean section
- 2) Malpresentation
- 3) Suspected acute fetal compromise
- 4) Multifetal pregnancy, placenta abruption and placenta previa

- Complications of caesarean section:
- A. Intraoperative complications include
- 1) Bowel damage
- 2) Urinary tract damage
- 3) Hemorrhage
- B. <u>Postoperative complications include</u>
- 1) Infection and endometriosis
- 2) Deep vein thrombosis and pulmonary embolaism

Hysterectomy

Hysterectomy: is the surgical removal of the uterus. It may also involve removal of the cervix, ovaries, fallopian tubes and other surrounding structures.

- There are 2 types of hysterectomy:
- 1) <u>Total hysterectomy:</u> it includes complete removal the uterus and cervix of the uterus
- 2) <u>Partial hysterectomy</u>: it includes removal of the uterus while leaving the cervix intact

- Indications for hysterectomy:
- 1) Cancers of uterus, cervix, and ovaries
- 2) Uterine fibroids
- 3) Severe endometriosis
- 4) Postpartum to remove placenta previa
- Complications of hysterectomy:
- 1)Bowel injury
- 2)Bladder injury
- 3) Injury to the ureter
- 4) Deep vein thrombosis and pulmonary embolism



Principles of medicine and surgery

Lecture 6

Amputation

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Amputation

- Amputation: it's the removal of a limb (arm or leg) or part of a limb (foot, toe, hand or finger)
- Amputation should be considered when part of a limb is dead. A limb is dead when arterial occlusive disease is severe enough to cause infarction of tissue (gangrene).
- The occlusion may be in major vessels (atherosclerotic or embolic occlusions) or in small peripheral vessels (in diabetes). If the obstruction cannot be reversed and the symptoms are severe, amputation is required.

- Amputation is required as a lifesaving operation. Antibiotic cover should be broad and massive. Other life-threatening situations for which amputation may be required include gas gangrene, neoplasm (such as osteogenic sarcoma)
- Indication of amputation :
- 1) Gangrene
- 2) Spreading cellulitis
- 3) Severe infection with extensive tissue damageMalignancy
- 4) Paralysis
- 5) Peripheral arterial disease

Types of amputation

. Distal and transmetatarsal amputation

In patients with small-vessel disease, typically caused by diabetes, gangrene of the toes may occur with relatively good blood supply to the surrounding tissues. In such circumstances, local amputation of the digits can result in healing. However, if the metatarsophalangeal joint region is involved, a ray excision is required, taking part of the metatarsal and cutting tendons back.

2. <u>Below knee amputation</u>

- Below knee amputation is the surgical removal of the lower leg, foot and toes.
- A below-knee amputation preserves the knee joint and gives the best chance of walking again with a prosthesis
- The presence of a femoral pulse does not guarantee healing of a below-knee amputation and sometimes a failed below-knee amputation may require revision to an above knee procedure.

3. Above knee amputation

Above knee amputation: is surgical removal part of the thigh, knee, shin, foot and toes.

An above-knee amputation is more likely to heal and may be appropriate if the patient has no chance of walking again. If the femoral pulse is absent, the amputation should be above the knee.

4. Other types of amputation

- Hand amputation
- Arm amputation

- Finger amputation
- Foot amputation
- Toe amputation

Postoperative care of an amputee

Opiate pain relief should be given regularly. Exercise and mobilization are of the greatest importance. After surgery, flexion deformity must be prevented and exercises started to build up muscle power and coordination. Mobility is progressively increased with walking.

Complications of amputation

- Hemorrhage (which requires return to the operating theatre for hemostasis)
- Hematoma (which requires evacuation)
- Infection (usually in association with a hematoma)
- Abscess (that must be drained and appropriate antibiotics given)
- Wound dehiscence and gangrene of the flaps
- Deep vein thrombosis and pulmonary embolism (prevented by giving subcutaneous heparin)
- Late complications may include pain and a scar adherent to the bone



Principles of medicine and surgery

Lecture 7

tracheostomy

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Tracheostomy

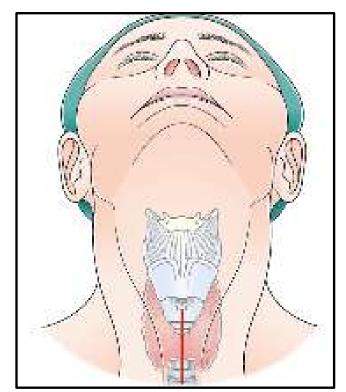
- Tracheostomy: is a surgical procedure to make an opening into the trachea so that a tube can be inserted into the opening to assist breathing.
- This procedure relieves airway obstruction or protects the airway by formation a direct entrance into the trachea through the skin of the neck.
- Tracheostomy may be carried out as an emergency when the patient is *in extremis* and the larynx cannot be intubated, but it is not always an easy procedure,

 particularly in an obese patient.

Indication for tracheostomy:

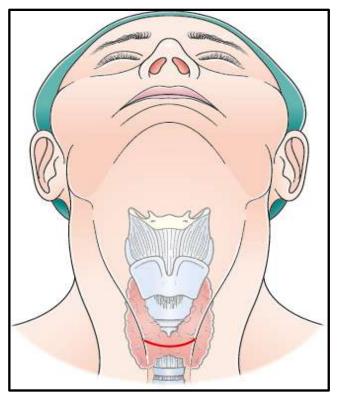
- 1. Acute upper airway obstruction (inhaled foreign body, a large pharyngolaryngeal tumor, or acute pharyngolaryngeal infections in children)
- 2. Potential upper airway obstruction (after major surgery involving the oral cavity, pharynx, larynx or neck)
- Protection of the lower airway (protection against aspiration of saliva in unconscious patients as a consequence of head injuries, faciomaxillary injuries, comas, tetanus)
- Patients requiring prolonged artificial respiration

- There are 2 types of tracheostomy:
- **Emergency tracheostomy**: A vertical midline incision is made from the inferior aspect of the thyroid cartilage to the suprasternal notch and continued down between the infrahyoid muscles. A further vertical incision straight into the trachea at the level of the second, third and fourth ring should be made immediately. Then a tracheostomy tube should be inserted into the trachea.



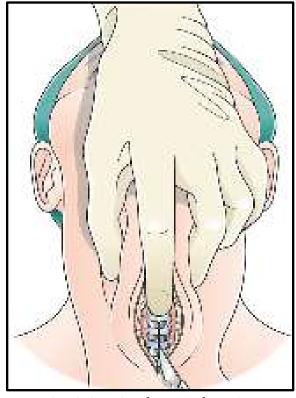
skin incision in an emergency tracheostomy

2. <u>Elective tracheostomy</u>: The advantage of an elective surgical procedure is that there is complete airway control at all times, unhurried dissection and careful placement of an appropriate tube . Following induction of general anesthesia and endotracheal intubation, the patient is positioned with a combination of head extension and placement of an appropriate sandbag under the shoulders. There should be no rotation of

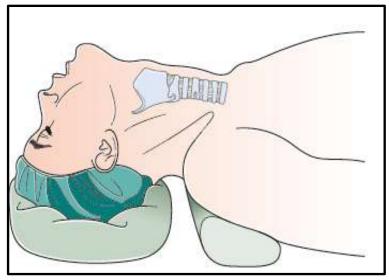


skin incision in an elective tracheostomy.

the head . A transverse incision may be used in the elective situation .



An incision in the trachea in an emergency tracheostomy.



Position of the patient for elective tracheostomy

Percutaneous tracheostomy

Tracheostomy may be performed percutaneously with bronchoscopic assistance. A transverse incision is made between the first and second tracheal rings, and blunt dissection of the midline is then performed.

<u>Tracheostomy tubes</u>

These are basically made of two materials: silver or plastic. Both materials have been used to make tubes of various sizes. A cuffed tube is used initially, which may be changed after 3–4 days to a non-cuffed plastic or silver tube.

When in position, the tube should be retained by double tapes passed around the patient's neck with a reef knot on either side.



Silver tracheostomy tube



Plastic tracheostomy tube

- Complications of tracheostomy:
- A) Intraoperative complications
- 1. Hemorrhage
- 2. Injury to the carotid artery, recurrent laryngeal nerve and esophagus
- 3. Damage to the trachea
- B) Early postoperative complications
- 1. Apnea
- 2. Hemorrhage

- 3. Subcutaneous emphysema and pneumothorax
- 4. Accidental extubation,
- 5. Infection
- 6. Swallowing dysfunction
- C) Late postoperative complications
- 1. Tracheocutaneous fistula
- 2. Tracheo-oesophageal fistula
- 3. Tracheal stenosis