

**TRAUMA  
IV FLUIDS  
DRAINS  
INCISION**

**PRESENTED BY**

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# Trauma

**Trauma** is the major cause of death in the first 40 years of life

- Trauma has 3 peaks of death:
  - Death **at time** of accident (seconds to minutes)
  - Death **due to** life threatening trauma (minutes to hours)
  - Death **after** leaving the hospital (days to weeks)
- **Triage:** is the process of determining the priority of patients treatments based on the severity of their condition. it comes from French word and it mean to separate
- **BLS** = basic life support:
- **CLS** = cardiac life support like CPR, giving drugs like dopamine and other things important to save patients with emergency heart problem
- **ATLS** = advanced trauma life support that divide in to primary /secondary/tertiary:
  - 1- Primary survey: (ABCDE)**
    - **A: airway patency:** cervical spine stability - chin lift technique to avoid tongue swallow
    - **B: breathing:** chest tube - nasal tube
    - **C: circulation:** check the vital sign - blood group - clotting screen - give warm fluid - pressure on the site of bleeding, Put Two wide bore cannula, Give 1000cc of Ringer lactate, should be warm to avoid hypothermia which may cause 1-Coagulopathy 2-Acidosis.
    - **D: disability:** neurological problems - use Glasgow Coma Scale (from 3-15 score) or AVPU system (A: alert - V: verbal - P: pain - U: unresponsive)
    - **E: Exposure & Environment:** rapidly check the pt. from head to toe and keep warm environment to avoid hypothermia.
    - **F: Fracture:** do backslap or POP
  - **Adjunct to primary survey:**
    - Foley's catheter (if no urethral bleeding)
    - NG tube (if no fracture of the base of the skull)
    - Intubation either: Endotracheal tube through mouth or through opening of tracheostomy
    - Monitoring of vital signs: PR, BR and oximetry
    - Radiological investigation as X-ray (Chest, abdomen and pelvis), FAST (Focused Assessment with Sonography in Trauma) and CT.
    - ECG and cardiac markers (Troponin I and CK-MB) in cases of suspected cardiac trauma.
    - Diagnostic peritoneal lavage (examine peritoneal fluid).
    - Diagnostic and therapeutic laparotomy or thoracotomy.

## 2- Secondary survey:

- examination of patient from top to toe
- take rapid history: **AMPLE** (A: allergy - M: medications - P: past medical or surgical or pregnancy - L: last meal - E: event or environment)

## 3- Tertiary survey: in special centers

# Trauma

## 1

## History

### Cognitive function:

- Ask who they are, where they live and their occupation.

### History of the accident:

- Ask the patient what they remember of the accident, and useful if they can describe what happened.
- It is often helpful to know about:
  - **Gunshot**
    - Type of machine: **low velocity (pistol)**, **high velocity (gun)**
    - Number of bullets
    - Distance from shooter
    - Site of inlet and outlet
  - **Road traffic accident:**
    - Was he the walker (**on the street, sidewalk**), driver, passenger (**front or back seats**), protection (seat belts, airbags)
    - Others in accident: injured, dead.
    - Type of car and its speed (low or high velocity)
    - Damage to the vehicle: collision, rolling
  - **Fall from a height:**
    - Height of fall
    - Did the patient hit anything on his way?
    - What position was the body at time of impact?

### Walking after accident:

- To exclude pelvic and lower limb injuries.

### Associated symptoms:

- Loss of consciousness, bleeding, vomiting, urination, cough, dyspnea .

**Transportation:** car, ambulance

**The distance** of the hospital

**What resuscitation** and procedures done? What organs was damaged.

# Trauma

## 1 History

### Post-Operative History

- Greet the patient, introduce yourself, and explain what you plan to do.
- Gather demographic information of the patient.
- Ask what is the type of operation (elective, emergency), and type of anesthesia (general, spine, local).
- Determine the post-operative day (e.g., first, second day).
- Ask how the patient felt during and immediately after the operation.
- Were they weak or in pain upon waking up from anesthesia?
- Did he receive blood in theater or post-operative?
- Ask if the patient was admitted to a specialized unit, such as a **critical care unit (CCU)**, **high-dependency unit (HDU)**, or general ward.
- Any history of bleeding from site of wound or change dressing or bag or drain.
- Pain at site of operation, which analgesia receive, pain at site of cannula.
- **GIT:** -nausea, vomiting dyspepsia, heartburn, abdominal pain, jaundice, hematemesis or NG tube.
- **Respiratory and CVS:** - hoarseness of voice, stridor, dyspnea, orthopnea, chest pain, hemoptysis or palpitation, cough.
- **Urinary system:** when pass urine (by container or catheter) colure, dysuria, frequency.
- **Mobility and Post-Operative Pain:**
  - Determine when the patient started mobilizing.
- Ask if they experience pain during coughing or muscle movement
- Is there any pain at calf muscle?
- **Past Medical history:** DM, HTN, asthma or immune suppression, goiter.
- **Past Surgical history:** operation when do it.
- **Past Drug history:** steroid, Inderal, thyroxine, insulin, anticoagulant e.g. aspirin, drug allergy.

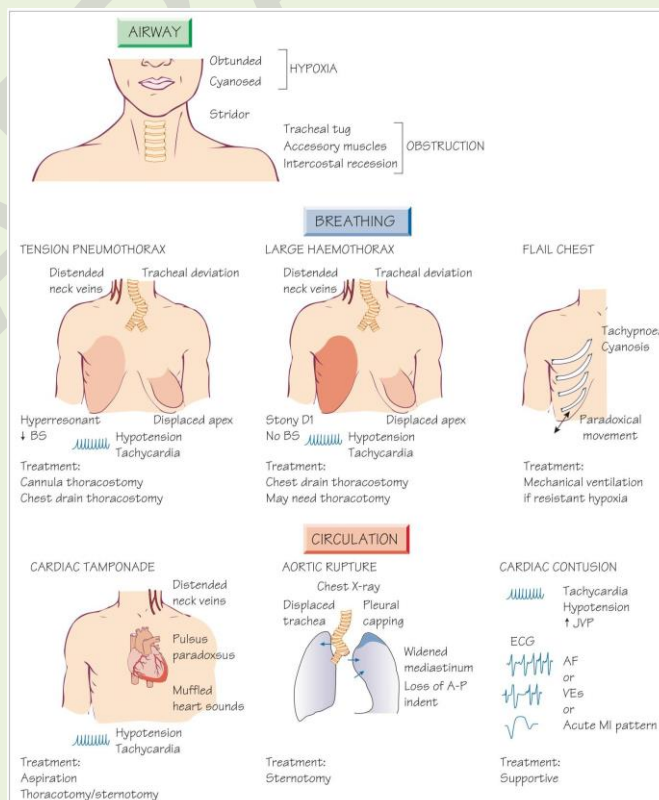
# Trauma

## 2 Examination

While doing general examination, palpate for symptomless swelling, laceration, bony depression and distortion (especially in the head).

### Post-operative Examination

1. **General appearance of the patient**
2. **Input & output:** IV fluid, drain (amount, color)
3. **Wound:**
  - **Get permission**
  - **Inspection:**
    - Dressing (clean, soaked with discharge)
    - Stitches (silk, nylon)
    - Color: red
    - Shape: healed
    - Discharge: (pus, blood, serum)
    - Bulging: fluid or something else
  - **Palpation:** Induration (indicates healing)
4. **Examine the system involved.**



# I.V fluid

1

## Types

Crystalloids	Type	Use
5% glucose & dextrose	Iso	<ul style="list-style-type: none"> <li>Provides little energy</li> <li>Maintaining hydration</li> <li>Heart or liver failure</li> </ul>
Hypertonic glucose (10% - 50%)	Hyper	<ul style="list-style-type: none"> <li>Hypoglycemia</li> </ul>
Normal saline (0.9%)	Iso	<ul style="list-style-type: none"> <li>Fluid resuscitation (eye irrigation)</li> <li>Maintaining hydration</li> <li>Excessive vomiting</li> </ul>
Half normal (0.45% NaCl)	Hypo	Hypertonic patient due to primary deletion of the ECF
Hypertonic saline (3% NaCl)	Hyper	Severe hyponatremia
%5 Dextrose/Half-normal	Hypo	Fluid maintenance once deficits have been corrected with saline or Ringer's solution
Dextrose-saline (one-fifth)	Iso	<ul style="list-style-type: none"> <li>Fluid maintenance</li> <li>Pediatric</li> <li>Heart or liver failure</li> </ul>
Hartmann	Iso	More physiological
Ringer lactate	Iso	Fluid resuscitation after a blood loss due to trauma, surgery, or a burn injury, renal failure.
Mannitol	Hyper	<ul style="list-style-type: none"> <li>Renal failure</li> <li>Reduction of intracranial &amp; intraocular pressure</li> <li>Excretion of toxic substances</li> </ul>

Colloid	Properties	Use
Gelofusine	Increased bleeding times in postoperative patients	<ul style="list-style-type: none"> <li>Hemorrhagic, hypovolemic shock</li> <li>Septicemic shock</li> </ul>
Dextran	Anaphylactic reactions & profound coagulopathy	<ul style="list-style-type: none"> <li>Heart or liver failure</li> </ul>
HES	Wide effects on plasma expansion	
Albumin	5% albumin is isotonic; 20% albumin is hypertonic	Indications as a volume expander are very limited



# I.V fluid

## 2 Post-surgical fluid

There is neuro-hormonal response to trauma (like **increase ADH** and **increase aldosterone** that lead to edema and hypertension due to Na retention) so we give fluid according to this response.

### First day:

Type of fluid: glucose-water // Amount of fluid:

- **Ongoing Loss:** IN diarrhea, sweating, drain, nasogastric tube, dehydration. Depend on conscious state and urine output (400-500 ml normally) (calcium needed). Give fluid according to type of trauma, surgery and patient.
- **Deficit:** give fluid according to type of trauma, surgery and patient.
- **Maintenance:**
  - o Minimum requirement of patient is **5% dextrose water**
  - o One liter of dextrose water = 50g of glucose
  - o BMR = 500 Kcal
  - o Rough method → minimum 2-3 liters fluid in 70 kg patient
  - o Calculate like the following :

For example: 70 kg adult

- o **First 10 kg** = give 100 ml/kg = 1000 ml
- o **Second 10 kg** = give 50 ml/kg = 500 ml
- o **Reminding kg** = give 20 ml/kg = 1000 ml

So we will give **2500 ml** of iv fluid to this patient

- **Not give K in the first day** because the trauma make the effect on aldosterone so there are sodium and potassium retention so not give K.

### Second day:

- Give glucose-saline in same amount (**or**) glucose saline + normal saline + electrolytes

### Third day:

- **Give K** → 1 ml/kg = 60-80 ml of K
- K is given with fluid, Normal range of K = 3.5-5.0 (mEq/L)

### After 3 days:

- Change the type of nutrition from IV fluid to other types of parenteral nutrition



# Stoma

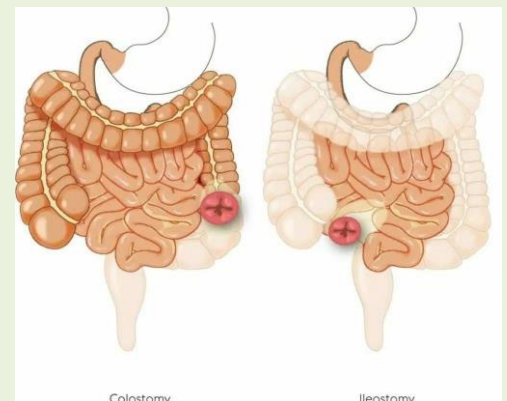
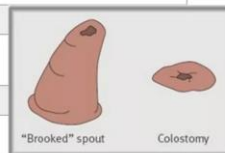
## General information

Is an artificial opening made in the colon (or small intestine) to divert feces and flatus outside the abdomen where they can be collected in an external appliance. Depending on the purpose for which the diversion has been necessary, a stoma may be temporary or permanent. Temporary or defunctioning stomas are usually fashioned as loop stomas, while end stomas usually as a result of surgical removal of distal bowel.

## The indications of stoma:

1. **Diversion** : to prevent contamination of a distal bowel segment by stool as in distal bowel anastomosis .
2. **Decompression** to bypass a distal obstruction so the bowel proximal to the site of obstruction is exteriorized .
3. **Feeding** as gastrostomy and jejunostomy feeding tubes insertion.
4. Congenital anomalies as imperforate anus , Hirschsprung disease, and intestinal atresia.
5. **Bowel lavage** as appendicectomy for colonic lavage.

	Ileostomy	Colostomy
	Sprout +	No sprout / flush
Site	Usually in RIF	Temporary colostomy - transvers or right upper quadrant End colostomy - usually in LIF
Effluent	Liquid contain some amount of enzymes (alkali and proteolytic enzymes) → excoriation of skin + (Autodigestion)	Solid, hard stools compared to ileostomy
	Watery liquid stools	Hard stools
Odor	Odor +	Odor is more
Frequency of discharge	Higher	Lower
	Circular folds on the ileum +	no
	More likely to develop fluid and electrolyte problems	



## When you see a stoma (during abdominal examination) examine it.

- o Inspect:
  - Site.
  - Shape (spouted, flush)
  - Type & Effluent.
  - **Complications:** prolapse, retraction, necrosis of the distal end, fistula, stenosis, hernia, bleeding, colostomy diarrhea, contact dermatitis.
- o Ask the patient to cough: stomal hernia, parastomal hernia.
- o Examine perineum:
  - Closed by abdominoperineal resection in permanent colostomy.
  - Intact in temporary colostomy.





# Drains

## Types of drainage:

- Closed drainage system: tubes with bags (( the tubes should be flexible and rubber but we don't have this proper type of tubes ))
- Open drainage system: only tubes without bags
- Active drainage: maintained under suction
- Passive drainage: have no suction

## Indication:

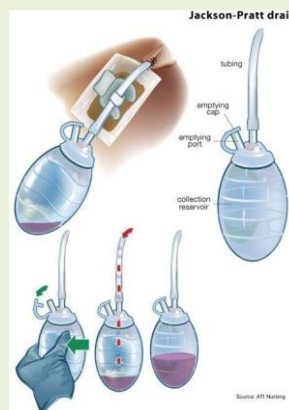
- To evacuate (drain) existing abnormal collections of fluid or gas, To remove pus, blood, serous exudates, chyle or bile
- To help eliminate dead space
- To form a controlled fistula
- To prevent buildup of normal or abnormal body fluid
- To warn or prevent serious complications

## Complications:

- Damage to structures during insertion
- Damage after insertion
- Route for infection from external environment
- Failure of drainage (Poor Drain Selection, Poor Drain Placement, Poor Postoperative Management) or false sense of security
- Pain/discomfort
- Insufficient drainage
- Incision dehiscence / hernia
- Premature Removal
- Accumulation of fluid

## Types of tubes:

- T tube
- Foley catheter
- NG tube



# Incision

## 1. Kocher's incision

- start below xiphoid process and run parallel to the right subcostal margin
- for **liver surgery and cholecystectomy**

## 2. Extended midline abdominal in.

- From xiphoid process to symphysis pubis ( run around umbilicus )
- For **exploratory surgery and trauma**

## 3. Gridiron in. ( McBurney's in. )

- Centred over McBurney's point two-thirds of the distance between the umbilicus and the right anterior superior iliac spine (ASIS), obliquely
- For **appendectomy**

## 4. not important

## 5. lanz in.

- Centred over McBurney's point two-thirds of the distance between the umbilicus and the right anterior superior iliac spine (ASIS), transverse incision
- More cosmetically subtle than the gridiron
- For **appendectomy**

## 6. Paramedian in.

- For access to lateral viscera (not used nowadays )

## 7. Transverse in.

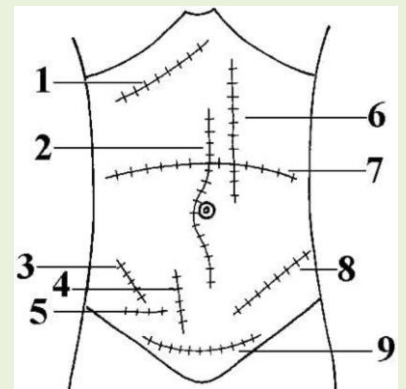
- **Paediatric surgery**

## 8. Rutherford-Morison in.

- Centred over McBurney's point two-thirds of the distance between the umbilicus and the right anterior superior iliac spine (ASIS), like gridiron but only more extended laterally toward the back
- To facilitate access to the colon and kidney
- For **renal transplant and used in appendicular mass**

## 9. Pfannenstiel in.

- Transverse incision, two fingerbreadths above the symphysis pubis, which is extended in the direction of the anterior superior iliac spine (ASIS) and ends 2-3 cm medial to ASIS on both sides
- For **caesarean suction**



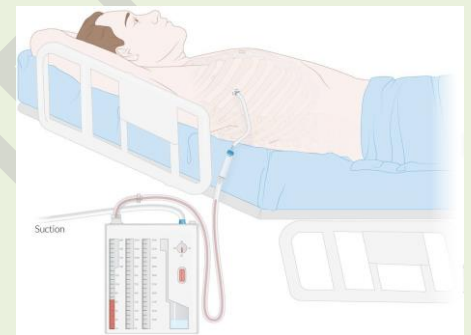
# Chest Tube

## General information

- It is closed drain.
- To isolate the atmospheric pressure from the pleural pressure the tube should be placed in an **underwater seal** of about 200-300 cc of normal saline, so the air can't return back into the pleural cavity.
- We do under water seal and not emptying the pleura directly and completely **to avoid rapid lung expansion**.
- In aspiration and insertion of chest tube □ we should insert in the **upper border of the rib** to avoid injury to neurovascular bundle.

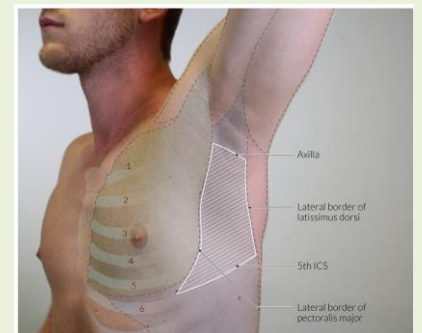
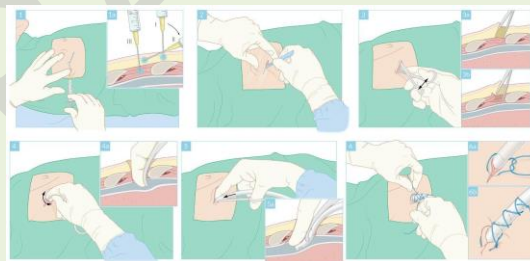
## Indications

- Complex pneumothorax
- Pneumothorax on positive-pressure ventilation
- Hemothorax
- Large pleural Effusion
- Empyema
- Chylothorax



## Contraindications

- Bleeding diathesis
- Coagulopathy



## Site of insertion

- It is inserted in the **Triangle of safety** which has the following boundaries:
  1. **Anteriorly** → lateral border of pectoralis major muscle.
  2. **Posteriorly** → anterior border of latissimus dorssi.
  3. **Inferiorly (base)** → the 5<sup>th</sup> intercostal space.
  4. **Superiorly (apex)** → the base of axilla.
- A line is made in the triangle at the **mid-axillary line** and the tube is inserted at the level of this line in the 4<sup>th</sup> or 5<sup>th</sup> intercostal space.

# Chest Tube

## We should know the followings:

- Contents of the tube and bottle.
- Amount of the contents.
- If the chest tube is functioning or not:
  - **Swinging movement of fluid** in the tube, if not ask the patient to cough.
  - **Air bubbles.**

## When we should remove chest tube?

### A-In pneumothorax

1. If there is **no** air bubbles or air leak.
2. If there is **no** swinging movement.
  - Clump the tube for 24 hr. and do X-ray, if the lung expanded open the clump and ask pt. to cough if there are air bubbles leave the tube, if not, remove it.

### B-In hemothorax or chylothorax or pyothorax

- **No** discharge for 24-48 hr.

### C-In effusion

- If there is **Small amount** of fluid we can remove the tube (large amount → not remove it).
- Depend on the fluid collection in the bottle and the X-ray.
- Normal pleural fluid is 50-100 cc.

## Complications

- Bleeding
- Organ perforation
- Intercostal neuralgia
- Tube blockage
- Subcutaneous emphysema
- Re-expansion pulmonary edema
- Local infection and empyema

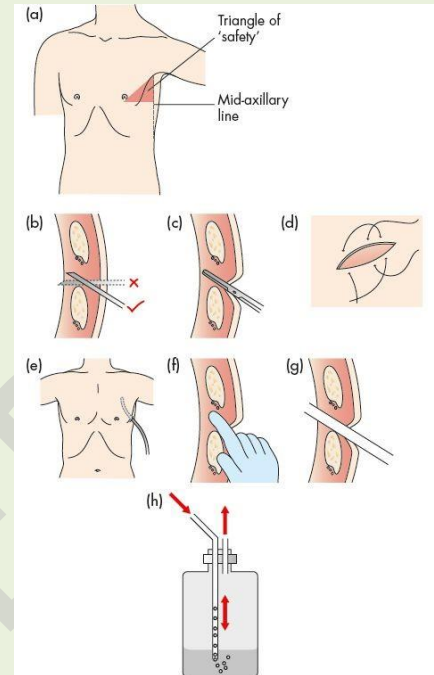


Figure 55.7 Insertion of chest drain: (a) triangle of safety; (b) penetration of the skin, muscle and pleura; (c) blunt dissection of the parietal pleura; (d) suture placement; (e) gauging the distance of insertion; (f) digital examination along the tract into the pleural space; (g) withdrawal of central trocar and positioning of drain; (h) underwater seal chest drain bottle.

