CHEST DRAINS

Indications - Chest drains are inserted to drain

1. **Pneumothorax** - Collection of air within the pleural cavity
- Tension - Needle aspiration followed by insertion of chest drain (<14Fr)
- Non-tension - Respiratory compromise guides drain insertion, not size

2. **Haemothorax** - Collection of blood within the pleural cavity
- Initial treatment is with wide bore (28Fr) chest drain
- I.V antibiotics for minimum 24 hours

3. **Intra-operative** (oesophagectomy anastomosis site)

Investigation of choice - Chest X-Ray - To check drain position/lung expansion

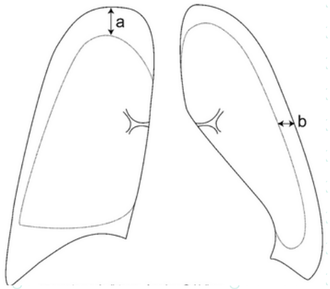


Illustration: If PNEUMOTHORAX on CT Chest, 'a' or 'b' >2cm is an indication for ICD if respiratory compromise. BTS Guidelines, 2010

Management -

- Insertion of ICD + Post insertion check X-Ray
- Close observation for minimum 48 hours
- I.V Antibiotics in case of haemothorax (minimum 24 hrs)
- Appropriate charting of drain output, especially post-operative once oral intake initiated
- Repeat chest X-Rays prior to and after drain removal

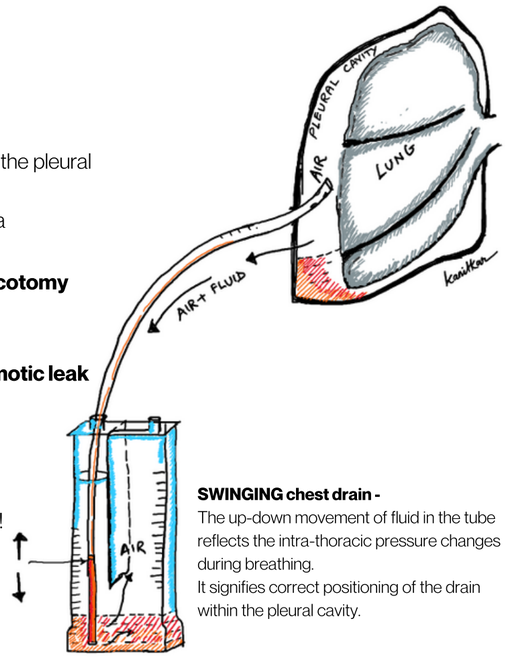
Interpretation of drain output and associated complications -

1. Pneumothorax - ICD (narrow-bore) + under-water seal apparatus
- SWINGING - Normal
- STATIC - Could mean 2 things. Either the drain is **dislodged** and out of the pleural cavity OR the lung has expanded and the drain has served it's purpose.
- BUBBLING = **Air leak.** Either due to lung injury or broncho-pleural fistula

2. Haemothorax - ICD (wide-bore)
- Drain output 200ml/hour over many hours or 1500ml/24hours - **Thoracotomy**
- Haemodynamic instability despite blood transfusion - **Thoracotomy**

3. Other-
- Chyle/Bilious content in post operative ICD is suggestive of an **anastomotic leak** and patient invariably needs an emergency intervention
- **Infection**
- **Subcutaneous emphysema** due to air leak

Any changes in drain outputs, do chest-x-ray & contact senior !



SWINGING chest drain -
The up-down movement of fluid in the tube reflects the intra-thoracic pressure changes during breathing.
It signifies correct positioning of the drain within the pleural cavity.

Illustration: Chest Drain (Intercostal drain - ICD) under-water seal apparatus

ABDOMINAL DRAINS

All you need to know !

Types of drains -

1. **Open** drains - Corrugated drain
2. **Closed** drains - Rubber tubing connected to a bag/bottle
- Active drains (With in-built suction - High or low pressure)
- Passive drains (Drain with gravity or pressure differences) - MOST COMMON

Indications -

1. To **drain** an infected collection/ area of sepsis
- Appendicular/diverticular abscesses (RIF/LIF or pelvic drain)
- Pancreatic abscess
- Peri-anal sepsis (OPEN drain can be used)

2. To **decompress** a hollow viscus
- Naso-Gastric tube in G.O.O (Gatsric outlet obstruction) or S.B.O (Small Bowel Obstruction)
- Flatus tube (Sigmoid volvulus)

3. To **warn** of life threatening complications after major resections
- Drain at site of anastomosis
- Drain at site of intra-abdominal bleeding
- Drain at site of extensive resection

Complications and Management -

1. Dislodgement
- Check if stitch has come undone - re-stitch
- If bleeding - Clamp drain + senior review - CT angiogram to check for vascular injury

2. Infection
- Start I.V Antibiotics
- Discuss with senior - drain removal
- Send drain for culture + sensitivities

3. Blockage (Usually if thick pus/ necrotic debris)
- Daily B.D/T.D.S flushes
- Consider increasing the size of drain through I.R (Upsizing)

A — **Systematic Abdominal examination:**
Complete exposure from xiphisternum to pubis is important.
Make a note of the location of the wound, drains and stoma (often a diagram is useful)

B — **Make a note**
What is connected to the drain- is it a drain **Bag** or a **Bottle**.
Often the pigtail drains inserted by IR are enclosed in a stoma bag.

C — **Record**
The output from the drain.
The volume and the **Content**.
Culture + Sensitivities

D — **Review**
The operative notes for the **Details** of the procedure and the placement of the drain (these details are often recorded by the surgeon on the operative note).

E — **Escalate**
To a senior if there is an increase in the drain output, change in consistency/colour of the drain content

Illustration: A-->E approach to revieweing surgical drains

A FEW COMMONLY ENCOUNTERED ABDOMINAL DRAINS

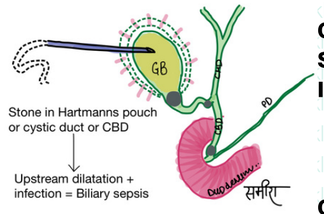


Illustration: Cholecystostomy drain

CHOLECYSTOSTOMY DRAIN -

Site - Within gall bladder

Indication - Drainage of sepsis

- Biliary sepsis + Haemodynamically unstable patient
- Elderly/frail patients who are unfit for ERCP/ Surgery

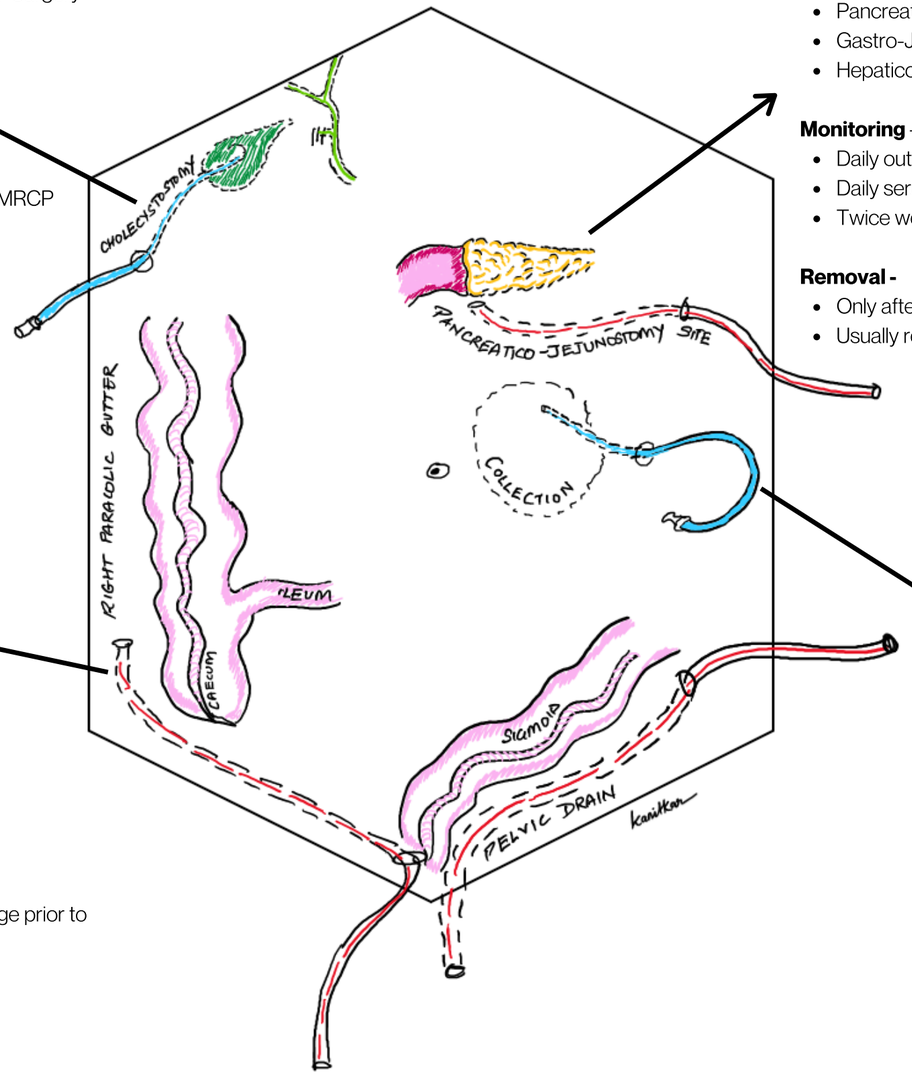
Content - Pus + Bile

Management -

- Daily output charting
- Culture + sensitivities

Removal -

- Ensure obstruction is relieved - Tubogram/MRCP
- Usually pigtail, so DON'T just pull it out!



SEPSIS DRAINAGE DRAINS -

Site - As per image (para-colic gutters or pelvis)

Indication - Drainage of sepsis

- Appendicular/Crohns abscesses (right para-colic gutter/pelvis)
- Diverticular abscesses (Left para-colic gutter/ pelvis)

Content - Pus

Management -

- Daily output charting
- Culture + sensitivities

Removal -

- Repeat imaging (CT Abdomen with I.V contrast) to assess shrinkage prior to removal
- Removal is usually straightforward (Done by nurses)

PANCREATIC SURGERY DRAINs -

Site - Around the 3 anastomosis (Image)

Indication - To warn about complications/leaks

- Whipples procedure
- Other pancreatic surgery

Content -

- Pancreatic anastomosis (Clear serous fluid)
- Gastro-Jejunal anastomosis - Hemo-serous fluid
- Hepatico-Jejunal anastomosis - Hemoserous fluid

Monitoring -

- Daily output charting, close monitoring after initiating pral intake (This is when leaks become evident)
- Daily serum amylase
- Twice weekly pancreatic drain amylase (Raised amylase is a hallmark of leak/pancreatic fistula)

Removal -

- Only after consultant instruction
- Usually remain till dry

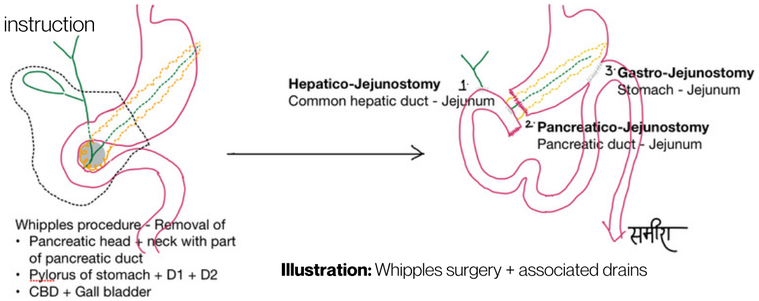


Illustration: Whipples surgery + associated drains

PANCREATIC COLLECTION DRAIN -

Site - Within Necrotic pancreatic collection/ Pseudocyst

Indication - Drainage of sepsis/ Relief of pressure on stomach

- Acute necrotising pancreatitis with infected collections
- Chronic pancreatitis + pseudocyst causing compression of stomach (Usually drained internally but can be drained externally)

Content - Pus

Monitoring -

- Daily output
- Culture + sensitivities
- B.D to T.D.S flushes with 50ml saline

Removal -

- Repeat imaging (CT Abdomen with I.V contrast) to assess shrinkage prior to removal
- Removal is usually straightforward (Done by nurses)

Chest Drains Bibliography:

- Boersma WG, Stigt JA, Smit HJM. Treatment of haemothorax [Internet]. Vol. 104, Respiratory Medicine. Elsevier; 2010 [cited 2021 Jun 18]. p. 1583–7. Available from: http://www.resmedjournal.com/article/S0954611110003513/fulltext
- MacDuff A, Arnold A, Harvey J. Management of spontaneous pneumothorax: British Thoracic Society pleural disease guideline 2010. Thorax [Internet]. 2010 Aug 1 [cited 2021 May 25];65(SUPPL. 2):ii18–31. Available from: http://thorax.bmj.com/