



**SURGICAL DRAINS**

**BY**

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**CABS ,FICMS**

# Outline

- ❖ Definition .
- ❖ indication of drains.
- ❖ Classification of drains.
- ❖ Types of drains.
- ❖ Assessment.
- ❖ Complication of Drain.
- ❖ Removal of drain.
- ❖ summary

# Definition

- A surgical drain is a tube used to remove pus, blood or other fluids from a wound .

Drains inserted after surgery don't result in faster wound healing but are sometime necessary to drain body fluid which may accumulate and in itself become a focus of infection

- Drain may be hooked to wall suction, a portable suction device, or they may be left to drain by gravity.

## Cont., Definition

- Accurate recording of the volume of drainage as well as the content is vital to ensure proper healing and monitor for excessive bleeding. Depending on the amount of drainage, a patient may have the drain in place one day to weeks.
- Drains are available in different size .



# Indications

1. To help eliminate dead space .
2. To evacuate existing accumulation of fluid , to remove pus, blood , serous exudates , chyle or bile.
3. To prevent the potential accumulation of fluid .
4. Decrease infection rate.

# Classification

- Open Vs Closed Systems:
  - Open
  - Closed
- Active Vs Passive :
  - Active
  - Passive

## ➤ Open drains

- Include corrugated rubber or plastic sheets .
- Drain fluid collects in gauze pad or stoma bag .
- They increase the risk of infection.
- E.g. Penrose drain.



## ➤ Closed drains

- Consist of tubes draining into a bag or bottle.
- They include chest and abdominal drains.
- The risk of infection is reduced.
- E.g. Jackson-pratt drain.

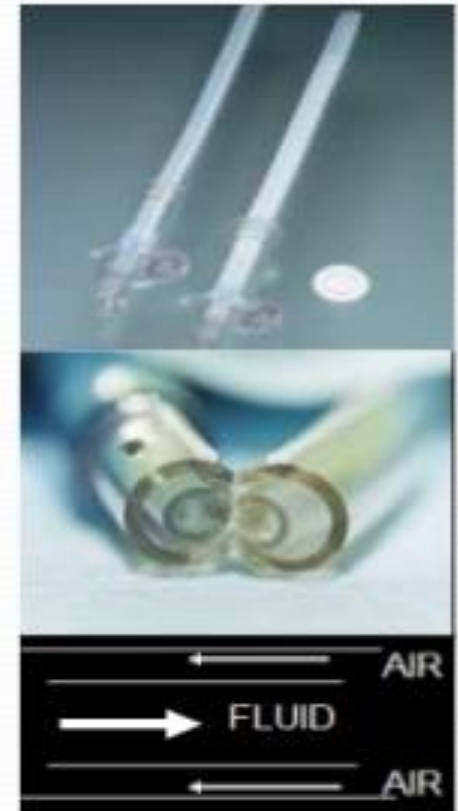


## ➤ Active drains

- Active drains are maintained under suction .
- They can be under low or high pressure.
- Closed ( Jackson- Pratt , hemovac drain )
- Open (sump drain ).



Advantages	Disadvantages
<ol style="list-style-type: none"><li>1. Keep wound dry , efficient fluid removal .</li><li>2. Can be placed anywhere .</li><li>3. Prevent bacterial ascension.</li><li>4. Allows evaluation of volume and nature of fluid.</li></ol>	<ol style="list-style-type: none"><li>1. high negative pressure may injure tissue .</li><li>2. Drain clogged by tissue .</li></ol>





## ➤ Passive drains :

- Passive drains have no suction.
- Drains by means of pressure differentials, overflow, and gravity between body cavities and the exterior.
- Closed ( NGT, Foleys catheter, T-Tube)
- Open ( Penrose drain, corrugated drain )



### Advantages

1. Allow evaluation of volume and nature of fluid.
2. Prevent bacterial ascension.
3. Eliminate dead space.

### Disadvantages

1. Gravity dependent affects location of drain.
2. Drain easily clogged.

# Comparison of active and passive drains

	Active Drain	Passive Drain
Function	Works by negative pressure created by compressible drums or mechanical evacuation system	Depends upon pressure differentials & gravity
Pressure Gradient	Negative Pressure	Normal
Drain Exit site	Dependent Position is not necessary	Dependent position for best function
Retrograde Infection	Lower incidence	Higher incidence
Fluid collection	Decreased incidence because negative pressure improves tissue apposition & obliterates dead space	Increased incidence because of limited effect on dead space
Obstruction of Drain	More common	Less common
Pressure necrosis	Greater incidence	Less common

## Types of drain

- Jackson- pratt drain.
- Hemovac drain .
- Pigtail drain.
- Penrose drain.
- T-tube.
- Chest tube.
- Nasogastric tube.
- Urinary catheter.
- Negative pressure wound therapy.



# Jackson-pratt drain

- A Jackson-Pratt (JP) drain is used to remove fluids that build up in an area of the body after surgery. The JP drain is a bulb-shaped device connected to a tube. One end of the tube is placed inside body during surgery. The other end comes out through a small cut in the skin. The bulb is connected to this end.
- The JP drain used as negative pressure vacuum, which also collects fluid.
- The JP drain removes fluids by creating suction in the tube. The bulb is squeezed flat and connected to the tube that sticks out of your body. The bulb expands as it fills with fluid.

## **Common uses:**

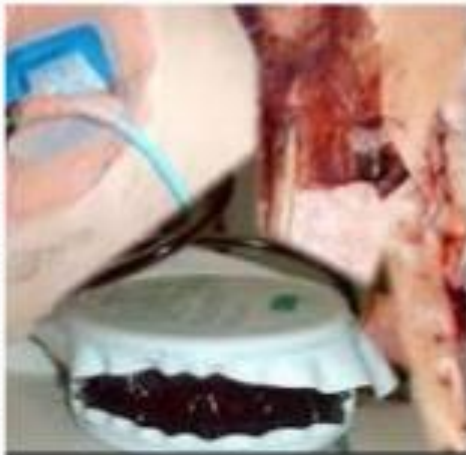
- Abdominal surgery
- Breast surgery.
- Mastectomy.
- Thoracic surgery.





# Hemovac drain

- This is a fine tube. With many holes at the end, which is attached to an evacuated glass bottle providing suction. It is used to drain blood under the skin .



# Pigtail drain

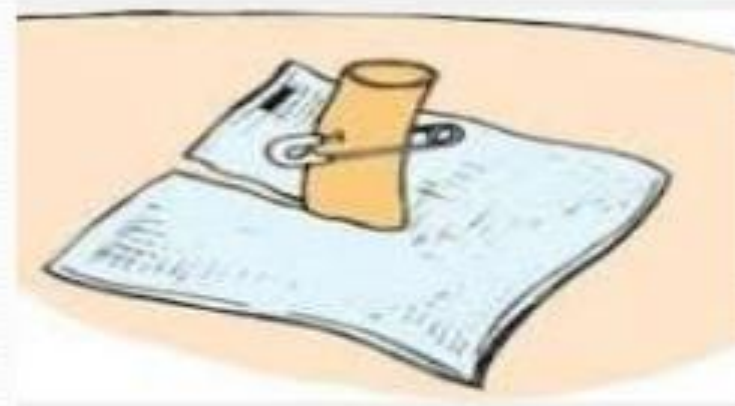
- A pigtail is a type of catheter that has the sole purpose of removing unwanted body fluids from an organ, duct or abscess. Pigtail drains are inserted under strict radiological guidance to ensure correct positioning.
- A pigtail is a sterile, Thin, long, universal catheter with a locking tip that forms a pigtail shape. The tip of the pigtail has several holes, which facilitate the drainage process.
- Pigtail are inserted through the skin by a radiologist. It may be inserted to allow, for example, urine to drain directly from a kidney , if the ureter is diseased or blocked. This is called a nephrostomy. Other condition requiring the insertion of it include a blocked bile duct that needs to be drained of bile.



# Penrose drain(open drain)

A Penrose drain is a soft and flexible. This drain doesn't have a collection device. It empties into absorptive dressing material, it promotes drainage passively. With the drainage moving from the area of greater pressure in the wound or surgical site to the area of less pressure.

- a sterile , large pin is often attached to the outer portion to prevent the drain from slipping back into the incised area.
- The drain acts like a straw to pull fluids out of the wound and release them outside the body.





# Davol drain

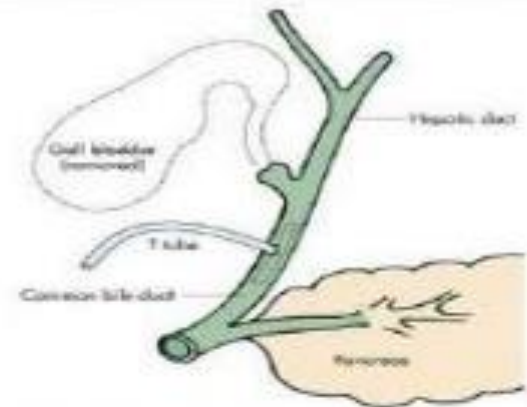
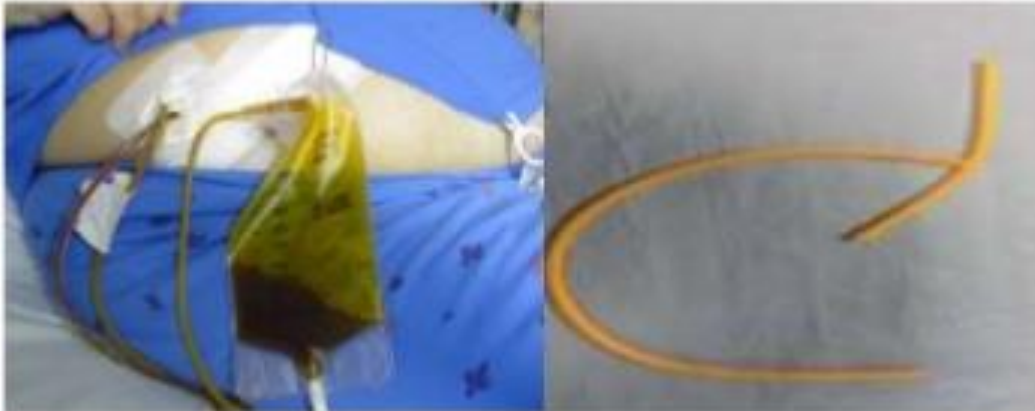
- This suction device has a rubber bulb on top of the drain that acts as pump to inflate the balloon in the drainage bottle. To re-establish suction, squeeze the rubber bulb with a continuous pumping motion until the balloon in the drainage bottle is completely inflated. Quickly replace the plug in the drain before the balloon deflates. The inflated balloon inside the drainage bottle creates the suction.





# T-tube

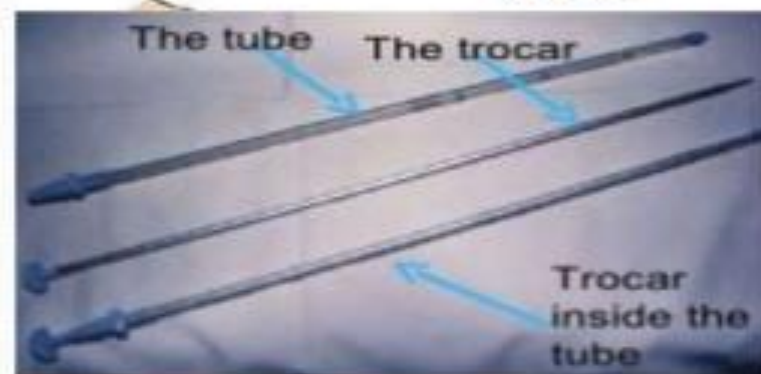
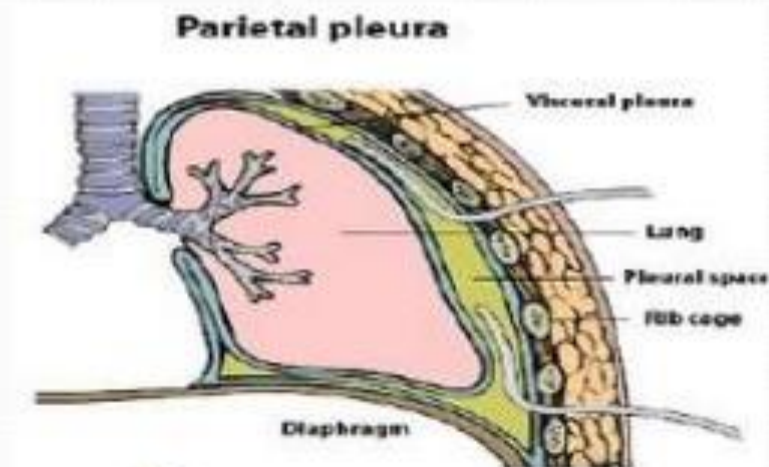
- T tube: a tube consisting of a stem and a cross head is placed in to the common bile duct while the stem is connected to a small pouch (i.e. bile bag). It is used as a temporary post-operative drainage of common bile duct. Sometimes its used in ureteric problems too.



# Chest tube (close drain)

- Used to drain; haemothorax, pneumothorax, pleural effusion, chylothorax and empyema.
- Put in the pleural space in the 4<sup>th</sup> intercostal space above the upper border of the rib below.

Size of chest tube	
Adult male	28-32 Fr
Adult female	28 Fr
child	18 Fr
Newborn	12-14 Fr



# Cont. chest tube

## ➤ **Complications to assess for:**

1. Arterial thrombosis.
2. Air embolism.
3. Hematoma.
4. Bleeding.
5. Infection.



# Nasogastric tube

❖ NG tube : a tube passes through the nostrils to the stomach.

## ➤ Indication :

1. Aspiration of gastric juice.
2. Lavage: in cases of poisoning or overdose medication.
3. Feeding.

## ➤ Complication of NG tube :

1. Epistaxis.
2. Aspiration.
3. Erosions in the nasal cavity and nasopharynx.





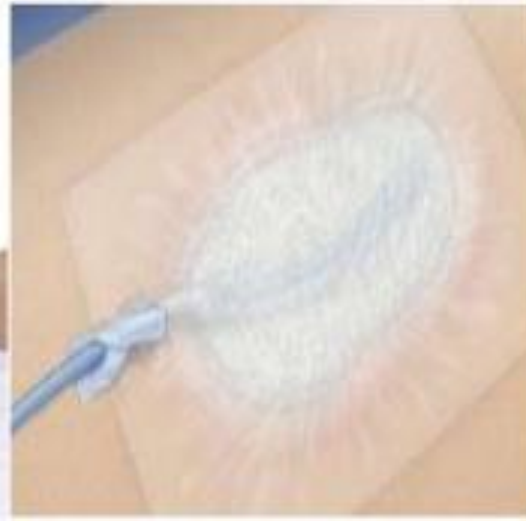
# Urinary Catheters

- Urinary catheters are hollow, flexible tubes used to collect urine from the bladder. Urinary catheters come in many sizes and types. Catheters can be made of rubber, silicone, or latex. The catheter tube leads to a drainage bag that holds collected urine.
- **Indication :**
  1. to allow urine to drain if you have an obstruction urethra.
  2. to allow pt. to urinate if pt. have bladder weakness or nerve damage.
  3. to drain your bladder before, during and after some types of surgery.
  4. as a treatment for urinary incontinence when other types of treatment haven't worked.



# Negative pressure wound therapy

- (NPWT) : promote wound healing and wound closure through the application of uniform negative pressure on the wound bed, reduction in bacteria in the wound, and the removal of excess wound fluid, while providing a moist wound healing environment.
- It used to treat a variety of acute or chronic wounds, wound with heavy drainage, wound failing to heal, or healing slowly. E.g. skin graft sites and burn, infected wound, and diabetic ulcers





# Assessment

- **Initial:**

1. Assess drain insertion site for signs of leakage, redness or signs of ooze. Document site condition and notify treating team.
2. Assess if drain is secured with suture or tape, document.
3. Assess patency of drain. Ensure drain is located below the insertion site and free from kinks or knots. Note and document amount and type of fluid in drain bottle/receptacle.



# Cont.Assessment

- **Ongoing:**

1. Monitor patient for signs of sepsis; if the patient is febrile, has redness, tenderness or increased ooze at the drain site, this could be a sign of infection, the treating team must be notified and blood cultures may need to be obtained.
2. Drain patency and insertion site should be observed at the beginning of your shift and before and after moving a patient. If applicable, ensure suction is maintained. A blocked drain tube can lead to formation of hematoma and increased pain and risk of infection.
3. Drainage needs to be documented at a minimum 4 hourly and more frequently if output is high.
4. Clean the drain insertion site daily .
5. Empty the collection bulb on the drain 3 times daily (or more often if needed) .
6. Drains should be removed as soon as practicable, the longer a drain remains in situ, the higher risk of infection as well as development of granulation tissue around the drain site, causing increased pain and trauma upon removal.

# Education for patient

- Educate patient/parent to ensure the drain is below the site of insertion but not pulling on the patient. Educate the patient/parent that there is a risk of dislodgement, requiring increased care when moving. Patient should be aware that moving whilst drain is in situ will cause some pain, but this can be minimized with regular analgesia and the patient should be encouraged to mobilize with supervision when appropriate.

# Complication of Drain

## ➤ **infection :**

- Ascending of bacterial invasion.
- Foreign body reaction.
- Fluid accumulation.
- Poor postoperative management.

## ➤ **Discomfort/ pain:**

- Chest tubes (diameter too large)
- Stiff tubing.
- Blockage.



# Complication of Drain

- Inefficient drainage :
  - Obstruction
  - Poor drain selection (diameter too small to remove viscous fluid)
- erosion into hollow organs .
- Incision dehiscence:
  - Poor placement .
- premature removal.
- Accumulation of fluid.

# Inadvertent removal/Drain dislodgement

1. If the drain is suspected to have been moved, the drain should be secured and the treating team notified.
2. In the event a drain has been removed or dislodged, a sterile dressing should be applied and the treating team notified.
3. If the drain is suspected to have receded into the patient, the treating team should be notified and imaging (x-ray, etc.) should be performed.

## Removal of drain

- Generally, drain should be removed once the drainage has stopped or becomes less than 25ml/day. Drain can be shortened withdrawing by approximately 2cm per day, allowing the site to heal gradually. Drain that protect post-operative sites from leakage form a tract and are usually kept in place for one week.



## Cont. removal of drain

- ✓ You'll need gloves, a disposable drape, dressings, and a suture removal kit. Explain to the patient what you're about to do, and that he may experience some momentary discomfort during removal. Offer him something for pain before you begin.
- ✓ Then, don gloves and any other personal protective equipment deemed necessary, such as a gown, mask and goggles. Place a disposable drape next to the site. Remove any stitches first. Lift the suture with the sterile tweezers and snip the stitch near the knot. Gently pull out the suture by the knot and discard.
- ✓ Next, carefully loosen the drain, especially if it's been in for some time, as it will have a buildup of granulation tissue surrounding it. With a 4 x 4-inch gauze pad, firmly grasp the drain close to its exit site with your dominant hand. Stabilize the skin around the drain with your other hand.

## Cont. removal of drain

- ✓ Before you start to pull, have your patient take a deep breath, as it can ease the discomfort by reducing anxiety. Once he inhales, steadily and swiftly withdraw the drain and place it on the drape. You should not feel any resistance. If you do, stop and notify the physician. The drain may need to be surgically removed.
- ✓ If you're successful, cover the site with a dry, sterile dressing and document the outcome. Continue to record the type and amount of any ongoing drainage, which should be minimal and stop within 24 hours. If a site drains more than expected, it may be a sign that fluid is continuing to accumulate, and a new drain may have to be placed.
- ✓ Managing drains is an important part of the postop healing process. With your knowledge and skill, you'll contribute to the best possible outcome.



# Post removal

- Monitor site for signs of infection, obtain swabs or samples if required.
- Monitor and mark dressings to ensure minimal leakage, replace dressings as required to minimize risk of infection.
- Dressing should be removed when wound has healed (3-5 days).





**THE END**