Lost In Space: Lines and Tubes in the Wrong Places
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Objectives:
- Review normal position of central venous catheters
- Review normal position of pulmonary artery catheters
- Review normal position of endotracheal tubes
- Review normal position of nasogastric and feeding tubes
You should systematically evaluate mediastinum, lung fields, pleural space, diaphragm, and chest wall. Also evaluate neck, axilla, and abdomen. Basically, you can recognize air, water and bone density on chest x-ray. Lung fields appear dark because of air. 99% of the lung is air. The pulmonary vasculature, interstitium constitute 1% and give the lacy lung pattern.
Central Venous Access

- deliver necessary medications or possibly to draw blood
- Many of the medications that are commonly delivered, for example chemotherapy and some antibiotics, can irritate the lining of the vein. This irritation can cause permanent narrowing or clotting of the vein. For this reason the catheter is placed "centrally", in a large vein, where the medications can be diluted and decrease or eliminate the irritation of the vein lining.
Central Venous Access

- Tunneled and non-tunneled catheters
- Ports
- Peripherally inserted central catheters (PICC)

**Tunneled** catheters have a section that travels under the skin before going into the vein. This section also contains a cuff. The cuff is made of Dacron and allows the surrounding tissue to grow in and secure the catheter. Both the cuff and tunnel are used to stabilize the catheter and prevent infection.

**Port** is a chamber made of metal or plastic that is attached to the catheter. Both the port and the catheter are placed beneath the skin. Again, this is done to prevent infection. Some people like the port because it is under the skin and isn’t visible. Also, routine activities, like swimming, are not limited with a port. But to use the port, a needle must be placed through the skin.
A PICC line is a Peripherally Inserted Central Catheter. Usually placed in an arm vein, its tip is put in the superior vena cava or preferably at the superior vena cava/ right atrial junction. It functions like a tunneled catheter.

COMPLICATIONS

- **Acute**
  - malposition, vessel perforation, arterial puncture/ cannulation, air embolus, pneumothorax, Spasm, bleeding from the subcutaneous tunnel, other
- **Semi-acute**
  - malposition, post insertion phlebitis, infection, dehiscence
- **Delayed**
  - A. non Function
  - extrinsic compression: suture, clamp, kink, pinch off
  - syndrome
  - catheter occlusion: precipitate, thrombus (fibrin sheath, luminal thrombus, venous thrombus)
  - B. fragmentation
  - C. infection
Fluoroscopic image after right internal jugular hemodialysis catheter placement.

Postplacement right subclavian port radiograph.
Fluoroscopic image after left hemodialysis subclavian vein catheter placement.
Fluoroscopic image after left hemodialysis internal jugular vein catheter placement.

Postplacement PICC line chest radiograph in a patient with metastatic adenocarcinoma.
Fluoroscopic image after right internal jugular port placement.
Fluoroscopic image after left PICC placement.
Acute Complications

- Malposition
- Vessel Perforation
- Arterial puncture/ cannulation
- Air embolus
- Pneumothorax
- Spasm