PRACTICAL PROCEDURES AND PATIENT INVESTIGATION

Ahmed Alburakan, MD, MSc ,FRCSC , FRCPC
Assistant professor & consultant
Trauma, acute care surgery & critical care medicine
King Saud University

OUTLINE

- Introduction
- General precautions
- Aseptic technique
- Local anaesthesia
- Suturing
- Airway procedures
- Thoracic procedures
- Abdominal procedures
- Vascular procedures
- Urinary procedures
- Central nervous system procedures
- Excision of lumps and swellings
- Imaging

GENERAL CONSIDERATIONS

- Every procedure should be preceded by adequate explanation.
- Reason for procedure, simplified steps, what is expected during the procedure.
- Communication and reassurance throughout the procedure.
- Counselling regarding the need, the benefit and any alternatives to the procedure.
- Written informed consent is required sometimes.

GENERAL PRECAUTIONS

- Needles should not be resheathed.
- Sharp instruments discarded by the operator should be placed in a special ‘sharps’ container.
- Drapes and other soiled equipment should be placed in appropriate containers.
- Gloves and gown should only be removed after all used equipment / drapes have been placed in appropriate containers.

ASEPTIC TECHNIQUE

- 'using practices and procedures to prevent contamination from pathogens. It involves applying the strictest rules to minimize the risk of infection'

- As a minimum precaution, the skin should be cleansed with an antiseptic solution, and sterile instruments used.

- For some procedures, full aseptic technique should be employed.

Aseptic technique could be:

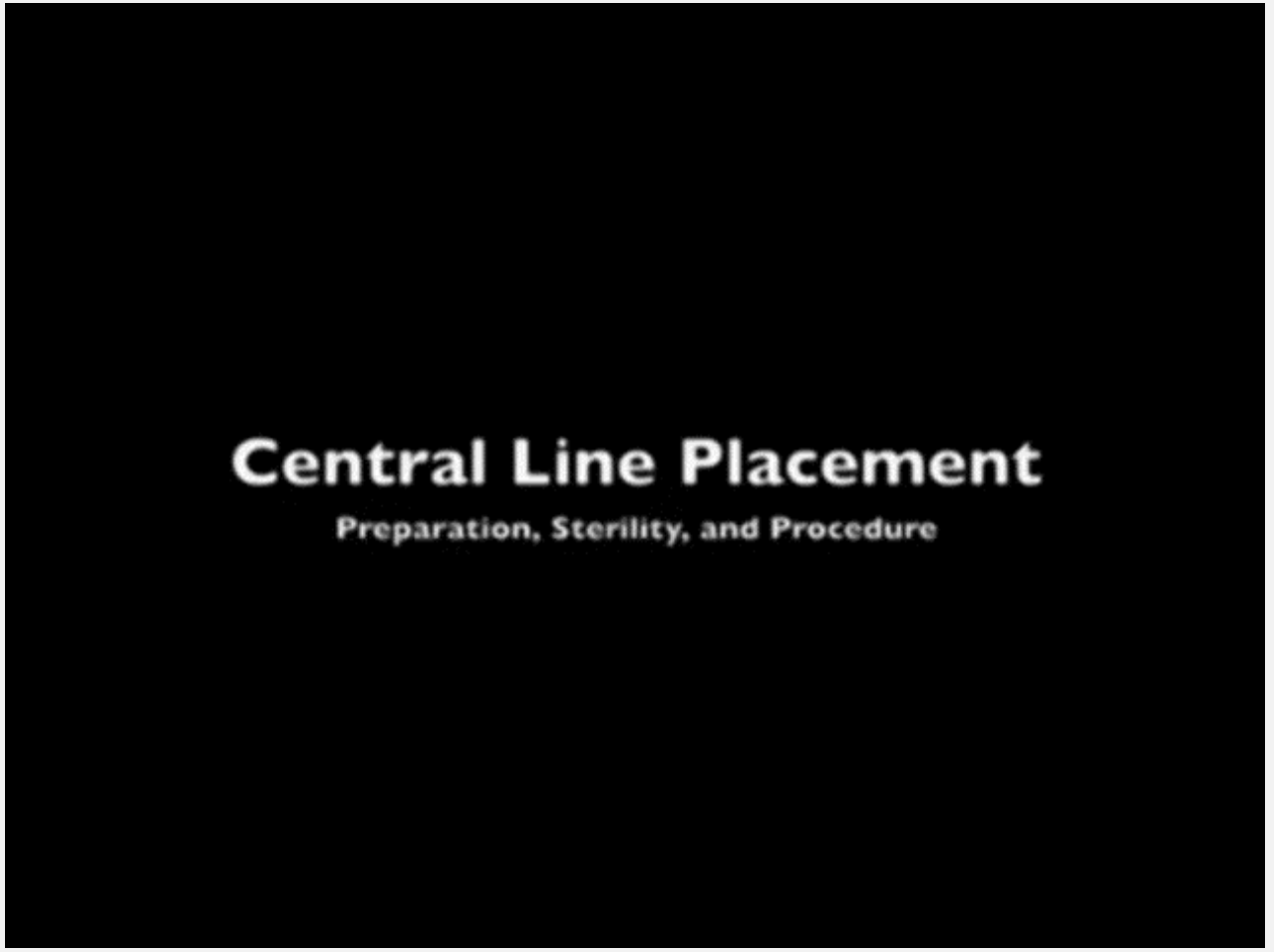
1- **Strict (full) aseptic technique:** used in procedure which it bypassing the main defensing mechanism of the body "skin" as when you do procedure in central vein or artery, lumber puncture, chest tube, paracentesis.

2- **Less strict technique** as when you draw blood sample, you will need new needle and instruments, dry the area with alcohol swap and wear a clean gloves.

ASEPTIC TECHNIQUE

ASEPTIC TECHNIQUE

This video demonstrate how to do full aseptic technique.
Same technique used for other procedure like foley catheter, LP, arterial line and chest tube not only central line.



LOCAL ANAESTHESIA

- Local anaesthetic agents inhibit membrane depolarization and hence block the transmission of nerve impulses.
- Either topical (doesn't work well for skin because it's a tough barrier better for mucus membranes, eyes and orifices) , or local infiltration (for skin).
- Local anaesthetic drugs are potentially toxic and care must be taken to avoid inadvertent intravascular injection.
- Signs of toxicity: numbness, tingling, tinnitus, light headedness. (we should know the signs of toxicity because it's graded, and we could save the patient before aggressive signs appear).
- Higher doses: LOC, convulsions, arrythmias

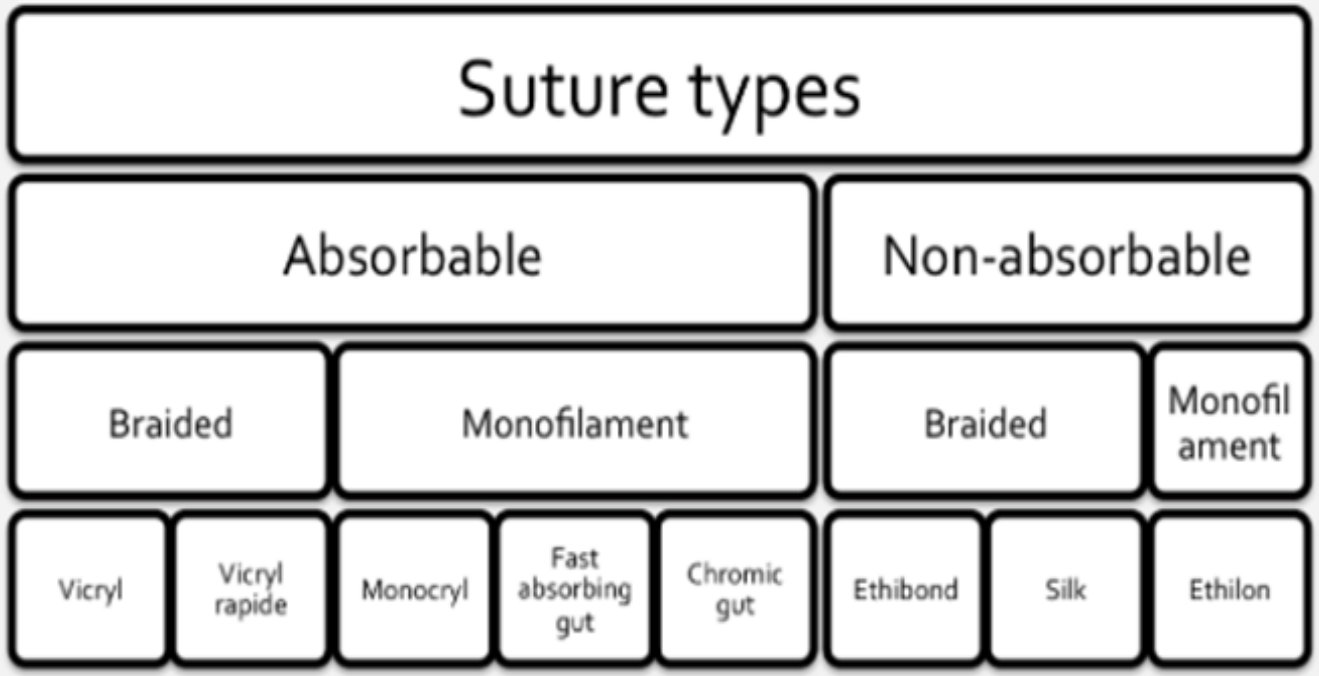
LOCAL ANAESTHESIA

Esters	Max Dose (mg/kg)	Duration (h)
Chloroprocaine	12	0.5 – 1
Procaine	12	0.5 – 1
Cocaine	3	0.5 – 1
Tetracaine	3	1.5 – 6

Amides	Max Dose (mg/kg)	Duration (h)
Lidocaine	4.5/(7 with epi)	0.75 – 1.5
Mepivacaine	4.5/(7 with epi)	1 – 2
Prilocaine	8	0.5 – 1
Bupivacaine	3	1.5 – 8
Ropivacaine	3	1.5 – 8

- Easters is old, not commonly used
- Amides is the mostly used, specially Lidocaine and Mepivacain. The main difference is the duration of action: Lidocaine is very fast acting and goes away after 1-1.5h. Suitable for local procedure and minor operation.
- Bupivacain used as along acting infiltration or in epidural catheter.
- Important to notice that Lidocaine could be mixed with epinephrine (epi), When mixed it will cause vasoconstriction which will make Lidocaine stays in place and also reduce a bit the bleeding from the site. It used in big area as in back and trunk.
- **But** you can't use the mix in the area where it's in the artery as in the toe or other fingers because if it leads to vasoconstriction of the vessels going to the toe it will cause toe ischemia.
- You should know the toxicity, mechanism of action and duration. No need for doses.

SUTURING



Suture types available in the Kelowna General Hospital ED, divided by type. N.B., "Ethilon" is a nylon nonabsorbable suture. Prolene is a polypropylene nonabsorbable suture that is used in other EDs for similar applications as Ethilon/nylon

Important examples by doctor:

1- In case of subcortical (under the skin) use absorbable (monocryl).
2- In case of vascular anastomosis use non- absorbable (Ethilon, prolene).
3- Bowel anastomosis will heal in 3 days so, we use absorbable (most commonly used vicryl). If we used non- absorbable it may cause stomach ulcer, bleeding...
4- Superficial suture in the skin (above skin) use non- absorbable (monofilament) so we avoid tissue reaction (wound scar, discoloration). Then take it off after around 7 days.

- Why you need to do suture at the end of the procedure? Either to approximate the wound and thus result in faster healing, to stop bleeding or to perform anastomosis.
- Types of suture in general: either monofilament or braided and either absorbable and non-absorbable.
- Monofilament: it's a one strand
  - Pros: usually causes less tissue reaction, less bacteria and pathogen travelling through because it only one strand!
  - Cons: difficult to handle for the surgeon
- Braided: Multiple strands
  - Pros: Easy to handle
  - Cons: causes tissue destruction and bacteria can travel through thus, causing infection.
- Absorbable vs non-absorbable: in some area we don't want the stitch to stay forever because it may cause granuloma, tissue reaction and overgrowth. Ex. Stitch in subcortical or under the skin we don't wont the stitch to last forever. So we use Absorbable suture. But in case if the Stitch above the skin you can use non-absorbable and will cut it, it's even better because it won't cause tissue reaction.

In case of vascular anastomosis (connect artery with artery), we use non-absorbable because we don't wanted ever to disappear to avoid risk of pseudoaneurysm or opening of the vessel.

SUTURING

Undesired tissues reactivity is greater with:

- Multifilament (compared to monofilament)
- Larger suture gauge
- Natural material (compared to synthetic)

Synthetic material (Preferred one now)

- Absorbable: Vicryl
- non-absorbable: Ethilon, prolene

Absorbable Sutures

	Effective Wound Support	Complete Absorption	Comments
Surgical Gut	8-9 days	30 days	Rarely used; high tissue reactivity
Chromic Gut	10-21 days	>90 days	Gut treated with chromium to decrease tissue reactivity and slow absorption
Fast Absorbing Gut	5-7 days	14-28 days	Gut treated with heat to speed absorption
Polyglactin (Vicryl)	21 days	90 days	Less reactive than gut; synthetic
Vicryl Rapide	10 days	42 days	Gamma-irradiated to speed absorption

Non-Absorbable Sutures

	Tensile strength	Tissue reactivity	Comments
Silk	Low	High	Multifilament, pliable
Nylon (Ethilon)	High	Low	Monofilament, stiff
Polypropylene (Prolene)	Moderate	Very low	Monofilament, less knot security because slippery (may need extra throw in knot)

SUTURING

Suture Removal Timeframes

Body Part	# of days after suturing
Face	3-5
Scalp	7
Chest, Extremities	7-10
High tension areas, Back	10-14

Ex. Around joint as elbow

And if patient is diabetic and smokers we may leave it up to 3 weeks.

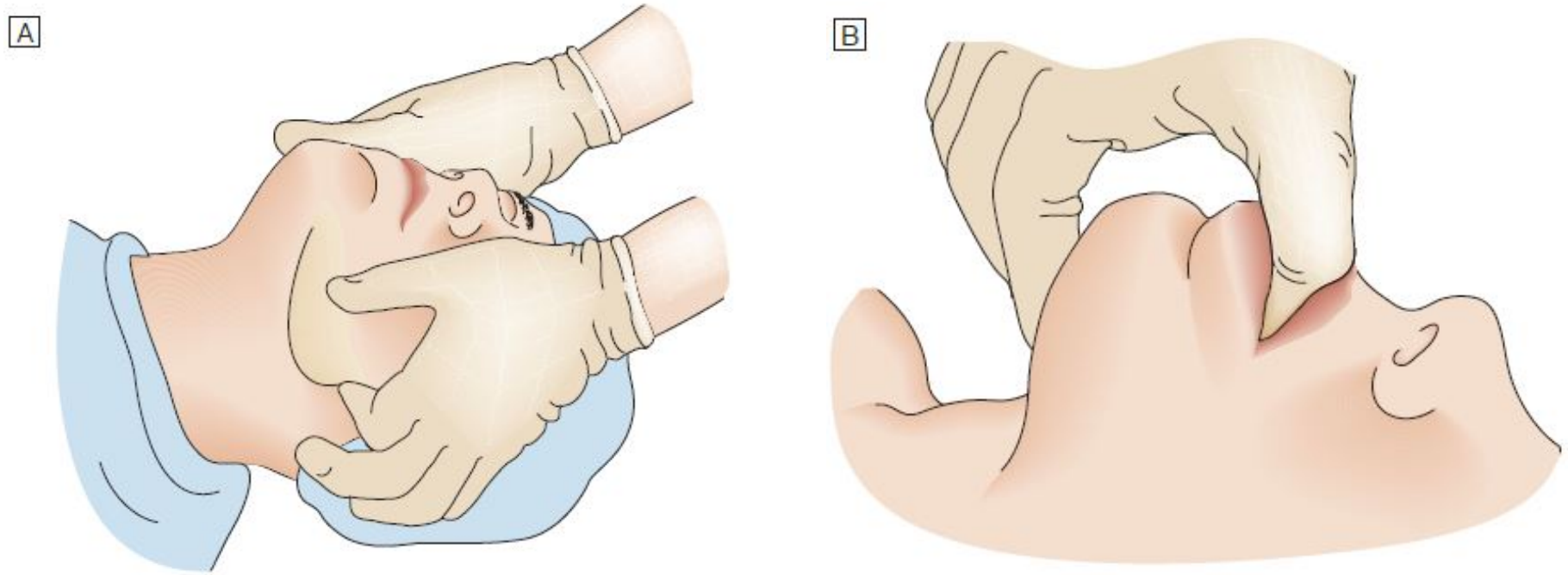
- The blood supply to a region determent its healing time!
- Face has an excellent blood supply and it one of the fastest area to heal.

- Why we don't want to keep sutures longer than it's required?
  To avoid tissue reaction and discoloration.

In exam, pay attention to the site: skin, subcutaneous, vessel or bowel. Then chose absorbable or non-absorbable, Monofilament or braided.
Case: Small incision in the face for the removal of small lipoma: Will stitch it simple stitches. So We will use non- absorbable (monofilament), will keep the suture for 3-5 days. **If you see 4 days choose it ☻**

AIRWAY PROCEDURES

- Ability to maintain airway is a basic but essential maneuver.
- Hypoxia results in irreversible tissue damage and death quickly.
- In the unconscious patient, muscles that normally main-tain a clear airway become lax. The tongue and soft tissue fall backwards, particularly in the supine patient, occluding the airway. Sometimes just putting the patient in his left side can open the airway (simple maneuver but life saving).
- Maintaining open airway is essential to oxygenate and ventilate.



A. Jaw thrust: No head tilt.
B. Chin lift: will cause head tilt, so it can be dangerous to use on a patient who may have a cervical spine injury.

AIRWAY PROCEDURES

LARYNGEAL MASK AIRWAY

- Not a replacement for orotracheal intubation
- However, can provide an airway for oxygenation and ventilation for brief periods of time.
- Increased risk of aspiration

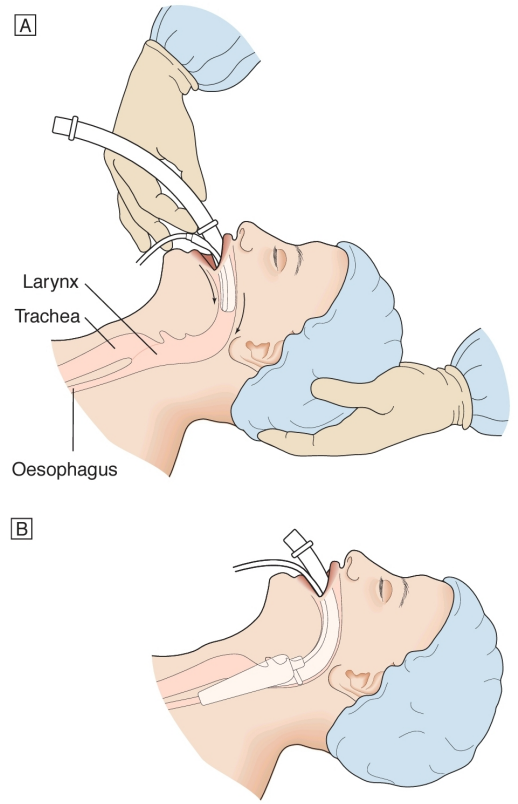


Fig. 8.2 Insertion of a laryngeal mask airway. A Gentle insertion of airway with head in extended position. B Advancement of airway.

ENDOTRACHEAL INTUBATION

- A definitive airway
- Life saving
- Protects from aspiration
- Every effort should be spent in learning this maneuver.

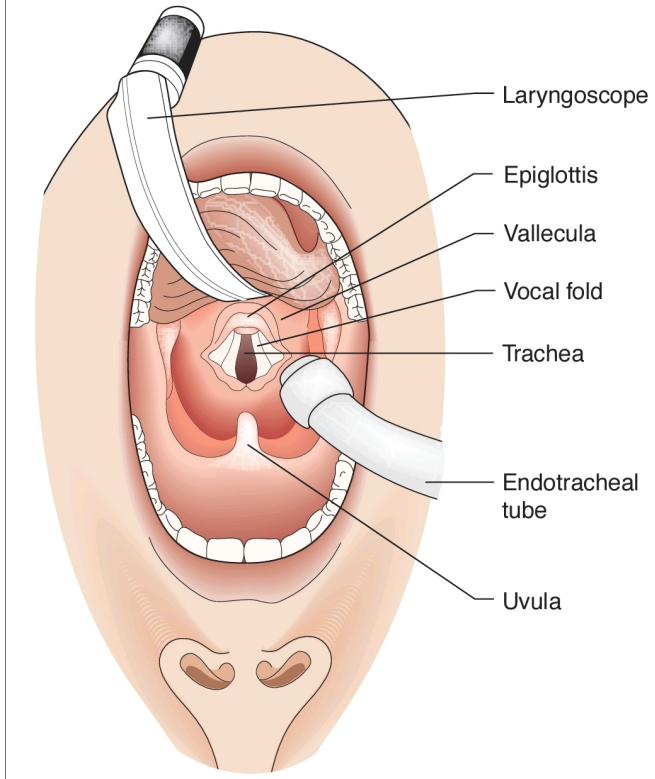


Fig. 8.3 Oral endotracheal intubation.

SURGICAL AIRWAY

- Life saving procedure in case of difficult airway or failure to intubate. (Burns, severe facial trauma, etc.) Like broken jaw, large hematoma.
- **Needle cricothyroidotomy:** needle insertion in the cricothyroid membrane (your landmark) and jet ventilation
- **Surgical cricothyroidotomy:** incision in the neck and cricothyroid membrane and insertion of tracheostomy tube. Contraindicated age<12 we do tracheostomy for them.

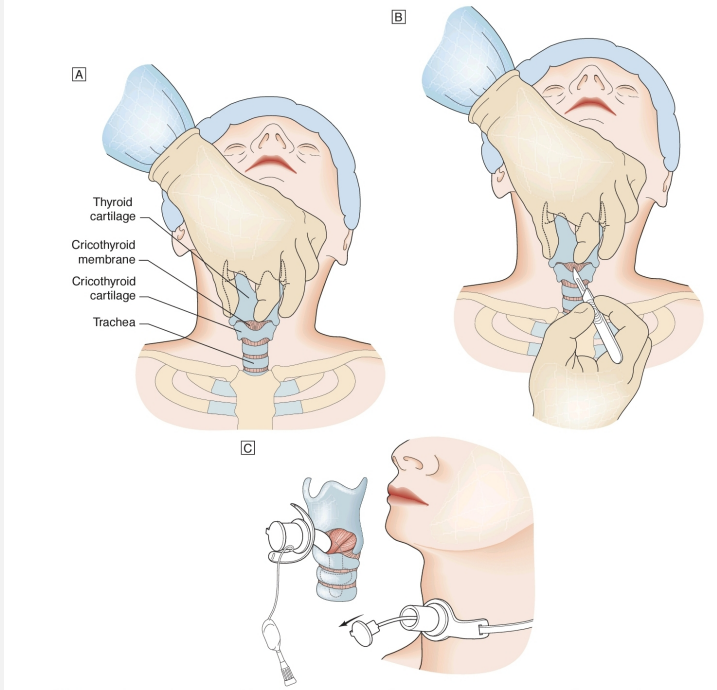


Fig. 8.4 Surgical cricothyroidotomy. A Palpation of thyroid cartilage. B Incision through cricothyroid membrane. C Insertion of tracheostomy tube.

AIRWAY PROCEDURES

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CHEST TUBE INSERTION

- Indicated for drainage of pleural cavity. (Pneumothorax, hemothorax, effusion, etc.)
- For pneumothorax smaller size can be enough (14-16Fr)
- For trauma or hemothorax, a larger tube is indicated.

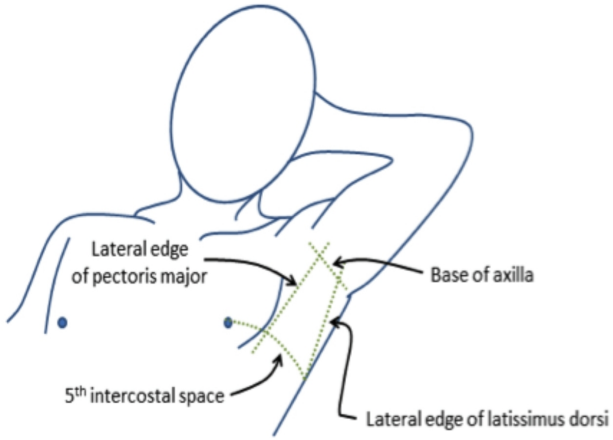
CHEST TUBE INSERTION: EQUIPMENT

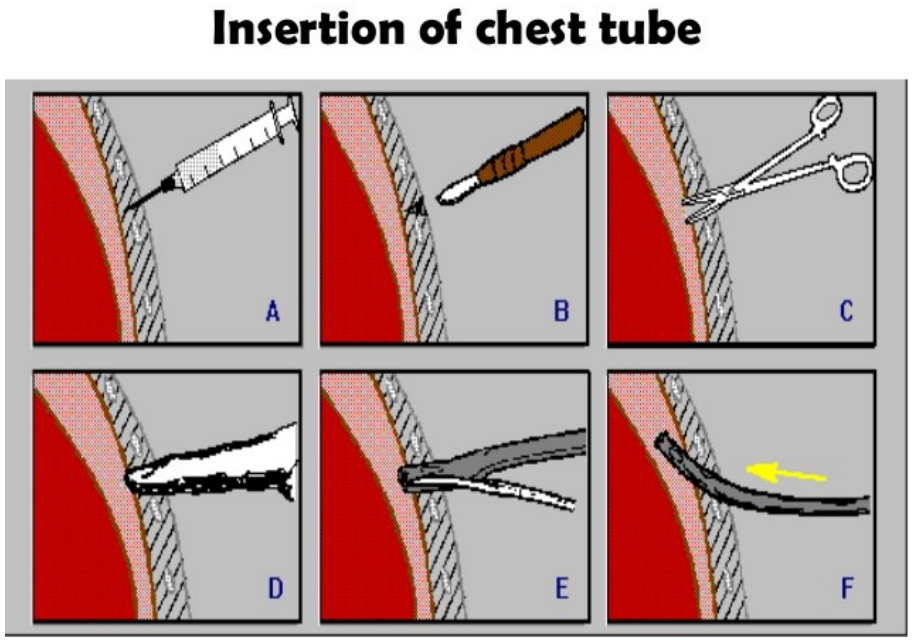
- Sterile gloves and gown
- Skin antiseptics
- Sterile drapes
- Gauze swabs
- Syringes and needles (21–25 gauge)
- Local anaesthetic, e.g. lignocaine (lidocaine) 1% or 2%
- Scalpel and 11 no. blade
- Suture (e.g. “1” silk)
- Instrument for blunt dissection (e.g. curved Kelly clamps or artery forceps)
- Chest tube of appropriate size
- Connecting tubing
- Closed drainage system (including sterile water if underwater seal being used)
- Dressing

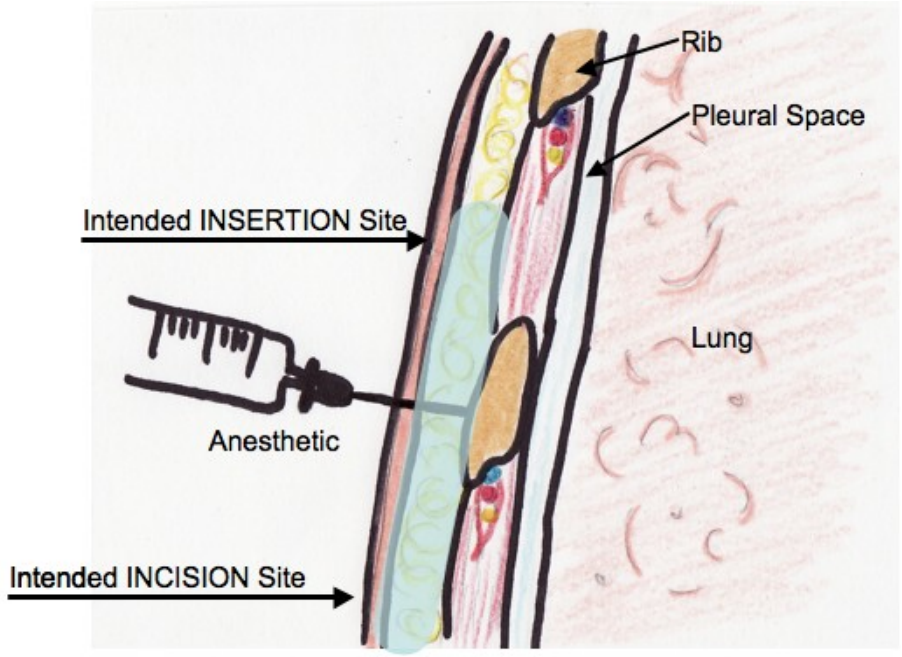
CHEST TUBE INSERTION: SITE

- Position as in the opposite figure.
- 4th or 5th intercostal space, between anterior and mid axillary line.
- Nipple line in males
- Infra-mammary fold in females

Helpful in case if a patient crashing or obese and you can't count intercostal space

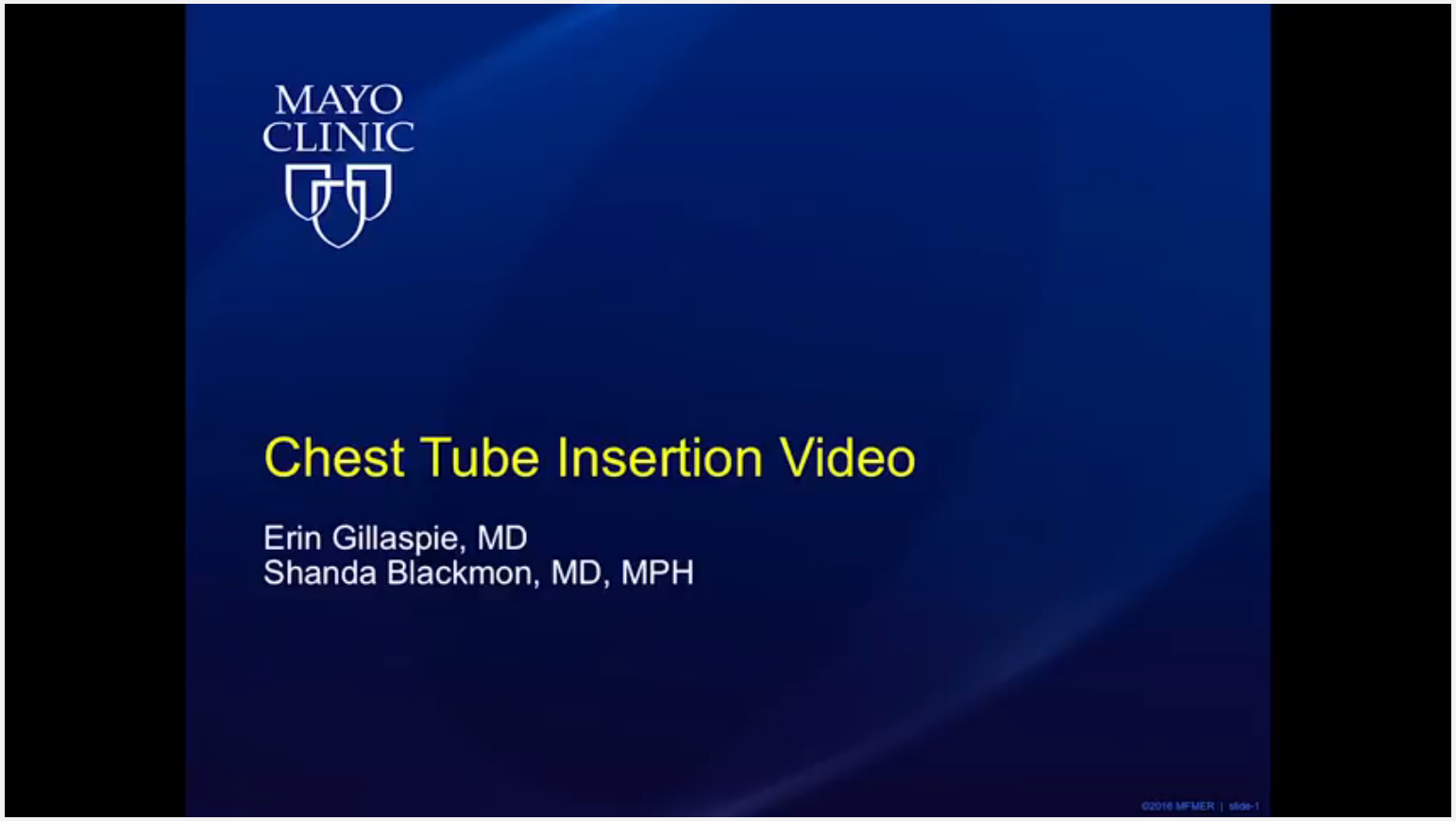






CHEST TUBE INSERTION: TECHNIQUE

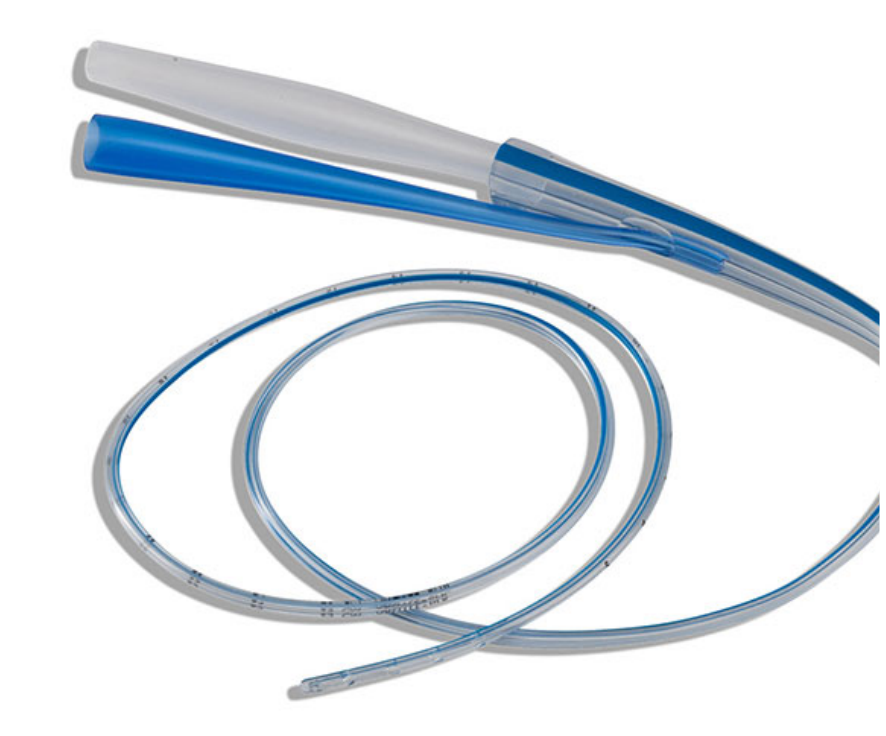
THORACIC PROCEDURES



ABDOMINAL PROCEDURES

NASOGASTRIC TUBE INSERTION

- Could be diagnostic or therapeutic.
- A tube to drain stomach contents (ex. Bowel obstruction, blood, recurrent vomiting, take out toxic substance before get absorbed) or administer enteral nutrition.
- Usually, a 14–16 Fr single-lumen radio-opaque nasogastric tube with multiple distal openings is sufficient. (One for drainage or nutrition and the other to evacuate air)
- Fine bore NG may be used if for enteral nutrition only.
- Contraindicated in patients with base of skull fracture. Because the tube may enter the brain.



NASOGASTRIC TUBE INSERTION

- Inspect nose for any deformity.
- Patient in sitting position.
- Lubricate the tube and measure (from the tip of nose, to behind the ear then to the stomach).
- Insert the tube along the floor of nose.
- Once in oropharynx, ask patient to swallow (water may help)
- Once in stomach, confirm position by aspiration, or by injecting air and auscultation

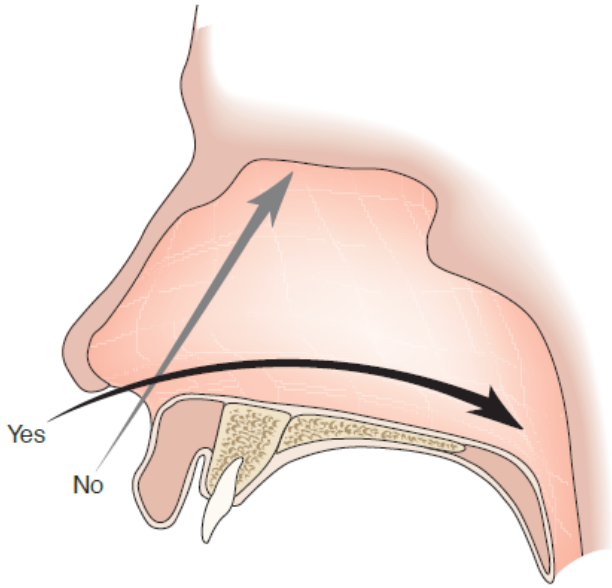


Fig. 8.7 Nasogastric intubation. Note the correct direction for inserting the tube.

ABDOMINAL PROCEDURES

VASCULAR PROCEDURES

CENTRAL LINE INSERTION

- Indications:

  - Hemodynamic monitoring. (CVP)

  - Administration of inotropes, vasopressors. In patient with shock and we want to elevate the BP. It's not given peripheraly because it's irritating, come out of the vein and cause sever vasoconstriction and necrosis of the hand.

  - Parenteral nutrition.

- Sites:

  - Internal jugular

  - Subclavian

  - femoral

  - PICC

CENTRAL LINE INSERTION

- Should be done under aseptic sterile conditions.
- Should be done with ultrasound guidance
- Watch for air embolism
- Always confirm placement by withdrawing blood from the catheter, and by xray.
- All lines should secured in place.

CENTRAL LINE INSERTION

- Complications:
  - arterial cannulation That's why we use ultrasound to make sure
  - hemo or pneumothorax happen with internal jugular or subclavian
  - hematoma
  - air embolism When the needle has air
  - infection

URINARY PROCEDURES

URETHRAL CATHETERIZATION

- Indications:
  - relieve urinary retention
  - accurately measure urine output
  - nursing of incontinent patients.
  - long procedures under GA.

URETHRAL CATHETERIZATION

- Sterile, aseptic technique.
- Choose the appropriate catheter, usually 16-18Fr Foley.
- Ensure catheter is lubricated.
- **Avoid using force**, catheter should advance gently.
- Complications:
  - trauma
  - false passage
  - UTI happen specially with long time placed catheter

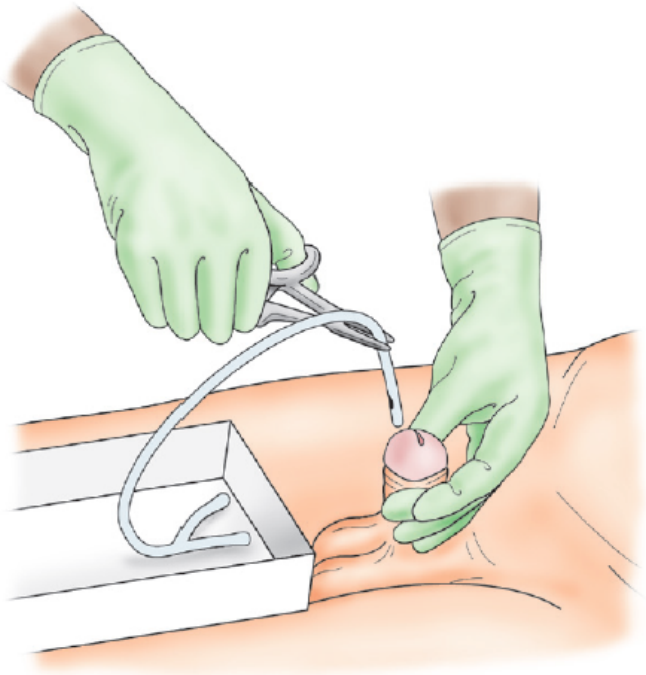


Fig. 8.16 Male catheterization.

SUPRAPUBIC CATHETERIZATION

- Risky procedure, most of the time Foley works
- Indicated for bladder drainage or monitoring of urine output
- When urethral catheterization has failed, or is contraindicated.

  - trauma
  - false passage
  - obstruction by tumor

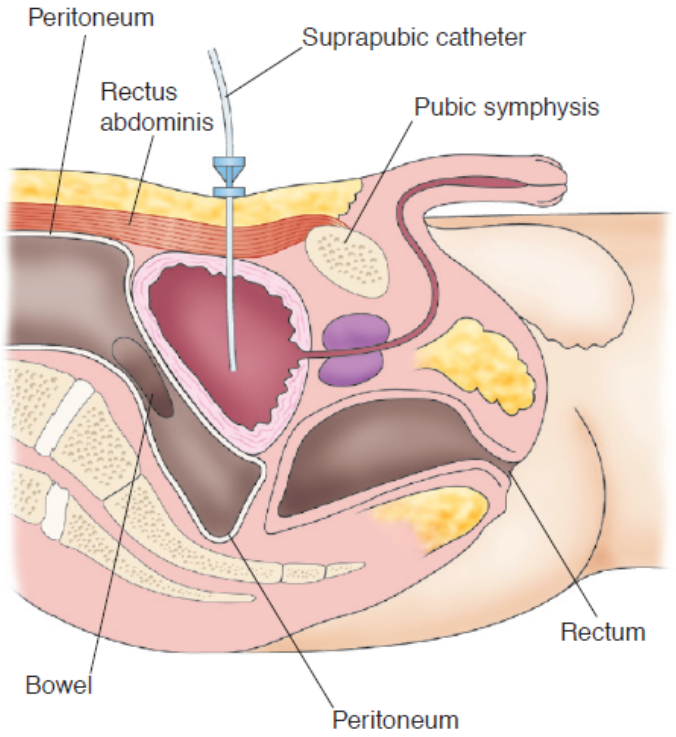


Fig. 8.17 Suprapubic catheterization.

SUMMARY

- Protect yourself, colleagues and the patient.
- Aseptic technique.
- Talk to your patients, and the rest of the team.
- Know indications, alternatives, complications of the procedure you are performing.
- Get help, practice!