



PEDIATRIC PROCEDURES & INSTRUMENTS

LIST OF IMPORTANT PROCEDURES



1. Lumbar Puncture
2. Bone Marrow Aspiration
3. Intraosseous needle insertion
4. Bone Marrow Biopsy
5. Thoracocentesis
6. Paracentesis
7. Bag & Mask Ventilation
8. Ryles tube introduction
9. Umbilical Vein Catheterisation

LIST OF IMPORTANT INSTRUMENTS TO FAMILIARISE



1. Lumbar Puncture needles
2. Bone Marrow Aspiration & Biopsy needles
3. 3 way valve for thoracocentesis/ paracentesis
5. IV Canula of different sizes
6. Feeding tubes
7. MDI & Spacer
8. Oxygen masks
9. Ambu Bag with Reservoir
10. Endotracheal tube

LP NEEDLE





LUMBAR PUNCTURE

- **Instrument**
 - Sterile spinal needle with stillete, 22 – gauge (black), length according to age (1.5-3.5 inch)
- **Indications**
 - Diagnostic
 - CNS infections like meningitis, encephalitis, subarachnoid hemorrhage, pseudotumor cerebri, inflammatory CNS diseases like Guillain – Barre syndrome
 - Instillation of intrathecal dye for imaging procedures (e.g.: myelography)
 - Measurement of CSF pressure.

LUMBAR PUNCTURE



– Therapeutic

- Instillation of intrathecal medications
(e.g.: chemotherapeutic CNS prophylaxis in leukemia, tetanus immunoglobulin in tetanus , rarely antibiotics in severe meningitis)
- Spinal anesthesia

LUMBAR PUNCTURE



- **Contraindications**
 - Elevated Intracranial pressure owing to a suspected mass lesion of the brain or spinal cord.(So fundus examination & head CT are mandatory)
 - Severe respiratory distress & shock etc. as that may worsen with positioning in flexion.
 - Thrombocytopenia. ($< 20,000$ cells/mm³)
 - Local infection at the site

LUMBAR PUNCTURE



Complications

- Post LP headache and backache
- Iatrogenic meningitis
- Cerebral herniation in sudden drop of elevated intracranial pressure.

BONE MARROW ASPIRATION



- **Instruments**
 - **SALAH** bone marrow aspiration needle
- **Indications**
 - Diagnostic
 - Diseases like leukemia, to detect marrow infiltration in disorders like lymphomas and other non hematologic malignancies.
 - To rule out malignant process in ITP before starting steroid therapy
 - Bone marrow culture in diseases like typhoid, malaria.

BONE MARROW ASPIRATION



Salah's BMA Needle

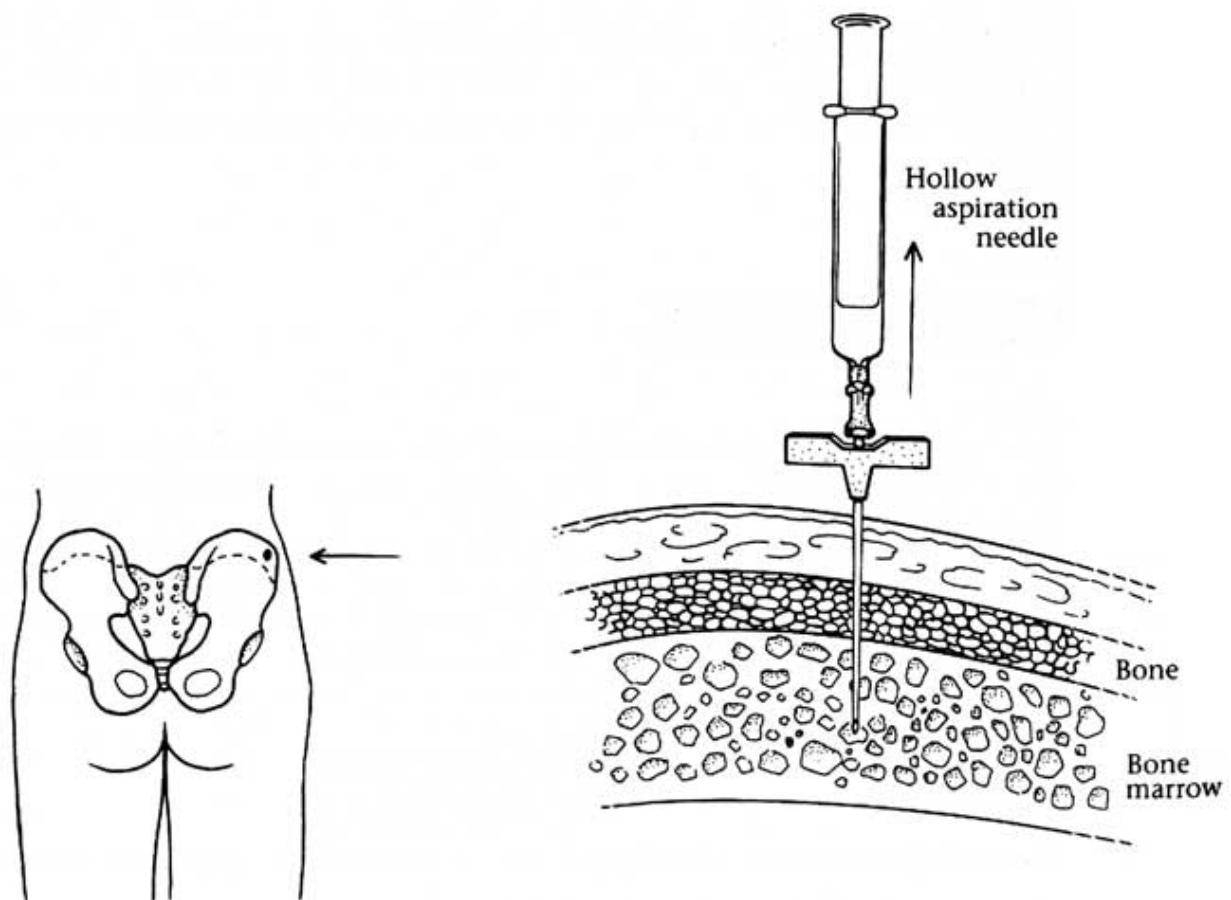


PROCEDURE



- Patient is placed in prone position. Clean the area with povidone iodine followed by alcohol (70%). Infiltrate skin, subcutaneous tissue & periosteum with 2% lignocaine (2 – 5 ml). With a boring movement introduce the needle perpendicularly into the cavity of ileum at the center of posterior iliac spine. A give away feeling is felt when the needle enters the marrow contents.
- When site chosen is tibia, the needle should be directed away from the knee joint as damage there can impair growth of epiphysis.
- Causes of dry tap
 - Myelofibrosis
 - Aplastic anemia

BONE MARROW BIOPSY



Wendolyn Hill

BONE MARROW BIOPSY



- **Instrument**
 - **Jamshidi** trephine biopsy needle
- **Site**
 - Posterior iliac spine
- **Indication**
 - Dry tap in BMA
 - Suspected Aplastic anemia and myelofibrosis

BONE MARROW BIOPSY

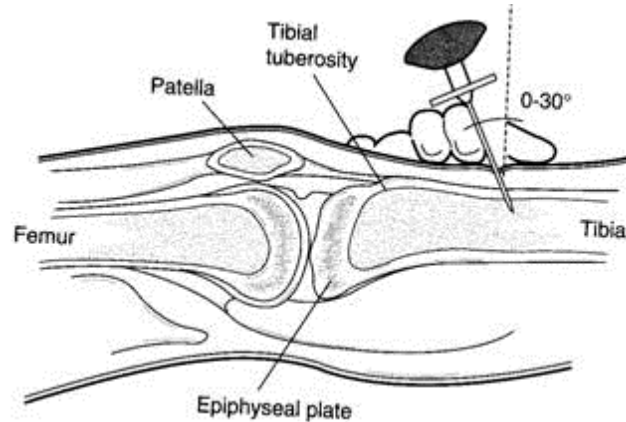


Jamshidi Bone Marrow Biopsy Needle



- Pierce bone with a boring movement. As the bone marrow is reached, remove the stillete, advance the needle with to and fro rotation movements and obtain a bit of bone. After taking tissue from needle , an imprint smear is made by gently rolling the tissue on a glass slide , which is then fixed and stained

INTRAOSSEOUS ACCESS



Life saving procedure to be mastered by all doctors who care for children

Most preferred site is 1-2 cm below the tibial tuberosity, just medial to it

Use a 18G BMA needle or even a blood transfusion set needle in infants during emergency

Insert the needle at 90 degree to the skin and penetrate into the marrow with a twisting motion. Remove the stylet and aspirate some marrow into a saline filled syringe. Infuse some saline to ensure location and remove any clot. Fix the needle firmly using bandages. Infuse crystalloids, drugs or blood using standard IV tubings attached to the needle. Remove preferably within 6 hrs.

THORACOCENTESIS



- **Instruments**

- Needle (18 – 22G), over the needle catheters (18 – 23G), specimen collection tubes, 3 way valve assembly, syringe 10 - 30ml

- **Indications**

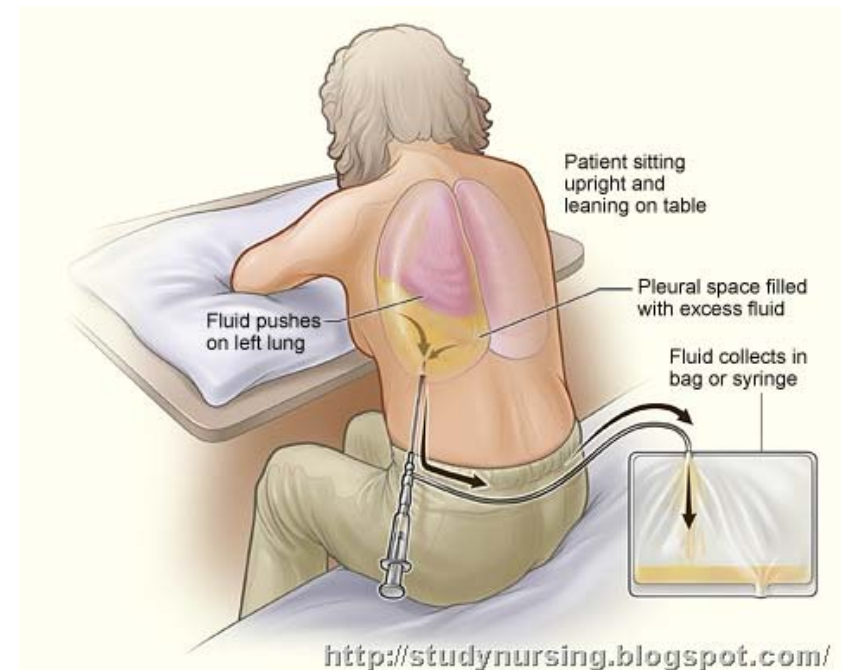
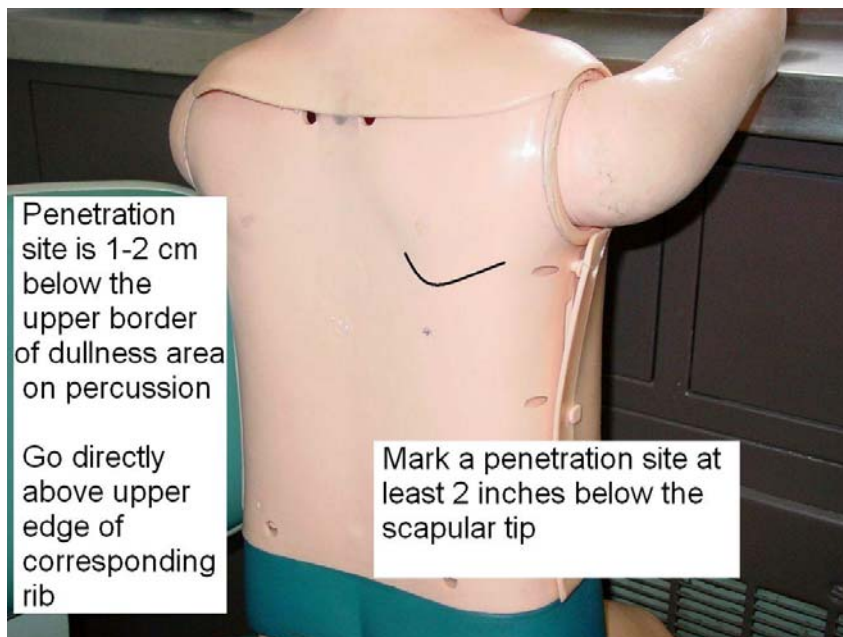
- Pleural effusion
- Pneumonia with effusion/ empyema
- Suspected malignancies



PROCEDURE

Child is made sit and lean to a support. Local anaesthesia is given and the needle with a 3 way valve and syringe is introduced through the upper border of a rib (to protect the vessels) and aspirated. If the aspirate is pus or is in large amounts intercostal tube is to be placed.

THORACOCENTESIS



THORACOCENTESIS SET



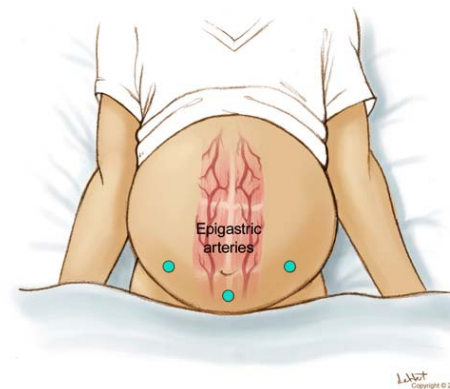
THORACOCENTESIS- COMPLICATIONS



- Pneumothorax (3-30%)
- Hemopneumothorax
- Haemorrhage
- Hypotension due to a vasovagal response
- Pulmonary oedema due to lung re expansion
- Spleen or liver puncture
- Air embolism
- Introduction of infection

ASCITIC TAP (PARACENTESIS)

- A wide bore needle with a syringe and a three way adaptor is used. Z track technique.
- Site chosen is junction between the medial 2/3 and lateral 1/3 of an imaginary line drawn from the ant sup iliac spine & umbilicus



BAG & MASK VENTILATION



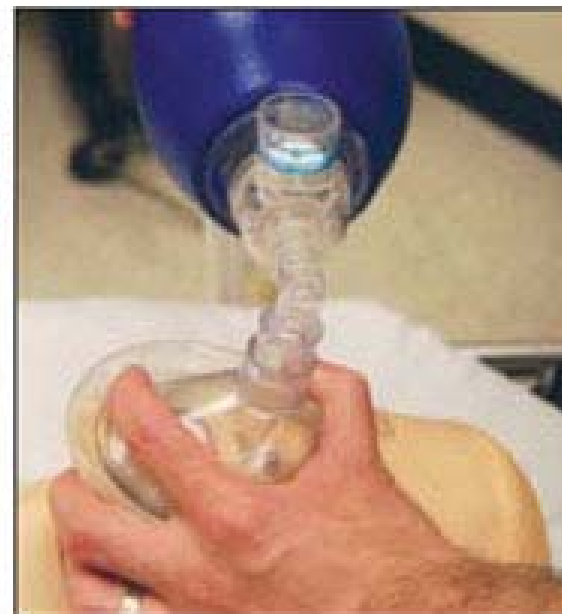
- Pulse Oximeter
- Oxygen source
- Bag-valve Mask device
- Cushioned rim mask with variable sizes
- Oropharyngeal airways
- Yankauer suction catheter with vacuum power source

BAG & MASK VENTILATION

Common pitfalls of BVM ventilation include inadequate positioning, improper mask holding, and failure to use an oral or nasal airway.



1) Ideal BVM positioning is obtained by aligning the patient's external auditory meatus with the sternal notch.



2) Traditionally, the 'EC' hand position is utilized to obtain a seal with the mask.

BAG & MASK VENTILATION



- Use a self-inflating bag with a volume of at least 450 to 500 mL for infants and young children, as smaller bags may not deliver an effective tidal volume.
- In older children or adolescents, an adult self-inflating bag (1000 mL) may be needed to reliably achieve chest rise.

BAG & MASK VENTILATION



100% oxygen is to be used during resuscitation. Titrate to $> 94\%$ once circulation is re-introduced

A self-inflating bag delivers only room air

To deliver a high oxygen concentration (60% to 95%), attach an oxygen reservoir to the self-inflating bag.

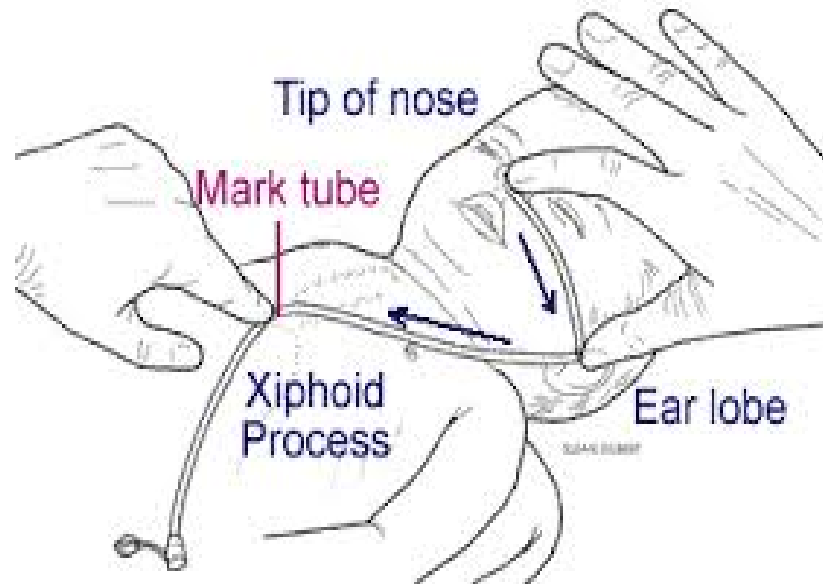
Maintain an oxygen flow of 10 to 15 L/min into a reservoir attached to a pediatric bag and a flow of at least 15 L/min into an adult bag.

FEEDING TUBE INSERTION



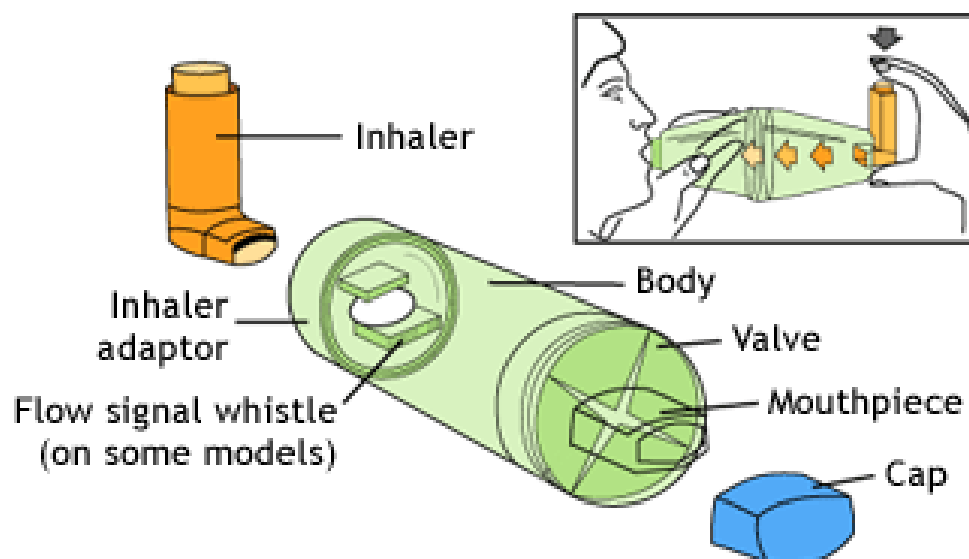
- Indications
 - stomach aspiration – poisoning etc..
 - Nasogastric feeding
- Different sizes are available No.5- No 10 are used at various ages for infants

FEEDING TUBE INSERTION



- The length to be inserted is measured from the nostril to the tragus of the ear and then to the xiphisternum. Once inserted push air through the tube & auscultate over the epigastrium to check position

MDI WITH SPACER



- Used for prophylaxis in persistent asthma
- Correct technique is to be taught to the child and parents
- Parts to be explained clearly

ENDOTRACHEAL INTUBATION



Indications:

Assisted ventilation

Drugs through ET route

Surfactant administration
in newborn RDS

Laryngoscope blades of different
sizes



ENDOTRACHEAL TUBES



Uncuffed tubes starts with 2.5



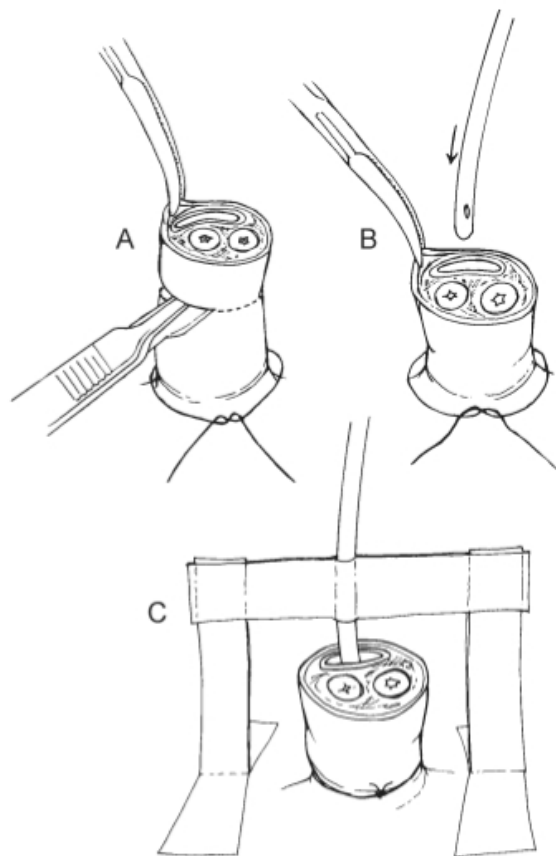
Cuffed tubes for older children



UMBILICAL VEIN CATHETER

Inserting an umbilical vein catheter

- A. Preparation of the umbilical cord
- B. Inserting the catheter into the umbilical vein. This is the larger, thin walled structure towards the head. Note the two umbilical arteries, which are thick-walled and towards the legs of the infant.
- C. Fixation of the inserted catheter, which prevents kinking



Used in newborns for Exchange transfusion and also as venous access for giving IV fluids, drugs etc.. and obtaining samples in preterms when peripheral lines are not available

LIVER BIOPSY



Indications

- Chronic hepatitis, cirrhosis, storage disorders
- Malignancies, undiagnosed hepatomegaly
- To differentiate between neonatal hepatitis and biliary atresia.

Pre- requisites

- Prothrombin Time
- Blood group & crossmatching
- Vitamin K administration before biopsy

LIVER BIOPSY NEEDLE



Vim Silverman Needle



Different types of needles are used

- Vim Silverman
- Menghini Needle
- Trucut Needle

LIVER BIOPSY- PROCEDURE



When using Menghini, after making a track with the track maker, the needle is fitted with a 2 ml syringe containing normal saline and introduced. The needle is first flushed and then applying a suction force it is advanced further and quickly withdrawn. The specimen is then flushed out of the needle.

Thank You

