Care of the child with a Tracheostomy

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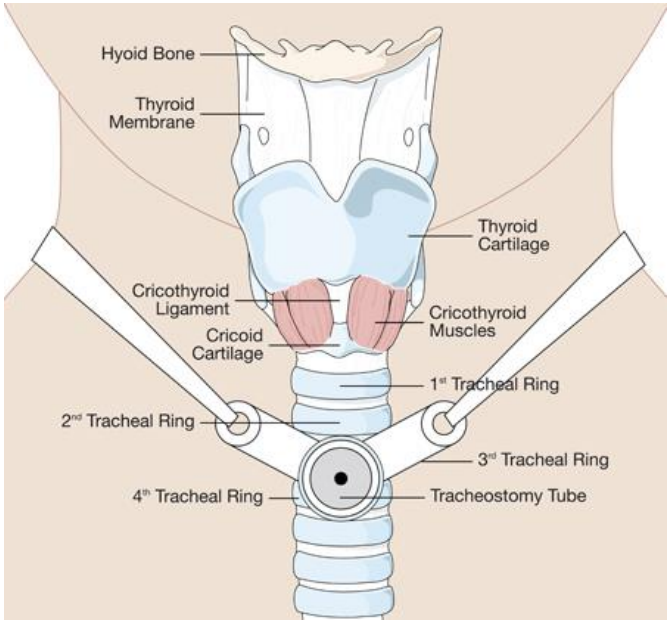
Anatomy & Physiology of Trachea:

- Extends from cricoid cartilage to carina
- Length:
  - 4cm in FT infant
  - 11-13cm in adult
- Diameter:
  - 3.6mm in FT infant
  - 12-23mm in adult
- Composed of smooth muscle supported by 16-20 horse-shoe shaped cartilagenous rings


Hyoid Bone
Thyroid Membrane
Thyroid Cartilage
Cricothyroid Ligament
Cricothyroid Muscles
Cricoid Cartilage
1st Tracheal Ring
2nd Tracheal Ring
3rd Tracheal Ring
4th Tracheal Ring
Tracheostomy Tube

Indications for Paediatric Tracheostomy

- 1. Upper Airway Obstruction- causes
  - **Congenital:-**
  - Sub-glottic stenosis
  - Bilateral Vocal cord paralysis
  - Pierre Robin Sequence (Micrognathia/Macroglossia)
  - Tracheomalacia/Bronchomalacia

Upper Airway Obstruction

- **Acquired** :-
- Subglottic stenosis
- Trauma
- Inflammation(acute epiglottitis)
- Tumour

Indications cont'd

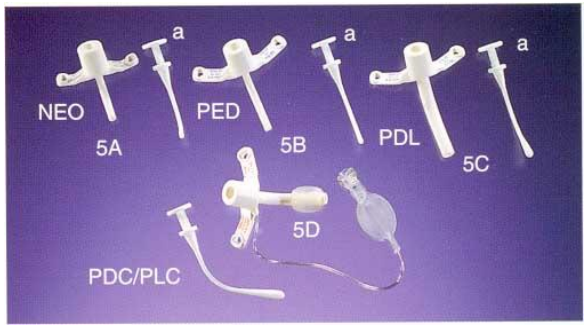
- 2. **Ventilation insufficiency**:-
- - To reduce dead space
- - Prolonged intubation
- - Pulmonary disease
- - Neurological disease

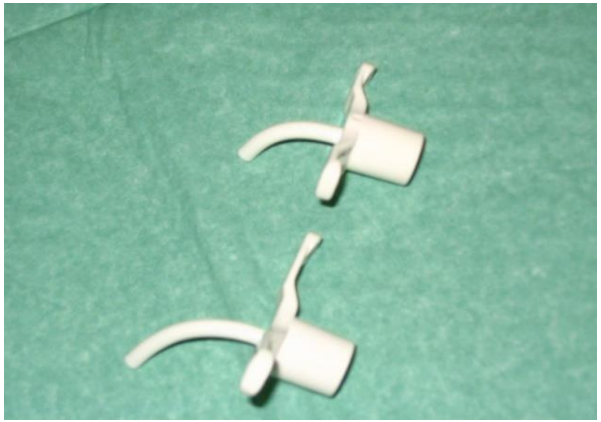
Indication's cont'd

- **3. Protection of tracheobronchial tree**:-
- -Aspiration risk
- - Neurological disease
- - Head + Neck surgery
- -Trauma
- - Coma (e.g. Post head injury)

Considerations when choosing a tube

- Neo or Ped
- Single or Double lumen
- Cuffed or Uncuffed
- Fenestrated or Unfenestrated
- PVC or Silicone
- Flextend or Customised tubes





Bivona Tube

Bivona Tube

- Bivona tubes – may be reprocessed for single –patient use up to 5 times.
- Contra-indicated with MRI & laser & electro-surgical devices. Change to Shiley tube pre procedure.
- **N.B** use sterile water when inflating cuff.

Physiological changes post tracheostomy

- Reduced dead space by approx 70%
- Easier breathing
- Loss of filtering warming & humidification of inspired air
- Reduction or loss of voice

Complications of Paediatric Tracheostomy

- **Immediate**:-
- Haemorrhage or haematoma
- Anaesthetic problems
- Damage to local structures
  - Pneumothorax
  - Recurrent Laryngeal Nerve
  - Oesophagus

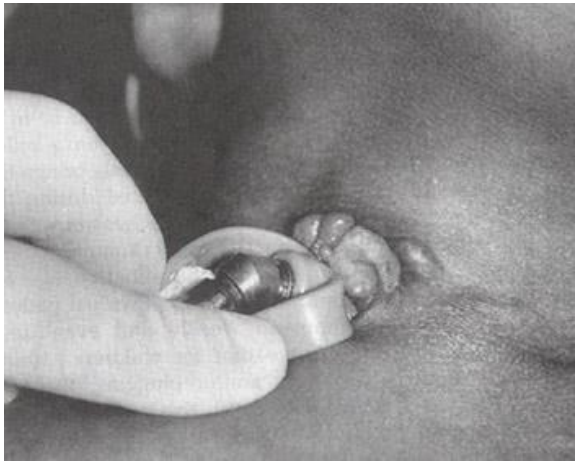
Complications cont'd

- **Early**:-
- - Tube dislodgement
- - False passage
- - Surgical Emphysema
- - Obstruction of tube or trachea
- - Infection
- - Haemorrhage

Complications cont'd

- **Late**:-
- -Granulations
- -Suprastomal Collapse
- -Chest Infection
- -Colonization with MRSA/Pseudomonas
- -Dysphagia/Speech delay
- -Laryngotracheal stenosis

Granulation tissue around stoma



Transfer from theatre to ICU/HDU

- Safety- care with handling, not to dislodge tube
- Oxygen/Ambu bag/ MIE circuit, suction machine to accompany child
- Emergency case/bag with child
- Stay sutures labelled?
- Post op Chest X-Ray requested

Nursing Documentation

- Why was the tracheostomy performed?
- Is the child intubatable or has (s)he a patent upper airway?
- Is the tube patent?
- Is the tube secure?

Nursing Care

- **Aims:-**
- - Maintain Patent Airway
- - Facilitate removal of pulmonary secretions
- - Provide adequate humidification
- - Care of stoma
- - Early recognition of complications

Nursing Concerns

- Avoid Accidental Decannulation
- Avoid Tube Blockage

- **N.B.** Children with a tracheostomy require constant supervision at all times

Bedside Equipment

- Oxygen supply with connection tubing suitable for tracheostomy
- Ambu bag/ MIE circuit if required
- Suction machine with appropriate size suction catheters
- Emergency bag (refer to contents list)
- Emergency tracheostomy surgical pack at bedside (CUH) < 4weeks
- Humidification system-Fisher Pakel/HME
- Daily check list completed

Tube patency

- How do you know that the tube is patent

Indications for suctioning

- secretions visible at the trach port
- Noisy respirations
- Tachycardia/tachypnoea
- Restlessness in babies
- Older child will communicate
- Increased respiratory distress
- Colour changes
- Desaturation

Suctioning

- Hand Washing/Gloves/Goggles
- Duration- 5 seconds per suction (may suction 2-3 times using same catheter only if secretion loose and clear if secretions thick and coated replace suction catheter per suction)
- Depth – refer to tube measurement (outer diameter of the obturator from entry point to exit point of the tube)
- Pressure – no greater *60-80mmHg <4 weeks, 80-100mmHg 4 weeks up to 3 years,100-120mmHg >3 years* when suctioning.
- Size of suction catheter- double size of tube

Humidification

- The nose & pharynx provides 75% of normal humidification, which a tracheostomy tube bypasses
- Therefore there is loss of warming, moistening and filtering
- This results in bronchonstriction reducing airflow, a dehydrated respiratory tract, impaired mucociliary function,sputum retention & atelectasis

(Woodrow, 2002)

How do we provide humidity?

- Heat Moisture Exchange Filters (HME)
- Heated humidity (all new trache's)
- Nebulisation
- Hydration

Heat + Moisture Exchanger

- Trap warmth + moisture of expired air in cylinder coil.
- Inspired air is warmed + humidified through the coil.
- HME acts as macroscopic particle trap
- Change once wet

Stoma and Skin Care

- Inspect stoma daily
- Vigilant cleaning with gauze and Nacl around stoma
- Wash the skin under the ties with warm soapy water, rinse and pat dry thoroughly
- Apply padding under the ties and skin protector if altered skin integrity evident.
- Trachi dress if required otherwise stoma is left exposed
- Observe for redness, swelling or discharge
- Avoid the use of powder and cotton wool

Stoma and Skin Care

- Common problems:
- Redness
- Dryness
- Excoriation
- Granulation tissue
- Fissures and skin breakdown

Skin excoriation

3 Days later

Skin Inflammation

Stoma excoriation

Securing Tracheostomy Tube

- Marpac tapes
- Older child may consider Velcro tapes
- Tapes changed PRN, wet ties provide a medium for skin breakdown
- Rule of thumb! Tip of finger only should fit between neck + ties with head flexed forward

Routine Tracheostomy tube change

- Preparation
- Position
- Proficiency
- Demeanour/Reassurance

Routine tracheostomy tube change

- Shiley tubes changed weekly, Bivona tubes changed monthly.
- Always a 2 person procedure except in emergency
- Remember to remove obturator once new tube inserted

Tube Blockage

- Early detection is crucial

- Signs to observe for may include the following
  failure to pass suction catheter
  failure to ventilate
  retractions
  pallor/cyanosis
  desaturation
  respiratory arrest

Management of Blocked Tube

- Shout for help
- Cut ties and remove blocked/dislodged tube
- Insert new tube as quickly as possible, and remember to remove introducer
- Assess for breathing
- If child not breathing follow BLS sequence

Parental Education

- Early involvement of parents with tape changing, suctioning and tube changes
- Encourage parents to take child off ward once training + Basic Life Support completed
- Phased discharge is important where feasible.
- Rooming in with child prior to discharge (24hrs-48hrs) encourage parents to take child out for hours from the hospital

Parental education cont'd

- The family must develop the skills needed to competently and independently provide tracheostomy care for their child.
- At ward level the staff nurse plays a huge role in encouraging the confidence and the skills in the parents to enable them to take their child home

Discharge Planning

- Aim is to get child home as soon as possible
- Multidisciplinary approach
- Start discharge process early- identify link nurse/discharge coordinator
- Early involvement of community care team + local hospital
- Ensure family supports are in place prior to discharge

Parental Support

- Tracheostomy Info Booklet
- Parent Workbook
- Tracheostomy Awareness Group (TAG)
- Link with another family
- Internet/resources
- Family support is vital, Medical Social Worker, Speech + Language Therapist, Counselling services +/- Psychology + GP

Follow up + Management

- Regular Microlaryngobronchscopy (MLB) + re-evaluation in OPD as necessary.
- Decannulation- Two methods
- 1. Ward decannulation.
- 2. Surgical decannulation- requires airway reconstruction .

Decannulation

- Decannulation=removal of a tracheostomy tube
- Surgeon will consider decannulation when there is
  - satisfactory pulmonary function
  - an adequate airway (at least 50% of normal)
  - adequate vocal cord function

Assessment

- A Microlaryngobronchoscopy (MLB) to ensure that there has been resolution of the original lesion and no evidence of complications i.e. granuloma's/supra stomal collapse

- Child will be off ventilation a minimum of 2 weeks

Preparation of child/family

- Emotional time for child/parents devastating if it fails !
- Ward decannulation is always called a ‘trial’ because there is no guarantee it will be successful
- Consider psychology for older child

Ward Decannulation

- Day 1- Downsize and TOSCA
- Day 2-Tracheostomy tube is capped
- Day 3-Removal of Tracheostomy tube

Post Decannulation

- Parents are re trained Basic Life Support
- Follow up in ENT Outpatients
- PHN contacted
- Parents hold on to supplies & equipment until review in OPD
- Return to school within 1 week if well
- Swimming once stoma site is sealed
- Reduction or discontinuation of homecare package one week post decanulation

Questions

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