Airway Indications for a Tracheostomy and Tubes

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Topics

- Indications for tracheostomy tubes
  - congenital upper airway obstruction
  - acquired upper airway obstruction
  - chronic aspiration
- Types and sizing of tracheostomy tubes
- Developmental considerations

Indications for a Tracheostomy

Upper Airway Obstruction

Congenital

- Congenital Craniofacial Syndromes
- Other congenital syndromes
- Blockage from polyps, tumors, or cystic hygromas
- Malacia of trachea or bronchi
- Vocal cord paralysis
Indications for a Tracheostomy
Upper Airway Obstruction

Congenital Craniofacial Syndromes
Abnormalities of midfacial area

- abnormalities in the growth of the skull and facial bones
- choanal (nasal) atresia or stenosis
  - infants are obligate nose breathers
- narrow nasopharyngeal channels
- relative small mandible (lower jaw)
- relatively large tongue


Indications for a Tracheostomy
Upper Airway Obstruction

Congenital Craniofacial Syndromes

- Pierre Robin sequence
- Treacher Collins
- Goldenhar
- Nager

http://tracheostomy.com/trachkids/

Retrieved from http://www.tcconnection.org/

http://tracheostomy.com/trachkids/

Indications for a Tracheostomy
Upper Airway Obstruction

Congenital Craniofacial Syndromes

Surgical placement of
Mandibular lengthening devices

After removal of devices

Indications for a Tracheostomy
Upper Airway Obstruction

Congenital Syndromes

• Down’s Syndrome
  - upper airway obstruction
• CHARGE syndrome
  - choanal stenosis


Indications for a Tracheostomy
Upper Airway Obstruction

Congenital Defects

Blockage from
• polyps,
• tumors,
• hemangiomas
• cystic hygromas

Localized lymphangioma is typically multicystic and/or multinodular.


Indications for a Tracheostomy
Upper Airway Obstruction

Congenital Malacia

• Malacia of larynx, trachea, or bronchi
• Softening of the cartilage resulting in collapse of the airway

Indications for a Tracheostomy
Upper Airway Obstruction
Acquired Causes

- Vocal cord paralysis
- Subglottic stenosis from intubation
- Injuries or burns to the head/neck that cause airway swelling


Indications for a Tracheostomy
Upper Airway Obstruction
Acquired Causes

Vocal cord paralysis
Unilateral vocal cord paralysis.
On left: Larynx in abduction.
On right: Larynx in adduction, showing paralyzed vocal cord (arrow).

Retrieved from http://www.emedicine.com/PED/topic2167.htm#section~pictures

Indications for a Tracheostomy
Upper Airway Obstruction
Acquired Causes

Subglottic stenosis from intubation
After repair with rib graft

Retrieved from http://www.emedicine.com/PED/topic2167.htm#section~pictures
Indications for a Tracheostomy

**Upper Airway Obstruction**

**Acquired Causes**

- **Injuries head/neck**
  - Thermal - burns
  - Chemical - caustic ingestion
  - Blunt trauma
    - Motor vehicle accident
    - Snowmobile/ ATV
    - Direct blow to neck

  Tend to be school aged boys

Retrieved from http://www.mccall-idchamber.org/visiting/snowmo/1snowmo.html

**Chronic Aspiration**

- Recurrent pneumonia
  - Inadequate ability to swallow oral secretions
  - Impaired nasopharyngeal control
  - Associated with developmental delay, CP, and seizure disorder


**Laryngotracheal separation**

- Surgical separation between the larynx and trachea
- Tracheostomy stoma is the only airway

Types of Tracheostomy Tubes

Parts of a Tracheostomy Tube

- **An adaptor**
  - the portion of the trach tube seen on the outside of the patient's neck between the flanges
- **Flange**
- **Tube**
- **Obturator**

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Tube Selection:
Size and Curvature

- Consider
  - Length
  - Internal diameter
  - External diameter
  - Curvature

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Types of Tracheostomy Tubes

Sizing of a Tracheostomy Tube

- Variable sizes & styles
- Consider
  - Length
  - Internal diameter
  - External diameter
  - Curvature

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Sizing of a Tracheostomy Tube [Diagram]

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Retrieved from: [Website Link]
Types of Tracheostomy Tubes

Sizing of a Tracheostomy Tube

- **Length**
  - Neonatal pediatric or adult tube
- **Internal diameter**
  - Measured in mm for neonatal and pediatric sized tubes
- **External diameter**
  - Larger with a double cannula tube
- **Curvature**
  - Need to avoid touching the posterior wall of the trachea

Types of Tracheostomy Tubes

Composition of tube

- Rigid
  - Metal
- Polyvinyl chloride
- Silicone
- Flex

Types of Tracheostomy Tubes

Jackson Metal

- All have inner cannula can be cleaned
- Needs special adaptor to connect to a ventilator or resuscitation bag
- Can be sterilized & used for several patients
- May be hard on the airway
- Very durable
Types of Tracheostomy Tubes

Plastic Tracheostomy Tubes

- No inner cannula for smaller neonatal and pediatric sizes
- One patient use
- Universal adapter for resuscitation bag or ventilator
- More flexible

Types of Tracheostomy Tubes

• **Shiley®**
  - most common
  - PVC Plastic

Types of Tracheostomy Tubes

• **Bivona®**
  - Silicone plastic with wire coil
  - More flexible
  - Swivel attachment
  - Wedge to remove for cleaning
Types of Tracheostomy Tubes

Double Cannula
- Available on adult trach tubes
- Disposable and non-disposable inner cannulas

Cuffed Tube
- Additional parts: Cuff, pilot balloon, and a pilot line
- Indications:
  - To try to limit aspiration
  - Chronic nocturnal ventilation
  - High pressure ventilation

Complications
- Tracheomegaly
- Tracheal stenosis
- Trachea perfusion compromise
Types of Tracheostomy Tubes

**Air Cuffed Tube**
(high volume/low pressure)
- Do NOT use minimal leak techniques
- Maintain cuff pressure < 20 cm of H2O

Shiley® Cuffed Pediatric

Bivona® Aire-Cuf® Neonatal and Pediatric Silicone Tracheostomy Tubes


**Tight to Shaft Cuffed Tube**
(high pressure/low volume)
- Bivona® tight-to-shaft, inflated with water
  - Do not inflate to occlusion
  - Optimal inflation is less than minimal diameter of the trachea
  - Unable to determine transtracheal pressure

Bivona® TTS™ Cuffed Neonatal and Pediatric Silicone Tracheostomy Tubes

The TTS™ tube is like an uncuffed tube, but it has a cuff. When completely deflated, it collapses tight to the shaft of the tube.


**Foam Cuffed Tube**
(high volume/low pressure)
- Remove air before insertion
- Pilot balloon kept open to manage pressure

Fome-Cuf® tubes are a unique problem-solver that is used to address extremely difficult airway management problems.

These tubes are ideal when long-term ventilator support is indicated

Cuff Leak

• Signs
  - Frothy and thinner secretions or signs of recently eaten food
  - Increased vocalization
  - Low pressure alarm or airway pressure readings decreased on vent
  - Pilot balloon is flat or air can't be withdrawn from cuff
• Intervention
  - Withdraw any air or fluid from the cuff. Then instill the prescribed volume.
  - Change trach if any of the above signs reoccur.

Developmental Issues

Infant

School Aged

Adolescent

Developmental Issues for Newborns

• Parents need to grieve the loss of the “Gerber Baby”
• May be first child for parents
• May delay normal development
• Child unable to cooperate
Developmental Issues for Toddlers/Pre-schoolers

- Increasing mobility
- Desire for independence
- Need to explore
- Other children
- Environmental concerns
- Educational system

Developmental Issues for School Aged Children

- Body image
- Integration into school
- Communication
- Autonomy

Developmental Issues for Adolescents

- Self cares
- Body image
- Increasing independence
- Transition to adult services

Retrieved from: http://joshuas.50megs.com/images/joshucorydad4-21-01.jpg

Retrieved from: http://wimedicalhometoolkit.aap.org/bios.cfm
Key Points:
Indications & Types of Tubes

- It is critical to know the reason a child has a tracheostomy as it may impact the care of the child
- There are a variety of tracheostomy tubes that may be used by children
- Know the brand, length, and size of the tube
- Remember developmental considerations