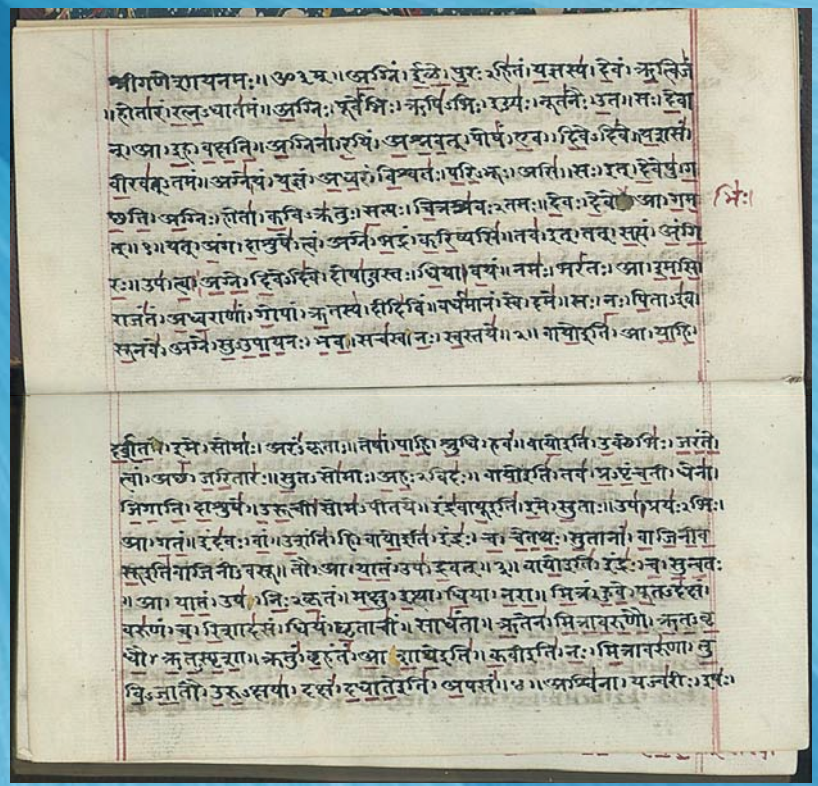
Tracheotomy

History

- -Discussed in the Ebers Papyrus and the Rig Veda
- -1500 BC



History

- -Treatment obstructive diseases (Antyllus, 2nd century AD)
- -Discussed in the writings of Braassarolo (1546)
- -Considered “futile and irresponsible”
- -Rarely preformed until 1883

History

- Trousseau, 1833:

  -discussed 200 cases in diptheria patients

- Wilson, 1932:

  -suggested the use in poliomyelitis patients

History

- Present Era (1965-present):

  -“Rational Period”

  -Indications, complications outlined

  -Modern trach

The Closeout

Patient Evaluation

- careful, thorough, rapid
- Presence of stridor?

  -Inspiratory (obstrxn at or above glottis)

  -Expiratory (usually more distal,tracheal)

  -Biphasic (possibly subglottic obstrxn)

Patient Evaluation

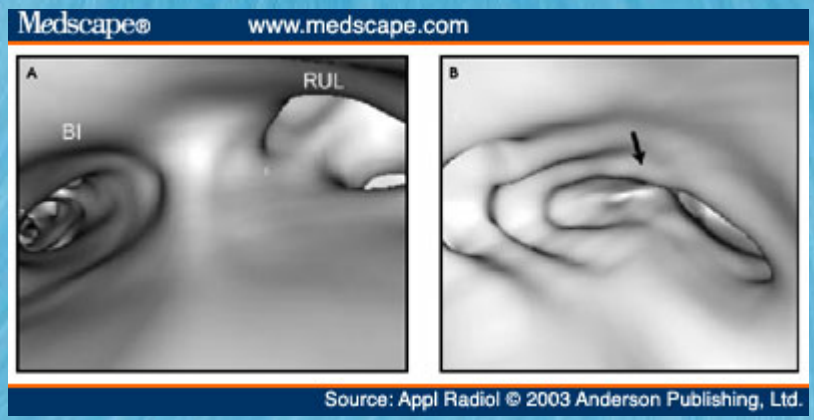
- Quality of Voice
  - -muffled (supraglottic)
  - -hoarse (laryngeal involvement, ie RRP)
  - -breathy (vocal fold paralysis)
- Other signs (supra/substernal retractions, tachypnea, cyanosis)

Patient Evaluation

Age

-Children (laryngomalacia, choanal atresia, hemangioma, tracheomalacia, infection)

-Adults (Tumors more common, trauma)



Patient Evaluation

- Suspicion of laryngeal trauma?

-Awake tracheotomy

-Flexible fiberoptic intubation

The Barrel (AKA the Tube, the Slot, the Shack)

Nonsurgical Measures

- Identify the difficult airway

  -Oxygen
  -mask ventilate, jaw thrust
  -Heliox (80%helium, 20%oxygen)

Nonsurgical Measures

- Oropharyngeal and Nasopharyngeal airways
- Good for patients with an altered mental state
- OPA's can obstruct if improperly placed
- NPA's can cause epistaxis

(Altered Mental State)

Nonsurgical Measures

- Steroids and decongestants:

Nonsurgical Measures

- Steroids and decongestants

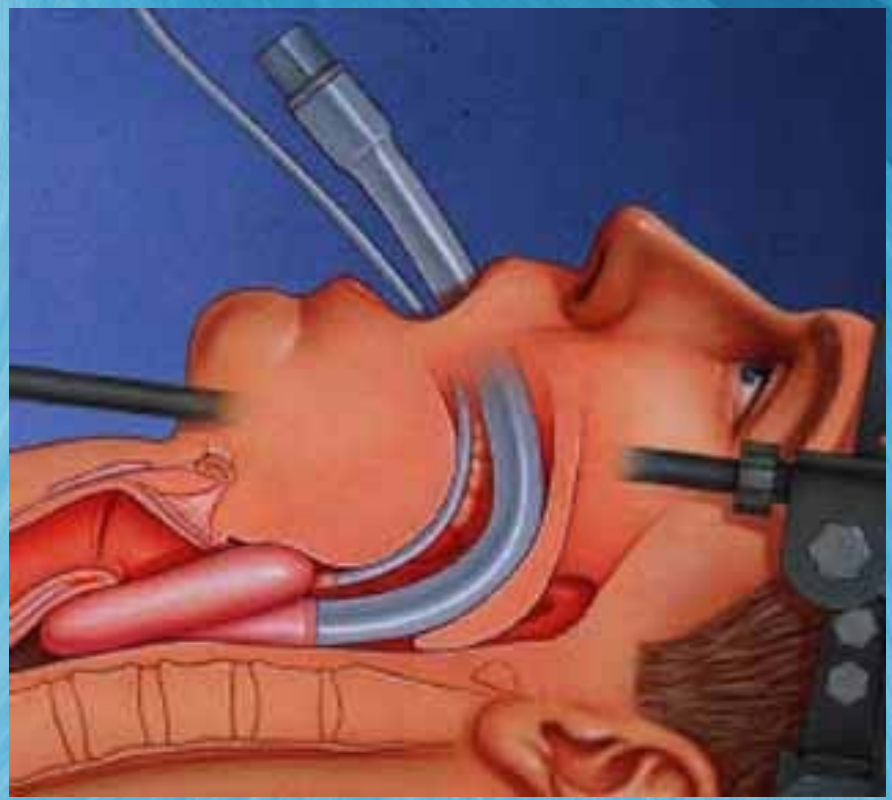
  -Steroids: (methylpred succinate (rapid onset) followed by dexameth)

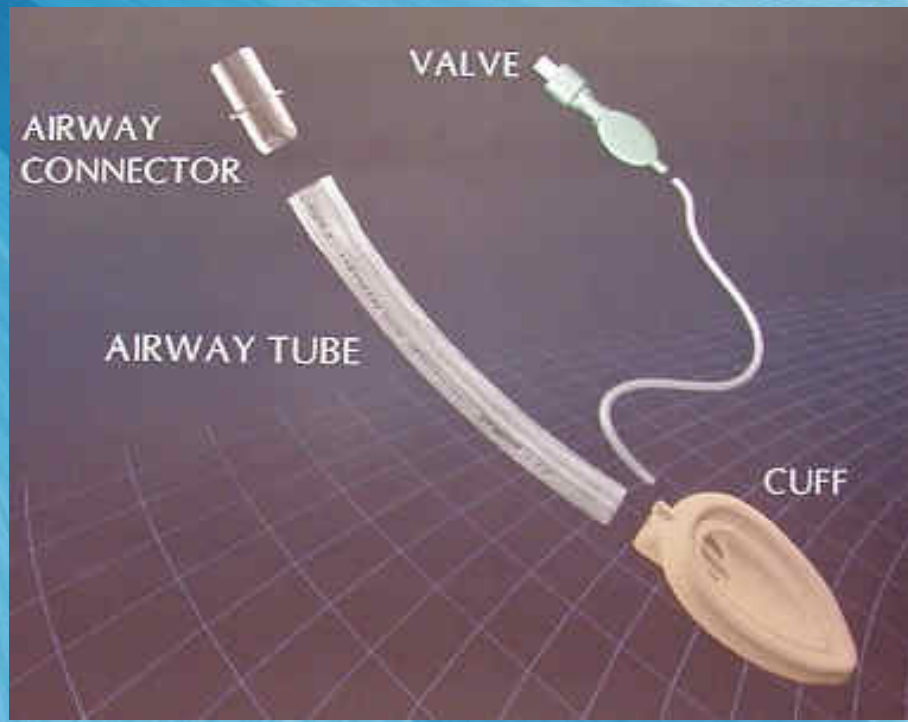
  -Racemic epi/aerosol epi: topical decongestant

Nonsurgical Measures

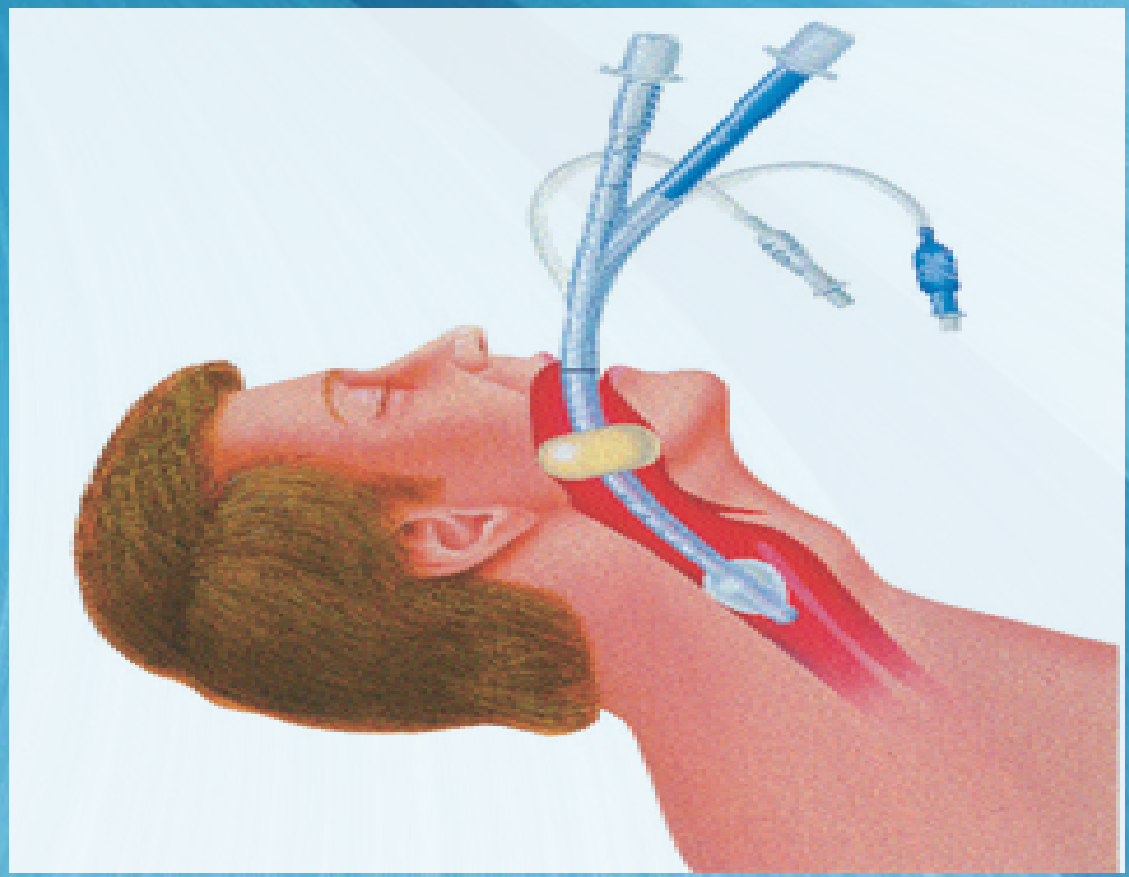
- -Endotracheal translaryngeal intubation
- -Jackson Sliding Laryngoscope
- -Fiberoptic intubation
- -Laryngeal mask airway (LMA)
- -Combitube

LMA



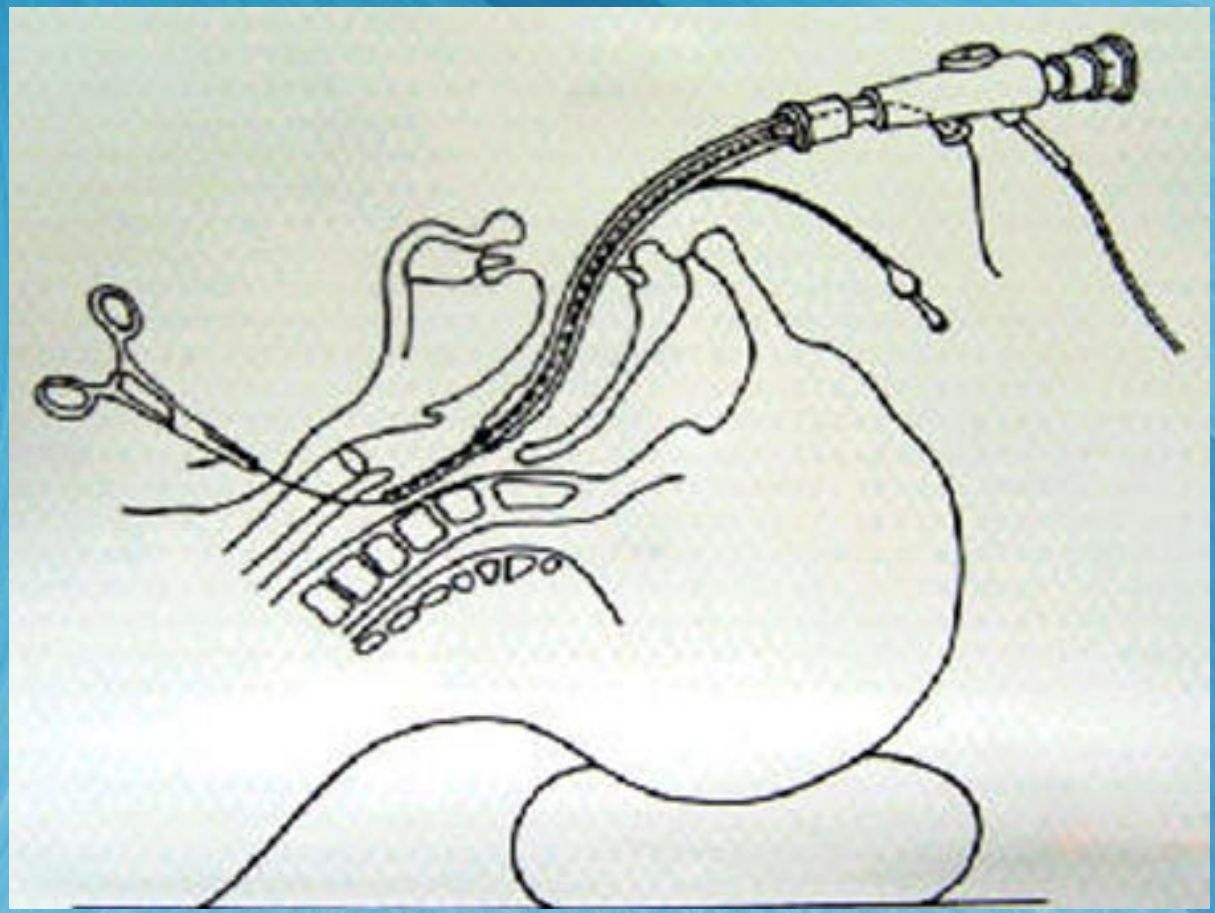


Combitube



Jackson Laryngoscope

Fiberoptic Intubation



Surgical Measures: Tracheotomy

Tracheotomy

- Indications:

  1)Major Head and Neck Surgery (often temporary airway)

  2) Bypassing upper airway obstruction

  3) Chronic ventilator dependency

  4) Relieving OSA

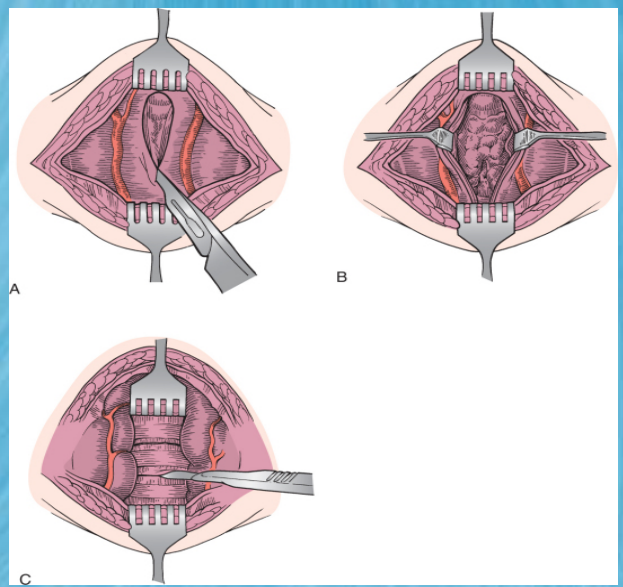
  5) Eliminating pulmonary dead space

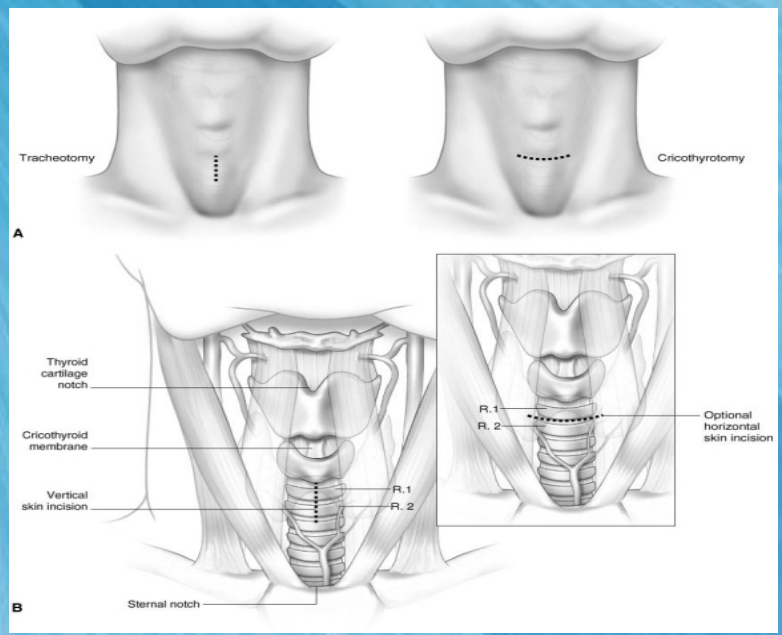
  6) Management of secretions, including aspiration.

  7) Emergent indications

Description of Procedure

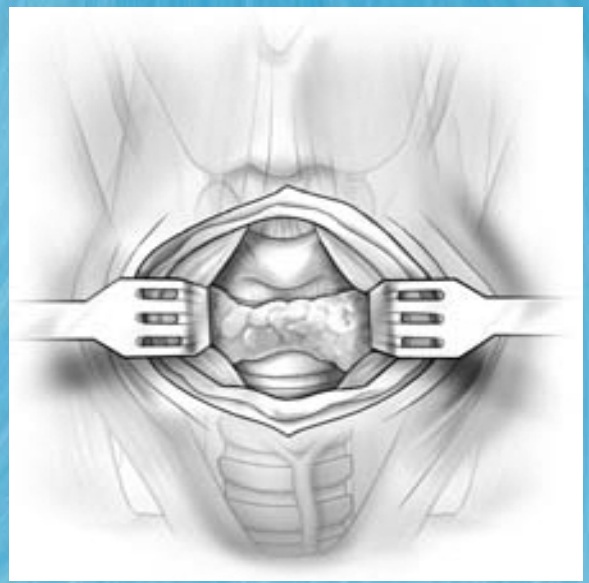
- Skin Incision
- Platysma divided
- Strap muscles separated in the midline
- AJs retracted laterally or ligated

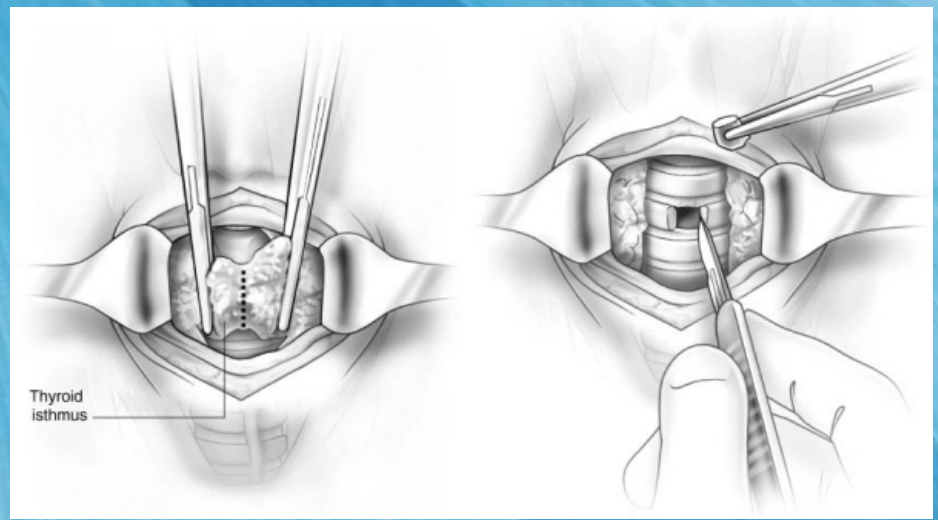




Description of procedure

- Thyroid isthmus divided or retracted
- Cricoid hook to pull trachea anteriorly
- Fascia removed from anterior trachea





Description of procedure

- Incision (btwn 2nd and 3rd tracheal rings)
- Bjork flap

-reduces the incidence of accidental decann. and makes reinsertion easier.

-contraindicated in children

- Et tube withdrawn slightly

Description of procedure:

- Trach tube or endotracheal tube inserted
- Ventillation confirmed

Emergent Tracheotomy

1) Severe Maxillofacial trauma
2) Hemorrhage or emesis
3) Cervical spine injury
4) Endotracheal intubation failed or not possible
5) Laryngeal trauma (severe)

Emergent Tracheotomy

- Vertical incision
- Left hand
- -stabilizes larynx; palpates trachea
- Airway entered
- Endotracheal tube inserted
- -Cricoid hook can be used to stabilize trachea during insertion (if avail)
- Ventillation confirmed
- Hemostasis
- Revision

Complications

- complication rate of between 5% to 40% In
- 1130 surgical tracheotomies: major complication rate for surgical tracheotomy 4.3%, with a mortality rate of 0.7%
- -Goldenberg D, Ari EG, Golz A: Tracheotomy complications: a retrospective study of 1130 cases. *Otolaryngol Head Neck Surg* 2000; 123:495-500.and others
- Overall: Hemorrhage (3.7%);Obstruction (2.7%); Tube displacement (1.5%)
-

The Snap

Complications

- **Immediate**

  -hemorrhage

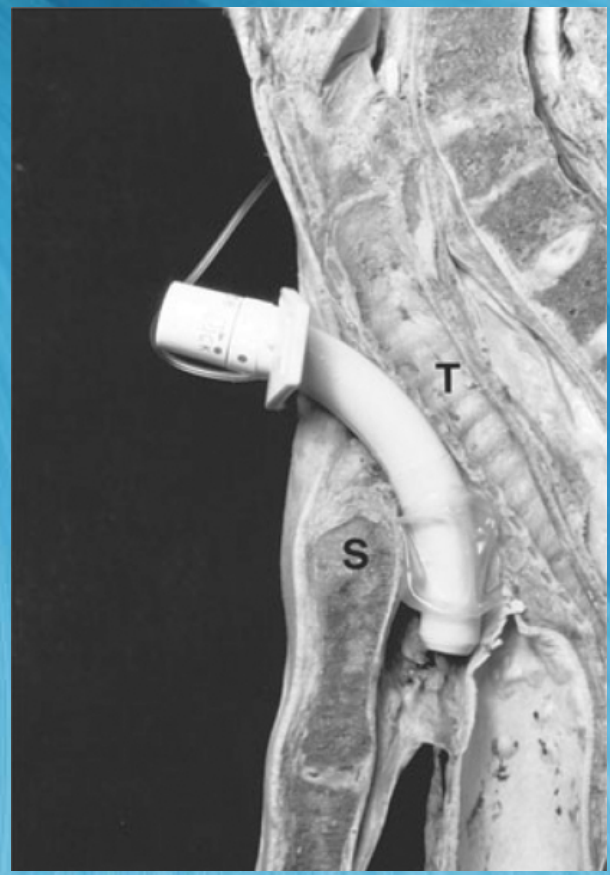
  -false passage

  -airway fire

  -damage to surrounding structures

False Passage

Figure 68-8 Mechanism of false passage between the sternum (S) and the trachea (T). *(From Myers EN, Stool SE, Johnson JT: Complications in tracheostomy. In Myers EN, Stool SE, Johnson JT [eds]: Tracheostomy. New York, Churchill Livingstone, 1985, p 150.)*



Complications

Intermediate (hours-days)

-delayed hemorrhage

-tracheitis, stomal cellulitis

-mediastinitis

-subcutaneous emphysema or pneumomediastinitis (0-9% incidence); commonly children

-PTX (0-4% incidence)

-Obstruction (usually a blood clot, decannulation) (2.5% incidence)

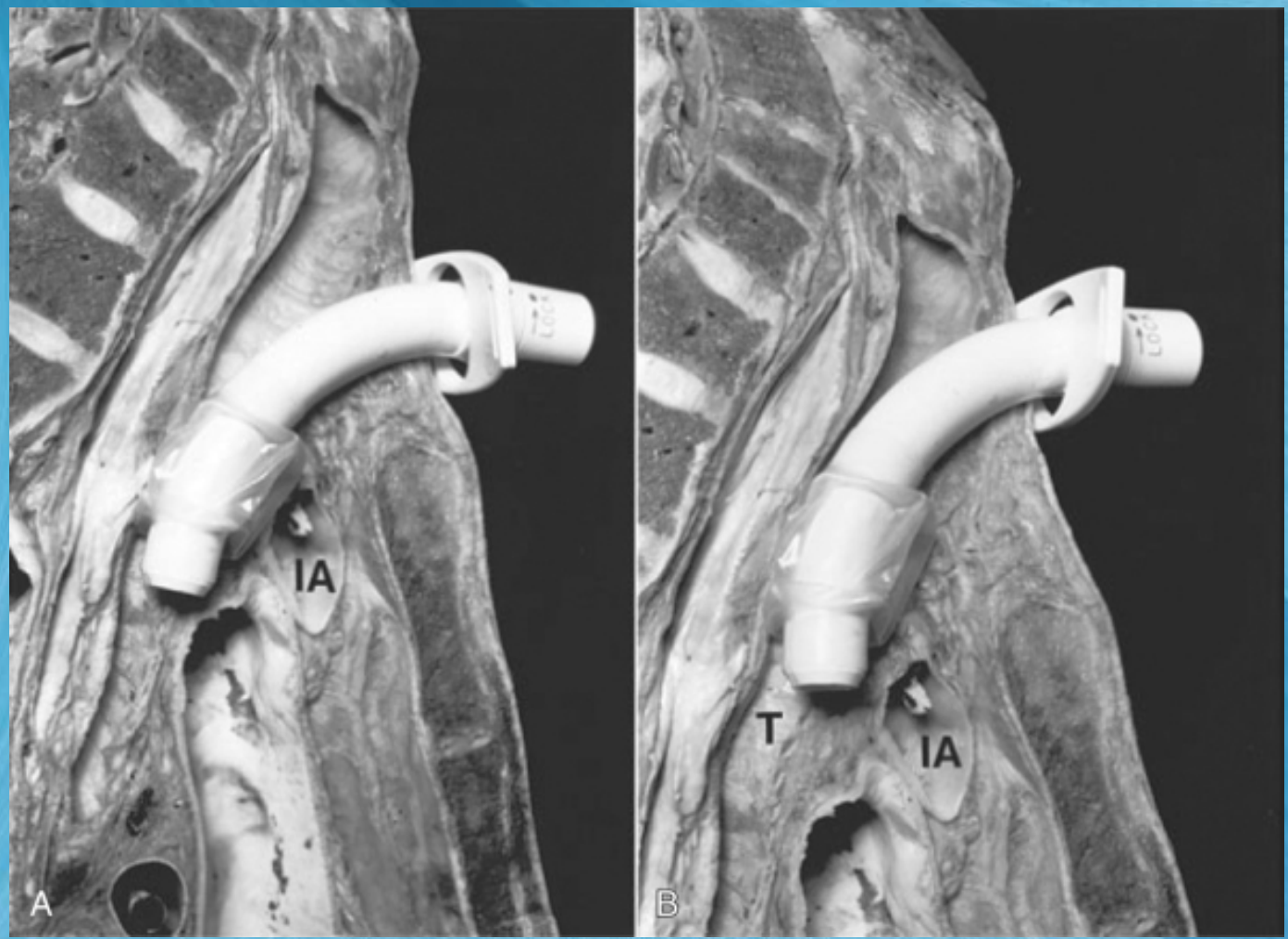
Complications

Delayed

- delayed hemorrhage
  - -grannulation tissue
  - -trachea-innominate artery fistula
- Tracheoesophageal fistula
- Tracheal stenosis
- Tracheocutaneous fistula

TI Fistula

Mechanism of erosion of the innominate artery (IA) by pressure from the concave surface of the tracheostomy cannula. **B,** Pressure of the tip of the tracheostomy cannula on the anterior tracheal wall (T) causes erosion into the innominate artery (IA). *(From Myers EN, Stool SE, Johnson JT: Complications in tracheostomy. In Myers EN, Stool SE, Johnson JT [eds]: Tracheostomy. New York, Churchill Livingstone, 1985, p 167.)*



Postoperative Care

- -Humidified air
- -Frequent suctioning
- -Trach change

Decannulation

-Good airway patency (disease process treated)

-fiberoptic exam VS downsizing and capping

Pediatric tracheotomy:

- -Similar to adult
- -Simple vertical incision
- -Often performed concurrently with bronchoscopy
- -Avoid Bjork flap
- -Avoid tracheal ring excision
- -Avoid emergent trach
- -Use stay sutures (4.0-5.0 nonabs. Monofilament)

Percutaneous tracheotomy

- Preoperative Planning
  - Intubation cart
  - Coags
  - Physical exam (High Innom? Obese?)

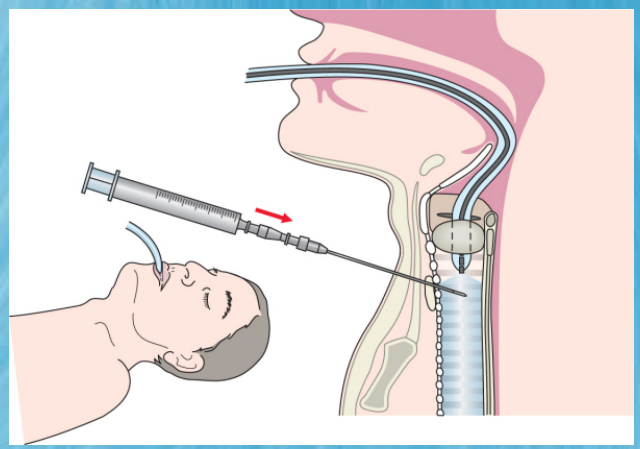
Endangered Species

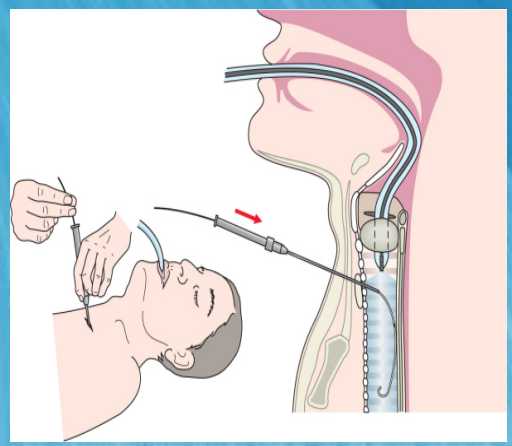
Percutaneous tracheotomy

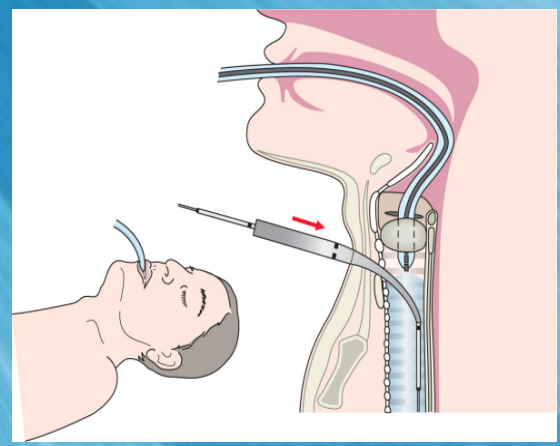
- Anesthesia:
  - Local (1% epi w/lidocaine)
  - Topical via bronchoscope or transtracheal
  - IV sedation

Percutaneous tracheotomy

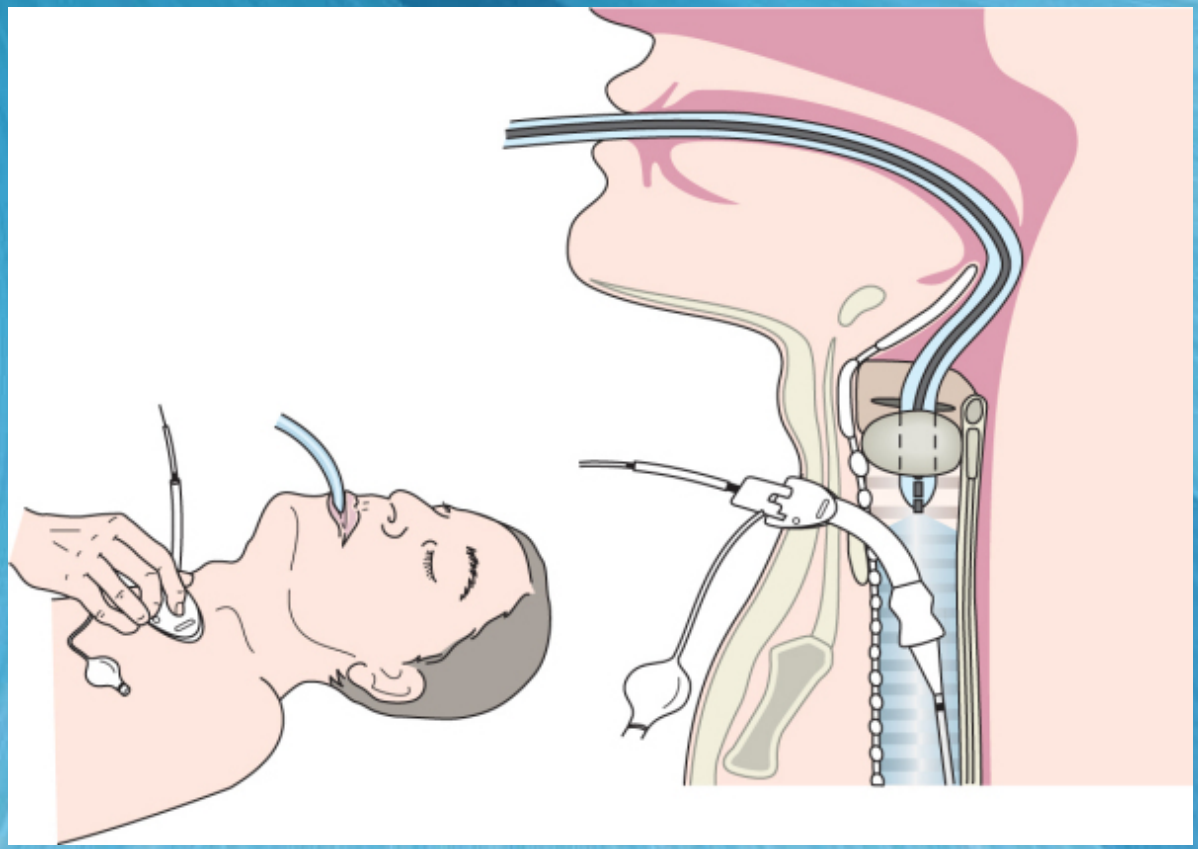
- -Needle→ Guidewire
- - Serial dilation
- -Insertion of trach tube







Percutaneous Tracheotomy



Percutaneous tracheotomy

Advantages:

- -short operative time
- -easy
- -bedside
- -low cost

Percutaneous Tracheotomy

Disadvantages:

- -potential complications
- -blind tracheal entry

Percutaneous Tracheotomy

- Relative contraindications
- Absolute contraindications

Percutaneous Tracheotomy

- PEARLS:
- • **The airway should be stabilized by endotracheal intubation or introduction of a bronchoscope to ensure an orderly tracheostomy.**
  • **Patients who will require long-term ventilatory assistance should undergo earlier conversion from endotracheal intubation to tracheostomy to prevent complications such as laryngeal or subglottic stenosis.**
  • **Traction sutures in open surgical tracheostomy are helpful in maintaining an airway in cases of a displaced tracheostomy tube in the immediate postoperative period.**
  • **Extended length tracheostomy tubes should be used in obese patients to reduce the risk of accidental decannulation.**
  • **Preoperative and/or predischarge teaching makes postoperative care of the tracheostomy considerably easier for the patient.**
  • **The use of bronchoscopy is mandatory in all cases of percutaneous dilatational tracheostomy.**
  • **Endoscopic percutaneous dilatational tracheostomy is especially well suited to adult patients in the intensive care unit because it is safe, simple, and can be performed at the bedside, reducing the need and expense of moving the patient to the operating room.**

Percutaneous Tracheotomy

- **PITFALLS**
- • **Failure to stabilize the airway before tracheostomy may result in intraoperative or postoperative complications or death.**
  • **Delay in conversion from long-term endotracheal intubation to tracheostomy may result in laryngeal or subglottic stenosis.**
  • **Absence of tracheal traction sutures following open surgical tracheostomy may compromise the ability to appropriately reposition a displaced tracheostomy tube in the early postoperative period.**
  • **Lack of adequate light, suction, retraction of tissues, as well as failure to maintain dissection in the midline may lead to injury to major arteries and nerves.**
  • **Unless the anesthesia team is present and alerted, adequate cardiopulmonary resuscitation may not be available for the patient undergoing tracheostomy for chronic obstruction of the airway.**
  • **Inadequate training, inappropriate patient selection, and lack of attention to technical detail may increase the risk of complications in endoscopic percutaneous dilatational tracheostomy.**

Percutaneous tracheotomy

- Children aside, endoscopic perc. Tracheotomy is a viable alternative to surgical trach when performed by an experienced surgeon

  -Kost KM. endoscopic percutaneous dilational tracheotomy: a prospective evaluation of 500 consecutive cases. *Laryngoscope*. 2005; 115 (10 pt 2):1

QUIZ

a)Endangered Species
b)Barrel
c)Snap
d)Closeout

a)Endangered Species
b)Barrel
c)Snap
d)Closeout

a)Endangered Species
b)Barrel
c)Snap
d)Closeout

a)Endangered Species
b)Barrel
c)Snap
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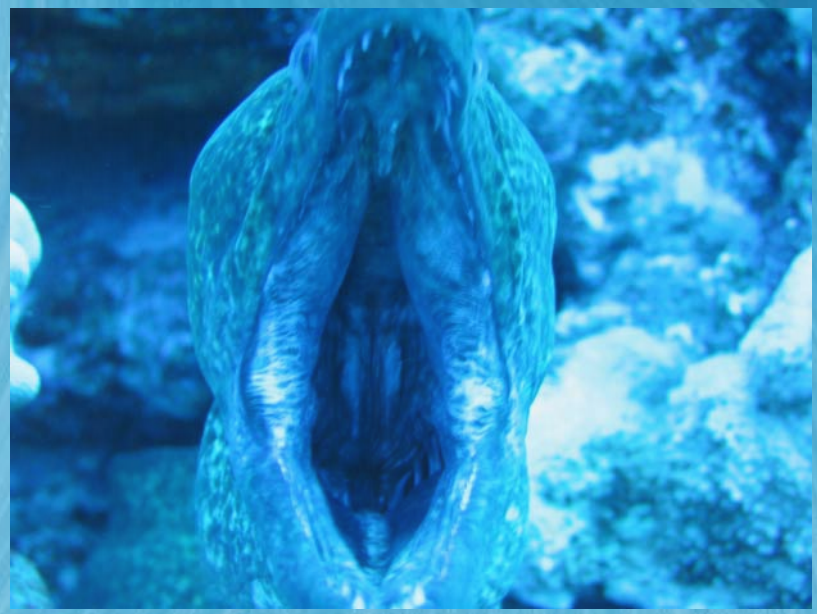

- Frost EA. Tracing the tracheostomy. *Ann Otol Rhinol Laryngol.* 1976; 85:618-24.
- Brandt L, Goerig M. The history of tracheotomy. *Anaesthesist.* 1986; 35:279-83.
- Kost KM. endoscopic percutaneous dilational tracheotomy: a prospective evaluation of 500 consecutive cases. *Laryngoscope.* 2005; 115 (10 pt 2):1
- Lalwani AK. Current Diagnosis and Treatment: Otolaryngology Head and Neck Surgery, 2nd ed. McGraw-Hill. New York, NY. 2008.
- Meyers EN. Operative Otolaryngology Head and Neck Surgery, 2nd ed. Elsevier. Philadelphia, PA. 2008.
- Cummings CW. Cummings: Otolaryngology: Head & Neck Surgery, 4th ed. Mosby. Philadelphia, PA. 2005.