Epiglottitis

An acute inflammatory disease caused by infection of the epiglottis, arytenoids, and aryepiglottic folds, resulting in rapid progression to significant/total upper airway obstruction.

ANESTHETIC CONSIDERATIONS:

- Emergency situation characterized by dynamic airway obstruction – call for help!
- Maintain airway patency
  - Sitting position
  - Avoid agitation/crying – consider EMLA for IV
  - Minimize unnecessary airway manipulation
- Maintain spontaneous ventilation – apnea and paralysis could cause life threatening airway obstruction
- Potentially difficult intubation
- Potential for sepsis and septic shock
- Postoperative disposition - observation in a high intensity unit
- Possible full stomach – secondary to maintaining spontaneous ventilation

ANESTHETIC GOALS:

- Recognize this potentially life threatening emergency.
- Avoid agitation and unnecessary airway manipulation – can precipitate dynamic airway collapse
- Secure the airway by maintaining spontaneous ventilation in a position that maintains upper airway patency (intubation vs surgical airway)
- Maintain airway protection until definitive treatment (Abx and steroids) has resulted in decreased epiglottic swelling – postoperative disposition in ICU

HISTORY

- Diagnosed based on clinical signs and symptoms
- Presents most often in children 2 to 7 years of age, although infants and adults may also be affected
- Adults and children present with acute onset (<24 h) of sore throat, high fever, dysphagia, drooling, thick muffled voice, inspiratory stridor, and respiratory distress
- AMPLE history
- Establish onset and progression of illness
- Degree of airway obstruction; positional changes
- Risk factors:
  - In children, incomplete or lack of immunization for Hib and immune deficiency
  - In adults, epiglottitis has been associated with a number of comorbid conditions, including hypertension, diabetes mellitus, substance abuse, and immune deficiency

PHYSICAL

- Take note of patient's position of comfort and maintain (sitting upright, refusal to lie down, etc)
- Children frequently tripod if old enough to do so (characteristic posture of sitting upright and leaning forward with the chin up and mouth open in an attempt to maintain the airway)
- Signs of upper airway obstruction (inspiratory stridor, retractions, tachypnea, labored breathing, cyanosis)
- May be quiet, pale and 'toxic' looking (signs of generalized toxemia may include tachycardia, a flushed face, and prostration)
- Full set of vitals including temperature
- May be accompanied by pulmonary edema, pericarditis, meningitis and septic arthritis
- Attempts to directly visualize the epiglottis should be deferred as any instrumentation, even a tongue blade, may provoke laryngospasm
- Assess volume status
- Differentiation of epiglottitis from laryngotracheobronchitis (croup) can be difficult

TABLE 24-15 -- Clinical Features of Acute Epiglottitis and Laryngotracheobronchitis

Parameter	Acute Epiglottitis	Laryngotracheobronchitis
Age group affected	2–7 yr	<2 yr
Incidence	Accounts for 5% of children with stridor	Accounts for about 80% of children with stridor
Etiologic agent	Bacterial (*Haemophilus influenzae*)	Viral
Onset	Rapid over 24 hr	Gradual over 24–72 hr
Signs and symptoms	Inspiratory stridor, pharyngitis, drooling, fever (often > 39?C), lethargic to restless, insists upon sitting up and leaning forward, tachypnea, cyanosis	Inspiratory stridor, "barking" cough, rhinorrhea, fever (rarely > 39?C)
Laboratory	Neutrophilia	Lymphocytosis
Lateral radiographs of the neck	Swollen epiglottis	Narrowing of the subglottic area
Treatment	Oxygen, urgent tracheal intubation tracheostomy during general anesthesia, fluids, antibiotics, corticosteroids (?)	Oxygen, aerosolized racemic epinephrine, humidity, fluids, corticosteroids, tracheal intubation for severe airway obstruction

INVESTIGATIONS

- Sick children require minimal investigations
- Neutrophilia common
- Neck X-ray in stable patients can be diagnostic: thickening of the aryepiglottic folds and swelling of the epiglottis (the "thumbprint" sign)
- Once intubated, obtain CBC, lytes, BUN, Creatinine, blood and throat cultures

TREATMENT

- In children, indirect laryngoscopy, placement of intravenous lines, oropharyngeal examination, intramuscular injections, and lateral neck radiographs should not be performed because further distress may precipitate complete airway obstruction
- In cooperative adults, very careful flexible fiberoptic laryngoscopy, intravenous lines, and careful oropharyngeal examination by experienced personnel may

be beneficial
- The patient with severe airway compromise should proceed directly to the operating room accompanied by both the anesthesiologist and surgeon
- Secure the airway in a controlled situation (intubation vs surgical)
- Antibiotics
- Steroids are unproven in epiglottitis

OPTIMIZATION
- IV access
- Patient positioning – patient sitting up during induction
- OR setup for difficult intubation, cricothyrotomy, tracheostomy, and rigid bronchoscope, with surgeon present prior to induction
- Consult ENT and PICU/ICU

ANESTHETIC OPTIONS
- GA with inhalational induction vs awake intubation

ANESTHETIC SETUP
- **Drugs**
  - Standard
  - Airway topicalization, reversible sedation (for awake tube)
- **Equipment**
  - Standard CAS
  - Difficult airway cart and flexible bronchoscope
  - Multiple sizes of endotracheal tubes; recognize diameter of airway may be severely narrowed (plan for 1-2 sizes small than expected for age)
  - ENT surgeon, tracheostomy set
  - Rigid bronchoscope

MANAGEMENT OF ANESTHESIA
- **Induction**
  - Maintain spontaneous ventilation
  - Volatile in high FiO2 (do not use nitrous)
  - Classically child is sitting for inhaled induction, IV placed and blood work drawn once patient at surgical depth
  - Consider rapid rehydration, administration of atropine
  - Deepen anesthesia until adquate to pass styletted ETT orally while maintaining spontaneous ventilation
  - **Caution:** adequate depth of anesthesia for laryngoscopy may take longer than expected owing to shallow breathing and V/Q mismatch from pneumonitis, atelectasis, or mucus plugs
  - Try to avoid traumatizing epiglottis with laryngoscopy
  - Awake intubation or inhalational induction in adults
  - Total upper airway obstruction can occur at any time, especially with instrumentation of the upper airway, perhaps reflecting glottic obstruction by the edematous epiglottis, laryngospasm from aspirated saliva, and respiratory muscle fatigue
- **Maintenance**
  - Volatiles/ IV anesthetics
- **Emergence**
  - Sedated and still intubated to ICU/PICU postop
  - Barash: Once the surgeon has examined the larynx, noting the appearance of the epiglottis, aryepiglottic folds, and surrounding tissues, the endotracheal tube may be changed to a nasotracheal tube and secured (in children) – but this may be a risky maneuver

DISPOSITION & MONITORING
- Intubated and ventilated to ICU/PICU postop
- Extubated (usually done in the OR for pediatrics) when signs of infection are resolving (usually 48-72 hours later) and significant air leak present
- Fiberoptic inspection/direct vision to confirm reduced swelling of the epiglottis and surrounding tissues prior to extubation

COMPLICATIONS
- Loss of airway on induction
- Sepsis
- Post-extubation airway obstruction
- Epiglottic abscess
- Secondary infection eg, pneumonia, cervical adenitis, cellulitis, septic arthritis, and meningitis) may result as a consequence of bacteremia or direct extension
- Necrotizing epiglottitis

PATHOPHYSIOLOGY
- Infectious epiglottitis is a cellulitis of the epiglottis, aryepiglottic folds, and other adjacent tissues. It results from bacteremia and/or direct invasion of the epithelial layer by the pathogenic organism. The posterior nasopharynx is the primary source of pathogens in epiglottitis. Microscopic trauma to the epithelial surface (eg, mucosal damage during a viral infection or from food during swallowing) may be a predisposing factor.
- Swelling of the epiglottis results from edema and accumulation of inflammatory cells in the potential space between the squamous epithelial layer and the epiglottal cartilage. Swelling rapidly progresses to involve the entire supraglottic larynx (including the aryepiglottic folds and arytenoids). The subglottic regions generally are not affected; swelling is halted by the tightly bound epithelium at the level of the vocal cords.
- *Haemophilus influenzae type B* was most common pathogen but now immunized against
- Now Group A strep, *Neisseria meningitides*, and *Candida albicans* are more prevalent (this explains the association with meningitis)
- As many as 6% of children with epiglottitis without an artificial airway (endotracheal tube or tracheostomy) may die as compared with less than 1% of those with an artificial airway

REFERENCES
- Co-existing Chpt. 24, Miller Chpt. 75, 82, 85; Cote Chpt. 31 and 37; UpToDate: Epiglottitis; Barash Pg. 1312-1313