ACUTE UPPER AIRWAY OBSTRUCTION IN CHILDREN

INTRODUCTION

- Upper airway obstruction is a common cause of pediatric emergency department visits,
- accounting for approximately 15% of all critically ill patients.
  - Infectious etiologies account for 90% of these,
  - with viral croup accounting for 80%.
- Epiglottitis accounts for 5% of severe cases.
- Other significant causes include other infections (bacterial tracheitis, tonsillar pathology and diphtheria).
- Traumatic etiologies must also be considered,
  - including foreign bodies, external trauma to the neck, burns, Postintubation
  - Congenital etiologies must be considered in young infants,
  - less common causes are edema secondary to severe allergic reaction.

WHAT IS THE DIFFERENCE BETWEEN CHILD AND ADULT AIRWAYS?

- The tongue is larger, easily displaced, and the most common cause of airway obstruction in the obtunded child.
- The narrowest portion of the pediatric airway is at the cricoid ring, making obstruction with subglottic pathology more likely than adults.

SIGN AND SYMPTOMS

- Stridor
- Respiratory distress(Suprasternal retractions)
- Hoarsness of voice

STRIDOR
• A harsh, vibratory sound of variable pitch due to partial obstruction of airway resulting in turbulent airflow through airways.
• Inspiratory stridor
• Expiratory stridor.
• Biphasic stridor

• A healthy child easily tolerate moderate to severe airway obstruction and will maintain his or her tidal volume almost to the point of exhaustion, at which time hypoxia, hypercapnia, and acidosis progress rapidly, leading to cardiac arrest.

HOW CAN YOU TELL WHERE THE PROBLEM IS?

• Supraglottic lesions, such as epiglottitis, present with inspiratory stridor, a prolonged inspiratory phase, and a muffled cry or voice.
• Glottic lesions also lead to high-pitched inspiratory stridor and a weak or hoarse voice.
• Subglottic lesions cause expiratory stridor with a normal voice and a brassy cough.
• Failure to manage the airway is the leading cause of preventable deaths in children.

CROUP

• Also called laryngotracheobronchitis
• Most common cause of infectious acute upper airway obstruction.
• Approx. 10% of children seen with croup require admission, 1-5% require intubation.

PATHOPHYSIOLOGY

• Transmitted via the respiratory route.
• Initial port of entry is the nose and nasopharynx
• Begins with a prodrome of a few days of mild nasal congestion, sore throat and cough
• As the infection spreads distally, the edema also increases.
• A hoarse voice and harsh, brassy, bark like cough
• Stridor

Viral etiologies include parainfluenza virus type
• 1, influenza, respiratory syncytial virus (RSV),
• rhinoviruses and measles.
• Mean age of affected patients is 18 months,
• range 3mths to 3yrs, with a slight male predominance
• seasonal increase in cases in autumn and early winter.
• May have elevated temperature.
• Drooling is uncommon.
• May have mild expiratory wheezing
• Inspiratory stridor at rest with nasal flaring, suprasternal and intercostal retractions.
• Poor air entry

**Lethargy + agitation = HYPOXIA**
• Dehydration.

**DIAGNOSIS**

• The most commonly used system for classifying the severity of croup is the Westley score. It is primarily used for research purposes rather than in clinical practice.
• It is the sum of points assigned for five factors:
• level of consciousness,
• cyanosis,
• stridor,
• air entry
• retractions.
• the final score ranges from 0 to 17.
• 85% of children presenting to the emergency department have mild disease; severe croup is rare
• A frontal X-ray of the neck is not routinely performed, but if it is done, it may show a characteristic narrowing of the trachea, called the steeple sign, because of the subglottic stenosis
• Nasopharyngeal swabs for viral & bacterial culture
TREATMENT
- HUMIDIFIED OXYGEN
- STEROIDS
- RACEMIC EPINEPHRINE

TREATMENT OF CROUP
- Humidified air or oxygen
  - Provides H2O and penetrates the area of inflammation and add moisture to the mucosa. Decrease the viscosity of the secretions in the trachea which facilitates clearance of the airways.
- Steroids are controversial
  - Albuterol treatment via nebulizer 2.5mg in 3cc NS.
  - Racemic epinephrine, given via nebulizer, is indicated for children with stridor at rest or marked increase in work of breathing. It has been shown to decrease airway obstruction. Max. effect is seen in 30 min. with rebound in 2 hours.

EPIGLOTTIS
- Also known as supraglottitis
- 60% male dominance

PATHOPHYSIOLOGY
- Local invasion of the epiglottis occurs followed by bacteremia.
- The epiglottis, aryepiglottic folds, vocal cords, and supraglottic structures become inflamed and edematous, leading to narrowed airway and respiratory
• compromise.
• Inspiratory airway occlusion often occurs prior to total occlusion from supraglottic edema.

• Swollen epiglottis (the thumb sign)
• Thickened aryepiglottic folds
• Obliteration of the vallecula

SIGNs AND SYMPTOMs

• Very sudden onset and progresses rapidly
• Muffled voice or cry (in croup it is more hoarse)
• Minimal cough
• Sore throat, fever, hoarseness
• Drooling caused by difficulty swallowing saliva
• Intercostal muscle retractions
• Noisy, high-pitched, squeaky inhalations
• Purple skin and nails
• Odd head posture. (sniffing position), tripod position

WHY DO CHILDREN WITH EPIGLOTTITIS HAVE AIRWAY OBSTRUCTION?

• Fatigue
• Laryngospasm
- Progressive swelling of the supraglottic structures
- Pooled secretions

**COMPARISON**

<table>
<thead>
<tr>
<th>Croup</th>
<th>Epiglottitis</th>
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</thead>
<tbody>
<tr>
<td>Voice – hoarse</td>
<td>Voice – muffled</td>
</tr>
<tr>
<td>Cough – barking</td>
<td>Cough – usually none</td>
</tr>
<tr>
<td>Fever – yes</td>
<td>Fever – yes</td>
</tr>
<tr>
<td>Saliva – minimal</td>
<td>Saliva – lots</td>
</tr>
<tr>
<td>Neck swelling – little</td>
<td>Neck swelling – lots</td>
</tr>
<tr>
<td>Begins – slowly</td>
<td>Begins – suddenly</td>
</tr>
<tr>
<td>Season – autumn</td>
<td>Season – all year</td>
</tr>
<tr>
<td>Time – evening/night</td>
<td>Time – all day</td>
</tr>
</tbody>
</table>

**TREATMENT**
- MAINTAIN AIRWAY
- DONOT AGITATE THE CHILD
- OXYGEN
- ANTIBIOTICS

**PROGNOSIS**
- Viral croup is usually a self-limited disease, but can very rarely result in death from respiratory failure and/or cardiac arrest.
- Symptoms usually improve within two days, but may last for up to seven days.
- Other uncommon complications include bacterial tracheitis, pneumonia, and pulmonary edema.

**PREVENTION**
- Many cases of croup have been prevented by immunization for influenza and diphtheria.
- At one time, croup referred to a diphtherial disease, but with vaccination, diphtheria is now rare in the developed world.

**THANKYOU**