Upper Airway Obstruction

Noisy Breathing
Upper Airway

- Nose
- Nasopharynx
- Oropharynx
- Larynx (supraglottis, subglottis)
- Trachea (extrathoracic)
Upper Airway Obstruction

Noisy Breathing

- Noise during INSPIRATION
  - Difficulty breathing IN
    - Proximal to Thoracic Inlet
      - Nose, pharynx, larynx

- Noise during EXPIRATION
  - Difficulty breathing OUT
    - Distal to Thoracic Inlet
      - Trachea, bronchi, peripheral airways
Upper Airway Obstruction

Difficulty breathing IN

- Awake/Crying IMPROVES
  - Nose / Pharynx

- Awake/Crying DETERIORATES
  - Larynx
Upper Airway Obstruction

*Noise decreases as obstruction worsens*

Noise NOT indicative of degree of obstruction

therefore

THE WORST OBSTRUCTION IS SILENT
Upper Airway Obstruction

Which clinical signs are indicative of the severity of obstruction?

Recession (sternal, lower costal margin)
Tachypnoea
Tachycardia
Expiratory difficulty (abdominal muscles contract)
Depressed consciousness
Cyanosis
Noise soft/absent
### Where in the Airway is the Obstruction

<table>
<thead>
<tr>
<th></th>
<th>Snoring</th>
<th>Stridor</th>
<th>Wheeze</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Naso pharynx</strong></td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><strong>Larynx</strong></td>
<td>± Small babies</td>
<td>+</td>
<td>+ Severe obstr</td>
</tr>
<tr>
<td><strong>Trachea &amp; bronchi</strong></td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Small airways</strong></td>
<td></td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>
Obstruction in Upper Airway versus Lower Airway

AIR TRAPPING - *PERCUSSION*

Upper border of liver displaced downwards

Cardiac dullness not detected
Upper Airway Obstruction

**Approach**

- History
- Age
- Clinical examination
  - Site of obstruction
  - Severity
Upper Airway

Age

• Short
• Narrow
• Elastic
• Tendency to collapse
Upper Airway

Resistance to airflow through a tube is inversely proportional to the radius\(^4\).
Upper Airway
Infant/Child

Scenario:

Airway 4 – 5 mm diameter
1 mm oedema

• Resistance increases 16 times
  (adult 3 times)
• Surface area decreases by 75%
  (adult 45%)

Upper airway of a child not a miniature replica
Upper Airway

Nose

- “Blocked” nose (infants < 6 months)
- Choanal atresia
- Foreign body
- Polyps
- Allergy
Upper Airway
Nose

- “Blocked nose” (0 – 6 months)
- Choanal atresia
- Foreign body
- Polyps
- Allergy
Upper Airway
Oropharynx

- Adenoidal hypertrophy
  (Obstructive sleep apnoea)
- Micrognathia
- Craniofacial abnormalities
- Large tongue
Upper Airway

Oropharynx

OBSTRUCTIVE SLEEP APNOEA

Adenoidal hypertrophy

Snoring

Sudden death during sleep

Craniofascial abnormalities

Micrognathia
Oropharynx

Obstructive sleep apnoea
  High index of suspicion (10%)
  Examine child while asleep
  Early diagnosis and treatment
  Prevent complications
    Hypoxaemia
    Growth failure
    Sudden death
Upper Airway
Supraglottis

Epiglottitis
(H. influenzae type B)
Acute onset
Drooling
Pyrexia
Posture

AIRWAY
ANTIBIOTICS
Upper Airway
Larynx

- Laryngomalacia
- Webs, cysts
- Vocal cords (paralysis, papillomata)
Larynx

Laryngomalacia

Obstruction

  Inspiratory, variable

Newborn infant, stridor (awake)

Improves: prone, sleep, age

Voice normal
Larynx

Laryngeal papillomata
6 months – 5 years
Inspiratory stridor
Voice HOARSE
Not associated with infection
REFERRAL
Upper Airway

Subglottis

Laryngotracheobronchitis (Croup)
6 months – 2 years
Preceded by a cold (Parainfluenza)
Stridor
Normal voice
Barking cough
Grade severity of obstruction
# Croup

Grading according to Severity of Obstruction

<table>
<thead>
<tr>
<th>Severity</th>
<th>Inspiratory Obstruction</th>
<th>Expiratory Obstruction</th>
<th>Pulsus Paradoxus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Grade 2</td>
<td>+</td>
<td>Passive</td>
<td>-</td>
</tr>
<tr>
<td>Grade 3</td>
<td>+</td>
<td>Active</td>
<td>+</td>
</tr>
<tr>
<td>(Grade 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>apathy, cyanosis)</td>
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</tbody>
</table>
Croup

Treatment

Adrenaline inhalations
Steroids
Avoid crying
Airway – intubation
    tracheostomy
Upper Airway

Subglottis

Congenital subglottic stenosis

<6 months

No preceding infection

History of intubation

Endoscopy

Tracheostomy
Upper Airway

Bacterial Tracheitis

- Older child (<2 years)
- Toxic, erythematous rash
- Thick secretions
- Airway (tracheostomy)
- Staphylococcus aureus
Upper Airway

**Foreign Body**

- May lodge in any part of airway
- HISTORY
- X-rays
- Endoscopy
Upper Airway Retropharyngeal Abscess

- <6 months
- Sore throat (anorexia) for several days
- Pyrexia, drooling, stridor
- X-ray: prevertebral space increased
- Surgical drainage
- Antibiotics