Upper Airway Obstruction

Many causes, 3 outcomes

By Dr M Patrick
Outcomes

• **Death**
  - If we don’t do it properly

• **Disability**
  - If we don’t do it properly

• **A normal life**
  - If we do do it properly
Respiratory Difficulty: Signs

- Stertor $\Rightarrow$ oropharyngeal obstruction
- Stridor $\Rightarrow$ upper airway obstruction
- Wheeze $\Rightarrow$ lower airway obstruction
# Stridor: Causes

<table>
<thead>
<tr>
<th>Cause</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croup</td>
<td></td>
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<tr>
<td>- Viral laryngotracheitis</td>
<td>very common</td>
</tr>
<tr>
<td>Recurrent croup</td>
<td>common</td>
</tr>
<tr>
<td>Bacterial tracheitis</td>
<td>common now</td>
</tr>
<tr>
<td>Laryngeal foreign body</td>
<td>uncommon</td>
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<tr>
<td>Epiglottitis</td>
<td>rare</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>rare</td>
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<tr>
<td>Retropharyngeal abscess</td>
<td>common now</td>
</tr>
<tr>
<td>Infectious mononucleosis</td>
<td>rare</td>
</tr>
<tr>
<td>Angioneurotic oedema</td>
<td>rare</td>
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</tbody>
</table>
When it’s not croup

- **Tracheitis**
  - Coarse stridor
- **Foreign body**
  - Dramatic onset of severe obstruction, stridor, cough/“choking”
- **Diphtheria**
  - Incomplete immunisation
- **Epiglottitis, retropharyngeal abscess**
  - Dysphagia or the patient prefers a sitting position
  - Systemic “toxicity” with erythematous rash (Staphylococcus), soft stridor
- **Laryngeal papillomatosis**
  - Aphonia in a child with a previously hoarse voice
  - **Secretions**
    - Poor cough reflex
Stridor: Bacterial tracheitis

• Emergency treatment
  - Oxygen
  - Seek expert help to intubate and ventilate
  - IV antibiotics

AVOID UNNECESSARY UPSET FOR CHILD
Stridor: Epiglottitis

• **Emergency treatment**
  - Oxygen
  - Seek expert help to intubate and ventilate
  - IV antibiotics

**AVOID UNNECESSARY UPSET FOR CHILD**
Stridor: Laryngeal foreign body

- **Emergency treatment**
  - Seek urgent help to anaesthetise and remove FB
  - Choking child procedure
  - Direct laryngoscopy
  - Cricothyroidotomy/ surgical airway
Stridor: Viral croup

- **Emergency treatment**
  - Oxygen
  - Adrenaline (Epinephrine)
    - 1:1000 (5ml nebulised)
  - Seek expert help if intubation and ventilation required
  - Give dexamethasone/prednisone

**AVOID UNNECESSARY UPSET FOR CHILD**
CROUP
(LARYNGOTRACHEOBRONCHITIS)

- The commonest cause of upper airway obstruction

- Clinical diagnosis
  - Previously well
  - < 2 years of age
  - Gradually progressive inspiratory obstruction which manifests as STRIDOR
  - Barking cough
  - Onset a day or 2 after an upper respiratory infection
  - Mild fever (<38°C) may be present
  - The child is well, apart from the respiratory obstruction
Investigations

- **Chest X-ray is not necessary**
- **Neck X-ray is not necessary**
  - X-ray lateral neck and AP is necessary only if there is serious doubt about the diagnosis of viral croup
- **Blood gases**
  - Cross of death
  - May aggravate the problem by making the child cry
The Cross of Death

\[ R = \frac{1}{r^4} \]
Assessment of Severity

- This is an assessment of severity of **Airway Obstruction**
  - Grade I: INSPIRATORY stridor only
  - Grade II: Inspiratory and EXPIRATORY stridor
  - Grade III: ACTIVE EXPIRATION and/or PALPABLE PULSUS PARADOXUS
  - Grade IV: APATHY and/or CYANOSIS

- Applicable to UAO caused by CROUP only
- Watch out
  - Stridor becomes softer as the obstruction becomes more severe
Management

• **All grades of obstruction...**
  - Antibiotic (amoxil) if bacterial infection is suspected:
    - fever > 38°C
    - “toxic”
    - purulent sputum
    - concomitant ARI
  - **ACYCLOVIR (IV)** if oral Herpes simplex and if post measles
All grades...

• **KEEP THE CHILD COMFORTABLE**
  - the mother/carer is best at doing this
  - crying and hyperventilation increase the oedema (Bernoulli again)

• **Continue oral feeding**

• **Avoid painful procedures**

• **Paracetamol if febrile**

• **STEROIDS: PREDNISONE 2 mg/Kg orally or**
  **dexamethazone 0,5 mg/kg intravenously,** provided that:
  - no measles in the past month
  - no oral Herpes
  - repeat in 24 hours if no improvement
Grade I

• Manage at home, provided:
  - conditions are favourable
  - the obstruction is not getting worse
  - in our setting, it is probably advisable to admit all
Grade II

- **Hospitalise**
  - **ADRENALINE NEBULISATIONS**
    - 1 ml of 1:1 000 in 1 ml saline
    - every 15 minutes, or more often, till improved, then every 30 minutes till grade I, then prn
  - **Consider nebulised steroid**
Grade III

- Monitor $O_2$ saturation (pulse oximeter)
- CONTINUOUS ADRENALINE NEBULISATIONS
  - for two hours and hope that the child improves to Grade II
- If the obstruction remains at Grade III, consult the Paediatrician on call
- If the obstruction progresses (at any time) to Grade IV then...
Grade IV

- **Continuous adrenaline nebulisations using 100% O₂**

- **URGENT INTUBATION**
  - preferably in theatre

- **Intubation in casualty or ward**
  - only if time does not permit transfer to theatre
  - use an ETT 1 size smaller than usual for age
  - intubate under etomidate 0.3mg/kg IV slowly

- **Transfer to the nearest ICU with the ETT well secured and with the child in head box oxygen after making contact with the ICU personnel**
Stertor / Snoring: Causes

- Big tonsils and/or adenoids
- “Floppy” airway
- Small airway
Snoring/Stertor

- In children, snoring is NEVER normal

- Consequences of snoring ⇒⇒ Obstructive sleep apnoea
  - Daytime drowsiness and irritability
  - Learning problems
  - Enuresis
  - Cor pulmonale
Oropharyngeal Obstruction

The commonest MISSED cause of upper airway obstruction
OPO

• **Clinical Features**
  - Mouth breathing
  - Nasal speech
  - Recurrent otitis media
  - Postnasal discharge with night-time cough
  - Snoring at night which may wake the child
  - Obstructive sleep apnoea
  - **Child AND mother are sleepy during the day**
Aetiology

- Allergic rhinitis
- Adenoidal hypertrophy
- Tonsillar hypertrophy
- Pierre-Robin Sequence
- "Floppy pharynx" as in Down Syndrome
Investigations

- X-ray posterior nasal space (lateral view)
- Oxygen saturation awake and especially during sleep
- Chest X-ray and ECG if cor pulmonale present
Adenoidectomy and Tonsillectomy

- Three or more episodes of acute otitis media in preceding 12 months
- Secretory otitis media
- Obstructive sleep apnoea
- All children undergoing tonsillectomy
- Two or more of the following:
  - mouth breathing
  - snoring
  - recurrent sinusitis
When to Admit or Refer

- **ADMIT**
  - if ANYTHING on history or examination suggests obstructive sleep apnoea

- **REFER TO ENT**
  - if any indications for T’s and
  - A’s are present

- **URGENT referral to ENT**
  - if there is a history of obstructive sleep apnoea. Do not waste time with an X-ray (or an echo!)
Remember, for children...

Bernoulli sucks