Clinical Guidelines

Upper airway obstruction (UAO)

<table>
<thead>
<tr>
<th>Document Control Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author</strong></td>
</tr>
<tr>
<td><strong>Author Position</strong></td>
</tr>
<tr>
<td><strong>Document Owner</strong></td>
</tr>
<tr>
<td><strong>Document Owner Position</strong></td>
</tr>
<tr>
<td><strong>Document Version</strong></td>
</tr>
<tr>
<td><strong>Replaces Version</strong></td>
</tr>
<tr>
<td><strong>First Introduced</strong></td>
</tr>
<tr>
<td><strong>Active Date</strong></td>
</tr>
<tr>
<td><strong>Review Schedule</strong></td>
</tr>
<tr>
<td><strong>Next Review</strong></td>
</tr>
<tr>
<td><strong>CATS Document Number</strong></td>
</tr>
<tr>
<td><strong>Applicable to</strong></td>
</tr>
</tbody>
</table>

Children’s Acute Transport Service provides paediatric intensive care retrieval for Great Ormond Street, The Royal Brompton and St Mary’s NHS Trusts. Funded and accountable to the North Thames Paediatric Intensive Care Commissioning Group through Great Ormond Street NHS Trust.
Assessment

The most pertinent clinical sign is stridor, which is usually an inspiratory noise, but sometimes can be both inspiratory and expiratory.

Not to be confused with:
- Wheeze: a sign of lower airway obstruction and narrowing.
- Stertor: signifies upper airway collapse in children with decreased conscious state, pharyngeal hypotonia or swallowing problems.

Key message

Identify and treat serious upper airway obstruction. Once the airway is secure, time can be spent on identifying the specific cause for UAO.

Specific points in assessment

- Is this a first presentation?
- Is there history of previous intubations or previous difficulty with intubation?
- Is the airway stable?

<table>
<thead>
<tr>
<th>Prevalence in UK</th>
<th>Diagnosis</th>
<th>Key Features</th>
</tr>
</thead>
</table>
| COMMON           | Viral laryngotracheobronchitis (croup) | Peak incidence in second year of life  
Barking cough, stridor, low-grade fever, hoarse voice  
Symptoms often at night |
| UNCOMMON         | Epiglottitis | Peak incidence 1-3yrs  
Acute presentation  
High fever, soft stridor, drooling, open mouth “Toxic” |
|                  | Bacterial tracheitis | Average age 4-6yrs  
Preceding URTI  
Stridor, hoarse voice, high fever, respiratory distress  
“Toxic” |
|                  | Laryngeal foreign body | Peak incidence age 1-2yrs  
Acute onset  
Coughing, choking, stridor  
Respiratory distress |
|                  | Inhalational Injury | History of exposure to smoke  
Carbonaceous deposits around mouth, sputum |
|                  | Anaphylaxis | Acute onset  
Exposure to triggers  
Itching, urticaria, facial swelling  
Cardiovascular compromise |
|                  | Severe bilateral tonsillar enlargement | Neck pain and swelling  
Dysphagia |
| RARE             | Angioneurotic oedema | Acute onset  
Localised angioedema  
Can affect any part of body |
|                  | Diptheria | Recent travel  
Low grade fever  
Neck pain and swelling  
Greyish adherent pseudo membrane |
|                  | Retropharyngeal abscess | Neck pain and swelling, dysphagia, trismus  
Inspiratory stridor, fever |
Initial management

Irrespective of the cause for UAO, some general management guidelines apply:

**General management: AVOID UPSETTING THE CHILD**
- Leave child with parent in a comfortable position
- DO NOT insert tongue depressor
- DO NOT attempt IV access or blood tests
- DO NOT ask for a Chest or lateral neck X-ray
- DO NOT force an oxygen mask over face.
- Adrenaline nebulisers may temporarily relieve severe airway obstruction. Dose is 0.5 ml/kg of 1:1000 solution, up to a maximum of 5 ml. The effect of adrenaline is temporary.
- Pulse oximetry is a poor guide to severity when oxygen is delivered

**Specific management of selected conditions**

**Viral croup**: summarized in flow chart.

![Flow chart for Viral Croup](chart.png)

**Westley Croup Score**

- **Stridor**
  - 0 = none
  - 1 = at rest, audible with stethoscope
  - 2 = at rest, audible without stethoscope
- **Recession**
  - 0 = none
  - 1 = mild recession
  - 2 = moderate recession
  - 3 = severe recession

- **Cyanosis (O2 sats < 92% in air)**
  - 0 = none
  - 4 = with agitation
  - 5 = at rest

- **Level of consciousness**
  - 0 = normal
  - 5 = altered mental state

**Croup score 0-1: Mild croup**
- Croup score 2-7: Moderate croup
- Croup score >/=8: Severe croup

CALL FOR SENIOR HELP
- Senior Paediatrician
- Senior Anaesthetist
- Senior ENT

Stay with child
- Give nebulised adrenaline 0.5ml/kg of 1:1000 solution up to maximum of 5mls. This dose can be repeated
- Child might require urgent intubation and transfer to PICU.

Call CATS
Epiglottitis

<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>DO NOT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Call for senior help</td>
<td>o Attempt oropharyngeal examination, since this may precipitate complete obstruction</td>
</tr>
<tr>
<td>• Paediatric SpR/Consultant</td>
<td>o Attempt insertion of an iv cannula or take blood</td>
</tr>
<tr>
<td>• Anaesthetic SpR/Consultant</td>
<td>o Send the child for neck x-ray or other x-ray</td>
</tr>
<tr>
<td>• ENT SpR/Consultant</td>
<td>o Upset the child e.g. removing parents</td>
</tr>
<tr>
<td>✓ Allow the child to remain in its favoured position</td>
<td>o Leave the child unsupervised</td>
</tr>
<tr>
<td>✓ The child should be constantly supervised by someone skilled in intubation</td>
<td>o Rely only on pulse oximetry</td>
</tr>
<tr>
<td>✓ Give humidified oxygen as tolerated</td>
<td></td>
</tr>
<tr>
<td>✓ Administer IV antibiotics when airway secured</td>
<td></td>
</tr>
</tbody>
</table>

Foreign body obstruction:

- The management depends on the site and severity of airway obstruction. Intubation may result in further impaction of the foreign body, and should be considered ONLY when there is impending/actual cardio-respiratory arrest.
- The anaesthetist will then try to visualize/clear the object under direct laryngoscopy. Otherwise, examination under anaesthetic with rigid bronchoscopy by the ENT team is the best option.

Bacterial tracheitis

- Stridor may be soft or absent even in severe airway obstruction.
- Consider early intubation by anaesthetist.
- After intubation the ET may become blocked with secretions. Administer IV antibiotics once the airway has been secured

Inhalational injury

- Along with the history, other pointers may include soot in sputum, singed nasal hair, soot around mouth and face, and facial burns involving mouth and nose.
- The airway must be secured at the earliest opportunity.
- Delay can lead to progressive airway obstruction due to oedema and a situation where intubation becomes impossible.
- Call anaesthetic team and intubate early.
Management at Intubation

- Most experienced anaesthetist must be present at the intubation.
- Most anaesthetists would favour a gas induction.
- Anticipate a difficult airway. (Refer to the difficult airway guidance from APA/DAS)
- Ensure a back-up oxygenation strategy is prepared.
- Anticipate a smaller ETT than indicated by age (obtain croup tubes if available)

Management following intubation

- Once the airway obstruction is bypassed, most children are easy to ventilate. Exceptions might be in case of bacterial tracheitis (pulmonary involvement), inhalational injury (ARDS), or anaphylaxis (bronchoconstriction).
- Ensure that the ETT is securely taped.
- Use sedation and paralysis to ensure safety of ETT.
- Following a difficult intubation, an ETT should only be changed if there is a clear clinical reason which justifies this risk.
- Start adjunctive treatments such as iv dexamethasone (0.15 mg/kg QDS) in case of croup; or ceftriaxone (80 mg/kg) in case of epiglottitis or tracheitis.
- Blood cultures must be taken in suspected cases of infection.
- In case of inhalation injury and burns, start fluid replacement as per burns guidance.
- Patients with bacterial tracheitis may require fluid resuscitation and inotropic support.

Transport considerations

- Children with an unstable airway should not be transported without detailed discussion with the CATS consultant.
- ETCO2 monitoring is mandatory during transfer to ensure continuous correct ETT placement.
- Use continuous muscle relaxation during retrieval to ensure safety of ETT.
- If transporting an un-intubated child with suspected foreign body obstruction, avoid unnecessary delay and transfer immediately to ENT centre (directly to theatres if necessary). The team must have a strategy to manage unexpected obstruction or hypoxia.