Stridor

Definition / Supporting Information

Stridor is a high-pitched, monophonic noise caused by turbulent airflow through a partially obstructed extrathoracic airway, heard predominately on inspiration.

Keywords / also known as: airway obstruction, croup, inspiratory noise, wheezing

Essential History

Ask about:

- Age of child
- Birth history and timing of stridor
- Immunisation status
- Preceding symptoms of upper respiratory tract infection
- Duration of stridor
- History of allergy / anaphylaxis

'Red Flag' Symptoms and Signs

Evaluation should only progress after the ABC (airway, breathing, and circulation) of resuscitation have been addressed.

- Consider C-spine immobilisation if there has been trauma involving the neck
- If anaphylaxis is suspected, intramuscular (IM) adrenaline / epinephrine 1 in 1000 should immediately be given (by EpiPen® if available) in the following doses:
  - Child ≥ 12 years
    - 500 micrograms IM (0.5 mL)
  - Child 6 to 12 years
    - 300 micrograms IM (0.3 mL)
  - Child ≤ 6 years
    - 150 micrograms IM (0.15 mL)

Ask about:

- Severe and sudden onset of symptoms
- Presence of drooling
- Difficulty swallowing (see Dysphagia)
- Constant stridor
- Trauma to the neck
- Faltering Growth

Look for:

DO NOT examine the throat if epiglottitis is suspected, as this can cause airway obstruction.

- Neck position
  - Extension of the neck is often seen with serious infection, such as epiglottitis or retropharyngeal abscess
- Drooling
  - Suggests a mass effect or oedema in the posterior pharynx, causing dysphagia in addition to stridor
- Oropharynx
  - Retropharyngeal bulge
  - Lateral displacement of the uvula and swelling of a tonsillar pillar from an underlying infection
- Neck
  - Presence of suprasternal retractions when obstruction is severe
  - Displacement of the larynx, a mass obstructing the airway, or signs of trauma
- Quality of the voice
  - Hoarseness, aphonia, or a weak cry suggest vocal cord disease
- Stertor
  - Noisy, rumbling-type noise similar to snoring
  - Heard with partial airway obstruction in the oropharynx or nasopharynx

Differential Diagnosis / Conditions

In order of likelihood:

- Viral croup (see Croup)
  - Stridor preceded by fever, upper respiratory symptoms, and a barking or seal-like cough
- Foreign body
  - Sudden onset
  - History of choking or placing small objects in the mouth
- Laryngomalacia
  - Suspected if stridor begins in the first few weeks of life and presents only during specific phases of alertness, such as eating, sleeping, or excitement
- Anaphylaxis
  - Sudden onset, may be associated with ingestion / exposure to known allergen
  - Associated erythema, urticaria, angioedema
  - May be gastrointestinal symptoms

- Subglottic stenosis or granulation tissue
  - Stridor that develops after a prolonged intubation
  - May be continuous
- Retropharyngeal abscess
  - Fever
  - Difficulty swallowing (see Dysphagia)
- Epiglottitis
  - High fever, toxic, drooling
  - Unimmunised child (see PHE Green Book Chapter 16)
- Diphtheria
  - Unimmunised child (see PHE Green Book Chapter 15)
  - Toxic looking, fever
- Haemangioma
  - Worsening stridor
  - History of cutaneous hemangiomas
- Bilateral vocal cord paralysis
  - History of injury to both recurrent laryngeal nerves
  - Arnold–Chiari malformation or increased intracranial pressure
- Vocal cord cyst
  - Hoarse voice
  - Chronic irritation to vocal cords or airway instrumentation
- Recurrent respiratory papillomatosis
  - Usually associated with stridor or hoarseness 2–3 years after birth
- Laryngeal web
  - Develops shortly after birth (congenital)
  - Develops after airway instrumentation (acquired)
- Onset of stridor in an older child or adolescent with no previous history should prompt a more thorough evaluation.

Investigations

To be undertaken by specialist practitioners (eg, Emergency Department / General Paediatric Team(s)):

- Laboratory tests are not useful in the immediate management of stridor (see Croup).
- When there is diagnostic uncertainty a radiograph of the neck may be considered after senior advice and may show:
  - Foreign body
    - May be visualised on radiograph **if radio-opaque**
    - Clinical suspicion is key
  - Retropharyngeal abscess

        - Retropharyngeal mass on lateral neck radiograph
- Flexible laryngoscopy (ear, nose and throat (ENT) specialist)
    - Direct visualisation of the airway (including the posterior pharynx and glottis) by flexible laryngoscopy often provides definitive information
- Direct laryngoscopy and bronchoscopy under sedation or general anaesthesia
    - Can help to diagnose and quantify the severity of subglottic stenosis
    - Identify other subglottic lesions that cause obstruction

Treatment Approach

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team):

- Keep the patient calm and maintain the airway
- Keep the child with the parent in the position of most comfort for the child
- Refer as appropriate
- Treatment for viral croup (see below and Croup)
- Laryngomalacia- most cases can be managed with observation alone, with particular attention to adequate caloric intake and weight gain

Specific Treatment

An ABC assessment is the priority. Skilled senior personnel (anaesthetist, paediatrician, ENT clinician) should be present where the child requires airway support. Be aware that stridor may become less apparent as the airway obstruction worsens.

- For the child with signs of severe respiratory compromise (distressed appearance, severe retractions, nasal flaring, pallor or cyanosis, altered conscious level), initially focus on the following:
    - Nebulised adrenaline/epinephrine 1 in 1000 (1 mg/mL) may temporarily relieve symptoms of obstruction.
        - Child 1 month to 12 years: 400 micrograms/kg, max. 5 mg (5 mL), diluted in sodium chloride 0.9% to achieve a suitable volume for nebulising.
    - Dexamethasone may temporarily alleviate inflammation
    - Maintaining the airway
    - Calling skilled personnel to assist in management
    - Intubation to relieve obstruction
        - Attempted only by personnel skilled at airway management
        - Performed in as controlled a setting as possible
        - If potentially difficult, surgical support should be present in case tracheostomy is required
- Viral croup
    - Most cases of croup can be managed with close observation alone.

  - Moderate cases can be treated with oral dexamethasone (150 to 600 micrograms/kg) as a single dose, or nebulised budesonide (2 mg) as a single dose.
- Other causes
  - Once the acute airway has been dealt with, management depends on the underlying condition

When to Refer

Arrange face-to-face secondary care assessment if:

- Any ‘red flag’ signs are present
- Respiratory distress (see Dyspnoea) or hypoxaemia / cyanosis
- Inability to eat or drink (see Dysphagia)
- Altered conscious level or signs of fatigue
- Stridor associated with signs of increased intracranial pressure
- Intramuscular adrenaline/epinephrine required at any time, even if improvement

Refer to Paediatric ENT Team if:

- Progressive or continuous stridor
- Poor weight gain or faltering growth associated with persistent stridor
- Repeated hospitalisation
- Presence of cutaneous haemangiomas in association with persistent stridor
- Laryngomalacia requiring surgical management to relieve the obstruction caused by redundant epiglottic folds or arytenoid tissue

‘Safety Netting’ Advice

- Ask the parents to be aware of the red flag symptoms and signs in the presence of underlying conditions or recurrence of stridor

Patient / Carer Information

Please note: whilst these resources have been developed to a high standard they may not be specific to children.

- Croup (Web page), Patient
- Stridor (Web page), Patient

Resources

National Clinical Guidance

Fever in under 5s: assessment and initial management (Web page), NICE clinical guideline CG160, National Institute for Health and Care Excellence

Medical Decision Support

Diptheria (Web page), Public Health England's Green Book

Haemophilus influenzae type b (Web page), Public Health England's Green Book

Suggested Resources

Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.

Berkowitz RG. Neonatal airway assessment by awake flexible laryngoscopy. Ann Otol Rhinol Laryngol 1998;107:75–80 [PubMed]

Botma M, Kishore A, Kubba H, et al. The role of fiberoptic laryngoscopy in infants with stridor. Int J Pediatr Otorhinolaryngol 2000;55:17–20 [PubMed]

Friedman EM, Vastola AP, McGill TJ, et al. Chronic pediatric stridor: etiology and outcome. Laryngoscope 1990;100:277–280 [PubMed]

Olney DR, Greinwald JH, Smith RJH, et al. Laryngomalacia and its treatment. Laryngoscope 1999;109:1770–1775 [PubMed]

Advanced Life Support Group. Advanced Paediatric Life Support. The Practical Approach. 5th edn. Chichester: Wiley Blackwell; 2012

Spotting the Sick Child (Web page – requires log-in), Department of Health

Acknowledgements

Content Editor: Dr Tina Sajjanhar

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Paediatric Specialty Group: Association of Paediatric Emergency Medicine

Update information

Created: 2017

Date last updated: -

Next review due: 2020