

Ear, nose and throat emergencies

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Abstract

Airway emergencies comprise a diverse group of conditions, which affect upper and lower airways, and have potential for rapid deterioration and lethal outcome unless managed promptly and efficiently. The latter depends on individual skills and effective interaction between anaesthetists, ENT surgeons and other members of the team.

Keywords Croup; ENT emergencies; epiglottitis; foreign body; neck abscess; stridor; tracheostomy

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Airway emergencies may affect adults and children, upper (croup, epiglottitis, neck abscess, bleeding tonsil) and lower (foreign body aspiration, lower bleeding) airways, as well as natural and artificially created airways (e.g. tracheostomy).

In some cases (e.g. croup), medical management may improve the patient's condition. Frequently anaesthesia and airway control are necessary, with or without surgical intervention. Excellent communication between all members of the team, especially anaesthetists and ENT surgeons, is therefore imperative.

Stridor

Stridor is an abnormal, high-pitched sound, which arises from a turbulent airflow through a partially obstructed airway. The cause of stridor may be related to the respiratory, gastrointestinal, cardiovascular or central nervous systems. Main causes of stridor are listed in [Table 1](#).

Depending on the timing in the respiratory cycle, it is possible to distinguish three types of stridor:

- *inspiratory* – caused by obstruction at the level of larynx (e.g. acute epiglottitis, anaphylaxis)
- *expiratory* – suggestive of tracheobronchial obstruction (e.g. inhaled foreign body)
- *biphasic* – a sign of glottic or subglottic anomaly (e.g. subglottic stenosis, bilateral recurrent laryngeal nerve damage).

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Learning objectives

After reading this article, you should be able to:

- define stridor and list its main causes
- differentiate between croup and acute epiglottitis based on the onset and clinical picture
- plan and perform anaesthetic management for acute epiglottitis, foreign body aspiration, bleeding tonsil, and deep neck abscess
- troubleshoot and manage tracheostomy and laryngectomy emergencies

Stridor should be differentiated from *stertor* – a lower-pitched, snoring-type sound generated at the level of the nasopharynx, oropharynx or supraglottis.

Assessment options

- Pulse oximetry and arterial blood gas evaluation (indicative of severity).
- AP and lateral (LL) radiographs (LL ‘thumb’ sign in case of epiglottitis, AP ‘steeple’ sign in case of croup) [Figure 1](#).
- *Contrast enhanced* CT (mediastinal masses, aberrant vessels).
- MRI (upper airway lesions, vascular anomalies).
- *Flexible laryngoscopy* (fiberoptic nasendoscopy).
- Bronchoscopy (for distal pathology).

Plan management together *with ENT surgeons* at all stages.

Initial management

Aimed at improving oxygenation, airflow, and reduction of oedema.

- Position upright (in some cases, e.g. acute epiglottitis, leaning forward alleviates obstruction better than straight upright).
- 100% oxygen via face mask, aiming for SpO₂ ≥94%.
- *Nebulized adrenaline*
 - Child: 5 mg (5 ml of 1:1000) undiluted, single dose
 - Adult: 5 mg (5 ml of 1:1000) undiluted, may be repeated as needed with caution and ECG monitoring
 - effect lasts 1–2 hours, after which obstruction may recur.
- *Dexamethasone*
 - Child: 0.15–0.6 mg/kg PO, IV or IM (usually as a single dose, but may be repeated after 12 hours)
 - Adult: 0.75–9 mg/day IV/IM/PO divided q6–12 hours
 - effect may be delayed by up to 4 hours.
- *Heliox* inhalation
 - reduces the work of breathing by promoting laminar flow
 - available concentrations (% of helium/oxygen): 80/20, 70/30, 60/40
 - drawback: highest possible FiO₂ using Heliox is 40%, which may not be sufficient to ensure adequate oxygenation in certain cases.

Causes of stridor

Acute	Chronic
Infection Laryngotracheobronchitis (croup), epiglottitis, abscess (retropharyngeal, peritonsillar), bacterial tracheitis	Tumour Base of tongue, larynx, invasive thyroid cancer
Airway oedema Anaphylaxis, airway instrumentation	Subglottic stenosis Following prolonged/traumatic intubation
Foreign body Aspiration of a nut, popcorn, hard candy, coin, etc.	Other laryngeal pathology Papillomatosis, laryngomalacia, dyskinesia, cysts, haemangiomas
Nerve damage e.g. iatrogenic bilateral recurrent laryngeal nerve damage during thyroidectomy	Tracheal compression Goitre, vascular slings and rings, double aortic arch
Acute exacerbation of chronic condition	

Table 1

Croup

Viral laryngotracheobronchitis, predominantly caused by *parainfluenza*; *influenza* or *respiratory syncytial* infection also possible.¹ It is the most common cause of stridor in children 6–24 months old. Due to the narrow diameter of the airway in a small child, inflammation oedema causes much more prominent narrowing of lumen than in adult. Anxiety worsens the condition, and should be minimized where possible.

Clinical presentation

- Gradual onset with hoarse voice and ‘barking’ cough, usually preceded by upper respiratory symptoms.
- Low-grade fever.
- ‘Toxic’ appearance is rare (opposite to epiglottitis).

Management

- Assessment of severity (*Westley* croup score, 6–11 severe, >11 impending respiratory failure).
- Oxygen (as above).

- Dexamethasone 0.15 mg/kg PO/IV or 0.6 mg/kg IM (max. 16 mg) as a single dose, or Nebulized budesonide 2 mg as a single dose is preferable in severe hypoxia, persistent vomiting, or respiratory distress preventing administration of an oral dose.
- Nebulized adrenaline – in case of moderate to severe stridor (as above).
- Intubation – in about 1% of children; indicated in children progressing to asynchronous chest wall and abdominal movement, fatigue, and signs of respiratory failure (see below).
 - Usually straightforward laryngoscopy.
 - Gum-elastic bougie (GEB) is valuable: it allows airway oedema to be pushed aside and an ETT of suitable diameter then railroaded into position, without losing control of the airway.
 - Size-down ETT by about 1.0 mm ID than normal, and have a selection of further smaller sizes.
 - Usually required for 2–3 days, until an air leak around the ETT develops; if a leak does not develop, consider flexible bronchoscopy.

Acute epiglottitis

Acute life-threatening infection of predominantly bacterial nature (*Haemophilus influenzae*, *Streptococcus pneumoniae*, *Staphylococcus aureus*, MRSA); occasionally caused by *Parainfluenza* virus and *Candida* fungi. Cases of traumatic epiglottitis (due to caustic ingestion or thermal injury, causing inflammation and oedema) have also been reported.²

Haemophilus influenzae type B (Hib) vaccination has reduced the incidence of the condition. However, it neither precludes the possibility of epiglottitis, nor of *H. influenzae* being its cause.

Clinical presentation

- Rapid onset with sore throat, sitting or leaning forward, tripod positioning, dyspnoea and biphasic stridor, and difficulty controlling secretions (drooling saliva).
- High fever (usually >39.5 °C).
- ‘Toxic’ appearance.

Management

Anxiety/stimulation of any kind (examination of the oral cavity, intravenous lines, blood draws, or separation from a parent) may precipitate complete airway obstruction, and must be avoided.

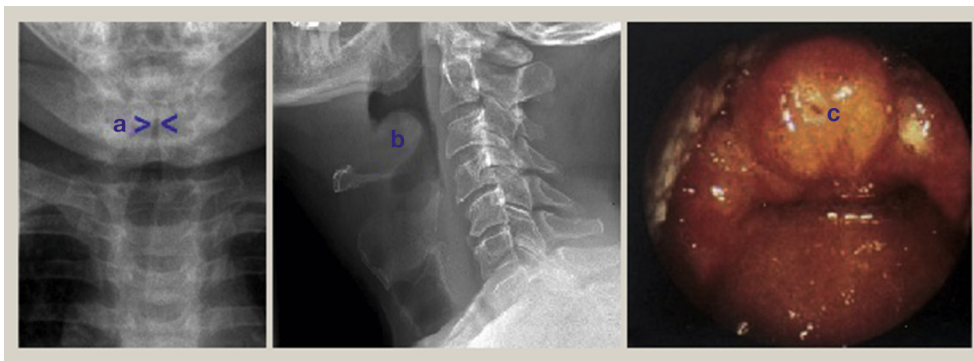


Figure 1 Signs of croup and epiglottitis. (a) ‘Steeple’ sign on AP radiograph (croup); (b) ‘thumb’ sign on LL radiograph (epiglottitis); (c) inflamed epiglottitis with severely distorted glottic anatomy (epiglottitis).

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