

# Stridor

## What is stridor?

- Stridor is a symptom not a diagnosis and it is important to find the underlying cause.
- Stridor is a loud, harsh, high pitched respiratory sound. It may start as low-pitched 'croaking' and progress to high-pitched 'crowing' on more vigorous respiration.
- It is usually heard on inspiration due to partial obstruction of the airway (usually extrathoracic - that is, in the trachea, larynx or pharynx).
- Stridor can occur on expiration in severe upper airway obstruction but usually indicates tracheal or bronchial obstruction (intrathoracic).
- Biphasic stridor suggests subglottic or glottic obstruction.<sup>[1]</sup>

## How common is stridor?

The detailed epidemiology of stridor depends on the cause, but it is worth noting the following patterns of disease:

- Stridor is common in younger children with smaller airways.
- In children, acute stridor often accompanies upper respiratory tract infection.
- In children, chronic stridor usually occurs with congenital conditions.
- Stridor in adults is much less common.
- Chronic stridor in adults often indicates serious underlying pathology.

# Causes of stridor

The Venturi principle dictates that when a gas moves forward, the lateral pressure drops. The lateral pressure is helping to hold open the airway and, when this pressure falls, the narrowed flexible airway (particularly so in children) collapses to obstruct airflow and generate the noise characteristic of stridor. Conditions causing stridor may involve the central nervous, cardiovascular, gastrointestinal and respiratory systems.

## Causes of stridor in children

These may be acute or chronic and the presentation and causes are considered below.<sup>[2]</sup>

### Acute stridor in children

- **Croup** or laryngotracheobronchitis:
  - The most common acute stridor in children.
  - Usually at age 6 months to 2 years.
  - A barking, seal-like cough, low fever and worse at night.
- **Inhaled foreign body**:
  - Common, especially in children aged 1 to 2 years.
  - Preceded by choking or coughing.
- **Tracheitis**:
  - Uncommon cause.
  - Usually occurs under the age of 3 years.
  - Bacterial infection following a viral infection in toddlers.

- Abscesses:
  - May be retropharyngeal (under the age of 6 years).
  - Or **peritonsillar** (usually in adolescents).
  - Presents with high fever and difficulty in swallowing.
  - Retropharyngeal abscesses present with pain on swallowing and hyperextension of the neck.
  - Peritonsillar abscess presents with trismus, difficulty with swallowing and difficulty with speaking.
- **Anaphylaxis:**
  - Hoarseness and inspiratory stridor.
  - Accompanied by other symptoms of an allergic reaction.
  - Usually within 30 minutes of exposure to an allergen.
- **Epiglottitis.**

- Congenital problems:
  - Laryngomalacia:
    - This is the most common cause of stridor.
    - It occurs in neonates and early infancy.
    - The stridor is often exacerbated by the supine position, and crying and feeding.
  - Vocal cord dysfunction:
    - This is the next most common cause of infant stridor.
    - The stridor is biphasic and associated with a weak cry.
    - Unilateral vocal cord palsy is most common and can be secondary to birth trauma or intrathoracic surgery.
    - It usually resolves in the first 2 years of life.
  - Subglottic stenosis:
    - This may be congenital with narrowing of the subglottis and cricoid rings.
    - It can be acquired after prolonged intubation.
    - It causes inspiratory stridor but this can be biphasic and misdiagnosed as asthma.
  - Laryngeal disorders:
    - Congenital laryngeal webs can cause biphasic stridor.
    - Laryngeal dyskinesia, exercise-induced laryngomalacia and other disorders produce stridor.
    - Laryngeal tumours may cause stridor. These may be laryngeal cysts, haemangiomas (rare), or papillomas (vertical transmission of human papillomavirus).
  - Tracheomalacia:
    - This is caused either by external compression or, more commonly, by a defective tracheal cartilage
    - It is the most common cause of expiratory stridor.

- Choanal atresia:
  - Most common congenital anomaly of the nose in infants.
  - Unilateral may be asymptomatic.
  - Bilateral may present with apnoea or cyanosis during feeding.
  - It can be diagnosed by an inability to pass a nasal catheter.
- Tracheal stenosis:
  - Congenital tracheal stenosis is usually caused by tracheal rings and presents with persistent stridor and a prolonged expiratory phase.
  - Other congenital causes of tracheal stenosis include external compression from aortic arch abnormalities.

### **Causes of stridor in adults** <sup>[3]</sup>

These may again be acute or chronic but the likely causes differ in adults. The presentation and causes are considered in the boxes below.

#### **Acute stridor in adults**

- **Airway trauma:**
  - This can present with stridor and sudden onset of dysphonia and haemoptysis.
  - Signs include cyanosis, intercostal retractions, nasal flaring, tachypnoea and progressive dyspnoea with shallow respirations.
  - Surgical emphysema may be identified as subcutaneous crepitation in the neck or upper chest.

- **Anaphylaxis:**
  - As with children, this causes stridor with upper airway oedema and laryngospasm.
  - There may be other signs of respiratory stress.
  - There is often nasal congestion and profuse, watery rhinorrhoea.
  - These respiratory effects are typically preceded by other symptoms including fear, weakness, increased sweating, sneezing, urticaria, erythema and angio-oedema.
  - The signs of shock can then follow rapidly.
- **Acute laryngitis:**
  - Stridor is caused by severe laryngeal oedema.
  - It is usually accompanied by hoarseness.
- **Aspiration of foreign body:**
  - Stridor is of sudden onset and is life-threatening.
  - There may also be paroxysmal coughing, gagging or choking, hoarseness, wheezing, tachycardia and other signs of respiratory distress.
  - Patients are usually anxious and distressed.
- Narrowing above the larynx causes stridor. Such narrowing may be caused by:
  - Anaphylaxis, as described above.
  - Acute epiglottitis. Although rare in adults, it does occur.
  - Retropharyngeal abscess, particularly in adolescents and young adults.

- Laryngospasm may cause stridor:
  - In [hypocalcaemia](#) accompanied by paraesthesia, and other signs of calcium deficiency.
  - [Inhalation injury](#). This occurs after inhalation of smoke or toxic fumes.
  - Laryngeal oedema and bronchospasm develop within 24 hours.
  - Signs and symptoms can include the discovery of singed nasal hairs, burns around the face, coughing, hoarseness, sooty sputum, crackles, rhonchi and wheezes and signs of respiratory distress.

### Chronic stridor in adults

- [Laryngeal tumour](#):
  - Stridor is a late sign accompanied by dysphagia, dysphonia and enlarged cervical lymph nodes.
- Laryngeal inflammation, causes include:
  - [Diphtheria](#).
  - [Tuberculosis](#).
  - [Syphilis](#).
  - [Sarcoidosis](#).
  - [Granulomatosis with polyangiitis](#).
- Cricoarytenoid ankylosis in:
  - [Rheumatoid arthritis](#).

- Tumours causing compression:
  - Mediastinal tumours:
    - These can eventually compress the trachea and bronchi.
    - Stridor is accompanied by hoarseness, brassy cough, tracheal shift or tug and distended neck veins.
  - **Retrosternal thyroid:**
    - Stridor with dysphagia, cough, hoarseness and tracheal deviation.
    - Accompanied by signs of **thyrotoxicosis**.
  - **Thoracic aortic aneurysm:**
    - Signs and symptoms are similar to mediastinal tumour.
- Iatrogenic causes include:
  - Bronchoscopy or laryngoscopy.
  - Prolonged intubation.
  - Neck surgery.

## Symptoms of stridor

A careful history gives helpful clues as to the aetiological cause of the stridor. Examination may occasionally help confirm the diagnosis. It is important to consider the age of the patients and whether the stridor is acute or chronic.

## History



- Children:
  - Age of onset.
  - Duration, progression and severity of stridor.
  - Precipitating factors (feeding, crying).
  - Whether positional (worse right/left, prone/supine).
  - Whether aphonia is present.
  - Other symptoms (cough, aspiration, drooling, choking, cyanosis, sleep).
  - Severity (colour change, respiratory effort, apnoea).
  - Perinatal history.
  - Developmental history.
  - Vaccination history.
  - Growth and weight gain.
- Adults:
  - Onset, duration, progression and severity should all be assessed.
  - Past medical history and details of any trauma or surgery.

## Examination

- Consider:
  - It may be possible in both adults and children to elicit signs of the level at which airway narrowing is occurring.
  - If the patient is distressed, defer further examination until equipment and facilities are available for emergency airway management in children and adults.
  - Patients suspected particularly of having acute epiglottitis should not be examined.

- Observe:
  - Fever and signs of toxicity suggesting bacterial infection.
  - Drooling from the mouth.
  - Character of cry, cough and voice.
  - In children, the craniofacial features, nasal patency and any cutaneous haemangiomas.
  - Any positional preference that alleviates stridor.
- Palpate (very carefully):
  - Crepitations or masses in the neck, face or chest.
  - Deviation of the trachea.
- Auscultate:
  - Nose, oropharynx, neck and chest (this can help locate the source of the stridor).

## Differential diagnosis

Diagnosis is made from the list of causes above. It is useful to consider the likely and important diagnoses according to age:

- In neonates, consider particularly congenital laryngeal paralysis or choanal atresia.
- In children, consider [inhaled foreign bodies](#) (such as toys or peanuts), croup, acute epiglottitis, diphtheria, upper airway burns and anaphylaxis.
- In adults, consider anaphylaxis, thyroid disease, trauma and tumours. However, remember acute epiglottitis, as this occurs in adults and requires prompt and appropriate management. Rarely, psychogenic stridor in young women.<sup>[4]</sup>

There is a clear distinction to be made between acute and chronic stridor. Some causes of stridor are life-threatening and need quick diagnosis and treatment.

# Investigations

Mild stridor may require no investigation when self-limiting upper respiratory infections are the cause. The need for further investigation is dictated by the clinical situation, the degree of distress and the severity of the stridor. The following may be useful:

- [Pulse oximetry.](#)
- [Arterial blood gases.](#)
- Imaging:
  - AP and lateral X-rays of the neck and chest (can identify particularly epiglottitis).
  - Special view X-rays (inspiratory/expiratory and lateral decubitus X-rays to demonstrate air trapping).
  - Contrast studies (if compression, tracheo-oesophageal fistula, gastro-oesophageal reflux suspected).
  - CT scanning (for aberrant vessels and mediastinal masses).
  - MRI scanning (particularly for upper airway and vascular abnormalities).
  - Virtual bronchoscopy.<sup>[5]</sup>
- Other tests and procedures:
  - Pulmonary function tests (differentiating restrictive/obstructive lesions and upper/lower airway obstruction).
  - Laryngoscopy and bronchoscopy (after oxygen saturations are stable and acute epiglottitis excluded).

## Treatment for stridor<sup>[4]</sup>

This depends on the cause of the stridor. Management of the particular causes may be very different. However, the following general points can be made:

- Emergency management is essentially about maintenance of the airway. Ill patients (moderate-to-severe stridor) should be kept nil by mouth.
- If management of the airway fails, resuscitation procedures should be followed.

In the event of cessation of stridor with airway obstruction:

- Abrupt cessation of stridor may herald complete obstruction with chest movement but no breath sounds.
- Patients will soon become unconscious.
- If there are any signs of airway obstruction from a suspected foreign body, try to clear this with back blows or abdominal thrusts (clearly not appropriate in acute epiglottitis).
- Give oxygen.
- If necessary, perform emergency endotracheal intubation, cricothyroidotomy or tracheostomy with mechanical ventilation.
- Be prepared to suction any aspirated vomit or blood through the endotracheal or tracheostomy tube.

- Medication from corticosteroids to antibiotics can be useful.
- A variety of surgical procedures may be necessary from tracheotomy to removal of obstructing tumours.

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## Further reading

- [Aihole JS](#); Stridor in a child: It's diagnostic challenges. *Respir Med Case Rep.* 2020 Feb 13;29:101011. doi: 10.1016/j.rmcr.2020.101011. eCollection 2020.

## References

1. [Spencer S, Yeoh BH, Van Asperen PP, et al](#); Biphasic stridor in infancy. *Med J Aust.* 2004 Apr 5;180(7):347-9.
2. [Boudewyns A, Claes J, Van de Heyning P](#); Clinical practice: an approach to stridor in infants and children. *Eur J Pediatr.* 2010 Feb;169(2):135-41. doi: 10.1007/s00431-009-1044-7.

3. [Zochios V, Protopapas AD, Valchanov K](#); Stridor in adult patients presenting from the community: An alarming clinical sign. *J Intensive Care Soc.* 2015 Aug;16(3):272-273. doi: 10.1177/1751143714568773. Epub 2015 Jul 23.
4. [Zaw H, Nyi TH, Aye WW](#); Psychogenic stridor: an overlooked cause of acute stridor in the acute medical unit? *Clin Med (Lond).* 2020 Mar;20(Suppl 2):s43. doi: 10.7861/clinmed.20-2-s43.
5. [Seam N, Finkelstein SE, Gonzales DA, et al](#); The workup of stridor: virtual bronchoscopy as a complementary technique in the diagnosis of subglottic stenosis. *Respir Care.* 2007 Mar;52(3):337-9.

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<p><b>Last updated by:</b> Dr Colin Tidy, MRCP 16/10/2024</p>	
<p><b>Peer reviewed by:</b> Dr Hayley Willacy, FRCGP 16/10/2024</p>	<p><b>Next review date:</b> 15/10/2027</p>

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