

Stridor

Stertor & stridor are both auditory manifestation of disordered respiratory function.

Stertor:

Is a low pitched snoring or snuffly sound caused by obstruction of the airway above the larynx; in the nose, nasopharynx or oropharynx.

Stridor:

Noisy breathing due to obstruction at the level of the larynx, trachea or bronchi.

Stertor & stridor are due to turbulence of air flow within a partially obstructed respiratory tract. While sterter is always inspiratory, stridor could be inspiratory, expiratory or both (biphasic). Above the cricoid level it is inspiratory, below the cricoid level (trachea & bronchi) stridor is expiratory & at the level of cricoid stridor is biphasic.

Causes of sterter:

The pathology could be in the nose, nasopharynx or oropharynx.

1. Congenital: mass, cyst or dysgenesis.
2. Traumatic: as septal hematoma.
3. Inflammatory: as common cold, sinusitis, pharyngitis or tonsillitis.
4. Neoplastic: benign & malignant.
5. Allergic rhinitis & nasal polyp.
6. hypertrophied tonsils or adenoids.

Causes of stridor: Stridor in children; laryngeal 60%, 60% of laryngeal stridor is due to laryngomalacia, subglottic stenosis is 20%, vocal cord palsy 13%, while 15% of stridor in children is tracheal. Stridor is inspiratory when obstruction above vocal cords, biphasic (inspiratory & expiratory) when glottic, subglottic & extrathoracic trachea & expiratory (wheezing) stridor when intrathoracic trachea & bronchi.

The pathology could be in the larynx, trachea or bronchi.

1. *Congenital*: like laryngomalacia, laryngeal cyst or web, stenosis...
2. *Traumatic*: external (penetrating or blunt), or iatrogenic thermal or chemical injury.
3. *Foreign body*: in the larynx, trachea or bronchi.
4. *Inflammatory*: acute laryngotracheobronchitis or epiglottitis.
5. *Neoplastic*: benign as papilloma, malignant as squamous cell carcinoma.
6. *Allergy*.
7. *Pressure* on the larynx, trachea or bronchi from outside as in goiter, Oesophageal tumor, or by the large blood vessels of the thorax as in aortic aneurysm.

Management of Stertor & Stridor:

I. History:

- a. Age of onset: congenital causes usually present at or soon after birth, malignant tumors are more common in elderly. Trauma more common in adults, foreign body is more common in children as inflammatory causes.
- b. Character: loud stridor heard from a distance & continuous one is more serious than low & intermittent type.
- c. Onset: sudden in foreign body, rapid in trauma as inflammation, slow in neoplastic conditions.
- d. Associated sign & symptoms: deglutition & respiration share a common pathway, namely the oropharynx, so it is not surprising that disorders of breathing interfere with swallowing & vice versa.
- e. Review of other systems (respiratory tract, GIT, CNS ...)
- f. History of smoking or alcohol drinking.
- G. Past medical & surgical History & History of neck trauma.

11. Examination:

- a. *General appearance*: alert, active & well fed child is unlikely to have any serious pathology. Look for signs of severe respiratory obstruction (as flaring of the nostrils, intercostal or subcostal recession), stigmata of congenital anomalies.

- b. *Vital sign*: respiratory rate, pulse rate, temperature, blood pressure & color of the patient.
- c. *Nasal Examination*: looking for any inflammation, septal deviation, tumor or choanal atresia.
- d. *Examination of the oral cavity & pharynx*: looking for hypertrophied tonsils, adenoid, any mass or tumor in the nasopharynx, oropharynx or hypopharynx.
- e. *Examination of the larynx*: also for any mass or vocal cord paralysis, or signs of inflammation.
- f. *Examination of related system* : special attention to lungs, heart & CNS.

111. Investigations:

- a. Pulmonary function test & arterial blood gases. Including: PaO₂, PaCO₂ & PH.
 - PaO₂: indicates the level of O₂ being delivered to the tissues.
 - PaCO₂: best indicator of alveolar ventilation.
 - PH: measures the respiratory & Metabolic acidosis or alkalosis.
- b. Laboratory: including: Full blood count, ESR, biochemical & electrolyte analysis, blood culture...
- c. Radiological Investigations:
 - * *Plain X-ray*: including lateral soft tissue X-ray of the head, neck & upper thorax, may show soft tissue mass obstructing the airways. Also We send the patient for plain CXR.
 - * *CT scan & MRI*: have dramatically enhance the visualization of the structures in the head, neck & thorax.
 - * *Barium swallow & angiogram & thyroid scan*: to see if there is pressure on the airway from the esophagus, large blood vessels & thyroid gland respectively.
- d. Endoscopy: under local or general anesthesia, using rigid or fiberoptic endoscopes. Examination of nose, post nasal space, hypopharynx & larynx can be done.
- e. bronchoscopy & oesophagoscopy might be required.

IV. Treatment:

- a.* Hospital admission: mild cases can be treated as an outpatient without admission.
- b.* Careful follow up: monitoring of the vital signs & the progress of the condition.
- c.* Conservative measures: including: O₂, humidification & steroids.
- d.* In severe cases or if there is deterioration of the vital signs, alternative airway should be provided; either tracheostomy or Endotracheal intubation.
- e.* Treatment of the underlying cause: as antibiotics (amoxiclav or cefotaxime) for acute epiglottitis, surgery or radiotherapy for malignant tumors.

Acute laryngeal trauma

Blunt trauma to the neck is being seen with increasing frequency. Severe laryngeal trauma may occur without open neck injuries. The patient with undiagnosed laryngeal trauma may succumb early from laryngeal obstruction or develop late laryngeal stenosis that requires permanent wearing of a tracheostomy tube.

Three poor prognostic features in acute blunt laryngeal injuries include 1- early airway obstruction requiring tracheotomy 2- the presence of bare cartilage in the laryngeal lumen, & 3- fracture & collapse of cricoid.

The following symptoms are indicative of some derangement of laryngeal structure:

1. increasing airway obstruction with dyspnea & stridor.
2. Dysphonia or Aphonia.
3. Cough.

4. Hemoptysis.
5. Neck pain.
6. Dysphagia & odynophagia.

The signs may be

1. Deformities of the neck, including alteration in contour & swelling.
2. Subcutaneous emphysema.
3. Laryngeal tenderness.
4. Crepitus over the laryngeal framework.

Diagnosis

1. Indirect & direct laryngoscopy.
2. X-ray of the neck & chest must be taken to detect laryngeal fractures, tracheal injuries, & pneumothorax.
3. the CT scan is an excellent method of diagnosing hyoid fractures, fracture dislocation of thyroid & cricoid cartilages, & distortion of laryngeal structures.

Treatment

1. Conservative treatment if small lacerations, ecchymoses or submucosal hematomas. Conservative management includes voice rest, humidification, bed rest, & systemic steroids.
2. Laryngeal exploration.
3. Establishment of the airway by tracheotomy or cricothyrotomy.
4. Stenting.

Foreign bodies in the larynx & tracheobronchial tree

It is the sixth most common cause of accidental death. 55% of aspirated foreign bodies involve the respiratory tract in children 6 months to 4 years of age. The accident is neither observed nor suspected in more than one third of these cases.

The commonest site is right bronchial tree because it is wider & shorter than left one.

History: sudden onset of choking with paroxysmal cough, noisy breathing, persistent fever in spite of treatment, recurrent pneumonia.

Examination: respiratory distress, cyanosis, excessive salivation, abnormal cry sound, vital sign changes, may be mediastinal shifting, obstructive emphysema, On auscultation: poor air entry, ronchi especially unilateral ronchi.

Investigations: x-ray of the neck & chest (A-p view, lateral view), CT scan may be required.

Treatment:

All techniques used for aiding the obstructed patient in an emergency, such as pounding on the back, Heimlich maneuver, finger probing of the throat, are dangerous & are discouraged unless the airway obstruction is unrelieved by the patient's own reflexes. These techniques may result in further impaction & the possibility of a total obstruction that was not present before these attempts. General anesthesia is recommended. Foreign body removal is facilitated by the use of the ventilating rigid bronchoscope & optical forceps, which may be used in conjunction with rigid fiberoptic telescope.