

**Review Article***Copyright © All rights are reserved by Fahim Ahmed Shah*

Clinical Approach to A Case of Stridor in Paediatric Age Group

Fahim Ahmed Shah**ENT Specialist & Google Scholar, Oman.****Corresponding author:** Fahim Ahmed Shah, ENT Specialist & Google Scholar, Oman.**Received Date:** November 02, 2022**Published Date:** November 15, 2022**Abstract**

Stridor is a common paediatric problem. It is quite common during winter season as a result of acute laryngo-tracheo-bronchitis and spasmodic croup, it is important for the clinician to classify noisy breathing and to elicit a description of the sound to be enabled to determine whether the sounds emanate from the upper respiratory tract (Stridor, snoring snorting) or lower respiratory tract (wheeze) and whether they occur predominantly during expiration or inspiration. Stridor is caused by extra thoracic, inspiratory dynamic narrowing of the airway in the oropharynx, glottis or Subglottic region or mid-trachea. Stridor and wheeze may co-exist in the presence of mid tracheal obstruction. Expiratory Stridor may accompany inspiratory Stridor if obstruction is extreme. Airway obstruction resulting in stridor in children is a common presentation to pediatrician and Otolaryngologist and can be due to various causes. Infective, neoplastic, congenital and traumatic lesions can cause acute airway obstruction and stridor. In this article the need of clinical workup to establish a diagnosis is highlighted by describing the clues and hints of pathophysiology of the airway in a child with respiratory symptoms especially stridor to reduce morbidity and mortality.

Keywords: Stridor; Wheezing; Stertor; Snoring; Croup**Introduction**

Differentiating clearly the nature of noisy breathing helps a lot in clinical practice especially in pediatric age group to determine stridor, wheeze, stertor, or simple snoring is clinically possible if aerodynamic is understood. Stridor is an alarming indicator of an underlying health problem rather than a disease itself. Assessment of stridor whether it occurs during inspiration, expiration, or both is important to determine the level of obstruction.

Stridor is an abnormal harsh medium pitched predominantly inspiratory squeaking or whistling sound, usually due to an obstruction in the airway. Wheezing is whistling coarse rattle sound that usually occurs during expiration. While stertor is noisy breathing due to obstruction that occurs at the level above the

larynx due to congestion in the mouth and nose. Stertor can happen with a simple common cold. In some cases it is due to a structural abnormality at the back of the nasal cavity. Snoring is the noisy sound when there is an obstruction to the free flow of air through the passages at the back of the mouth and nose. Snoring occurs when the collapsible part of the airway, the tongue and upper throat meet the soft palate and uvula strike each other it also indicate adenoid enlargement.

Mechanism of Production of Stridor

Stridor is a noisy or high-pitched sound with breathing Stridor is not a disease, but a symptom of some underlying cause, it is a sign that the upper airway is partially blocked. The mechanism of

its production is that the air is forced to by past the obstruction causing turbulent flow of air through a narrowed or partially obstructed segment of the extra thoracic upper airway, involving areas include the pharynx, epiglottis, larynx, and the extra thoracic trachea. There are three subtypes of stridor depending on which phase of the respiratory cycle it occurs. Stridor during inspiration is the usual type, but stridor can occur during expiration phase as well or at times during both phases of respiratory cycle. Clinically this understanding of aerodynamics of rapid, turbulent flow of air through a narrowed or partially obstructed segment of the extra thoracic upper airway goes a long way to deal stridor.

Peculiarities of infant larynx

Infant larynx has a flabby cartilaginous support and glottic aperture & subglottic space is smaller Infantile epiglottis assumes an omega shape Aryepiglottic folds & false vocal cords tend to get drawn into the laryngeal lumen and is situated at a higher level than adult and has incompletely developed neuromuscular control.

Stridor in the Newborn

Causes of stridor in children

Stridor is exceptional in the newborn period and when present indicates a congenital anomaly of the upper respiratory tract or its neuromuscular control. According to the site of obstruction it can be in the pharynx larynx and trachea e.g. micrognathia, larynomalacia, laryngeal web laryngeal cleft, Subglottic and tracheal stenosis, haemangioma, cystic hygroma, cyst, vocal cord palsy, vascular ring. These causes are not easy to differentiate without investigation therefore it needs high profile diagnostic approach. Similarly some transient causes like meconium, mucus, blood in glottis or post intubation edema should be kept in mind and also those congenital anomalies of pharynx, larynx & trachea that are present in the first few week of life & persist thereafter like Lingual thyroid, Craniofacial anomalies associated with midfacial hypoplasia "[Apert's syndrome, Pierre- Robin Sequence]. Thyroglossal cyst, Tracheal stenosis, webs, tracheomalasia should be in differential diagnostic consideration.

Laryngeal Foreign Body

Although a very small proportion of foreign bodies get impacted in the larynx, yet inhalation of a foreign body is a serious event. Historically foreign body aspiration has been a tremendous cause of death and disability. There is a decrease in mortality for foreign body aspiration with the use of endoscopic techniques for foreign body removal. Any foreign body in the larynx presents usually as a respiratory emergency when urgent recognition is required to prevent disaster [1] foreign body aspiration occur most frequently in children under 3 years [2] The diagnosis of foreign body aspiration is frequently delayed because of no positive history [3] since in Paediatric age group usually foreign body aspiration event lacks forth coming witness this delay can be minimized by high index of suspicion because of the Upper airway foreign bodies

mimic symptoms of viral subglottic croup [4] It is still a very uncommon site for lodgment of foreign bodies Foreign body in larynx presents as sudden total or near total obstruction, usually during eating, also known as "Cafe coronary", very common cause of death [5] Sticky, thorny or irregular shaped foreign bodies may get lodged in the larynx [6]. Foreign body impacted in the larynx stimulates laryngeal spasm and causes complete respiratory obstruction resulting in a rapidly lethal outcome.

Approach to Differential Diagnosis

The causes of Stridor can be classified according to the duration of symptoms [acute, subacute (days), chronic (weeks)], and age of the child. Most present at birth and cause a great deal of parental anxiety Persistent (chronic) Stridor is almost always a disease of infancy and early childhood. Foreign body inhalation or recurrent aspiration needs direct laryngoscopy and or bronchoscopy for foreign body removal. Persistent mild congenital Stridor in an otherwise normal infant is generally caused by larynomalacia (congenital infantile larynx) and require no investigation. It is worse during sleep. Recurrent spasmodic croup in an older child is a benign condition and should not be further investigated. All other chronic or recurrent Stridor should be investigated [radiography, direct fibre-optic laryngoscopy with bronchoscopy if necessary]).

It is important to establish whether stridor is acute recurrent or persistent

Common causes of acute Stridor are acute-tracheobronchitis (commonest), acute epiglottitis, and foreign body, inhaled hot gases, trauma, retropharyngeal abscess, allergic edema and hysterical laryngospasm. Common causes of persistent stridor are laryngomalacia (50-60%), Subglottic stenosis (14%), and vocal cord palsy (10%).

Clues to the Diagnosis

Age: it is an important consideration

Laryngomalacia - 4-6 weeks. Characteristic low-pitched vibratory or fluttering stridor

Other congenital anomalies & vocal cord paralysis, usually just after birth

Foreign body usually 6 months to 2yrs. Croup: viral croup 3 months to 5 years Allergic /spasmodic croup - 1-3 yrs.

Phase of respiration: Inspiratory alone is laryngeal whereas biphasic to & fro stridor is tracheal.

Position Assumed by the Child

Severe viral croup & acute epiglottitis usually present with the child sitting up, leaning forward hyperextension of neck to maximize the airway. Similarly hyperextended neck is seen in cases of vascular ring, goiter and birth trauma to larynx in course of face delivery. Stridor that decrease in prone position and increase in supine position is due to Laryngomalacia, Pierre- Robin

Sequence. Stridor that worsen with crying and straining is due to Laryngomalacia, Sub-glottic hemangioma.

Assessment of Severity

1. Stridor which is intermittently present, and absent during quiet breathing, indicates mild degree of obstruction
2. Continuous stridor associated with marked chest wall retractions, indicate a moderately severe obstruction
3. Stridor associated a cyanosis, pallor, restlessness, impaired consciousness has severe obstruction demanding immediate relief.

Quality of Voice/Cry

Voice changes accompany most laryngeal lesions with the exception of Laryngomalacia where voice is normal. Weak or absent voice in vocal cord disorders, conditions associated with poor pulmonary function and also in Subglottic stenosis, in which expiratory flow is insufficient to make a good cry

Association of Feeding Difficulties

Laryngotracheoesophageal cleft, Neurological disorders.

Maneuvers

Pulling the mandible & tongue forward relieve obstruction in Pierre Robin syndrome and Obstruction higher than the level of larynx. Placing the child in prone position decrease the stridor in laryngomalacia. Palpation of carotids may show inequality of pulsations on the two sides in some case of vascular ring

Confirmation of Diagnosis

Radiology

Plain films of neck & chest both AP and lateral views. Fluoroscopy Barium Swallow Laryngogram Angiography. CT scan-larynx. Radio-opaque object-can readily be seen. Lodged anteriorly

are Laryngeal and lodged behind the soft tissue shadows of larynx are in esophagus. Similarly Sagittal plane are in Larynx and Coronal plane in oesophagus Foreign body in the larynx at the glottic or subglottic level, as can be predicted, lie in the sagittal plane.

Endoscopy

Laryngoscopy Direct Indirect Oesophagoscopy Bronchoscopy

Laryngoscopic examination offers the most valuable tool and gives immediate diagnosis of most of the laryngeal and sub-glottic disorders. Direct Laryngoscopy confirms the diagnosis and also provides access for removal of FB bodies but in severe distress, tracheostomy is advisable prior to direct Laryngoscopy.

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Conflict of Interest

No conflict of interest.

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