

A STUDY INTO THE CLINICAL PROFILE AND AETIOLOGY OF STRIDOR IN INFANTS AND CHILDREN

Baneesh A. B.¹

¹Assistant Professor, Department of ENT, P. K. Das Institute of Medical Sciences.

ABSTRACT

BACKGROUND

The cardinal sign of airway obstruction stridor is well known to all medical practitioners. It may be defined as the presence of hoarse, high pitched, noisy respiration resulting from the turbulent passage of air through a narrow airway. Since stridor is nearly a manifestation of a disorder, which maybe mild or extremely grave, the process underlying the cause should be sought in every case. The investigation of an infant with stridor calls for various ancillary methods of examination in addition to clinical assessment. Though uncommon, managing a child with noisy breathing is seldom easy. A detailed history and a precise and meticulous examination are required for managing a stridulous child.

MATERIALS AND METHODS

Patients attending ENT and Paediatric Department were included in the study. After taking a detailed history and examination, direct laryngoscopy was done.

RESULTS

24 patients with stridor were studied. Of which, acute laryngotracheobronchitis were 14 cases, laryngomalacia 3 cases, foreign body bronchus 2 cases.

CONCLUSION

Most common cause of stridor in children includes acute laryngotracheobronchitis and laryngomalacia. They are more common in children of age less than two.

KEYWORDS

Stridor, Laryngotracheobronchitis, Laryngomalacia, Direct Laryngoscopy.

HOW TO CITE THIS ARTICLE: Baneesh AB. A study into the clinical profile and aetiology of stridor in infants and children. J. Evid. Based Med. Healthc. 2017; 4(65), 3924-3927. DOI: 10.18410/jebmh/2017/784

BACKGROUND

The cardinal sign of airway obstruction stridor is well known to all medical practitioners. It may be defined as the presence of hoarse, high pitched, noisy respiration resulting from the turbulent passage of air through a narrow airway. Since stridor is nearly a manifestation of a disorder, which maybe mild or extremely grave, the process underlying the cause should be sought in every case. The investigation of an infant with stridor calls for various ancillary methods of examination in addition to clinical assessment.

Stridor in children results from a number of defects, both congenital and acquired. Although, a careful history and physical examination is necessary. A rigid endoscopy¹ is required to adequately evaluate the aetiology of stridor. It has not only diagnostic function, but at times, becomes therapeutic.

The characteristics of the stridor maybe a clue to the location of the obstruction. A harsh, high-pitched crowing noise during inspiration often indicates an abnormality in the larynx in the subglottic region or more often in the supraglottic tissues. Stridor of lower pitch with snoring and excessive secretions may indicate a pharyngeal or nasopharyngeal obstruction. Stridor that is inspiratory and expiratory with a prolonged low-pitched excretory phase suggests obstruction of the trachea or even main bronchi from compression or collapse.

As hoarseness is the common presenting feature of larynx disease in adults, its stridor in children, it's the basic structural and functional differences existing between paediatric and the adult larynx producing the variation. So, when dealing with a stridulous child, a detailed knowledge of basic anatomy and physiology of paediatric airway is required. Children and neonates are particularly susceptible to stridor because their immature airways are much more compliant than those of an adult and therefore are more prone to collapse. Furthermore, the diameter of a child's airway is so small that only a slight reduction in diameter causes a considerable reduction in cross-sectional area.²

The causes of stridor in children vary with age in children. Initial few months, it maybe congenital, laryngomalacia being the commonest one. With the growing age, the infant larynx develops further and the congenital

Financial or Other, Competing Interest: None.
Submission 05-08-2017, Peer Review 07-08-2017,
Acceptance 09-08-2017, Published 14-08-2017.

Corresponding Author:

Dr. Baneesh A. B.,

Assistant Professor, Department of ENT,

P.K. Das Institute of Medical Sciences.

E-mail: baneesh_ab@yahoo.com

DOI: 10.18410/jebmh/2017/784



cause becomes less. In early childhood, it's the infective cause mostly contributing to the stridor. A child with acute laryngitis and laryngotracheobronchitis presents immediately with stridor.

The clinician should know when the stridor began, how long it has persisted, whether it is constant or intermittent and what has been its progress and degree. Its relation to inspiration and expiration, the effect of sleeping, eating, crying or posture and a possible association with aspiration may all be important. Observation and examination over hours or days may give useful information, which was not detectable at a single examination.

Correlation of the clinical features, physical signs, radiologic abnormalities and the endoscopic changes are essential to localise the cause and make a correct diagnosis.

Objectives

To study the clinical profile- aetiology, symptoms at presentation and findings on clinical examination among children presenting with stridor.

MATERIALS AND METHODS

The present study was a hospital-based, cross-sectional study carried out in children attending the ENT Department as well as the children attending or admitted in the Paediatric Department of NSCB Medical College, Jabalpur.

Inclusion Criteria- Children with age less than 15 years presenting with acute stridor were only included in the study.

Exclusion Criteria- Children with history of wheeze due to lower respiratory tract infection were not included in the study.

Study was done in one year period in 2009 in Netaji Subhash Chandra Bose Medical College, Jabalpur. After getting approval from ethical committee, study was initiated. All children with acute stridor were included consecutively for one year period. A total sample of 24 children was included in the study.

Method of Examination- After taking a detailed history from parents, the standard procedure of examination of ear, nose, throat, oral cavity, head and neck was carried out on each case.

Followed by this, the diagnosis will be confirmed by direct laryngoscopic examination. As it is a highly technical surgical procedure, the management team including surgeon, anaesthetist and nursing staff was fully equipped to perform the examination safely and to optimise assessment. After induction, child is ventilated to a level of anaesthesia that will allow the passage of endoscope without gagging while maintaining spontaneous respiration. Airway control can be regained at any time with intubation or an endoscope. During laryngoscopy, all details of airway anatomy and disease manifestation seen are documented in a systematic method.

Statistical Analysis- Data was coded and entered in MS excel and analysed using Epi info software. Data was analysed using proportions.

RESULTS

The present cross-sectional study comprised of 24 cases attended the ENT and Paediatrics Department. A detailed clinical examination including direct laryngoscopy was performed. The results are discussed as demographic details and clinical profile.

Demographic Distribution- It was found that 45% (n=11) children with stridor were in 0-2 year's age group (Table 1). It is less common in 2 to 4 years age group and least common in children of more than 4 years. 18 (75%) cases were males and 6 were females. The majority of cases were from low socioeconomic background (83.3%). Out of 24 cases studied, 18 (75%) were immunised up to the age.

Clinical Profile- Of all 24 cases presented with noisy breathing, 79.1% were febrile. 19 cases had change of voice or cry. The distribution is given in table no. 2. Stridor in 20 (83.3%) cases was inspiratory; in 2, it was expiratory, and in rest, it was biphasic. On examination of oral cavity, 15 (62%) cases were having enlarged and congested tonsils. 5 cases were having greyish white membrane on tonsils, pillars and postal pharyngeal wall, which bled on removal. One child was having palatal palsy. There was also one child with grossly enlarged lymph nodes in neck. In acute laryngotracheobronchitis, stridor was inspiratory in 12 cases and biphasic in 2 cases. In diphtheria, stridor was inspiratory. In foreign body, bronchus stridor was expiratory. Stridor was constantly present 22 (91%) cases and was intermittent in 2 cases. Most of the children with acute laryngotracheobronchitis were in 0-2 age group. All the children with laryngomalacia were of less than 2 years of age.

Positive Findings on Direct Laryngoscopy- 41.6% of cases were having oedematous and congested false vocal cords. True vocal cords were congested in 20.8%. Epiglottis showed 'omega' shaped appearance in 3 cases and curling up of epiglottis in 2 cases. Aryepiglottic folds were short and flaccid in two children and there was indrawing with inspiration (Table 3).

DISCUSSION

The present study evaluated the incidence and aetiology of stridor in infants and children. The aetiological factors were assessed from history, physical examination and confirmed by direct laryngoscopy. It was found that stridor is a symptom disease more common in infants and young children and decreases gradually with increasing age.³ The present study also showed a higher prevalence of stridor in children coming from low socioeconomic conditions. It may be due to lack of proper nutrition, hygiene, good drinking water and immunisation.⁴ The associated presenting features found in the present study included cough, fever,

change in voice and feeding difficulty. Fever and cough were present in all infective cases.

The phase of stridor with respiration was mostly inspiratory. It was present in cases of laryngomalacia, acute laryngotracheobronchitis and diphtheria as it is produced by the lesions above the level of vocal cord.⁵ Two cases of acute laryngotracheobronchitis showed a stridor of biphasic nature. It may be due to the widespread oedema and narrowing of tract extending to subglottic mucosa.⁶ So, it maybe said that phase of stridor gives a clue to the anatomical site of obstruction. In cases of laryngomalacia, it was intermittently present, which means appearing only when the child is feeding or cries and maybe much more pronounced during sleep especially, if the child lies on back.⁷ In the present study, the aetiological factors of stridor in children is as follows. Acute laryngotracheobronchitis constituted 58.3%, membranous tonsillitis 20.8%, laryngomalacia 12.5% and foreign body bronchus 8.3% (Table 4).

D A Birch in 1961 in London⁶ studied 200 cases of stridor and the aetiology was acute laryngotracheobronchitis- 43%, infantile larynx- 40%, webs and cysts 5%. In a study in Christian Medical College Hospital, Vellore, by Rupa V and Raman R found that aetiology was congenital in 32.2% and acquired 67.8%. Laryngomalacia was common congenital cause. Laryngotracheobronchitis and diphtheria were the commonest infectious causes. The present study is also inconsistent with the previous studies^{8,9,10} (Table 5).

Acute Laryngotracheobronchitis- The study showed a higher frequency (42.8%) of the disease in age group less than 2 and its incidence declined with increasing age. There is also an increased frequency in male child.¹¹ The stridor was mostly inspiratory with severe cases having biphasic nature. There was a prior history of upper respiratory tract infection in most of cases.

Out of 5 cases with membrane over the tonsil, one was diagnosed diphtheria. None of these cases were having

history of DPT vaccination. One case had palatal palsy at the time of presentation. All three cases of laryngomalacia were less than the age of one year. The stridor was inspiratory and present intermittently in two cases and continuously in one. There was no change in voice or cry in these laryngomalacia cases. The study also shows increasing stridor on supine position. On direct laryngoscopy, the epiglottis showed 'omega' shaped appearance in 3 cases and curling up of epiglottis in 2 cases.¹² Aryepiglottic folds were short and flaccid in two children and there was indrawing with inspiration.

To conclude, the peak incidence of stridor was in age group 0-2 years and frequency became less with increasing age. There was a higher prevalence of stridor in children coming from low socioeconomic conditions. The study showed stridor was inspiratory in most cases. The most common aetiology of stridor in children was infective - acute laryngotracheobronchitis. Severe cases of laryngotracheobronchitis showed a biphasic pattern of stridor. All cases of laryngomalacia were less than one year. In laryngomalacia, stridor increased on supine position and anatomical abnormalities were found.

Age Group (Years)	Number of Percentage
0-2	11 (45.83)
2-4	9 (37.5)
4-6	2 (8.33)
6-8	2 (8.33)

Table 1. Age Distribution of the Study Population

Presenting Complaints	Number	Percentage
Noisy breathing	24	100
Fever	19	79.1
Cough	21	87.5
Change in voice	19	79.1
Feeding difficulty	19	79.1
Foreign body aspiration	2	8.3

Table 2. Incidence of Various Presenting Complaints

		Number of Cases	Percentage
Epiglottis	Curled up	2	8.3
	Omega shaped	3	12.5
Aryepiglottic fold	Short and flaccid	2	8.3
	Indrawing	1	4.1
False vocal cord	Oedematous and congested	10	41.6
True vocal cord	Congested	4	16.6
Trachea and bronchus	Foreign body	2	8.3

Table 3. Positive Findings on Direct Laryngobronchoscopy

	Number	Percentage
Acute laryngotracheobronchitis	14	58.3
Laryngomalacia	3	12.5
Diphtheria and membranous tonsillitis	5	20.8
Foreign body bronchus	2	8.3

Table 4. Aetiological Factors of Stridor in the Present Study

	Present Study	Rupa V, Raman R	Arthurton	D A Birch
Congenital	12.5%	32.2%	15.6%	40%
Acute laryngotracheobronchitis	58.3%	35%	24.4%	43%
Acute epiglottitis			4%	

Diphtheria and membranous tonsillitis	20.8%		0.4%	
Papilloma				1%
Vascular ring			0.8%	1%
Foreign body	8.3%		0.4%	1%
Cysts				2%
Subglottic stenosis				1%
Vocal cord paralysis				1.5%
Table 5. Comparison of Previously Reported Incidence Rates with the Present Study				

CONCLUSION

The present study showed acute laryngotracheobronchitis was the most common infective cause and laryngomalacia was the most common congenital cause of stridor in children. Laryngotracheobronchitis was more common in children of less than 2 years of age and severe cases showed biphasic pattern of stridor. All 3 cases of laryngomalacia were belonging to age group less than one. So, in evaluation of a stridulous child, direct endoscopic examination is of paramount importance for arriving at a diagnosis.

REFERENCES

- [1] Gleeson MJ, Clarke RC. Scott-Brown's otorhinolaryngology: head and neck surgery. 7th edn. Vol. 1. CRC Press 2008: p. 1120.
- [2] Flint PW, Haughey BH, Robbins KT, et al. Cummings otolaryngology-head and neck surgery. 6th edn. Elsevier Health Sciences 2014: p. 2897.
- [3] Holinger LD. Evaluation of stridor and wheezing. In: Holinger LD, Lusk RP, Green CG, eds. Pediatric laryngology and bronchoesophagology. Philadelphia: Lippincott-Raven 1997:p.42.
- [4] Holinger PH, Schild JA, Weprin L. Pediatric laryngology. Otolaryngol Clin North Am 1970;3(3):625-637.
- [5] Sobol SE, Zapata S. Epiglottitis and croup. Otolaryngol Clin North Am 2008;41(3):551-566.
- [6] Holinger LD. Etiology of stridor in the neonate, infant and child. Ann Otol Rhinol Laryngol 1980;89(5 Pt 1):397-400.
- [7] Shah UK, Wetmore RF. Laryngomalacia: a proposed classification form. International Journal of Pediatric Otorhinolaryngology 1998;46(1-2):21-26.
- [8] Birch DA. Laryngeal stridor in infants and children: a study of 200 cases. The Journal of Laryngology & Otolaryngology 1961;75(9):833-840.
- [9] Rupa V, Raman R. Aetiological profile of paediatric laryngeal stridor in an Indian hospital. Annals of Tropical Paediatrics 1991;11(2):137-141.
- [10] Arthurton MW. Stridor in a paediatric department. Proceedings of the Royal Society of Medicine 1970;63(7):712-714.
- [11] Denny FW, Murphy TF, Clyde WA, et al. Croup: an 11-year study in a pediatric practice. Pediatrics 1983;71(6):871-876.
- [12] Belmont JR, Grundfast K. Congenital laryngeal stridor (laryngomalacia): etiologic factors and associated disorders. Ann Otol Rhinol Laryngol 1984;93(5 Pt 1):430-437.