STRIDOR IN AFEBRILE CHILDREN

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ABSTRACT

Objective: To enlist the causes of stridor in afebrile children under twelve years of age.

Design: Descriptive study.

Place and Duration of Study: Carried out in ENT Dept CMH Rwp from Sep 2001 to Feb 2003.

Patients and Methods: Fifty children presenting for the first time with symptoms of stridor were selected according to the inclusion criteria by non-probability purposive sampling. Every patient was evaluated by detailed history, thorough physical examination and investigations including radiographic studies, laryngoscopy and bronchoscopy. Data was recorded on the performa attached as Annex 'A'.

Results: Of the 50 patients, there were 29 males and 21 females. The mean age at presentation was 3.8 years. About forty-eight diagnostic observations were made during the initial endoscopic procedure on these 50 children. Acquired lesions (76%) outnumbered the congenital lesions (24%). Of the congenital type, laryngomalacia (42%) was the commonest cause followed by vocal cord paralysis (17%), laryngocele (17%), laryngeal web (8%), tracheomalacia (8%) and tracheal stenosis (8%). The most important acquired lesion was foreign body in the Aerodigestive tract (55.26%), followed by respiratory papilomatosis (21.05%), traumatic (13.16%) and subglottic stenosis (10.13%) Because of chronic and presistent upper airway obstruction, tracheostomy was electively performed in 02 cases in this series. There was no complication associated with complete endoscopic examination

Conclusion: Foreign body in the tracheobronchial tree is the most frequent cause of stridor in afebrile children followed by congenital conditions and recurrent respiratory papillomatosis.

Keywords: Stridor, afebrile stridor, foreign body airway, congenital anomalies larynx

INTRODUCTION

Stridor is defined as "Noisy breathing resulting from rapid and turbulent airflow through a narrow segment of airway which may occur anywhere with in the larynx, trachea and major bronchi." [1]. Definitions vary, and descriptions include consideration of pitch, loudness, relation with respiration, associated body position and the age of onset [2]. Stridor may be inspiratory, expiratory or mixed inspiratory and expiratory (biphasic) [3]. Laryngeal stridor is usually inspiratory, bronchial is expiratory and a rare mixed variety must bring to the mind the possibility

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of an abnormal vessel arising from aortic arch [4].

The syndrome of laryngeal obstruction with stridor is fairly common in children. The pattern varies from merely noisy breathing to inspiratory croup associated with suprasternal, intercostal and subcostal recession.

Stridor implies partial airway obstruction, resulting from intrinsic or extrinsic abnormalities of the upper respiratory tract. It is always a symptom or a sign but never a diagnosis and search for a cause must always be made. In an infant whose airway is small, soft and easily occluded, this may be potentially life threatening. So its immediate diagnosis with prompt therapy is a rewarding challenge.

The causes of stridor and upper airway obstruction in afebrile children are varied and may be classified according to etiology, pathology, anatomical site of origin or individual characteristics of stridor itself, such as pitch or timing [5]. The list of differential diagnoses is quite lengthy and never complete. The dilemma arises in deciding how vigorously to pursue a definitive diagnosis and at what point intervention is necessary. Therefore a precise diagnostic approach is needed as soon as condition is noted.

Laryngeal stridor beginning in first week of life and persisting may be caused by congenital anomalies that include laryngomalacia, laryngeal atresia, congenital laryngeal web, cleft larynx, congenital cysts and tracheomalacia [6]. Subglottic and tracheal stenosis can occur after intubation [7].

Vocal cord paralysis in children can present as stridor, a weak cry or voice or feeding difficuilties and aspiration [8]. It is the second most common cause of neonatal stridor and has been reported to account for 10% of all congenital anomalies affecting the larynx [9]. Foreign body aspiration is true emergency with a significant morbidity and at times mortality [10]. Children aspirate a wide variety of vegetable and non vegetable objects leading to mechanical obstruction of airway. After entering the airway the foreign body induces a symptom complex consisting of choking, paroxysmal coughing, wheezing and stridor [11]. Trauma of the larynx may cause dyspnoea on exertion or inspiratory stridor [12]. Recurrent respiratory papillomatosis [13] and Chronic granulomaous diseases such as tuberculosis, sarcoidosis [14], leprosy, syphillis and Wegners granulomatosis [15] etc. can effect larynx causing dysnoea, dysphonia and stridor. Micrognathia can cause stridor or an inadequate airway because the tongue is displaced posteriorly. In Pierre Robin syndrome cleft palate is associated with micrognathia and stridor is marked.

Objective

To enlist the causes of stridor in afebrile children under twelve years of age.

PATIENTS AND METHODS

Study design

It was a descriptive study, comprising of 50 patients

Setting

The study was carried out at ENT deptt of Combined Military Hospital Rawalpindi, a tertiary care referral hospital.

Duration of Study

Sep 2001 to Feb 2003.

Sampling and Selection

Children presenting for the first time with symptoms of stridor were selected by non probability purposive sampling.

Inclusion Criteria

- Childern under 12 year of age.
- Afebrile children with stridor.

- Children having stridor due to foreign body in upper airway.

Exclusion Criteria

- Patients with fever and stridor.
- Children with other medical problems like bronchial asthma.
- Children presenting with other noises like stertor and snoring.

Data Collection

Every patient was evaluated by detailed history, thorough physical examination and investigations including radiographic studies, laryngoscopy and bronchoscopy. Data was recorded on the performa attached as Annex 'A'.

Follow up and Endpoint

Patients were followed up till the definitive diagnosis and treatment.

STATISTICAL ANALYSIS

Data was entered in SPSS version 10.0. Mean and S.D were calculated for numerical data and percentages were calculated for categorical data.

RESULTS

Of the 50 patients, there were 29 males (58 %) and 21 females (42 %) with male to female ratio of 1.38:1 (fig.1). The mean age at presentation was 3.8 years (table-1) and 50% of the children were under the age of 4 year.

Inspiratory stridor was present in 24 patients (48%), biphasic in 08 patients (16%) and 18 (36%) patients had expiratory stridor. Additional signs and symptoms included weak cry in 13 patients (26%), feeding difficulty in 10 patients (20%) and cyanosis in 04 patients (08%).

About forty-eight diagnostic observations were made during the initial endoscopic procedure on these 50 children. Stridor due to congenital conditions was found in twelve patients (24%). Among them Laryngomalacia was noted in 5 patients, Vocal cord paralysis and laryngocele in 2 infants each, while laryngeal web, tracheomalacia and tracheal stenosis was found in 1 patient each (table-2). Among the acquired conditions (76%) there were 21 cases (42%) of tracheobronchial foreign body (table-3). About four of the abnormalities of the respiratory tract were below the vocal cords and would be difficult to diagnose unless the endoscope was passed to and through the vocal cords. The remaining twenty-five diagnostic observations were located in the larynx and would be visible on a careful inspection of larynx and hypopharynx. Recurrent respiratory papillomatosis was found in 8 cases (16%). Stridor due to external trauma to the larynx was found in 5 patients (10%) and Subglottic stenosis was noted in 4 cases (8%) (fig.2). Some other observations made in the study include:-

- Incidence of infantile stridor in OPD cases in 1.5 years time was 0.079.
- Because of chronic and persistent upper airway obstruction, tracheostomy was electively performed in 2 cases in this series.
- 60% patients were four years old or younger, of which 3 patients presented with stridor at birth.
- Three patients had positive family history of other siblings suffering from same complaints as of the patients' and most of the patients had uneventful gestation.
- There was no complication associated with complete endoscopic examination.

DISCUSSION

Stridor results from turbulent flow of air in a major airway. It invariably indicates partial airway obstruction resulting from

Table-1: Age distribution of children with stridor.

	N	Minimum	Maximum	Mean	Std. Deviation
Age (in years)	50	00	11	3.80	2.55

Table-2: Frequency distribution of congenital conditions causing stridor in the study (24 % of total cases).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		38	76.0	76.0	76.0
	LC	2	4.0	4.0	80.0
	LM	5	10.0	10.0	90.0
	LW	1	2.0	2.0	92.0
	TM	1	2.0	2.0	94.0
	TS	1	2.0	2.0	96.0
	VCP	2	4.0	4.0	100.0
	Total	50	100	100	

LC – Laryngocoele *TM – Tracheomalacia* *LM – Laryngomalacia*
TS – Tracheal Stenosis *LW – Laryngeal Web* *VCP – Vocal Cord Paralysis*

Table-3: Frequency distribution of all conditions causing stridor in afebrile children in the study.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cong	12	24.0	24.0	24.0
	F.B.	21	42.0	42.0	66.0
	RRP	8	16.0	16.0	82.0
	SS	4	8.0	8.0	90.0
	Trauma	5	10.0	10.0	100.0
	Total	50	100	100	

FB - Foreign Body *RRP – Recurrent Respiratory Papillomatosis* *SS – Subglottic Stenosis*

Annex -A

Data collection proforma

Name			Date of admission	
Age			Date of discharge	
Gender	Male	Female	Residence	

Symptoms

Noisy Breathing		
Cough		
Breathing		
Change of voice		
Foreign body inhalation		

Signs

Pulse		
Resp. Rate		
Cyanosis		
Stridor		
Chest	Recession	
	Auscultation	

Investigations

Radiographic studies	X-Rays chest
	X-Rays neck
Endoscopy	Laryngoscopy
	Tracheo-Bronchoscopy

Diagnosis

intrinsic or extrinsic abnormalities of the upper respiratory tract [16]. In an infant whose airway is small, soft and easily occluded, this may be potentially life

threatening [17]. So its immediate diagnosis with prompt therapy is a rewarding challenge. It is always a sign or symptom but never a diagnosis or a disease [3]. It may appear just as a noisy breathing but it should always be remembered that stridor is indicative of airway obstruction [2,9] and search for the cause should always be made. Supraglottic, glottic, subglottic and cervical tracheal narrowing generally results in an inspiratory stridor while more distal lesions produce expiratory stridor [17]. Fixed lesion of the larynx and upper trachea, if severe enough, may result in both inspiratory and expirtory stridor. The pitch of laryngeal and hypophryngeal stridors tends to he lower and coarse, while more distal lesions are usually high-pitched.

Although endoscopy of the air and food passages gives the final diagnosis, the importance of history and physical examination remains. Careful history and skilled physical examination should identify most children with significant laryngeal disease.

The causes of stridor and upper airway obstruction in afebrile children are varied and may be classified according to etiology, pathology, anatomical site of origin, or individual characteristics of stridor itself, such as pitch or timing. The list of differential diagnosis is quiet lengthy and never complete, however leaving aside the febrile conditions like laryngeal infections, the common causes of stridor in afebrile children are generally the same in all studies carried out. The dilemma arises in deciding how vigorously to pursue a definitive diagnosis and at what point intervention is necessary.

Mundra Kumar, Associate Professor, Department of Pediatrics, University of South Florida College of Medicine published a study on Jan 2003 by the name of stridor [5], in which the most common cause of congenital stridor was laryngomalacia and the most common acquired cause of stridor in afebrile children was airway foreign body. He

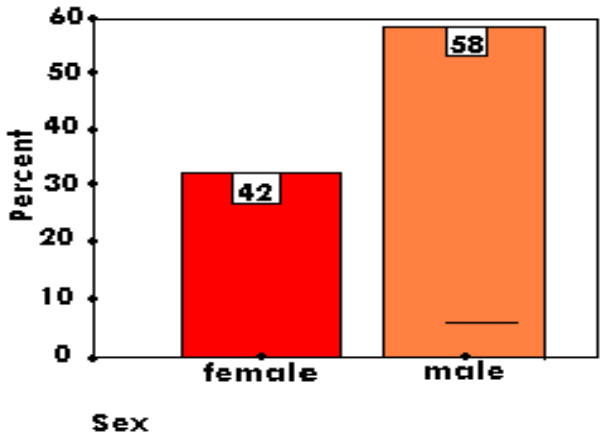

Fig. 1: Sex distribution percentage of children with afebrile stridor.

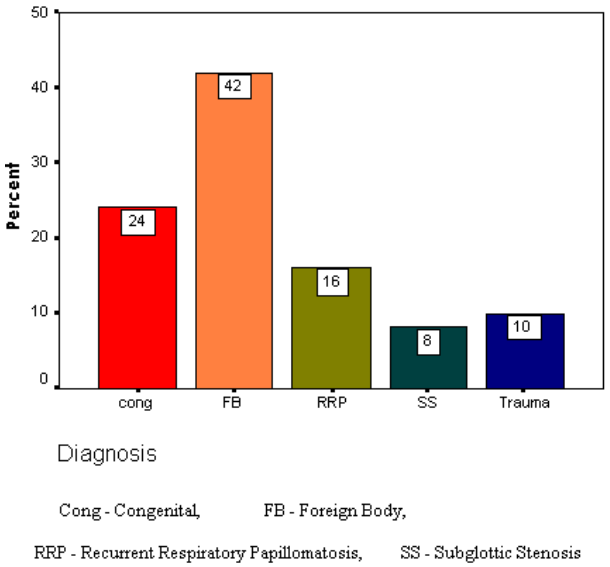

Fig. 2: Percentage graphic representation of conditions causing afebrile stridor in children.

also included the febrile conditions like acute infections of the larynx while in our study these children were excluded. However these results still correspond to our study results where laryngomalacia was the most common congenital condition (42 %) while among acquired causes foreign body in tracheobronchial tree remained the most common cause (55.26 %).

Another study (Feb 28, 2003) on "congenital stridor" [9] by Clement L Ren, Chief, Division of Pediatric Pulmonology, Associate Professor, Department of Pediatrics, Children's Hospital at Strong, suggests that

Laryngomalacia is the most common cause of congenital stridor followed by vocal cord paralysis. This again corresponds to our study results where larygomalacia (42 %) is followed by vocal cord paralysis (17 %) as second most common congenital condition causing stridor in afebrile children.

CONCLUSION

Stridor is common in laryngeal disorders in infants and children and potentially life threatening because of small, soft and easily occludable airways. It may be a symptom or a sign but never a diagnosis and search for a cause should always be made.

Keeping in view the results of our study the following conclusions can be drawn:-

- Foreign body in tracheobronchial tree is the most common cause of stridor in afebrile children among all congenital and acquired causes.
- Congenital conditions amount to almost one-forth of total conditions causing stridor in afebrile children. Among them laryngomalacia is most common condition which is followed by vocal cord paralysis and laryngocoele.
- Among acquired conditions of stridor in afebrile children, foreign body in tracheobronchial tree is followed by recurrent respiratory papillomatosis, traumatic causes and subglottic stenosis in order of frequency.
- Keeping in mind these causes, their frequency distribution and age of occurrence, a detailed history and thorough physical examination should be carried out to reach a diagnosis. Upper aerodigestive tract endoscopy confirms the diagnosis in most of the cases.
- Managament of stridorolous patient is a rewarding challenge. Airway should be made safe followed by prompt treatment immediately to pull these patients out of this potentially life threatening condition.

REFERENCES

1. Cinnamond MJ. Stertor and stridor. Adam DA, Cinnamond MJ, editors. Scott-Brown's Otolaryngology: **Oxford Butterworth - Heinemannath 1997; 6(6): 1-10**
2. Gilbert EG, Russell KE, Deskin RW. Stridor in the infant and child. **AORN J 1993; 58: 23-38.**
3. Santamaria JP, Schafermeyer R. Stridor: a review. **Pediatr Emerg Care 1992; 8: 229-234.**
4. McLaughlin, RB Jr, Wetmore, RF, Tavill, MA, et al. Vascular anomalies causing symptomatic tracheobronchial compression. **Laryngoscope 1999; 109: 312**
5. Mundra K. Stridor. [online] 2003 January 3 last update. [Cited 2004 Mar 20]. Available from: **URL:http://www. emedicine.com/ped/topic2159.htm.**
6. Hartnick, CJ, Cotton, RT. Congenital laryngeal anomalies. Laryngeal atresia, stenosis, webs, and clefts. **Otolaryngol Clin North Am 2000; 33: 1293.**
7. Mecluskey A, Spittle N. Treacheal stenosis after intubation. **BMJ 2000; 321: 1000-2.**
8. Daya H, Hosni A, Solar IB, Evans JNG, Barley CM. Paediatric vocal fold paralysis. **Arch Otolaryngol Head Neck Surg 2000; 126: 21-5.**
9. Clement RL. Congenital stridor. [online] 2003 February 28 last update. [cited 2004 Mar 23]. Available from: **URL: http://www. emedicine. com/ped/htm.**
10. Akhter J, Mirza F, Ahmed S, Brohi AR, Rasool N, Aziz A.Diagnostic value of clinical profile of patients with foreign body aspiration. **J Coll Physicians Surg Pak 2001; 11: 554-5.**

11. Khan NU, Nabi IU, Yousaf S, Akhtar SM. Foreign bodies in the larynx and tracheobroncheal tree. **Pak Armed Forces Med J; 50(2): 68-70.**

12. Charles M, Peter O, Robin T, et al; Blunt laryngeal trauma in children; **Laryngoscope 1987; 1043-1048.**

13. Evans JNG; Recurrent respiratory papillomatosis. Adam DA, Cinnamond MJ, editors. Scott-Brown's Otolaryngology: Butterworth–Heineman-nath **Oxford 1997; 6(6): 1-6.**

14. Thomas J, Keny MD, Jay MD, James L, Nettervelle MD. Sarcoidosis of paediatric larynx. **Arch Otolaryngol Head Neck Surg 2000; 126: 536-539.**

15. Ahmad U, Ahmad I, Sophia R, Bashir WA. Wegener`s Granulomatosis presenting with stridor. **Ann King Edward Med Coll 2002; 8(3): 238-239.**

16. Cotton R, Reilly J. Stridor and Airway Obstruction. In: Bluestone, ed. Pediatric Otolaryngology. **WB Saunders; 1275-1400.**

17. Mancuso RF. Stridor in Neonates;In: Isaacson G, WB; **Pediatric Clinics of North Am 1996; 43(6): 1339-1355.**