

A Clinical Study of Wheezing Child

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ABSTRACT

Introduction: Wheezing or noisy breathing is one of the common symptoms with which children are consulted in the pediatric out-patient or admitted into hospital for investigation and treatment.

In view of the multiplicity of conditions that cause wheezing, the present study is under-taken to study the common causes of wheezing or noisy breathing in children.

Material and Methods: The present study was conducted among children who presented to the hospital with history of noisy breathing, wheezing, breathlessness were included in the study.

Results: The common cause of wheezing in children is bronchial asthma but bronchiolitis in infants (16.6%) and tropical eosinophilia (8.3%) round worm infestation (8.3%) in older children constituted large percentage. Maximum number of children with bronchial asthma were between 5-9 years (70%). In bronchiolitis cases, all children came with the history of wheezing (breathlessness). The common presenting symptom of children with foreign body was wheezing with repeated respiratory infections and dyspnea. The consistent signs were signs of obstructive emphysema with Bag-pipe sign and rhonchial fremitus and expiratory thud. In the present series there were 10 cases of worm infestation with wheezing attacks. Other cases included respiratory infections like acute laryngo Tracheo-Bronchitis, primary complex, bronchopneumonia cases.

Conclusion: Though the common cause of wheezing was Bronchial Asthma, other causes like bronchiolitis in infants, Tropical eosinophilia, and round worm infestation in elder children were responsible for Asthma like attacks.

Keywords: Bronchial Asthma; Bronchiolitis; Respiratory infections; Wheezing

INTRODUCTION

Wheezing or noisy breathing is one of the common symptoms with which children are consulted in the pediatric out-patient or admitted into hospital for investigation and treatment. Wheeze is a characteristic harsh breathing, audible at times without the aid of stethoscope, due to partial obstruction of upper respiratory tract including trachea, bronchi and bronchioles either due to extrinsic and intrinsic of factors and is characterized by expiratory dyspnea and prolonged respiration.¹ For many it is thought to be synonymous with bronchial asthma, but 'all that wheezes is not asthma.'² Wheezing is a symptom of many pathological conditions, the aetiology of which has to be investigated for proper management of the case. Apart from Bronchial asthma other causes like tropical eosinophilia, acute respiratory infections like Bronchiolitis and helmenthic infestation must be thought of.³ Wheeze that is localized and lateralized (unilateral) is always secondary to obstruction of one of the bronchi either due to foreign body in the lumen or extrinsic pressure by enlarged lymphnode, tumour, or anomalous blood vessel.

In view of the multiplicity of conditions that cause wheezing, the present study is under-taken to study the common causes of

wheezing or noisy breathing in children.

MATERIAL AND METHODS

The present observational longitudinal study was conducted in Owaisi Hospital and Princesses Esra Hospital, which are allied hospitals for Deccan College of Medical sciences, Hyderabad, from December 2006 to November 2007. All children who presented to the OPD and IPD with history of noisy breathing, wheezing, breathlessness were included in the study. All Children <2months and >14 years and breathlessness due to CVS, CNS causes were excluded from the study. The criteria used for the diagnosis of bronchiolitis were severe dyspnea with signs of respiratory muscles acting, without any positive history of asthma or eczema, temperature or normal or slightly more than normal (not beyond 100 F), wheeze and diminished breath sounds. The criteria for diagnosis of tropical eosinophilia was an increase in absolute eosinophilia count more than 2000/cmm without any known detectable cause for eosinophilia. Those cases presented with history of repeated respiratory infections and wheezing, careful auscultation revealed that wheezing was unilateral and localized. Rhonchal fremitus was palpable on one side only. At times rhonchi were heard on both sides of chest but they were transmitted sounds because of thin chest wall.

STATISTICAL ANALYSIS

Obtained data was arranged according to characteristics and was expressed as a number and percentage of respondents and were analyzed using the SPSS Version 17 software.

RESULTS

Table-1 shows that the common cause of wheezing in children is bronchial asthma but bronchiolitis in infants (16.6%) and tropical eosinophilia (8.3%) round worm infestation (8.3%) in older children constituted large percentage.

Analysis of the in-patient cases with bronchial asthma: Maximum number of children with bronchial asthma were between 5-9 years (70%). Males constituted larger percentage (58.33%). Male: Female ratio was 32:25 (7:5). Amongst the cases of bronchial Asthma, most of the children belonged to middle socio-economic status (table-2).

Family history: 24 cases (40%) gave a definite positive history of bronchial asthma in the family. Details revealed that in 15 cases (25%) asthma was present on paternal side, while in 9 cases (15%) the disease was present on maternal side. However in 3 cases (5%) family history of asthma in the siblings and

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in all of them either father or mother, grand-father or mother, uncle or aunt was suffering from bronchial asthma. This shows that if more than one sibling is suffering from asthma one of the parents or grant parents usually must be suffering from asthma.

Eczema: 9 cases (15%) gave a definite history of eczema during early childhood before the asthmatic attacks started. In 3 cases (5%) eczema was presented along with asthmatic attacks.

Seasonal attacks: Seasonal attacks were present in 24 cases (40%). Winter was the common season where in 25% cases used to have repeated attacks of wheezing while in 9 cases (15%) the attacks were common during the months of February to April (spring), cases probably are due to Pollen allergy.

Infection: Infection was one of the important factor which was precipitating asthmatic attacks. Signs of infection like, fever, congestion of throat, leukocytosis were present in 33 cases (55%). These are the cases which were referred as having “Asthmatic bronchitis”. In these cases antibiotics were used in addition to bronchodilators for the treatment of acute attack.

Allergy: In 9 cases (15%) signs of allergy like rhinorrhea, sneezing preceding wheezing; pale oedematous nasal mucous membrane, eosinophilia in the nasal smear and blood were present. However because of the lack of facilities skin testing was not done.

Food Factors: In 8 cases there was definite correlation between consumption of certain food factor and asthmatic attacks. This was tested after the attack was treated in the hospital, the suspected item or substance was served in the food, and in 13.3% bases the following food substances precipitated or aggravated attacks (table-3).

Exercise: In 2 cases (3.3%) wheezing was initiated on running or physical exersion. In these two cases where there was no organic lesion in the heart. After the exercise, when auscultated these children had typical asthmatic breathing which used to persist for 2-5 hours.

Investigations: Polymorpho nuclear leukocytosis was present in 33 cases (55%). In 12 cases (20%) there was definite blood eosinophilia of more than 10% but less than 2000 cells/cmm absolute eosinophilia count. That is in 80% cases even during acute attack eosionophilia was not present.

Radiological Features: During acute attack 34 cases (56.6%) were showing emphysematous lungs. The emphysematous changes disappeared after acute attack subsided, in 24 cases (40%) while in 10 cases (16.6%) they persisted even after attack. Increased bronchovascular markings were noted in 30 cases (50%) while 6 cases (10%) present with bronchopneumonic changes and one case of pneumothorax.

Analysis of the in-patient cases with bronchiolitis: Total number of cases of bronchiolitis were 20. Among the 20 cases, 13 were males while 7 were female children. The common age was between 7 – 12 months (50%) (table-4).

The table-5 summarized the presenting symptoms and signs in bronchiolitis cases All most all children came with the history of wheezing (breathlessness). 7 cases complained of nocturnal cough and 4 cases (40%) presented as difficulty in breathing. 2 cases had liver enlargement. 1 case showed significant lymphadenopathy and mantoux test was negative.

Absolute eosinophilic count varied from 2000/cmm to 9192/cm. X-Ray chest was normal in 3 cases. 7 cases showed increased

Aetiology	No. of cases	Percentage
Bronchial Asthma	60	50.0%
Bronchiolitis	20	16.60%
Tropical Eosinophilia	10	8.30%
Round-worm infestation with repeated wheezing	10	8.30%
Acute Laryngo-tracheobronchitis	7	5.81%
Primary Complex	5	4.15%
Brochopneumonia	4	3.32%
Foreign body	3	2.5%
Ricketts with costochondral beading	1	0.83%

Table-1: Analysis of the in-patient cases from the aetiological points of view

Age	Cases	Percentage
1-4 Years	14 Cases	23%
5-9 Years	42 Cases	70%
10-12 Years	4 Cases	7%
Socio-Economic Status		
Socio economic status	Cases	Percentage
High S.E.S.	21 Cases	35%
Middle S.E.S.	24 Cases	40%
Low S.E.S.	15 Cases	25%

Table-2: Demographic distribution of bronchial asthma cases

Egg	2 Cases	Custard apple	1 Case
Banana	1 Case	Sugar	1 Case
Fish	1 Case	Chocolate	2 Cases

Table-3: Food Allergies in Bronchial Asthma Cases

Age	Cases	Percentage
2-3 Months	2	20%
4-6 Months	4	20%
7-12 Months	10	50%
1-2 Years	4	20%

Table-4: Age wise distribution of bronchiolitis patients

Presenting signs and symptoms	No. of cases
Dyspnea and tachypnea	20
Irritability and excessive crying	14
Intercostal retraction	20
Suprasternal retraction	5
Xiphisternal Retraction	5
Temperature:	
Normal	15
More Than 99 degree F	5
Tachycardia	14
Significantly palpable liver	12
Palpable spleen	3
Definite signs of congestive heart failure	8
Throat swab for culture:	
No Organs (Probably Viral)	18
Streptococci	1
H. Influenza	1
Radiological feature: Emphysema	18

Table-5: Presenting signs and symptoms in bronchiolitis

Case No.	Age and Sex	Definite H/o. F.B.	Presenting Symptoms	Duration	Positive Physical Signs,	Type of F.B.
I	5 Years Male	+	Wheezing and Repeated Respiratory Infections	1 Month	Unilateral Rhonchi wheeze –signs obstructive emphysema of right lower lobe bag-pipe sign positive	Beatle nut
II	6 Years Male	+	Wheezing and barking cough	3 Months	Bag-pipe sign positive signs of obstructive emphysema left lower lobe	Custard apple seed
III	3 Years	-	Progressive dyspnea and cough	2 Days	Positive bagpipe size –Wheeze+ obstructive emphysema right lower lobe.	Small Stone

Table-6: Cases Of Foreign Body

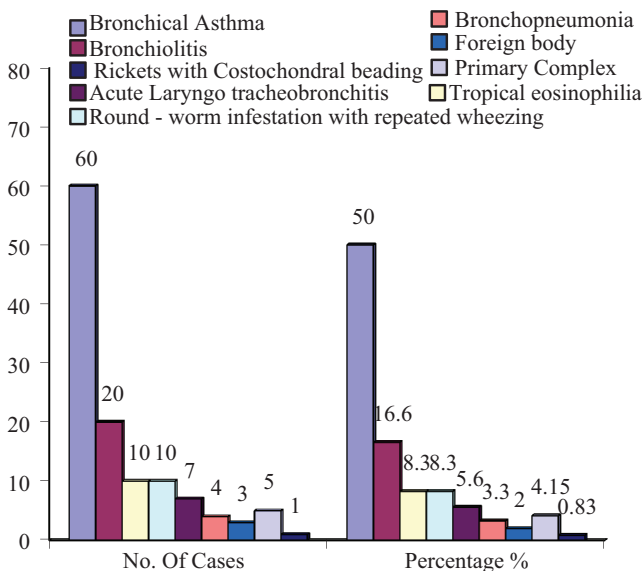


Figure-1: Analysis of the in-patient cases from the aetiological points of view

broncho vascular markings while 4 cases (40%) showed typical perihilar and basal mottling.

Table-6 shows cases Of foreign body. The common presenting symptom was wheezing with repeated respiratory infections and dyspnea. The consistent signs were signs of obstructive emphysema with Bag-pipe sign and rhonchial fremitus and expiratory thud. The common site of foreign body was right lower lobe bronchus – the 2 foreign bodies were non-radio-opaque while one was radio-opaque (small stone). All the cases responded dramatically to bronchoscopic removal of foreign body but for one case where crepitations persisted for three months after removal foreign body but there were no signs of bronchiectasis.

Round Worm Infestation

In the present series there were 10 cases of worm infestation with wheezing attacks. All the 10 cases were being treated as Asthma. But on investigation, stool examination revealed ova of round worm. Out of the 10 cases, 6 cases were males, while 4 cases were female children. Two children gave history of passing round worms. 4 children gave history of pain in abdomen and 3 children gave history of pica. All these children were passing round worm ova. 2 children in addition had giardiasis and one child had ankylostomiasis. Blood examination in 6 out of 10 cases showed eosinophilia (varying from 500-1500 cells/cmm of absolute eosinophilia count). These children were treated with ALBENDAZOLE followed after 15 days, stool examination was repeated after 1 month. In 9 cases ova disappeared after

treatment and in 8 cases Asthmatic attacks disappeared. In only one case of ascariasis, there were signs of bronchopneumonia with an absolute eosinophilia count of 1420 cells/cmm . Thus fitting probably into “Loeffler’s Syndrome”, All the cases of ascariasis with Asthma like attacks responded well to antihelmenthic treatment. So these cases were included under the heading of Round worm allergy and Asthmatic attacks.

Other Cases

Under this heading were included respiratory infections like acute laryngo Tracheo-Bronchitis, primary complex, bronchopneumonia cases. One case was having marked costochondral beading (rickets) so as to cause pressure on the lung parenchyma and the child was prone to respiratory infection and wheezing attack. The X-ray chest was showing pulmonary plethora and fine reticular appearance. This probably is due to frequency of respiratory infections causing narrowing of bronchial lumen and wheezing attacks.

DISCUSSION

Wheezing is a very common respiratory symptom during childhood. Epidemiological studies have reported that almost one-third of all children wheeze at least once in the first three years of life, with nearly 50% of all children having at least one wheezing episode by the age of 6 years.⁴

The present study found that the common cause of wheezing in children is bronchial asthma but bronchiolitis in infants (16.6%) and tropical eosinophilia (8.3%) round worn infestation (8.3%) in older children constituted large percentage. Heyman PW et al⁵ compared a large number of the wheezing children aged 3 to 18 years and reported that viral infections were the dominant risk factor for wheezing among children hospitalized before 3 years of age. Prasad S et al⁴ determined the severity of Vitamin D deficiency and its association with recurrent wheeze in children less than 3 years of age and concluded that Vitamin D deficiency was associated with increased risk of recurrent wheezing.

The present study is a selective one because those cases which could be followed were included in the study. Many of the cases, for example Bronchial Asthma cases were referred along with diagnosis. Acute respiratory infections like Bronchopneumonia and laryngo-tracheobronchitis in younger children can present with the complaint of wheezing for the relatively small bronchi can get easily narrow by inflammatory oedema and mucous secretions. In the present study, maximum number of children with bronchial asthma were between 5-9 years. Males constituted larger percentage (58.33%) with male:female ratio of 7:5. The prevalence of asthma in boys is almost double that of girls with then ratio ranging from 1.3:1 to 3.3:1 as quoted by various workers.^{6,7} Most of the asthmatics have the onset

of wheezing usually by 5 years of age. A 20 year follow up study was conducted by Blair⁸ to study the natural history of childhood asthma and found that 30% of all asthmatics have their first episode of wheezing in first year of life, 57% by 2 years of life and 84% of all by 5 years of life.

Viral infections are the major factors in precipitating an asthmatic in 40 percent of cases.^{9,10} The predominant viruses causing this infection included respiratory syncytial virus, parainfluenza virus, corona virus and rhinovirus. Food allergy in asthma is a controversial subject and difficult to prove. Attributed food allergies have been observed in 19.75 percent of the children, predominantly to grapes, banana, guavas, citrus fruits, ice-cream, chocolate fried food, tomatoes etc, but correlation is not proved. Pollen and molds in 7.5 percent of children while house dust, cold air, passive smoking, cockroach, debris, cologne spray, mosquito coil smoke, were found to be triggering factors in 6.3 percent of patients¹⁰

In the present study, those cases where wheezing was localized or confined to one half of the chest, when investigated the cause was either in the lumen such as foreign body or pressure on the wall of bronchus by enlarged lymphnodes of primary complex. The upper the site of obstruction like larynx, trachea, more is the inspiratory dyspnea, thus producing harsh vibratory high pitched shrill, crowing noise, which is known as 'stridor'. Inspiratory dyspnea is associated with expiratory distress because during expiration due to increased intrathoracic pressure, the bronchiolar lumen further narrows. The more peripheral the obstruction to the airway the more is the difficulty expressed during expiration resulting in hissing sound which is known as wheezing.¹¹ Thus obstruction to the airway whether upper or lower the difficulty in breathing is experienced, both during inspiration and expiration. However because of the natural recoiling during expiration greater effort is needed during the act. Expiratory thoracic muscles compress the lower chest, abdominal muscles contract pushing diaphragm up in an attempt to squeeze the air out of the lung resulting in raised intrapulmonary pressure, the air now escapes under high pressure through the narrowed bronchial lumen producing coo sound.¹²

Children have small air passages and abundant lymphatic tissue. Most of their diseases are inflammatory or allergic and therefore nose, throat and bronchi are easily obstructive.¹³

CONCLUSION

Though the common cause of wheezing was Bronchial Asthma, other causes like bronchiolitis in infants, tropical eosinophilia, and round worm infestation in elder children were responsible for Asthma like attacks.

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