THE CORRELATION OF SYMPTOMS AND OBJECTIVE WHEEZE IN ASTHMATICS

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ABSTRACT

Objective: To determine the correlation between symptoms and objective wheeze in asthmatics.
Study Design: A cross sectional study.
Place and Duration of Study: Medicine department, Combined Military Hospital Lahore, from Jul to Dec 2019.
Methodology: Two hundred patients of asthma were selected reporting in Medicine department, CMH Lahore. Patients were interviewed regarding their primary chest symptom and it was correlated with the clinical examination for wheeze to find which particular symptom correlated most with the presence of wheeze. The 130 symptomatic cases were subjected to spirometry to assess their lung functions tests.
Results: Two hundreds patients of asthma were interviewed of whom 130 patients were symptomatic. Out of 130 patients, 59 (45.3%) complained of difficulty in breathing, 40 (30.7%) complained of shortness of breath, 20 (15.3%) had wheezing, 7 (5.3%) had cough and 4 (3%) had chest pain. Eighty five (65.3%) patients when examined had wheeze. The distribution of objective wheezing in the above cases were 100% for wheezing patient, 66.1% for difficulty in breathing, 57.5% for shortness of breath 28.5% for cough and 25% for chest pain. The FEV1/FVC ratio was lowest for wheezing patients at 0.55 and highest for cough at 0.70.
Conclusion: Difficulty in breathing was the commonest symptom in symptomatic asthmatics being present in 66.1% of patients. The symptom which correlated best with the presence of wheeze was wheezy chest and difficulty in breathing and was also associated with lowest FEV1/FVC ratio.

Keywords: Bronchial Asthma, Shortness of breath, Wheeze.

INTRODUCTION

Asthma is the commonest chronic respiratory disorder affecting 5-10% of the general population[1]. Although, generally believed to be a disease of the lungs, it is a systemic airway disease involving the entire respiratory tract and coexists with other atopic diseases particularly allergic rhinitis. Both diseases frequently coexist in the same patients, with asthma present in 20–50% of patients with allergic rhinitis and rhinitis present in up to 80% of patients with asthma[2]. Asthma is defined as chronic inflammatory disease of the airways. The chronic inflammation is associated with the airway hyper responsiveness to trigger such as allergens and exercise that leads to recurrent symptoms such as wheezing, dyspnea, chest tightness and coughing. Symptoms are generally associated with widespread but variable airflow obstruction that is normally reversible either spontaneously or with proper asthma treatment[3].

The diagnosis of asthma includes a thorough medical history, physical examination and objective assessment of lung functions. Canadian guidelines for the diagnosis and treatment of asthma have existed since 1989 and were updated in 2003. A clinical diagnosis of asthma should be prompted by intermittent symptoms of breathlessness, wheezing, cough or chest tightness. Measurements of lung function by spirometry, before and after administration of a β2-agonist, should be used to confirm the clinical diagnosis of asthma. Challenge testing is most useful to exclude a diagnosis of asthma[4]. Spirometric lung function tests are available in pulmonology clinics but might not be available in the general OPDs and rural clinics where one has to rely solely on the history and physical examination. Other diagnostic tests like bronchoprovocation tests and exhaled Nitric Oxide levels, which are required

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when objective lung function tests are normal, are available only in the specialized centres[3-5].

In the medical history, it is important to note the cardinal symptoms of asthma, which are wheeze, recurrent cough, chest tightness and shortness of breath. These symptoms are variable and may occur spontaneously and on exposure to allergens and exertion. The symptoms may only be nocturnal and may or may not respond to asthma treatment[5].

The other important points in medical history are family history of asthma and other atopic diseases. A personal history of other atopic diseases particularly allergic rhinitis is suggestive. A history of hypersensitivity to triggers such as exposure to dust mites, cockroaches, animal dander, moulds, pollen, and tobacco smoke or cold air. It is also worthwhile to ask about exercise including asthma symptoms. Other related comorbidities like allergic rhinitis, sinusitis, obstructive sleep apnea and gastroesophageal reflux disease should also be assessed[6].

Because of variability of asthmatic symptoms the physical examination of asthma patients is often unreliably normal. Physical findings may only be evident when the patient is symptomatic. The most common abnormal physical finding is wheezing on auscultation which indicates airway obstruction[3]. The adage "Not all that wheeze is asthma and asthma might not always wheeze" being true to a certain extent. Nevertheless, in the right clinical setting wheeze can be considered a sinequa-non of asthma particularly if it is recurrent and has been documented repeatedly. This might also indicate response to treatment by its disappearance with appropriate treatment.

Diagnosis of asthma is confirmed by objective reversibility of lung functions which is described as an improvement in FEV1 of at least 12% or at least 200 ml, 15-20 minutes after the inhalation of a short acting bronchodilator or alternatively as an improvement in FEV1 of at least 12% or at least 200 ml after two weeks of treatment with an anti-inflammatory agent[4]. Because of the variability of asthma symptoms, patients with asthma will not exhibit reversible airway obstruction at every visit. Therefore, in order to increase its sensitivity, spirometry should be repeated when the patient is symptomatic, this however would further increase the logistical difficulties[5].

Because spirometry might not be available or might not be technically possible, so wheeze might be a clinical surrogate for the FEV1/FVC ratio and its disappearance after initial documentation with bronchodilator might be taken as a sign of reversibility[6]. The clinical value of tracheal auscultation in asthma is well recognized and the trachea is superior to the lung for the detection of wheezing in most patients. The transmission of wheezing sound through lung to the chest wall, the higher frequency sounds are more clearly detected over the trachea than the chest[7,8].

METHODOLOGY

A total of 200 patients of asthma were selected from July 2019 to December 2019 reporting in Medicine department, Combined Military Hospital, Lahore. Patients were enrolled regarding their primary chest symptom and it was correlated with the clinical examination for wheeze to find which particular symptom correlated most with the presence of wheeze. The symptomatic patients were subjected to spirometry to assess their lung functions test. Inclusion criteria was diagnosed asthmatic patients aged over 12 years of age and exclusion criteria included patients with other respiratory ailments particularly chronic obstructive airway disease, severe asthmatic symptoms, smokers and patients known to have cardiovascular diseases, recent history of asthma exacerbation, patients with signs of upper respiratory tract infection and patients with signs of respiratory distress.

The cases satisfying the inclusion criteria were selected by non-probability consecutive sampling. An informed consent was obtained from every patient and approval from the hospital ethical committee was obtained (212/2020). Patients were interviewed of whom 130 (65%) patients were symptomatic. Patients' primary chest symptoms were correlated with the clinical exa-

mination by auscultation the trachea for wheeze to find which particular symptom correlated most with the presence of wheeze. These 130 patients were then subjected to undergo spirometry to record their FEV1/FVC ratio.

RESULTS

Out of 200 patients 138 (69%) were males and 62 (31%) were females. Mean age of patients was 32 ± 13.7 SD. Out of 130 patients, 59 (45.3%) complained of difficulty in breathing, 40 (30.7%) complained of shortness of breath, 20 (15.3%) had wheezing, 7 (5.3%) had cough and 4 (3%) had chest pain. Eighty five (65.3%) patients when examined had wheeze. The distribution of objective wheezing in the above cases were 20/20 (100%)

Table-I: Clinical characteristics of asthmatic patients.

Symptoms During Asthma	n	Frequency (%)
Difficulty in Breathing	130	59 (45.3)
Shortness of Breath	130	40 (30.7)
Wheezing	130	20 (15.3)
Cough	130	7 (5.3)
Chest Pain	130	4 (3)

Table-II: Objective wheeze in symptomatic cases and associated lung function tests.

Objective wheeze in symptomatic cases	n	Frequency (%)	FEV1/ FVC ratio
Difficulty in Breathing	130	39/59 (66.1)	0.60
Shortness of Breath	130	23/40 (57.5)	0.64
Wheezing	130	20/20 (100)	0.55
Cough	130	2/7 (28.5)	0.68
Chest Pain	130	1/4 (25)	0.70

Table-II: Statistical analysis of results.

Correlaion Between Ashma and Weezing	Z test	Confidence Interval	*p*-value
- 0.77	5.211	2.576	0.00001

for wheezing patient, 39/59 (66.1%) for difficulty in breathing, 23/40 (57.5%) for shortness of breath, 2/7(28.5%) for cough and 1/4 (25%) for chest pain. The FEV1/FVC ratio was lowest for wheezing patients at 0.55, 0.64 for difficulty in breathing, 0.65 for shortness of breath, 0.68 for cough and highest for chest pain at 0.70.

The pearson correlation between two variables is negative showing inverse relationship with each other.

DISCUSSION

Asthma is a widespread disease after the industrial revolution. Different factors including parental smoking, dust and industrial smoke are prevalent in today's world[7]. The most common symptoms observed in our studies are shortness of breath, cough, difficulty in breathing, obstruction in breathing, wheezing, and chest pain[8]. Recently cross-sectional studies conducted in 70 different countries. These studies explore that almost 1-5% of adults and children are affected by asthma in over populated countries especially in India, China, Singapore, Malaysia, Nepal, Pakistan, and Bangladesh[7,9]. Another study explored that in children male child suffers more from asthma and their intensity and effects are more as compared to female child[10].

Some previous studies observed that 80% of asthma cases begin at the age of 6. Clinical observations of this group demonstrate cough, wheeze, shortness of breath are the first levels of severity among this age group[11]. Some researchers conclude that congenital airway anomalies and respiratory tract infection usually create hurdle in the diagnosis of this age group. This exposure in early childhood leads to more severity in the future but can be treated[12].

Studies conducted by the birth cohort in Sweden show that 2.1% of children from the whole population had severe asthma as described by the world health organization[13]. Whereas Nigerian studies depicted that 4.3% of children are affected by asthma[14]. Results of different studies especially conducted in Bahrain, Egypt, Tehran are near to our findings and found that 4-10% of asthma patients had a wheezing problem[15]. This result supports our research. We found a significant relationship between asthma and wheezing (p<0.05) whereas the studies of Zhu *et al*[16] and Carraro *et al*[17] found insignificant (p=0.01) (p= 0.98) relationship between these two variables respectively. Whereas studies conducted by Hussein *et al* found significant relationship among wheezing (especially wheezing with cough) and

asthma[18]. Their correlation supports our *p*-value (0.00001).

CONCLUSION

Difficulty in breathing was the commonest symptom in symptomatic asthmatics being present in 66.1% of patients. The symptom which correlated best with the presence of wheeze was wheezy chest and difficulty in breathing and also associated with lowest FEV1/FVC ratio. Therefore, asthmatics with these complaints should be subjected to a diligent examination and formal lung function tests even if examination is unremarkable on one occasion keeping in view the variable nature of disease.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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