Section: Respiratory Medicine

Original Research Article

SPIROMETRY PATTERNS IN PATIENTS WITH ADULT-ONSET ASTHMA

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ABSTRACT

Background: Setting: Asthma is a common obstructive airway disease and spirometry plays an important role in establishing the diagnosis of asthma. Spirometry can have various patterns which needs to be kept in mind while evaluating asthma patients. **Objective:** To study various spirometry patterns in patients presenting with Adult-onset asthma. **Design:** Spirometry records of asthma patients were extracted and analysed.

Results: A total of 480 Adult-onset asthma patients were studied of which 258 (53.75%) patients were females and remaining 222 (46.25%) were males. Out of total 480 patients, 327 (68.12%) patients showed obstructive pattern, 70 (14.58%) patients showed Preserved Ratio Impaired Spirometry (PRISm) and 82 (17.08%) patients showed normal spirometry. Amongst the patients showing obstructive pattern 215 (65.75%) patients showed significant Bronchodilator Reversibility (i.e. BDR) and the remaining 112 (34.25%) patients showed poor BDR. Amongst the total patients with obstructive pattern, 44 (09.17%) patients had additional restrictive pattern.

Conclusion: Asthma is increasing in incidence because of many reasons like increase in incidence of allergies and with increase in environmental pollution. Spirometry is a very simple tool for establishing the diagnosis of asthma as it detects obstruction. Even if spirometry is normal we must look for PRISm and offer asthma treatment to such patients.

Keywords: Adult-onset asthma, Spirometry, Lung function, Bronchodilator Reversibility (BDR), Preserved ratio Impaired Spirometry (PRISm).

INTRODUCTION

Asthma is a chronic inflammatory airway disorder characterized by variable airflow limitation, airway hyperresponsiveness, and respiratory symptoms such as wheeze, dyspnea, chest tightness, and cough. While traditionally considered a disease of childhood, asthma with onset in adulthood—commonly termed Adult-onset asthma—is increasingly recognized as a distinct clinical and pathophysiological phenotype. Adult-onset asthma often presents with greater disease severity, poorer symptom control, accelerated decline in lung function, and a higher burden of comorbidities compared to childhood-onset asthma, making accurate diagnosis and objective assessment very much important[1]. Long standing uncontrolled asthma leads to recurrent and life threatening exacerbations which results in rapid decline in lung function, thereby causing increased morbidity and mortality.

Spirometry measures lung function and helps in diagnosis, assessment of severity and follow up of various lung conditions including asthma. It is a very simple but underutilized tool to measure lung function. Spirometry measures Forced Expiratory Volume in first second (i.e. FEV1) which is a measure of obstruction. Patients with obstructive airway diseases including adult-onset asthma have low FEV1 and thereby a low FEV1/FVC ratio (<70%) suggesting obstructive pattern on spirometry.[1]

Aim of the of study: To study various spirometry patterns in patients presenting with Adult-onset asthma.

MATERIALS AND METHODS

Study design: Observational, Retrospective study.
Study setting: Patients diagnosed with Adult-onset asthma presented to Swami Ramanand Teerth Rural Government Medical College, Ambajogai, Maharashtra.
Study period: From year 2019 till 2025.
Sample size: Total 480 patients (n=480)
Inclusion Criteria:

- Patients having age more than 18 years of age.
- Patients must be able to follow the instructions for performing the spirometry test.

Exclusion Criteria

- Patients with acute exacerbation of asthma.

RESULTS

A total of 480 Adult-onset asthma patients were studied. Out of these 258 (53.75%) patients were females and remaining 222 (46.25%) were males. The average age amongst the patients was 38 years. Out of total 480 patients, 327 (68.12%) patients showed obstructive pattern i.e. FEV1 was less than 80% Predicted, 70 (14.58%) patients showed Preserved Ratio Impaired Spirometry (PRISm) and 82 (17.08%) patients showed normal spirometry Fig. No. 01. Amongst the patients showing obstructive pattern 215 (65.75%) patients showed significant Bronchodilator Reversibility (i.e. BDR) and the remaining 112 (34.25%) patients showed poor BDR Fig.No.02. Amongst the total patients with obstructive pattern, 44 (09.17%) patients had additional restrictive pattern (i.e. FVC <80% Predicted) on spirometry.

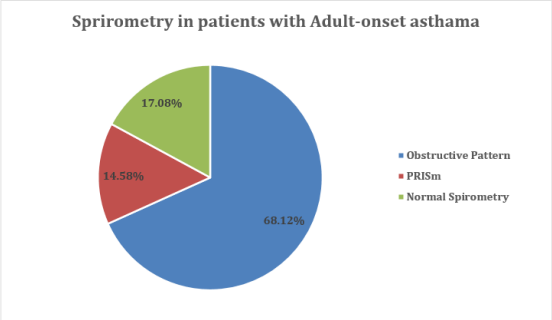

Figure No.01: Spirometry patterns in patients with adult-onset asthma

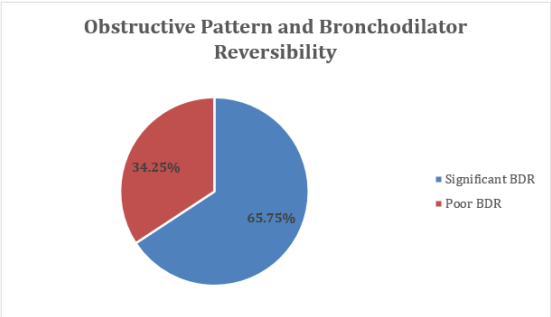

Figure No.02: Obstructive pattern and Bronchodilator Reversibility (BDR)

DISCUSSION

Adult-onset asthma is a common disease and should be suspected whenever a patient presents with symptoms of persistent cough, breathlessness, wheezing or chest tightness. Many asthma patients are misdiagnosed as having anxiety. A detailed clinical history including family history of asthma and allergy and spirometry are essential in establishing the diagnosis of asthma. Spirometry helps in confirming the diagnosis of asthma. Apart from the above mentioned utilities, it also provides another diagnostic measure by quantifying whether airway obstruction reverses after the patient is given a dose of a bronchodilator called Bronchodilator Reversibility (BDR) which is hallmark of reversible airway obstruction which in turn favours diagnosis of asthma. Although the exact criteria for reversibility of obstruction are unclear, the American Thoracic Society defines it as an increase in the forced expiratory volume in 1 second (FEV_1) of 12% or more from baseline and an absolute increase of 200 mL or more. It can also be an increase of more than 200 mL in the forced vital capacity (FVC).[2,3]

We found a greater number of females (53.75%) were having a diagnosis of asthma as also seen in a study of Debjani laha, the incidence of asthma is higher in females with a rate of 52% and it was similar to the study done by Prajapati etal,[4,5] where a higher proportion of study participants (57.7%) were of female gender. We found obstructive pattern (68.12%) as the main pattern in spirometry. Similar results were shown by Rathod MB et al.[6] It was seen that around 17.08% patients have a normal spirometry especially in between the attacks, this is because of the variable nature of the disease.

Preserved Ratio and Impaired Spirometry i.e. PRISm pattern was seen in 14.58% of patients. The PRISm phenotype is traditionally characterized by a maintained forced expiratory volume (FEV1) to forced vital capacity (FVC) i. e. FEV1/FVC ratio ≥70 but an abnormal FEV1<80 % predicted.[7]

We found that amongst patients having obstructive pattern, 09.17% asthmatics had additional restrictive pattern (FVC< 80%) on spirometry. Few asthma patients who have restrictive pattern on

spirometry, this might be because of small airway disease with hyperinflation and obesity.[8]

CONCLUSION

Asthma is increasing in incidence because of many reasons like increase in incidence of allergies and with increase in environmental pollution. A high degree of suspicion is to be kept in mind whenever we deal with any adult patient who presents with recurrent episodes of cough and breathlessness. Spirometry is a very simple tool for establishing the diagnosis of asthma as it detects obstruction. Even if spirometry is normal we must look for PRISm and offer asthma treatment to such patients.

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