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Original Research Article.

Role of Spirometry in Detection of COPD in Asymptomatic Smokers

Deepak Nagar[1], Vikas Uthra[2*]

[1]Assistant Professor, TB & Chest, Index Medical College, Hospital & R. C., Indore, Madhya Pradesh, India.
[2*]Assistant Professor, TB & Chest, Amaltas Institute of Medical Sciences, Dewas, Madhya Pradesh, India.

ABSTRACT

Background: Chronic obstructive pulmonary disease is a major cause of morbidity and mortality throughout the nation. Due to continuous exposure to risk factors, the prevalence of COPD is expected to increase during the coming decades. It is a standardised and the most objective way for measuring the airway limitation amongst COPD subjects. The aim of present study is to determine the role of spirometry in detection of COPD amongst asymptomatic smokers.

Materials and Methods: The present descriptive study was conducted amongst the high risk subjects of COPD. The study included male subjects who were more than 30 years of age and had no respiratory symptoms except for coughing. Based on the readings of spirometry subjects were classified as having mild COPD, moderate COPD and severe COPD as per the Gold's criteria. Subjects with abnormal results were reported to the respiratory department immediately. All the data was arranged in a tabulated form and analysed using SPSS software.

Results: The present study enrolled 350 subjects. The mean age of the subjects was 45.37+/- 8.94 years. Table 1 shows the distribution of subjects according to smoking index and age. There were 40.8% (n=143) subjects more than 40 years of age. There were 6.3% subjects less than 40 years old age and 29.3% subjects elder than 40 years of age with airway obstruction.

Conclusion: Spirometry gives the method to detect the disease at an early stage even when the associated symptoms just start appearing. In our study, spirometry was a useful tool in the detection of COPD at an early stage.

Keywords: COPD, Spirometry, Smoking, Mortality.

***Correspondence to:**

Dr. Vikas Uthra,
Assistant Professor, TB & Chest,
Amaltas Institute of Medical Sciences,
Dewas, Madhya Pradesh, India.

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INTRODUCTION

Chronic obstructive pulmonary disease is a major cause of morbidity and mortality throughout the nation. Due to continuous exposure to risk factors, the prevalence of COPD is expected to increase during the coming decades. With more subjects living longer and changes in the lifestyle pattern of subjects, there is a sudden upsurge in COPD subjects.[1] According to the global burden of disease study COPD was the sixth leading cause of death in 1990 and by 2020 it is expected to rank to third.[2,3] According to the metaanalysis study amongst the Indian population, the prevalence of COPD was 5% amongst males and 2.7% amongst females above the age of 30 years.[4] Tobacco smoking is the leading risk factor for COPD around the world but in many countries air pollution due to burning of fuel and biomass is becoming another contributing factor towards COPD. The early symptoms like cough and sputum production are generally ignored by the subjects as well as physicians. The main reason for seeking medical care is the dyspnea experienced by the subjects on mild to moderate exertion.[5] Therefore early diagnosis of COPD should be performed to avoid the advancement of symptoms. Studies have shown that cessation of smoking is found to decrease the rate of decline of ventilator function amongst the smokers.[6,7] Detection of COPD at an early stage is also likely to motivate the smokers to quit smoking. Spirometry is the gold standard for to determine the impact of COPD on patient's health. It aids in diagnosing and monitoring the progression of the disease.[1] It is a standardised and the most objective way for measuring the airway limitation amongst COPD subjects. The aim of present study is to determine the role of spirometry in detection of COPD amongst asymptomatic smokers.

MATERIALS AND METHODS

The present descriptive study was conducted amongst the high risk subjects of COPD. The study included male subjects who were more than 30 years of age and had no respiratory symptoms except for coughing. Patients with asthma or on bronchodilators or corticosteroids were excluded from the study. The study was approved by the institutional ethical board and all the subjects were informed about the study and a written consent was obtained from all in their vernacular language. All the subjects were educated about the harmful effects of smoking and how cessation

of smoking can help reduce the symptoms of COPD. They were all educated about the usefulness of spirometry in detection of COPD at an early age. Smoking index was used to evaluate the amount of smoking. It was calculated by multiplying the average number of cigarettes smoked per day and the number of years the person has been smoking. All the subjects were subjected to portable spirometer for measuring the airflow resistance. Based on the readings of spirometry subjects were classified as having mild COPD, moderate COPD and severe COPD as per the Gold's criteria. Subjects with abnormal results were reported to the respiratory department immediately. All the data was arranged in a tabulated form and analysed using SPSS software. Student t test was used for the quantitative analysis. Probability value of less than 0.05 was considered as significant.

Table 1: Distribution of subjects according to smoking index and age

Age	Frequency	Smoking Index	Frequency
>40 years	143(40.8%)	454.54±287.63	150(42.8%)
<40 years	207(59.2%)	200.91±105.92	200(57.2%)

Table 2: Distribution of subjects according to gold's criteria

Golds Criteria	Frequency	Percentage
Mild obstruction	234	66.8
Moderate obstruction	116	33.2

Table 3: Subjects with airway obstruction according to age and smoking index

Variable	Frequency	Percentage	P Value
Age			<0.05
<40 years	13	6.3%	
>40 years	42	29.3%	
Smoking Index			
<200	12	6%	<0.05
>200	38	25.3%	

RESULTS

The present study enrolled 350 subjects. The mean age of the subjects was 45.37+/- 8.94 years. Table 1 shows the distribution of subjects according to smoking index and age. There were 40.8% (n=143) subjects more than 40 years of age. There were 59.3% (n=207) subjects less than 40 years of age. The mean smoking index amongst subjects more than 40 years was 454.54±287.63 and the mean smoking index amongst subjects less than 40 years was 200.91±105.92.

Table 2 shows the distribution subjects according to gold's criteria. There were 66.8% (n=234) subjects with mild obstruction. There were 33.2 % (n=116) subjects with moderate obstruction.

Table 3 shows the subjects with airway obstruction according to age and smoking index. There were 6.3% subjects less than 40 years old age and 29.3% subjects elder than 40 years of age with airway obstruction. There were 6% subjects with smoking index less than 200 that had airway obstruction and 25.3% subjects with smoking index more than 200 that had airway obstruction.

DISCUSSION

Smoking cessation initiative can be aided by spirometry for the diagnosis of COPD and this can lead to reduction in the burden of the society. But there is no data confirming the same.[8] Prevention and treatment programme initiated in Finland for chronic bronchitis in the year 1998 used spirometry for early diagnosis of the disease and it was followed by smoking cessation clinics. In the year 2003, there has been a reduction in the smoking prevalence and admission of subjects of COPD indicating the natural reduction in the incidence of COPD using spirometry.[9] Screening for COPD amongst the high risk population of Poland has been implemented using spirometry. A total of 11027 smokers elder than 40 years were screened and there were 24.3% subjects with airflow obstruction.[10] According to Gorecka et al[11], diagnosing airflow limitation with smoking cessation aiding in reduction the subjects with smoking. According to our study, there were 40.8% (n=143) subjects more than 40 years of age. There were 59.3% (n=207) subjects less than 40 years of age. The mean smoking index amongst subjects more than 40 years was 454.54±287.63 and the mean smoking index amongst subjects less than 40 years was 200.91±105.92. Our study selected subjects more than 30 years of age, though some people start smoking at an early age but the appearance of symptoms of COPD begin appearing at a late stage. COPD is more prevalent amongst elder subjects.[12] Majority of the studies conducted in India screened subjects more than 30 years of age.[13,14] In our study, there were 66.8% (n=234) subjects with mild obstruction. There were 33.2 %(n=116) subjects with moderate obstruction.

The overall incidence of COPD amongst subjects has been reported to be 4-10%. Two techniques have been used for the early diagnosis of COPD i.e. case finding method and high risk population screening.[15,16] Both the methods have their own pros and cons. According to Stralelis G, et al[17] conducted a study to evaluate a method for Detection of COPD at an early stage using spirometry amongst 512 smokers, aged 40-55 years, found obstruction in 27 % cases. As per our study, there were 6.3%

subjects less than 40 years old age and 29.3% subjects elder than 40 years of age with airway obstruction. There were 6% subjects with smoking index less than 200 that had airway obstruction and 25.3% subjects with smoking index more than 200 that had airway obstruction.

CONCLUSION

COPD worsens with advancing age and frequency of smoking. There is a better prognosis of the disease if it is diagnosed at an early stage. Spirometry gives the method to detect the disease at an early stage even when the associated symptoms just start appearing. In our study, spirometry was a useful tool in the detection of COPD at an early stage.

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