Spirometry: A Useful Tool for Detecting COPD amongst Asymptomatic Smokers: An Institutional Based Study

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ABSTRACT

Background: Chronic obstructive pulmonary disorder is a prime reason of morbidity and mortality worldwide. Due to increased exposure to risk factors, the incidence of COPD can increase in the upcoming decades. Detecting COPD at initial stages can also motivate the smokers for quitting smoking. Spirometry aids in diagnosing and evaluating the disease progression. The present study was conducted with the aim to determine the role of spirometry in detecting of COPD in asymptomatic smokers.

Materials and Methods: The study enrolled male patients elder than 30 years of age and having nil respiratory signs and symptoms other than coughing. All the patients were subjected to portable spirometer for estimating the resistance of airflow. Based on the readings patients were divided as mild COPD, moderate COPD and severe COPD according to the Gold's criteria. 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 regarded as significant.

Results: The mean age of the subjects was 46.24+/- 8.90 years. There were 59% (n=118) subjects less than 40 years of age. The mean smoking index amongst subjects more than 40 years was 456.7±284.3 and the mean smoking index amongst subjects less than 40 years was 201.8±105.4.

Conclusion: Spirometry aids to detect the condition at initial stages when the related clinical features just start appearing. In present study, spirometry lead out to be a useful tool for detecting COPD at an early stage.

KEYWORDS: Spirometry, Pulmonary, Respiratory.

INTRODUCTION

Chronic obstructive pulmonary disorder is a prime reason of morbidity and mortality worldwide. Due to increased exposure to risk factors, the incidence of COPD can increase in the upcoming decades. With alterations in the lifestyle pattern and increased life expectancy of subjects, there is a upsurge in COPD patients.[1]

As per the global burden of disease, COPD was the sixth main cause of death in the year 1990 and by the year 2020 it can rank to third.[2,3] As per the metaanalysis study in the Indian population, the incidence of COPD was 5% in males and 2.7% in females elder than 30 years.[4] Smoking tobacco is the prime risk factor for COPD worldwide but in different countries air pollution because of burning fuel and biomass is also becoming a contributing risk factor towards COPD. The main sign for seeking medical service amongst patients is dyspnea seen by subjects on mild to moderate level of exertion.[5]

Due to this early and prompt diagnosis of COPD should be conducted to prevent the progression of symptoms. Researches have indicated that smoking cessation can decrease the frequency of decline of ventilatory function in the smokers.[6,7]

Detecting COPD at initial stages can also motivate the smokers for quitting smoking. Spirometry aids in diagnosing and evaluating the disease progression.[1] The present study was conducted with the aim to determine the role of spirometry in detecting of COPD in asymptomatic smokers.

MATERIALS AND METHODS

The present observational study was performed amongst the subjects with high risk of COPD. The study enrolled male patients elder than 30 years of age and having nil respiratory signs and symptoms other than coughing. Subjects having asthma or taking bronchodilator therapy or on corticosteroids were not enrolled in the study. Ethical committee clearance was obtained from 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 patients were educated regarding the harmful effects of smoking and that smoking cessation can decrease the symptoms of COPD. Smoking index was calculated to determine the frequency of smoking. It was obtained by multiplying the mean number of cigarettes smoked per day with the number of years the subject has been smoking. All the patients were subjected to portable spirometer for estimating the resistance of airflow. Based on the readings patients were divided as mild COPD, moderate COPD and severe COPD according to the Gold's criteria. 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 regarded as significant.

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

AGE	Frequency	Smoking Index	Frequency
>40 years	82(41%)	456.7±284.3	86(43%)
<40 years	118(59%)	201.8±105.4	114(57%)

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

GOLDS CRITERIA	Frequency	Percentage
Mild obstruction	134	67
Moderate obstruction	66	33

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

VARIABLE	Frequency	Percentage	P Value
Age			<0.05
<40 years	12	6%	
>40 years	60	30%	
Smoking Index			
<200	12	6%	<0.05
>200	50	25%	

RESULTS

The present study enrolled 200 subjects. The mean age of the subjects was 46.24+/- 8.90 years.
Table 1 shows the distribution of subjects according to smoking index and age. There were 41% (n=82) subjects more than 40 years of age. There were 59% (n=118) subjects less than 40 years of age. The mean smoking index amongst subjects more than 40 years was 456.7±284.3 and the mean smoking index amongst subjects less than 40 years was 201.8±105.4. Table 2 shows the distribution subjects according to gold's criteria. There were 67% (n=134) subjects with mild obstruction. There were 33 %(n=66) subjects with moderate obstruction. Table 3 shows the subjects with airway obstruction according to age and smoking index. There were 6% subjects less than 40 years old age and 30% 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% subjects with smoking index more than 200 that had airway obstruction.

DISCUSSION

An initiative to stop smoking cessation can be helped by spirometry for diagnosing COPD and this can cause significant reduction in the COPD burden of society. But there is no statistics confirming this.[8] According to the prevention programme started in Finland for patients of chronic bronchitis in 1998 used spirometry for the diagnosis of the condition and was followed by cessation of smoking in clinics. By the year 2003, a reduction in the smoking incidence and admission of patients of COPD was observed clearly indicating the reduction in the prevalence of COPD with spirometry.[9] Screening for COPD in the high risk subjects of Poland has been initiated with spirometry. A total of 11027 smokers aged more than 40 years were checked and there were 24.3% patients with obstruction of airflow.[10] As per Gorecka et al[11], diagnosing airflow restriction with cessation of smoking aidis in reducing the patients with smoking. According to our study, there were 41% (n=82) subjects more than 40 years of age. There were 59% (n=118) subjects less than 40 years of age. The mean smoking

index amongst subjects more than 40 years was 456.7±284.3 and the mean smoking index amongst subjects less than 40 years was 201.8±105.4. There were 67% (n=134) subjects with mild obstruction. There were 33 %(n=66) subjects with moderate obstruction. There were 6% subjects less than 40 years old age and 30% 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% subjects with smoking index more than 200 that had airway obstruction. The overall prevalence of COPD in subjects has been found to be 4-10%. Two methods have been considered for the prompt diagnosis of COPD and they are case finding technique and high risk screening.[15,16] Both the methods carry their own advantages and disadvantages. As per Stralelis G, et al[17] a study was conducted to determine a method of detecting COPD at initial stage with spirometry in 512 smokers, between the age of 40-55 years and they found obstruction amongst 27% subjects.

CONCLUSION
COPD deteriorates as the age advances and frequency of smoking increases. The disease prognosis is better if the disease is diagnosed at an early stage. Spirometry aids to detect the condition at initial stages when the related clinical features just start appearing. In present study, spirometry lead out to be a useful tool for detecting COPD at an early stage.

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