

PREVALENCE OF SYMPTOMATIC GASTROESOPHAGEAL REFLUX DISEASE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS IN NORTH INDIAN POPULATION

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ABSTRACT

Background: Our aim to this study is to evaluate a possible relation between GERD and COPD. We see the prevalence of symptomatic gastroesophageal reflux disease in COPD patients. **Material and Method:** The present study is a cross sectional study. In this study, consecutive 100 patients of COPD (chronic obstructive pulmonary disease) were selected by questionnaire method and spirometry. Population which comprised of 100 COPD patients, 91 was males and 9 were females. Performa contained 8 questions for COPD patients. The questionnaire was written at a fourth grade reading level and easily understood by all patients. The person with more than 35 age have selected for the COPD. **Results:** In the present study, GERD symptoms were found in 9 patients of 35-44 years age group, 16 patients of 45-54 years age group, 23 patients of 55-64 years age group, 18 patients of 65-74 years age group and 8 patients of more than 75 years age group. Overall, 38% (n=38) patients of total study population had GERD symptoms, who were taking treatment for COPD is 25% (n=25) patients of total study population, who were not taking any treatment. **Conclusion:** In present study, we have studied the prevalence of GERD in COPD group. In our study, majority of patients (66.2%) were from elderly age group which is more than 55 years age group had symptomatic GERD. Higher prevalence of GERD symptoms was found in male patients (76.9% of total males) as compare to female patients (44.4% of total females). High prevalence of GERD symptoms was found in those subjects who were taking treatment for COPD (drugs like inhaled Beta-2 against/inhaled steroid/oral theophylline). Higher prevalence of hiatus hernia (40.9%) and lax LES (27.3%) was found in those patients, who had symptomatic reflux in COPD group.

Keywords: Chronic obstructive pulmonary disease, Gastroesophageal, Endoscopy, Treatment, Reflux

INTRODUCTION

Gastroesophageal reflux disease (GERD) is defined as symptoms or tissue injury resulting from exposure of the esophagus to the gastric content. Gastroesophageal disease is a chronic and recurrent disease. Chronic obstructive pulmonary disease (COPD) is a major cause of chronic morbidity and mortality throughout the world. COPD is currently the fourth leading cause of death in world. COPD is

a disease state characterized by airflow limitation that is not fully reversible.

Microaspiration of gastric contents and vagal nerve-induced bronchospasm from gastric acid irritation of the esophagus. It may contribute to the observed association with GERD may include pneumonia, pulmonary fibrosis, asthma or chronic bronchitis (3-5). The latter may be a manifestation of COPD,

suggesting that GERD may be a risk factor for acute exacerbation of COPD. Acute exacerbations of An acute exacerbation of COPD is defined by the presence of worsening dyspnea, increased sputum production or the development of purulent sputum and may be accompanied by hypoxemia and worsening hypercapnia (7,8). Patients with COPD have on average 2.4 to 3 acute exacerbations per year. Risk factors for acute exacerbations include airway irritation from active smoking (4), environmental factors (9-11) and upper respiratory tract infection. In this regard, microaspiration of gastric contents and vagal irritation from gastroesophageal reflux may constitute airway irritants and represents a potential pathogenic mechanism for acute exacerbations of COPD.

Pathologic changes in the lungs lead to corresponding physiologic changes characteristic of the disease, including mucus hypersecretion, ciliary dysfunction, airflow limitation, pulmonary hyperinflation, gas exchange abnormalities, pulmonary hypertension and cor pulmonale. In advanced COPD, peripheral airways obstruction, parenchymal destruction and pulmonary vascular abnormalities reduce the lungs capacity for gas exchange producing hypoxemia and later on hypercapnia. Pulmonary hypertension, which develops late in the course of COPD (stage III: severe COPD), is the major cardiovascular complication of COPD. It is associated with the development of cor pulmonale and a poor prognosis (12). The prevalence and natural history of cor pulmonale in COPD are not yet clear.

Host factors and environmental exposures are the risk factors for COPD. The disease usually arises from an interaction between these two types of factors. The host factor that is best documented is a rare hereditary deficiency of α -1-antitrypsin. Other genes involved in the pathogenesis of COPD have not yet been identified. The major environmental factors are tobacco smoke, heavy exposure to occupational dusts and chemicals and indoor/outdoor air pollution. The role of sex as a risk factor for COPD remains unclear. In the past, most studies showed that COPD prevalence and mortality were greater among men than women (13-16). More studies from developed countries show that the prevalence of the disease is almost equal in men and women, which probably reflects changing patterns of tobacco smoking (17). Some studies have in fact suggested that the women are more susceptible to the effects of tobacco smoke than men. This is an important question given the increasing rate of

smoking among women in both developed and developing countries.

Ivan E. Rascon and Aguilar et al (18) evaluated the prevalence of gastroesophageal reflux (GER) symptoms in COPD patients and the effect of GER on the rate of exacerbations of COPD per year. In this study, they discovered that the rate of exacerbations of COPD was twice as high in patients with GER symptoms compared to those without GER symptoms. Duculon E et al reported the presence of GERD in 17 of 30 patients with severe COPD (57%). These authors diagnosed GERD using scintiscanning and short term pH monitoring for 3 hours after a test meal. GERD was defined by the number of events with pH <5 and the peaks with pH <2. Mokhlessi et al (11) using a modified version of a validated GERD questionnaire given to >100 patients, observed a high prevalence of mild GERD symptoms in patients with COPD. In the present study, a possible relation between GERD and COPD evaluated. We see the prevalence of symptomatic gastroesophageal reflux disease in COPD patients.

METHODOLOGY

The present study is a cross sectional study. In this study, consecutive 100 patients of COPD (chronic obstructive pulmonary disease) were selected by questionnaire method and spirometry. Population which comprised of 100 COPD patients, 91 were males and 9 were females. Performa contained 8 questions for COPD patients. The questionnaire was written at a fourth grade reading level and easily understood by all patients. The person with more than 35 age have selected for the COPD. The history of smoking more than 20 packs per year selected for the study. Forced expiratory volume in one second % predicted (FEV1%pred) <50% FEV1/forced vital capacity (FVC)<0.7 were selected as inclusion criteria. The subjects with history of sleep apnoea, any restrictive lung disease, and shortness of breath due to cardiac cause excluded in our study. All these patients confirmed by spirometry (SPIROLAB-2 Model). Various physical measurements eg. age, height and weight of an individual were used for predicting the expected normal values of various parameters.

These patients were further analysed for GERD symptoms by questionnaire method (Indian society off gastroenterology). If the patients had every symptoms of GERD, the entire Performa was filled. Those patients had symptomatic reflux, were classified as GERD (+), inclusion criteria were number of reflux episodes heart burn and exclusion

criteria were peptic ulcer disease, Barreest's esophagus, adenocarcinoma of esophagus.

Selected patients were subjected to upper gastrointestinal endoscopy (olympus co. Japan). Patients were asked to come with empty stomach on the day of procedure. Detailed endoscopic findings were entered in Performa. The result was tabulated and statistical method was applied.

RESULTS

In the present study, GERD symptoms were found in 9 patients of 35-44 years age group, 16 patients of 45-54 years age group, 23 patients of 55-64 years age group, 18 patients of 65-74 years age group and 8 patients of more than 75 years age group. The maximum population was from elderly age group that is 55-64 (n=23) and in 65-74 (n=18). The prevalence of GERD symptoms increased with increasing age. In our study, 76.9% (n=70) of total male patients (n=91) and 44.4% (n=4) of total female patients (n=9) were having GERD symptoms. Thus, the prevalence of GERD symptoms was greater in males than females in COPD group. The study population was also divided according to their economic class. Highest 39 patients were having GERD symptoms belong to middle economic class. 68.4% (n=39) of study population out of 57 vegetarian patients and 74.4% (n=32) out of 43 non-vegetarian patients had GERD symptoms. In our study, 53.8% (n=21) of study population out of 39 patients consuming bland diet had GERD symptoms while 78.7% (n=48) out of 61 patients were consuming spicy diet had GERD symptoms. In present study, the prevalence of GERD symptoms was divided according to their addiction or non addiction. In addiction group GERD symptoms were highly common 80% (n=4) in consuming both tobacco and alcohol. GERD symptoms were more common in 75% (n=9) alcoholics followed by 72.7% (n=48) tobacco users (chewers and smoker). Overall prevalence of GERD symptoms more common in addicts 61% (n=61) than in non addicts 11% (n=11). 75%, 56% and 57.1% patients of treatment taken group had GERD symptoms, who were taking inhaled β -2 against, oral theophylline and both these medicines, respectively. GERD symptoms were also common in 71.4% (n=5) of those patients, who were taking inhaled β -2 against plus inhaled steroid.

Overall, 38% (n=38) patients of total study population had GERD symptoms, who were taking treatment for COPD is 25% (n=25) patients of total study population, who were not taking any treatment. Out of 74 of total symptomatic reflux

patients, 22 patients were subjected to upper GI endoscopy. Maximum number of patients (40.9%; n=9) had hiatus hernia. 27.3% (n=6) patients had lax LES and in 9.1% (n=2) patients had both hiatus hernia and LALES (lower esophageal sphincter). 22.7% (n=5) patients had normal upper GI endoscopic findings.

DISCUSSION

The present study is a cross sectional study. In this study consecutive 100 patients of COPD were included. This study provides data on the prevalence of GERD symptoms among the study population according to their age, sex, socioeconomic status, diet grade, addiction and the treatments. The major objectives of present study were to establish the prevalence and symptomatic reflux, based on criteria in the study group. Among the COPD group, majority of the patients (n=49), who were having symptomatic GERD were from elderly age group that is more than 55 years of age group.

Although, COPD is more common in elderly patients and hiatal hernia and altered esophageal motility also occur more commonly in the elderly and this contributes to development of GERD. In this study, many elderly subjects were having hiatus hernia and these subjects further analysed by upper gastro intestinal endoscopy (21).

These findings were in accordance with literature where reflux occurs more commonly in elderly people. The risk factors responsible for higher prevalence of reflux disease in elderly population are altered esophageal motility like decreased peristaltic amplitude, increase non-propulsive, repetitive contraction and lower salivary secretory response in both volume and bicarbonate concentration in older patients.

Molid J.W. et al (22) studied the possible factors that could decrease lower esophageal sphincter pressure and predispose to GERD in elderly. Functional and anatomical diaphragmatic changes have been implicated as important factors in the genesis of GERD related to age. This shows increasing prevalence of GERD symptoms with advancing age.

COPD is more common in males than females. Tobacco smoking is a very important risk factor for genesis of COPD (13-16). In developing countries mostly males are smokers and females are non smokers. In this study most of the males were chronic smoker and all females never smoked. Smoking is also a risk factor for GERD (23).

In this study 76.9% (n=70) of male patients were having GERD symptoms while only 44.4% (n=4) of females were having GERD symptoms. The study showed that increase prevalence of GERD symptoms in males (Table 1).

In present study, majority of the patients (n=39) were found in middle economic class group but the prevalence of GERD symptoms (75%) were higher in higher economic class group as compare to lower and middle economic class (73.5% and 67.3%, respectively).

In this study, prevalence of GERD symptoms was higher in the non-vegetarians (74.4%) as compared with vegetarians (68.4%) in COPD group. Non-vegetarian diet usually has low fiber and high fat contents. Fat relaxes the lower esophageal sphincter and slows gastric emptying, which are related to gastro-esophageal reflux. In this study, 78.7% subjects having GERD symptoms were consuming spicy diet while 53.8% subjects were consuming bland diet in COPD group.

Laurie Barclay et al. (26) found that, GERD is thought to influence pulmonary function through microaspiration of gastric contents as well as bronchospasm due to acid acid-related vagal stimulation. Previously, GERD has been linked with the etiology or clinical manifestations of asthma, chronic bronchitis, pulmonary fibrosis and pneumonia. COPD is a common pulmonary condition that exacts a tremendous toll in terms of morbidity, mortality and economic cost. In the present study, we examine the incidence of GERD among patients with COPD as well as the effects of GERD on pulmonary function and the rate of COPD exacerbation.

Jacksonville et al (27) discovered that acid reflux is associated with twice as many COPD exacerbations

a year compared with patients without acid reflux. In present study, GERD symptoms were found in 75% of alcoholics, 72.7% of tobacco users and 80% of both alcohol and tobacco users.

Overall, prevalence of GERD symptoms was higher in addicts (61%) than non-addicts (11%). Tobacco smokers have a higher prevalence of lung-function abnormality and respiratory symptoms, a great annual rate of decline in FEV1 and higher death rates for COPD than non-smokers (24-25). Alcohol consumption and tobacco smoking are risk factors for GERD symptoms (5) (Table 2).

Ivan E. et al (18) found that a numerical trend toward a higher number of exacerbations in the smokers with weekly GER symptoms than in those smokers who had no symptoms of GERD, further supporting the association between GER symptoms and exacerbations of COPD. In the present study, 38% patients of total study population had GERD symptoms, who were taking treatment for COPD (either inhaled β -2 agonist / oral theophylline or both) is 25% patients of total study population, who were not taking treatment. In the present study, 75% patients of treatment taken group had GERD symptoms, 56% patients who were taking inhaled beta-2 agonist or oral theophylline and 57.1% patients taking both these medicines (Table 3).

Stein MR et al (26) found that the use of medication like theophylline and beta-2 agonist which may decrease lower esophageal sphincter pressure could facilitate reflux of gastric content. In the present study, higher prevalence of hiatus hernia (40.9%) and lax LES (27.3%) was found in those patients, who had symptomatic reflux in COPD group (Table 4).

Table1. Age and sex distribution of study population (COPD group)

Age Group (yr.)	COPD Group				Total
	MALE		FEMALE		
	R(+)	R(-)	R(+)	R(-)	
35 - 44	9	3	0	0	12
45 - 54	16	4	1	1	21
55-64	20	3	3	3	29
65-74	17	7	1	1	26
>75	8	4	0	0	12
Total	70	21	4	5	100

Table 2. Distribution of study population (COPD group) according to their addiction

Parameters	COPD GROUP					Total
	Addict			Non-addict (Not taking any of these things)		
	Reflux (+)	Reflux (-)	Total	Reflux (+)	Reflux (-)	
Tobacco chewing and smoking	48 (72.7%)	18 (27.3%)	66	11	6	17
Alcohol	9 (75%)	3 (25%)	12			
Both	4 (80%)	1 (20%)	5			
Total	61 (73.5%)	22 (26.5%)	83	11	6	100

Table 3. Distribution of study population (COPD group) according to the treatment they had taken

Treatment	COPD group					Total
	Treatment Taken			Not taken any of these medicine		
	Reflux (+)	Reflux (-)	Total	Reflux (+)	Reflux (-)	
Inhaled Beta-2 against	3 (75%)	1 (25%)	4	25	11	36
Inhaled steroids	0	0	0			
Both	5 (71.4%)	2 (28.6%)	7			
Oral theophylline	14 (56%)	11 (44%)	25			
All of the above	16 (57.1%)	12 (42.9%)	28			
Total	38 (59.4%)	26 (40.6%)	64	25	11	100

Table 4. Distribution of Reflux (+) COPD patients according to upper gastrointestinal endoscopic findings

Upper gastrointestinal endoscopic findings	Reflux (+) COPD group
Lax LES	6 (27.3%)
Hiatus hernia	9 (40.9%)
Both of above	2 (9.1%)
Normal study	5 (22.7%)
Total	22

CONCLUSION

In present study, we have studied the prevalence of GERD in COPD group. In our study, majority of patients (66.2%) were from elderly age group which is more than 55 years age group had symptomatic GERD. Higher prevalence of GERD symptoms was found in male patients (76.9% of total males) as compare to female patients (44.4% of total females). Maximum number of patients who had GERD symptoms, belong to middle economic class. Higher prevalence of GERD symptoms was found in non-vegetarian patients (74.4% of total non-vegetarians) than vegetarian patients (68.4% of total vegetarians). Higher prevalence of GERD symptoms was found in 78.7% of the spicy diet consumers as compare to 53.8% of the bland diet consumers. Tobacco and

alcohol addicts had high prevalence of GERD symptoms than non-addicts. High prevalence of GERD symptoms was found in those subjects who were taking treatment for COPD (drugs like inhaled Beta-2 against/inhaled steroid/oral theophylline). Higher prevalence of hiatus hernia (40.9%) and lax LES (27.3%) was found in those patients, who had symptomatic reflux in COPD group.

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ABBREVIATIONS

Gastroesophageal reflux disease

Term: GERD

Chronic obstructive pulmonary disease

Term: COPD

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