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Research Article

**ASSOCIATION OF GATROESOPHAGEAL REFLUX DISEASE
WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN
TERMS OF SIGNS AND SYMPTOMS**¹Dr. Muhammad Usman Safdar, ²Dr. Sidra Mehboob, ³Dr. Muhammad Amjad Nisar,¹RHC TMP Teh Liaqatpur, Rahim Yar Khan²Punjab Medical College, Faisalabad³RHC Sarai Sidhu, Distt khanewal**Abstract:**

Objective: To know the rate of gastroesophageal reflux symptoms in patients with chronic obstructive pulmonary disease and symptoms and severity of chronic obstructive pulmonary disease (COPD) worsening.

Study Design: A prospective, case control, questionnaire based, analytical study.

Place and Duration: In the Pulmonology Department, Mayo Hospital Lahore for one year duration from November 2016 to November 2017.

Methods: 150 control cases and gastroesophageal reflux symptoms were compared among 100 patients with COPD. According to the Mayo Clinic's modified version of GER questionnaire both groups were interviewed. Into two groups patients with COPD were divided according to the results of pulmonary function tests (PFT) of FEV1 > 50% and FEV1 < 50%.

Results: Patients with symptoms of COPD had more frequent gastroesophageal reflux symptoms (26 and 9.29%, $p = 0.001$, respectively), acid insufficiency (30.66%, value = 0.001, 71% vs 56% and 43.33), chronic cough (89% vs 29.33%, $p = 0.001$) and dysphagia (15% vs 4%, $p = 0.002$). 66 patients with COPD have symptoms of respiratory tract related with reflux disease, whereas this relationship not observed in control subjects. With frequent gastroesophageal symptoms, Ten of the 11 patients had increased use of inhalers ($p = 0.002$). Common gastroesophageal symptoms were significantly associated with a decrease in FEV 1 (25% versus 25% of $p < 0.001$). Conversely, patients with COPD (20.81 in general 48.13 + 50.94 + 23.33) without lung function tests and no gastro-intestinal symptoms were similar. The proton pumps inhibitor drugs and for COPD H2 blocker was more used in patients than the control group.

Conclusion: Patients with COPD had a higher incidence of gastroesophageal symptoms in patients with COPD.

Key Words: Gastroesophageal reflux disease, chronic obstructive pulmonary disease, Anti-reflux drugs.

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INTRODUCTION:

Chronic obstructive pulmonary disease (COPD) is the important cause of chronic mortality and morbidity represents a significant social and economic burden around the world. It's the 5th reason for death all over the world. In the United Kingdom, approximately 30,000 deaths per year are due to COPD, representing approximately six percent of all mortality of men and in women cause 4% of all deaths. 25% of all medical issues approximately occur due to respiratory failure and chronic obstructive pulmonary diseases causes more than 50% of all problems. COPD is a slowly progressing chronic disease characterized by obstruction to airflow in lungs (reduced FEV1 / FVC ratio) that does not change significantly change for many weeks. Mostly lung function remains stable, but the therapy or bronchodilator can reverse the symptoms. Gastroesophageal reflux disease (GERD) has recently become a major public health issue due to the less resources of medical care used in its treatment and the harmful effects on the life routine.

20-36% of the population is affected by GERD and occurs especially in elders. The backward movement of gastric contents into the esophagus is known as GERD. Symptoms of esophagus motility and gastroesophageal reflux, characteristic of reflux gastric mucus and / or acid reflux of stomach or intestinal contents, causing deterioration, esophageal mucosa damage. The normal mechanism against reflux is the anatomical configuration of the gastroesophageal junction and lower esophageal sphincter (LES) tone, when the pressure gradient between the lower esophageal sphincter and the stomach disturbed backflow occurs. LES tone insufficiency may be because of insufficient sphincter relaxation mediated by inhibitor nerves and muscle weakness. Smoking is the secondary cause of LES tone insufficiency and also includes aminophylline, B2 agonist drugs, nitrates and calcium channel blockers. The relationship between respiratory and gastroesophageal symptoms is well known in the context of asthma. In the adult population of U.S Gastroesophageal symptoms are estimated to occur in 8% of population on daily basis, weekly 14-19%, and monthly 40%. Unlike asthma, the clinical outcomes and prevalence of GERD in COPD are not proven.

MATERIALS AND METHODS:

This prospective, case control, questionnaire based, analytical study was held in the Pulmonology Department, Mayo Hospital Lahore for one year duration from November 2016 to November 2017. We checked 100 consecutive patients with COPD

who participated in the OPD or Respiratory Diseases clinic. (1) H / O 20 packets per year, <80% FEV1 / FVC ratio <70% and 200 ml of expected improvement in abnormal findings on spirometry in the British Thoracic Society (FEV1) or salbutamol after inhalation of FEV1 <15%). The exclusion criteria were as follows, Respiratory distress in patients, active PUD, Stenosis, Cancer, achalasia and normal spirometry.

According to the results of FEV1 <50% and FEV1> 50% pulmonary function tests (PFT) of COPD patients, two groups were divided. Respiratory symptoms such as shortness of breath, chronic sputum taken in patients with COPD, who were admitted. A total of 150 subjects as a control group who were included in the study with diagnosis of previous chronic obstructive pulmonary disease or asthma. Before entering the research, an informative presentation of each topic was obtained. Two COPD patients and control group completed a modified version of a questionnaire, also approved by GER Mayo Clinic previously developed by Locke and its partners. The first 50 questions were asked in were on four symptoms of gastroesophageal reflux disease were regurgitation acid, heartburn, chronic cough and dysphagia. Each symptom first question served as a branch point. If the answer is "no", the subjects are asked to move on to the next symptom. The next two questions were about severity and frequency of symptoms in the previous year. A modified version consists of 8 questions to determine the gastroesophageal symptoms were on shortness of breath, increased the use of coughs and wheezing and inhalers. Other questions include patient demographics, coffee / tea / alcohol, smoking history and non-prescription antacids or prescription anti-reflux drugs. This questionnaire was understandable and simple well read by control and COPD subjects. The survey was previously tested and completed within <25 minutes. Statistical analysis includes the t test for comparison tools and the relationship between variables X2-square test was used.

RESULTS:

100 patients with COPD and 150 control cases were selected for study. In both groups all volunteers were male. Patients with COPD were on average older than controls (mean age 57.01 ± 8.08 years and 50.1 ± 6.08 years, relatively, p = 0.001). Patients with chronic obstructive pulmonary disease had higher cigarette exposure during the year (29.9 + 10 pack-years and 7.01 + 6.89 pack-years, p = 0.001). The number of smokers during the year was obtained after dividing the number of smokers by 20 in the year. Patients in the COPD and control groups had

higher body mass index (BMI) (20.09 ± 3), 3 , $21.08 + 5.01$, $p = 0.26$ respectively) than the control group. Only one patient with COPD had used alcohol. There

were no variations in tea and tobacco consumption in patients of COPD with GERD symptoms and COPD patients without gastroesophageal reflux (Table 1).

Table 1. Demographics of control subjects and COPD patients.

Variables	COPD Patients (n=100)	Control Subjects (n=150)	p-value
Age (years)	56.8 ± 7.8	49.5 ± 5.18	0.001
Weight (Kg)	54.5 ± 8.4	60.48 ± 14.13	0.001
Height (m)	1.6 ± 0.1	1.71 ± 0.7	0.001
Body Mass Index(Kg/m ²)	19.9 ± 3.3	20.58 ± 4.86	0.26
Smoking (Pack year)	$29.9 \pm 9.9, n=100$	$6.83 \pm 6.91, n=36$	0.001
Tea (Cup/day)	8.4 ± 7.8	2.78 ± 1.38	0.003

Data are presented as mean \pm SD.

Negative sign showed a decrease from COPD patients to Control subjects.

CI=Confidence Interval.

In spirometry measurements, acid insufficiency (31% vs 27%, p value = 0.06), chronic cough (44% versus 45%) and dysphagia (16% versus 0%, p -value = 0.001) patients had more significant symptoms of gastroesophageal reflux compared to FEV1 <50% and p -value = 0.05 compared with FEV1 > 50%). However, in COPD patients, FEV1 > 50% and FEV1 <50% (36%, p value = 0.13) were similar in stomach uptake. For this reason, the analysis proves that with more severe COPD patients may have severe symptoms of gastroesophageal reflux more frequently (Table 2).

Table 2. Comparison of GER symptoms in COPD patients and control subjects.

GER symptoms	Control group	COPD group	p-value
Heart burn	65 (43.33%)	70 (70%)	0.001
Acid regurgitation	46 (30.66%)	56 (56%)	0.001
Dysphagia	6 (4%)	15 (15%)	0.002
Chronic cough	44 (29.33%)	89 (89%)	0.001
Frequent symptoms	14 (9.33%)	25 (25%)	0.001
Infrequent symptoms	45 (30%)	51 (51%)	0.001

Data is presented as number (percentage).

COPD patients in total 76 with GERD symptoms, 26 (33.09%) had common reflux symptoms and 52 (66.90%) had little reflux symptoms (p value 0.001). Elevated symptoms of COPD (dyspnea, wheezing, coughing) were observed in 11 of 25 patients (44%) with common gastroesophageal reflux, with symptoms in 15 (29.41%). In 10 of 11 COPD patients with frequent gastroesophageal reflux symptoms, the use of inhalers was increased (p value = 0.001).

Table 3. Association of GER symptoms with severity of COPD.

GER symptoms (n=76)		p-value	
Frequent	25 (32.89%)		
Infrequent	51 (67.10%)		0.001
COPD symptoms (n=76)			
No change	50 (65.78%)		0.001
Increased	26 (34.21%)		

GER symptoms	COPD patients		p-value
	FEV1 ≤50%	FEV1 ≥50%	
	(n=45)	(n=55)	
Heart burn	35	35	0.12
Acid regurgitation	30	26	0.05
Dysphagia	15	0	0.001
Chronic cough	45	44	0.05

No correlation was found between respiratory symptoms and gastroesophageal reflux symptoms in control subjects. For this reason, these results suggest that there is a greater correlation between symptoms of gastroesophageal reflux and respiratory symptoms (Table 3).

DISCUSSION:

The purpose of our study was to evaluate the relationship between the severity of airway obstruction and gastroesophageal reflux symptoms in patients with COPD. The important results of our analysis is that GERD reflux symptoms (one or several times a week) are more frequent in COPD patients than in the control group. At the Mayo Clinic, we used a modified version of the GER symptom questionnaire to accurately reflect the presence of respiratory symptoms and gastroesophageal reflux symptoms. We also confirm that there is a direct association between the gastroesophageal reflux symptoms (0% vs 25%, $p < 0.001$) and airway obstruction severity detected by FEV1. COPD patients also consumed more tea than the control group. Our study mainly included elderly male patients. In our study, we showed that 50% of the common symptoms of gastroesophageal reflux occur in COPD patients with FEV1 <50%. This is less than 80% of patients with asthma. The frequency of dysphagia was same in our population and in previous studies (16% and 18%, respectively). There are various mechanisms that can cause symptoms in patients with gastroesophageal reflux, COPD and asthma. One mechanism suppose that reflux triggers microaspiration, while others suggest that acid induces vagal stimulated reflex bronchoconstriction.

Reflux-related dyspnea may increase airflow and hyperinflation in patients with obstructive airway disease, which increases minute ventilation. Reduction of the contribution of the sphincter to the diaphragm, which promotes severe hyperinflammation, severe cough and the return of the stomach content of bronchospasm, may increase intra-abdominal pressure and alter the relationship between this low esophageal sphincter and diaphragm.

CONCLUSION:

In conclusion, our study showed that gastroesophageal reflux symptoms were higher in COPD patients than control subjects. A greater proportion of the common symptoms of gastroesophageal reflux are observed in patients with severe COPD who have been diagnosed with pulmonary function tests. The use of anti-reflux drugs is more in patients with COPD than in control subjects. For COPD patients, additional studies are only recommended for nonsmokers.

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