

“Prevalence of Gastroesophageal reflux disease (GERD) in Bronchial asthma patients”

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Abstract

Introduction: Gastroesophageal reflux disease (GERD) is one of the common gastro intestinal problem in surgical practice. Several studies have shown a close association between bronchial asthma and GERD. Data on prevalence of GERD in asthma patients in India are sparse.

Aims and objective: To study the prevalence of Gastroesophageal reflux disease (GERD) in patients with bronchial asthma.

Methodology: The study design was a case-control study. Adult bronchial asthma patients were included as cases. Age and gender matched controls were taken from non-asthmatic patients who attend pulmonary medicine OPD. GERD-Q questionnaire was used to assess the presence of GERD in both groups. GERD-Q score >8 was taken as presence of disease. Patients who had score >8 were subjected to upper GI endoscopy for documentation of GERD

Results: A total of 80 bronchial asthma patients and 80 non-asthmatic controls were studied. On assessment for presence of reflux symptoms (heartburn and regurgitation) in both the groups, 52 patients (65%) in case and 29(36.5%) patients in control group had reflux symptoms. Heartburn was found to be the predominant reflux symptom in both the groups. 33 (41%) patients in the case group and 21 (26.25%) patients in control group had a total GERD-Q questionnaire score of more than 8. The difference in prevalence of GERD among the cases and controls were found to be statistically significant with a p value of 0.04, odds ratio of 1.9 (95% confidence limit - 1.008 - 3.878).

Conclusion: Based on our study we conclude that there is increased prevalence of gastroesophageal reflux symptoms and gastroesophageal reflux disease in bronchial asthma patients. Heart burn is the predominant reflux symptom in bronchial asthma patients with reflux symptoms.

Keywords: Heartburn, Regurgitation, reflux disease, Bronchial asthma, GERD

Introduction

Gastroesophageal reflux disease (GERD) is one of the common gastro intestinal problems in surgical practice. Prevalence of GERD among general population is 10 to 40% [1]. GERD commonly manifests with symptoms like heartburn and regurgitation [2, 3]. GERD has also been found to manifest with non-gastrointestinal symptoms like pharyngitis, laryngitis, chronic cough, asthma like symptoms, dental erosions, sleep disturbances etc., several studies have shown a close association between bronchial asthma and GERD [4, 5]. Association between asthma and GERD is not clearly understood as both these conditions can aggravate the symptoms of each other. Asthma can predispose to reflux of gastric content secondary to raised negative intra-thoracic pressure during acute exacerbations. In addition drugs given for asthma patients can also reduce the tone of the lower esophageal sphincter leading on to precipitation of reflux symptoms. On the other side reflux of the gastric content in GERD can cause aggravation in symptoms of asthma by

bronchospasm either secondary to acid content or through vagal mediated reflex [6]. Prevalence of GERD in Asthmatic patients in western population ranges from 35% to 80% [7]. In a recent study in India the prevalence of GERD in asthma patients was 52% [8]. The present study was designed to study the prevalence of GERD in asthma patients in South Indian population.

Methodology

The study was conducted in the department of Surgery and Pulmonary medicine from May 2016 to June 2016. The study design was a case control study on humans. All patients > 18 years of age diagnosed as bronchial asthma based on clinical diagnosis and pulmonary function test were included as cases. Bronchial asthma patients with heart disease on aspirin medication, patients on treatment with oral steroids, bronchial asthma patients who had received proton pump inhibitors within 4 weeks prior to the study and patients with active pulmonary infection were excluded from cases. Non-asthmatic

patients > 18 years of age attending pulmonary medicine OPD with upper GI symptoms were included as controls. Patients with active pulmonary infections were excluded in the control group. The study was conducted after getting approval from the Institute’s Ethics committee. Patients were recruited in the outpatient services in the department of pulmonary medicine. Asthma patients were recruited from the asthma clinic which is conducted every week in the department OPD. Controls were recruited from the patients who attend the regular pulmonary medicine OPD for respiratory ailments. An informed consent was obtained from the subjects in both the groups. Demographic parameters like age, gender, address were noted. Duration of illness and treatment details were collected from the cases. Presence of reflux symptoms namely heartburn and regurgitation anytime in the past which required treatment was documented in both the groups. Using a standard, validated, self-administered questionnaire called Gastroesophageal reflux disease questionnaire (GERD-Q) [9], the frequency and severity of reflux symptoms in the preceding one week was scored. The questionnaire was prepared in both English and in the local language Tamil. The Tamil translation of the questionnaire was validated by face validation with the help of experts in the department of Surgery and Surgical Gastroenterology. The questionnaire was also pre-tested on a sample of patients before the start of the study. The questionnaire assesses the presence of significant reflux symptoms in the previous one week of the study. GERD-Q score of more than 8, was considered diagnostic of gastroesophageal reflux disease. Prevalence of gastroesophageal reflux disease in the cases and controls were calculated using the GERD-Q score. Subjects who were diagnosed to have GERD by the questionnaire were subjected to upper gastrointestinal endoscopy to document reflux esophagitis change of gastroesophageal reflux disease. Endoscopic grading of GERD was done using Savary Miller grading of reflux esophagitis. Prevalence of GERD in this subgroup of patients who underwent endoscopy was also calculated. Reflux symptoms, their duration and its correlation with the presence of asthma were also studied. Sample size calculated using OPENEPI online software. Based on the expected difference in prevalence of GERD among cases and controls of 25%, 95% confidence interval and power of the study as 80% the calculated sample size was 80 in each group. Statistical analysis was done using SPSS version 20. Categorical data was expressed as numbers. Continuous variables were expressed as the mean ± standard deviation (SD). Proportion of patients with GERD in case and control group, diagnosed using GERD questionnaire, was calculated and assessed for significance. Chi Square test was used to analyse the difference in proportion of GERD in cases and controls. P value of <0.05 was taken as significant. Odds ratio

with 95% confidence limit was calculated. Sub group analysis of prevalence of GERD by endoscopy among the cases and controls who had a GERD score of >8 was also done.

Results

A total of 80 bronchial asthma patients, who met the inclusion criteria for cases were recruited in the study. Among them 34 patients were men and 46 were women. Age and gender matched 80 non-asthmatics patients were included as controls. Mean age of the patients was found to be 41.05 ± 7.8 years and 39.6 ± 3.7 years in the cases and control group respectively (Table.1). On assessment for presence of reflux symptoms (heartburn and regurgitation) in both the groups, 52 patients (65.5%) in case and 29(36.5%) patients in control group had reflux symptoms at some point of time in the past which required medications (Table.1). Heartburn was found in 30 (57%) out of the 52 patients with reflux symptoms in the case group.

Using the GERD-Q questionnaire, the severity and frequency of the reflux symptoms in the preceding one week of study was assessed for diagnosis of GERD. 33 (41%) patients in the case group and 21 (26.25%) patients in control group had a total GERD-Q questionnaire score of more than 8 (Table.1). The difference in prevalence of GERD (by GERD-Q questionnaire) among the cases and controls was found to be statistically significant with a p value of 0.04, odds ratio of 1.9 (95% confidence limit - 1.008 - 3.878) (Table.1).

The patients who were diagnosed to have GERD based on the GERD questionnaire score in both the groups were subjected to upper gastrointestinal endoscopy for definitive diagnosis. Among 33 patients in case group who had GERD questionnaire score more than 8, 27 (81%) patients had positive endoscopy finding of esophagitis (Table.2). Among 21 patients in control group who had GERD questionnaire score more than 8, 11(52%) patients had esophagitis by upper gastrointestinal endoscopy. Grade 2 esophagitis was the commonest finding in patients who had esophagitis in the cases group. The difference in prevalence of GERD (by upper gastrointestinal endoscopy) among the cases and controls who had GERD-Q score more than 8, was found to be statistically significant with a p value of 0.02, odds ratio of 3.172. (95% confidence limit - 1.459 to 7.217).

On analysis of the reflux symptoms among the patients who had GERD questionnaire score more than 8, heart burn was found to be the significant reflux symptom (p – 0.03) in both the groups. 19(57.6%) patients in case group had reflux symptoms for more than 1 year. On correlating the duration of reflux symptoms and presence of GERD it was found that presence of reflux symptoms for more than 1 year was found to be significantly associated with asthma (p – 0.04).

Table 1: Comparison of Parameters between the cases and controls

Parameters	Cases (n- 80)	Controls (n-80)	P*
Age (mean)yrs	41.05±7.81	39.6±3,7	P - 0.06
Gender			
Male(no.)	34	34	
Female(no.)	46	46	
Reflux symptoms			
Heartburn (no. /%)	30(38.25)	18(22.5)	P - 0.04
Regurgitation (no. /%)	22(27.5)	11(13.75)	

Nil	28(34.25)	51(63.75)	
Gird Questionnaire score			
>8(no. /%)	33(41)	21(26.25)	P - 0.03
			Odd's ratio – 1.9
			Confidence limit - 1.008 - 3.878

*P value <0.05 was taken as significant.

Table 2: Comparison of parameters between cases and controls who had GERD score >8

	Cases (33)	Controls(21)	P value
Endoscopy – esophagitis (no/%)	27(81)	11(52)	p - 0.02 odds ratio - 3.172. (95% confidence limit - 1.459 to 7.217).
Endoscopy grading			p- 0.04
Normal	6	10	
Grade 1	8	7	
Grade 2	16	2	
Grade 3	3	2	
Grade 4	0	0	
Reflux symptom (no.)			P - 0.03
Heartburn	25	17	
Regurgitation	8	4	
Duration of reflux symptom			P - 0.04
1. <6m	5	10	
2. 6m-1yr	9	3	
3. >1yr	19	8	

P value <0.05 was considered significant.

Discussion

Prevalence of reflux symptoms in asthmatic patients was found to have wide range from 34% to 89% [7, 10]. In the present study it was found that 65% of cases had GERD symptoms at some point of time which required treatment. In similar study done by Rameschandra *et al.* in India, the prevalence of GERD symptoms in asthmatics was found to be 52%. In a study done in Sri Lanka by Amarasiri *et al.* prevalence of reflux symptoms in asthmatics was 59.4 % (11). The prevalence of GERD symptoms in the present study seem to be in the higher range as compared to others studies may be because of the diet and lifestyle pattern of the study population. Majority of the people in the south India take spicy foods which is a stimulant for gastric secretion leading on to regurgitation and heartburn. Lifestyle factors like consumption of tea, coffee and use of tobacco products like bidis and cigarettes can also account for the higher presence of GERD symptoms in the present study. These factors have also been shown to be associated with increased incidence of GERD [12].

In the present study, though almost 62% patients had reflux symptoms, only 41% of patients had significant GERD-Q score. The GERD-Q questionnaire used in the study assesses both the frequency and severity of the reflux disease in the preceding one week of the study [9]. This may be reason for the difference in the prevalence of symptoms and the prevalence of significant disease. We found that this questionnaire was very useful tool as the questions are easy to understand by the study population.

The prevalence of GERD in asthma patients based on symptom questionnaire in the present study was 41%. In a study done by Jaimchariyatam based on cross sectional questionnaire in Thailand prevalence of GERD asthmatic patients was found to be 37.50% [13]. In an Indian study done by Gaude *et al.* using questionnaire FSSG the prevalence of GERD was found to be 40% [14]. In the study by Calabrese *et al.* prevalence of GERD was as high as 80% in bronchial asthma patients [15]. Similar studies by Takenaka *et al.* and Charles *et al.* observed the

prevalence of GERD among bronchial asthma patients was 37.4% and 43% respectively [16, 17]. Both the studies used FSSG scale reflux symptom questionnaire for diagnosing GERD. Kiljander and Laitinen reported GERD symptoms in 51% of 90 asthmatics studied [18]. In India, Sandur *et al.* found that the prevalence of GERD was as high as 70% in their study of 250 patients [4]. Both these studies used invasive modalities like endoscopy and pH monitoring for diagnosis of GERD.

Prevalence of GERD among general population is 10 to 40% [1]. Epidemiological screening studies done in India showed that prevalence of GERD in general population ranges from 7.6 to 16.2% [1, 2]. Studies have shown that prevalence of GERD in Asian population is increasing. This is due to changes in the life style and socioeconomic development. In India, a study done by Rameschandra *et al.* observed 28% of controls had GERD symptoms [8]. In the present study also there is a higher prevalence of GERD in the control population (26.25%). This observation can be because we have included non- asthmatic patients attending pulmonary medicine OPD in the control groups. Non asthmatic patients included patients with allergic rhinitis, upper respiratory tract infection, pharyngitis, etc. It has been a known fact that these non-asthmatic conditions can also be aggravated by GERD [12]. This could be the reason for the higher prevalence of GERD in the control group.

In the present study endoscopy method was used to confirm the presence of GERD. As upper gastrointestinal endoscopy is an invasive investigation the procedure was carried out only in patients who were diagnosed as having GERD by the GERD-Q questionnaire. The prevalence of GERD identified using endoscopy in this subgroup was 88% in cases and 52% in control group. This proves that most of the people with reflux symptoms will have positive endoscopy. But there is a subset of population who will have symptoms and not have changes in endoscopy. In the present study, 12% of asthma patients who had significant GERD-Q score did not show esophagitis changes in endoscopy. Similar observation was also observed in the study by Rameschandra *et al.* [8]. This can be explained

possibly by the presence of functional dyspepsia. This finding also adds evidence to the fact that the reflux symptoms may not clearly correlate with the endoscopic finding. In the study done by Gaude *et al.* all patients who had reflux symptoms were found to have positive esophagitis on endoscopy [14]. In endoscopy it was observed that grade 2 esophagitis (Savary Miller grading) was the commonest abnormality noted in our study. Gaude *et al.* in their study showed that the severity of asthma was directly proportionate to the severity of reflux esophagitis [14]. Yasuo *et al.* studied the relation of GERD in bronchial asthma cases using Los Angeles classification and observed that Grade D GERD was the commonest abnormality noted [19].

In the present study the reflux symptoms and their duration were correlated with the presence of asthma. It was found heart burn was the predominant reflux symptom and duration of the reflux symptom for more than a year was found to positively relate to the presence of asthma. This finding was comparable to the results in other similar studies [8, 10, 11, 13]. In India, Ramachandra *et al.* documented a 58% prevalence of GERD in asthmatics as compared to 32.5% in controls [8]. The conclusion of the study was that upper gastrointestinal symptoms other than reflux symptoms were also present in asthma patients.

Conclusion

Based on our study we conclude that there is increased prevalence of gastroesophageal reflux symptoms and gastroesophageal reflux disease in bronchial asthma patients. Heart burn is the predominant reflux symptom in bronchial asthma patients with reflux symptoms.

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