

Analysis of Prevalence Rate of Gastroesophageal Reflux Symptoms in Patients with Both Acute and Nonacute Cough

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ABSTRACT

Introduction: Gastroesophageal reflux disease or GERD is a digestive disorder that most commonly associated with the ring of muscles present between oesophagus and stomach. This ring of muscle is commonly called as the lower oesophageal sphincter (LES). If an individual developed this kind disorders, he/she might experience heartburn or acid ingestion. Gastro-oesophageal reflux disease (GERD) symptoms are more common in asthmatic individual. There are some evidence reporting that the severity and frequency of GERD symptoms are directly related to the severity of asthmatic condition.

Materials and Methods: This study was set to be carried out in 1500 consecutive patients (788 men and 937 women with a mean age of 42.2 years) who were reported to the outpatient ward in the Department of General Medicine, Saraswathi Institute of Medical Sciences, Hapur Road, Anwarpur, Uttar Pradesh (India) were taken for the present study. A written informed consent was taken from all of the patients. Inclusion criteria formulated were no patients had previous history of the administration of proton pump inhibitor (PPI), H₂-receptor antagonist, antibiotics, steroids or nonsteroidal anti-inflammatory drugs for a period of at least two months before the beginning of investigation. When the cough lasts for more than 3 weeks, it is considered as non-acute cough in the present study.

Results: On the whole, 656 (38%) patients were diagnosed as GERD and 230 (13%) had respiratory symptoms including cough, sputum, and/ or dyspnoea. GERD symptoms were found in 104 of 230 patients with respiratory symptoms and in 554 of 1500 patients without respiratory symptoms. There were no significant differences in age, male to female ratio, or the proportion of hypertension treated and current smokers between patients with and without respiratory symptoms.

Among 230 patients with respiratory symptoms, 117 were diagnosed as acute cough and had a F-scale score of 6.9±6.4. The remaining 113 patients were considered as having non-acute cough and had a F-scale score of 7.8±6.3. There was no observable significant difference in F-scale score between the two groups. 43 (37%) of 117 patients with acute cough and 48 (43%) of 113 with nonacute cough had GERD symptoms. The difference in prevalence of GERD between acute and nonacute cough groups did not attain statistical significance possibly.

Conclusion: To conclude, patients with respiratory symptoms are at a significantly increased risk of developing GERD. There was no observable difference in GERD prevalence between the patients with acute and nonacute cough which suggests that the development of GERD is commonly associated with the presence of respiratory diseases without the development of respiratory symptoms.

Keywords: GERD, Asthmatic, Acute, Chronic Cough.


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INTRODUCTION

Gastroesophageal reflux disease or GERD is a digestive disorder that most commonly associated with the ring of muscles present between oesophagus and stomach. This ring of muscle is commonly called as the lower oesophageal sphincter (LES). If an individual developed this kind disorders, he/she might experience

heartburn or acid ingestion. Gastro-oesophageal reflux disease (GERD) symptoms are more common in asthmatic individual. Systematic review on GERD symptoms evaluation in asthmatics has reported a prevalence rate ranging from 30-90% when compared the same with general population which ranges

between 10-20%.¹ A study conducted from South East Asia observed the prevalence of GERD symptom of about 57% in asthmatics when compared to 34% in non-asthmatic individuals,² and a urban based study on Indian population reported that 74.8% of asthmatics had a history of GERD during their disease course.³ There are some evidences reporting that the severity and frequency of GERD symptoms are directly related to the severity of asthmatic condition.⁴⁻⁶ The drugs which should be given to asthmatics might predispose this condition or if present already it may worsen the GERD symptoms.⁷⁻¹¹ In addition to the higher prevalence of GORD symptoms, asthmatics might also associate their GERD symptoms with respiratory symptoms and the so-called condition is referred as Reflux Associated Respiratory Symptoms (RARS). Various studies report the chronic respiratory manifestations of GERD.¹² While others reported a relation between reflux and cough and reflux & bronchial hyperresponsiveness.¹³⁻¹⁶

Various studies showed the association between the GERD and asthmatics had selection bias since data recorded were in a retrospective manner. Whereas certain studies which addresses the association between respiratory disorders and GERD symptoms in a randomly selected group of persons are sparse. The incidence of chronic bronchitis, asthma, and chronic pulmonary disease is 1.5 times greater in patients with reflux esophagitis.^{17,18} While various other studies elucidated a high prevalence of GERD among asthmatic patients.^{19,20} Hence, even-

after the availability of various studies that encased a close relation between GERD symptoms and chronic cough, it has still been unknown to identify whether acute cough is also associated with GERD. The aim of this study was to assess the relationship between GERD and respiratory symptoms in general practice.

MATERIALS AND METHODS

This study was set to be carried out in 1500 consecutive patients (788 men and 937 women with a mean age of 42.2 years) who were reported to the outpatient ward in the Department of General Medicine, Saraswathi Institute of Medical Sciences, Hapur Road, Anwarpur, Uttar Pradesh (India) were taken for the present study. A written informed consent was taken from all of the patients. Inclusion criteria formulated were no patients had previous history of the administration of proton pump inhibitor (PPI), H2-receptor antagonist, antibiotics, steroids or nonsteroidal anti-inflammatory drugs for a period of at least two months before the beginning of investigation. Patients who had a previous history of partial gastrectomy were excluded from the study. The study was carried out in accordance with the Declaration of Helsinki and was priorly approved by the institutional ethical committee. When the cough lasts for more than 3 weeks, it is considered as non-acute cough in the present study. All values are denoted as mean ± SD. Comparisons of groups were made using Student's t test or chi-square tests whichever is appropriate. P - value of less than 0.05 was considered as statistically significant.

Table 1: Comparison of GERD prevalence and F-scale score between patients with and without respiratory symptoms

Parameters	Respiratory symptoms (+)	Respiratory symptoms (-)	P - value
No. of patients	230	1500	
Age (years)	42.2 ±9.3	43.4 ±8.7	-
Male to female ratio	98:134	694:807	-
Current smoker	80 (34.7%)	488 (32.5%)	-
Hypertension	18 (7.8%)	114 (7.6%)	-
F – scale score	7.5 ±6.4	4.6 ±5.9	<0.01
No. of GERD	106 (46%)	554 (36.9%)	<0.01

Table 2: Comparison of GERD prevalence and F-scale score between patients with and acute and nonacute cough

Parameters	Acute cough	Non-acute cough	P – value
No. of patient	117	113	
F – scale score	6.9±6.4	7.8±6.3	-
No. of GERD	45 (38.4%)	50 (44.2%)	

Table 3: The GERD prevalence in patients with and without pharyngeal symptoms in acute and nonacute cough groups

Parameters	Non-acute cough		Acute cough	
	+	-	+	-
Pharyngeal symptoms				
No. of patient	26	87	55	59
No. of GERD	16 (61.5%)	33 (37.9%)	23 (41.8%)	20 (33.8%)

RESULTS

On the whole, 656 (38%) patients were diagnosed as GERD and 230 (13%) had respiratory symptoms including cough, sputum, and/ or dyspnoea. GERD symptoms were found in 104 of 230 patients with respiratory symptoms and in 554 of 1500 patients without respiratory symptoms. Patients who were reported with respiratory symptoms had developed GERD symptoms more frequently than patients without respiratory symptoms with a statistical significance ($p < 0.01$, Table 1). F-scale score is significantly higher in patients with respiratory symptoms (7.5 ± 6.4) than in those without respiratory symptoms (4.6 ± 5.9) ($p < 0.01$). There were no significant differences in age, male to female ratio, or the proportion of hypertension treated and current smokers between patients with and without respiratory symptoms (Table 1). Among 230 patients with respiratory symptoms, 117 were diagnosed as acute cough and had a F-scale score of 6.9 ± 6.4 . The remaining 113 patients were considered as having non-acute cough and had a F-scale score of 7.8 ± 6.3 . There was no observable significant difference in F-scale score between the two groups. 43 (37%) of 117 patients with acute cough and 48 (43%) of 113 with nonacute cough had GERD symptoms (Table 2). The difference in prevalence of GERD between acute and nonacute cough groups did not attain statistical significance possibly. Comparison of the prevalence of GERD between the patients with and without pharyngeal symptoms was tabulated in Table 3. In patients with nonacute cough, those were found in 16 (61.5%) of 26 patients with pharyngeal symptoms and in 33 (38%) of 87 without them. For acute cough, 23 (41.8%) of 55 patients with pharyngeal symptoms, and 20 (31%) of 59 patients without pharyngeal symptoms were diagnosed as GERD. The differences in the prevalence of GERD between patients with and without pharyngeal symptoms did not reach a statistical significance in acute and nonacute cough groups.

DISCUSSION

GERD is a common entity which refers to the abnormal exposure of the oesophageal mucosa to gastric contents especially the acids secreted. Various population based surveys have reported typical GERD signs and symptoms which include heartburn and acid regurgitation, at least yearly prevalence ranging from 26% to 60%.^{21,22,23} These results are in concordance with our findings where GERD symptoms in the general population are usually less common in the east when compared to the western region.^{24,25} Helicobacter pylori infection most probably result in the condition called hypochlorhydria which is more commonly seen in individuals with atrophic gastritis and Patients affected by H. pylori were proved to be at less risk of developing GERD,²⁶ which is the same generally observed in Japan with high prevalence of H. pylori infection. Moreover, several reports showed an increase in the trend of GERD in Asian countries over the recent years.^{24,25} Although it has been believed that the low acid secretion would be related mostly with a lower prevalence of GERD in the Far Eastern region. Kinoshita and colleagues (1997) briefed that gastric acid secretion in Japan is greatly rising in both H. pylori-positive and negative individuals. Actually, the decreasing prevalence of H. pylori infection was seen in many countries^{27,28,29} as well as in Japan.³⁰

On the other hand, there have been many researches that have showed a close relation between GERD symptoms and chronic

cough.^{18,19,20} And several possible mechanisms were also explained underlying a relation between GERD and respiratory symptoms. Two mechanisms that have been postulated through which GERD may induce cough. They are micro-aspiration of gastric refluxate into the lung causing an exudative mucosal secretion and secondly, a vagally mediated distal oesophageal-tracheobronchial reflex which ultimately leads to bronchospasm.³¹ The foregut and the respiratory tract have more common embryological origins and share the same number of reflexes. The existence of a vagally mediated esophageal-tracheobronchial reflex could possibly explain the reason behind worsening of asthmatic condition after a large meal.³² Micro-aspiration has also postulated as a cause of GERD induced bronchospasm. In guinea pig model, acid perfusion of the oesophagus has caused neurally mediated airway inflammation of the bronchus.³³ The intimate mechanisms of acid-induced airway obstruction are majorly dependent on the activation of capsaicin-sensitive sensory nerves with the subsequent release of tachykinins which modulate wide area of airway dysfunction.³³ The study carried out by Wilson and colleagues (1987) observed direct proof that ingestion of 200 mL of 0.1 N HCl increased bronchial activity. Thus, the heightened bronchial reactivity, micro-aspiration and a vagally mediated reflex mechanism are the reported possible pathways in the earlier researches.

The increased respiratory effort and repeated cough augment the abdominal pressure which facilitates the retrograde movement of all the gastric contents.³⁴ Changes associated with the lung volume may change the relationship between the diaphragm and lower oesophageal sphincter (LES) that is the ring muscles disrupting the normal physiological activity.⁷ The effect of asthmatic medications as well as the negative intrathoracic pressure may be produced during the asthma attacks which may overcome the protective nature of the LES, resulting in increased GERD signs and symptoms.²⁰ Theophylline which is a bronchodilator, has been effectively shown to induce the gastric acid secretion and lower the LES pressure.³⁵ Unavoidable exposure to small amounts of acid has been documented to be resulted in the impaired laryngopharyngeal sensitivity and thereby potentially increasing the risk of aspiration.³⁵ Using prolonged oesophageal pH monitoring, persistent cough without obvious pulmonary aetiology was most likely to be associated with the episodes asymptomatic gastroesophageal reflux.³⁴ Similarly, cough due to any reason can precipitate gastroesophageal reflux.³¹ Based on these, the present study was done to evaluate the relationship between GERD symptoms and acute cough was postulated. Similarly, to the results observed previous studies,^{18,19,20} patients with respiratory symptoms developed the symptoms of GERD more frequently than patients without respiratory symptoms which reported a statistical significance in the present study. Although the GERD prevalence is significantly higher in patients with non-acute cough than in those with acute cough since there was no significant difference. This is believed to be that even acute cough can cause an increase in intra-abdominal pressure which indirectly might promote gastric contents movements into the oesophagus. It seems falsely that GERD might cause acute cough since GERD is a chronic disease. Cough induced by GERD should be prolonged, persistent and chronic.

Sometimes few patients complain about having persistent cough following the symptoms of an upper respiratory tract infection in the routine clinical practice. When cough has been reported to be present for at least 3 weeks, but not more than 8 weeks, it is considered as a diagnosis of postinfectious cough.³⁶

The frequency of postinfectious cough increases up to 25% to 50%³⁶ and gastroesophageal reflux is thought to be one of its possible mechanisms which suggests that medical treatment of acid reflux in acute phase of cough might reduce the postinfectious cough even though the pathogenesis is often multifactorial usually.

CONCLUSION

To conclude, patients with respiratory symptoms are at a significantly increased risk of developing GERD. There was no observable difference in GERD prevalence between the patients with acute and nonacute cough which suggests that the development of GERD is commonly associated with the presence of respiratory diseases without the development of respiratory symptoms. It is more important that the association between GERD and acute cough could be more vastly recognized by the primary care physicians.

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