



RESEARCH ARTICLE

PREVALENCE AND SEVERITY OF BRONCHIAL ASTHMA IN GERD PATIENTS – A RETROSPECTIVE STUDY IN RESIDENT EXPAT WORKERS COHORT OF UNITED ARAB EMIRATES

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ARTICLE INFO

Article History:

Received 18th May, 2024
Received in revised form
19th June, 2024
Accepted 25th July, 2024
Published online 30th August, 2024

Key words:

GERD, Asthma, Allergic Respiratory Disorders.

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ABSTRACT

Background: A complex bi-directional relationship has been observed between Bronchial Asthma (BA) and Gastro-esophageal reflux disease (GERD). Both these diseases are known to aggravate each other and management of one is necessary for the control of the other. Despite increasing incidence and prevalence of both diseases in the United Arab Emirates (UAE) there is paucity of data from the region on this topic. **Aim:** To evaluate the prevalence and severity of bronchial asthma and other allergic respiratory disorders in patients with GERD. **Materials and Methods:** Study was conducted at Lifecare Hospital, Abu Dhabi in the Department of Gastroenterology in association with the department of Pulmonology and Family medicine. Subjects included 150 cases of gastro esophageal reflux disease (GERD) who had symptoms of bronchial asthma and other respiratory disorders like chronic cough, chronic rhinosinusitis and Allergic bronchitis. 150 cases of Functional dyspepsia served as controls. **Results:** The study revealed that diagnosis of Bronchial Asthma was significantly more in GERD (37%) as compared to other respiratory allergic disorders (19%). The most common variant was mild persistent asthma (63%) followed by moderate persistent (22%) and severe (15%). Chronic cough was observed in (22%), Chronic Rhinosinusitis (18%) and allergic bronchitis (3%). Spirometry evidence of Bronchial asthma was found in 57% of the GERD as compared to 37.93% of the controls. This difference was found to be statistically significant. **Conclusion:** The study showed that Bronchial asthma was significantly more common in GERD as compared to the controls with Functional Dyspepsia. Other Allergic respiratory disorders were also more common in GERD as against controls. Peripheral Eosinophilia was more common in patients with GERD and bronchial asthma, chronic cough and CRS compared to controls suggesting that GERD patients with eosinophilia should be evaluated for other allergic disorders.

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Citation: Sengupta Diptendu, Agrawal Anup Kumar, Bhattacharjee Pranjal and Kumar Mahesh. 2024. "Prevalence and Severity of Bronchial Asthma in GERD Patients – A Retrospective study in Resident expat workers cohort of United Arab Emirates". *International Journal of Current Research*, 16, (08), 29552-29555.

INTRODUCTION

Gastro-oesophageal reflux disease (GERD) is an extremely common clinical problem usually manifested by heartburn and acid regurgitation. These symptoms occur daily in up to 10% of population and intermittently in 15% of otherwise healthy individuals [1]. Apart from typical manifestations, patients with GERD may have other extra-oesophageal manifestations many of which are related to the respiratory tract [2]. Gastroesophageal reflux disease (GERD) is a potential trigger in many but not all asthmatics. [2] Although GERD may be a trigger in an individual asthmatic, GERD therapy does not "cure" asthma. In essence treatment of GERD in asthmatics treats a potential contributing condition, not asthma itself. This fact highlights that interactions between the two disease states are very complex and asthma outcome with GERD therapy are difficult to interpret. Asthma is very heterogeneous over time in individual asthmatics and is heterogeneous in different asthmatics.

There are three potential mechanisms whereby acid refluxing into the oesophagus induces asthma. These include a vagal mediated reflex, heightened bronchial reactivity and micro-aspiration of gastric acid resulting in bronchoconstriction [3]. On the other hand, physiological alterations in asthma such as increased pressure gradient between thorax and abdomen and flattening of the diaphragm due to hyperinflation and air trapping may potentially impair the anti-reflux barrier and promote gastro-oesophageal reflux disease [3]. Besides, bronchodilator medications particularly Beta-Agonists increase gastric acid secretion and decrease lower esophageal sphincter pressure and hence promote gastro esophageal reflux, however, there is debate about these findings [3]. GERD may even cause direct insult to the upper respiratory tract mucosa via reflux of gastric acid thus aggravating other allergic respiratory disorders like cough, bronchitis and rhino sinusitis [4,5]

Need for this study: The association between gastro esophageal reflux disease and other allergic respiratory disorders like asthma, chronic rhino-sinusitis and allergic bronchitis has not been studied in UAE.

- The primary goal of this study was to evaluate the prevalence of BA in patients with endoscopically documented reflux esophagitis (EDRE);
- The secondary goal was to evaluate other allergic respiratory disorders (for example chronic cough, Allergic Bronchitis and chronic rhinosinusitis) in subjects with EDRE. This may facilitate identification of methods and strategies for early diagnosis or prevention of disease and decreasing its burden.

Aim: To retrospectively evaluate the prevalence and severity of Bronchial Asthma and other allergic respiratory disorders in patients with GERD.

MATERIALS AND METHODS

The study was conducted at Lifecare Hospital, Abu Dhabi in the Gastroenterology department in association with departments of pulmonary medicine and Family medicine. Data of 300 patients from June 2023- December2023was analyzed. Lifecare hospital is a secondary care facility located in the worker’s village and caters exclusively to male expat worker population most of whom have difficult outdoor work conditions with frequent exposure to dust, sand and smoke. Study subjects were 150 cases of GERD who had associated other respiratory disorders like chronic cough, chronic rhino sinusitis and Allergic bronchitis. 150 cases of Functional dyspepsia served as controls.

RESULTS

- Group A comprised 150 patients with GERD (all male patients) with mean age of 45.1 ± 8.7 yr.
- Group B comprised 150 patients without esophagitis but with positive endoscopic examination for other pathology (all male), with mean age 46.3 ± 9.7 years
- No significant differences of BMI values (kg/m2), gender, or age were observed in the groups.

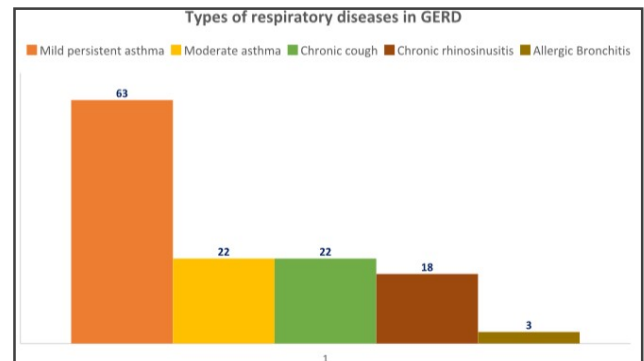
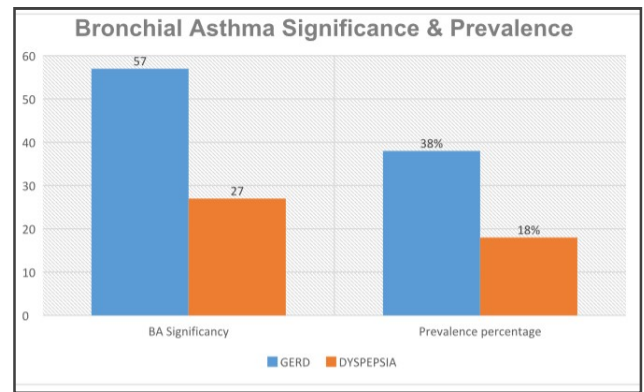
Table 1. Baseline characteristics of the patients and results of their pulmonary function tests

Sl no	Table 1	Group A Value	Group B Value
1	Basal FEV1 value averaged	91.8 ± 11.2	93.7 ± 11.2
2	Basal FVC value averaged	94.8 ± 10.1	97.2 ± 10.4
3	Basal PEF value averaged	93.8 ± 12.8	94.4 ± 12.7

Table 2. Prevalence of asthmatic disease

Group A	Group B
30% (with EDRE)	10% (without esophagitis, but positive endoscopic examination for other pathologies), yielding an odds ratio (OR) of 2.57 (IC = 0.75-10.25).

In the study group of GERD 63% were having mild asthma while 22% and 15% were found to have moderate and severe asthma respectively.



The study documented significant associations between Reflux esophagitis and Bronchial Asthma (p < 0.01) and between Reflux esophagitis and chronic cough (p <0.05). No statistically significant associations were found between esophagitis and other respiratory symptoms that were considered (Allergic Bronchitis and chronic Rhinosinusitis)

DISCUSSION

Gastroesophageal reflux disease (GERD), the spontaneous retrograde passage of gastric contents into the esophagus, represents a physiological event that may occur in healthy subjects. Many individuals with reflux symptoms are free from respiratory symptoms, while others report persistent respiratory symptoms, such as cough (mostly nocturnal) and hoarseness [2,4]. Studies on this subject are quite definite about a significant role of GERD in the induction of asthma [3]. Many of the published reports have evaluated the prevalence of GERD in patients treated with bronchodilator therapies (theophylline, inhaled and oral corticosteroids, long-acting and short-acting β-stimulating receptor drugs). The presence of GERD was based on GERD questionnaire and Esophagogastroduodenoscopy (EGD) findings, a diagnostic method with limited sensitivity and specificity [6]. In accordance with other reports, in the present study the prevalence of BA in patients with esophagitis (group A) was higher than in the controls (group B). However, the prevalence of BA in patients with esophagitis was less than that reported in other studies [18]. This finding probably reflects the restrictive selection criteria. Unlike other studies, the patients enrolled in this study were not receiving treatments for BA or other pathologies, which may influence the lower esophageal sphincter (LES) tone. Asthma medications may be a promoting factor for GERD in asthmatic subjects. Although the number of patients is small, the results support the evidence that subjects with EDRE have higher prevalence of BA than subjects without EDRE. The association cannot, however, establish a cause-effect relationship.

Table 3. Results of the FEV1, FVC, and PEF tests were reported as % of predicted values

Function Tests	Group A	Group B	Prevalence of Asthmatic Disease
FEV1%	91.8 ± 11.2	93.7 ± 11.2	30% more in group A
FVC%	94.8 ± 10.1	97.2 ± 10.4	30% more in group A
PEF%	93.8 ± 12.8	94.4 ± 12.7	30% more in group A
Blood eosinophils%	0.46 ± .005	0.20 ± .02	
*Mean±. SEM (structural equation modeling)			
Group Type	Members	Gender	Type of Disease
Group A	150	Male	GERD
Group B	150	Male	DYSPEPSIA

Group B Breakdown	85	Male	Acute gastritis with Dyspepsia
	49	Male	Chronic gastritis with Dyspepsia
	15	Male	Peptic ulcer with dyspepsia
	1	Male	Gastric carcinoma with Dyspepsia
Type of Disease	BA Significancy in Patients	Prevalence Percentage	
GERD	57	38%	
Dyspepsia without esophagitis	27	18%	
Type of Asthma	Percentage in GERD		
Mild Persistent Asthma	63%		
Moderate Persistent	22%		
Chronic Cough	22%		
Chronic Rhinosinusitis	18%		
Allergic Bronchi0s	3%		
An FEV1 test measures your ability to expel air from your lungs FVC tests is the amount of air that an individual is able to forcibly exhale from his / her lungs after taking the deepest breath they can. Peak flow measurement is a quick test to measure air flowing out of the lungs.			

The association that GERD may contribute to the pathogenesis of BA by disrupting esophageal mucosal integrity, promoting trans-epithelial allergen exposure and subsequent TH2 immune responses [10,11] is difficult to explain because it involves two physiological systems. Possible mechanisms that have been proposed for this are: (a) a generalized common smooth muscle disorder of the bronchial and gastrointestinal systems [9], (b) a complex neuromuscular disorder [12], and (c) involvement of inflammatory mediators that cause respiratory and gastrointestinal symptoms [13]. The prevalence of respiratory or other extra-esophageal manifestations of GERD remains unknown, however, because in any given patient it is difficult to decide if GERD is causing the extra-esophageal condition or if the two conditions coexist independently. In our study, pulmonary functions were unaltered in both groups of patients. Although gastroesophageal reflux disease (GERD) with esophagitis causes asthma symptoms, it has minimal effects on pulmonary function. Data in the literature suggest a strong association between GERD and asthma, and indicate that GERD worsens the asthma symptoms without affecting indices of pulmonary function [14]. GERD has practical importance in respect to the recent guidelines for the diagnosis and treatment of asthma [15]. We also observed a significant relationship between esophagitis and chronic cough in group A compared to the control group B.

Study Limitations: Small study population and Retrospective nature of study. Non-availability of pH monitoring and impedance manometry, gold standard for GERD diagnosis.

Conflict of interest statement: The authors declare no conflict of interest.

Ethical approval: This is a retrospective study and anonymized data was retrieved from patient medical records following due consent.

CONCLUSION

The presence of Asthma should be considered in GERD patients who suffer from chronic cough, shortness of breath, those with frequent episodes of nocturnal choking, and those with disease that is insufficiently controlled. Multicentric and placebo-controlled studies are needed to evaluate asthma symptoms, therapy, outcome, costs and their influence on quality of life in patients with EDRE. Peripheral Eosinophilia being more common in patients with GERD and bronchial asthma, chronic cough and CRS compared to controls points toward the fact that GERD patients with eosinophilia should be evaluated for other allergic disorders.

REFERENCES

1. Nebel OT, Fomes MF, Castell DO. 1976. Symptoms of gastro esophageal reflux, incidence and precipitating factors. *Dig Dis.*, 21:955-59.
2. Traube M. 1990. The spectrum of the symptoms and presentation of gastroesophageal reflux disease. *Gastroenterol Clin North Am.*, 19:609-16.
3. Harding SM, Richter JE. 1997. The role of gastro-oesophageal reflux in chronic cough and asthma. *Chest.*, 111:1389-402.
4. Contencin P, Narcy P. 1991. Nasopharyngeal pH monitoring in infants and children with chronic

- rhinopharyngitis. *Int J Pediatr Otorhinolaryngol.* 22:249–256. [PubMed: 1752736]
5. El-Serag HB, Gilger M, Kuebeler M, Rabeneck L. 2001. Extraesophageal associations of gastroesophageal reflux disease in children without neurologic defects. *Gastroenterology.* 121:1294–1299. [PubMed: 11729108]
 6. Burney PGJ, Laitinen LA, Perdrizet S, Huckauf H, Tatters0eld AE, Chinn S. *et al.* 1989. Validity and repeatability of the IUATLD (1984) Bronchial Symptoms Questionnaire: an international comparison. *Eur Respir J.*, 2:940-45.
 7. Rothenberg S, Cowles R. 2012. The effects of laparoscopic Nissen fundoplication on patients with severe gastro-oesophageal reflux disease and steroid-dependent asthma. *J Pediatr Surg.*, 47:1101-04.
 8. Perrin-Fayolle M. 1980. Asthma and gastro-oesophageal reflux. Results of a survey of over 150 cases [authors' translation]. *Poumon Coeur.*, 36:225–30.
 9. Kiljander TO, Lai0nen JO. 2004. The prevalence of gastro-oesophageal reflux disease in adult asthma0cs. *Chest.* 126(5):1490–94.
 10. Field SK, Underwood M, Brant R, *et al.* 1996. Prevalence of gastroesophageal reflux symptoms in asthma. *Chest.*, 109:316–22.
 11. Sontag SJ, O'Connell SA, Miller T, Bernsen M, Seidel J. 2004. Asthmatics have more nocturnal gasping and reflux symptoms than non-asthmatics, and they are related to night-time eating. *Am J Gastroenterol.*, 789–96.
 12. Sontag SJ, *et al.* 1992. Prevalence of esophagitis in asthmatics. *Gut.* 33:872–76.
 13. Mays EE. 1976. Intrinsic asthma in adults: association with gastro-esophageal reflux. *JAMA.*236:2626-28.
 14. Sontag SJ, O'Connell S, Khandelwal S, *et al.*, 1990. Most asthmatics have gastroesophageal reflux with or without bronchodilator therapy. *Gastroenterology.* 99:613-20.
 15. Irwin RS, Curley FJ, French CL. 1993. Difficult to control asthma: contributing factors and outcome of a systematic management protocol. *Chest.*, 103:1662-69.
 16. Harding SM, Guzzo MR, Richter JE. 2000. The prevalence of gastroesophageal reflux in asthma patients without reflux symptoms. *Am J Respir Crit Care Med.*, 162:34- 39.
 17. Sandur V, Muruges M, Banait V, Rathi PM, Bha0a SJ, Joshi JM, *et al.*, 2014. Prevalence of gastroesophageal reflux disease in patients with difficult to control asthma and effect of proton pump inhibitor therapy on asthma symptoms, reflux symptoms, pulmonary function and requirement for asthma medications. *JPGM.*, 60:282-86.
 18. G. Riccioni, R. Della Vecchia, V. Menna, C. Di Ilio, P. Con0 *et al.* 2004. Prevalence of Bronchial Asthma in Patients with Endoscopically-Documented Esophagitis ; *Annals of Clinical & Laboratory Science*, vol. 34, no. 1.
 19. Gabriele Di Lorenzo, Pasquale Mansueto, Maria Esposito-Pellitteri *et al.* 2007. The characteristics of different diagnostic tests in adult mild asthmatic patients: Comparison with patients with asthma-like symptoms by gastro-oesophageal reflux *Respiratory Medicine* 101, 1455–1461 <https://doi.org/10.1016/j.rmed.2007.01.014>
