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Study of IPF among patients with gastro-esophageal reflux disease

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ABSTRACT

Objective: To study the incidence of IPF in patients with gastro-esophageal reflux disease and to show the correlation between them.
Background: Interstitial lung diseases are common complication in patients with gastro-esophageal reflux disease due to repeated aspiration of gastric acid.
Patients and method: The present study was carried out in Chest Department Menoufia University hospital on 50 patients (33 male (66%), 17 female (34%)) diagnosed as having sever GERD according to Los Anglos classification (grade C and D). They were selected from Tropical Department, Menoufia University with no past history of pulmonary diseases, collagen vascular diseases, chronic liver diseases and ascites were enrolled in this study. All the patients were subjected to complete medical history, examination, laboratory investigations, upper gastro-intestinal endoscopy, radiological investigation (plain chest X-ray and chest HRCT) and pulmonary function tests (spirometry and DLCO).
Results: When the severity of GERD increased the mean value of percentage of DLCO decrease (patients with GERD grade D had the lowest DLCO mean 75.4 ± 26.8). There was statistically significant negative correlation between the grades of GERD and DLCO. There was a highly statistical significant difference and significant positive correlation as regards grades of GERD in relation to chest HRCT results ($p < 0.001$) (when the grade of GERD increase the degree of fibrosis in chest HRCT increases).
Conclusion: The present data support and extend the concept of a high incidence of pulmonary fibrosis in GERD patients even in those patients free of respiratory symptoms.

Introduction

Idiopathic pulmonary fibrosis (IPF) is a chronic and ultimately fatal disease characterized by a progressive decline in lung function. The term pulmonary fibrosis means scarring of lung tissue and is the cause of worsening dyspnea, Fibrosis is usually associated with a poor prognosis [1]. The cause of the initiating alveolar epithelial injury is unknown, but postulated mechanisms include immunological, microbial, or chemical injury, including aspirated gastric refluxate. Reflux is promoted by low basal pressure in the lower oesophageal sphincter and frequent relaxations, potentiated by hiatus hernia or oesophageal dysmotility [2]. In susceptible individuals, repeated microaspiration of gastric refluxate may contribute to the pathogenesis of IPF. Microaspiration of nonacid or gaseous refluxate is poorly detected by current tests for gastroesophageal reflux which were developed for investigating oesophageal symptoms. Further studies using pharyngeal pH probes, high-resolution impedance manometry, and measurement of pepsin in the lung should clarify the impact of reflux and microaspiration in the pathogenesis of IPF, Recently, a strong association between gastroesophageal reflux and idiopathic pulmonary fibrosis has been reported [3].

Patients and method

This prospective study carried out in Chest Department Menoufia University Hospital between February 2015 and April 2016 on 50 patients (33 male (66%), 17 female (34%) diagnosed as having sever GERD according to Los Anglos classification (grade C and D) [4]. They were selected from Tropical Medicine Department

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Menoufia University Hospital. An informed consent was taken from the patients.

After exclusion of chest diseases, collagen vascular diseases, chronic liver diseases and ascites. All patients in the study were subjected to the following:

Complete history taking.

General and local chest and abdominal examination.

Laboratory investigations: including liver function tests, kidney function tests, complete blood count (CBC), collagen markers and ABGs.

Upper GI endoscopy: using (Olympus CV240, Japan, Tokyo).

Radiological Investigations in the form of: Chest X-ray (postero-anterior and lateral views) and High resolution computed tomography (HRCT) chest in the prone position.

Pulmonary Function Tests: Using (Quark PFT-DLco module 3, Rome, Italy). Including spirometry]slow vital capacity (SVC), forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), FEV1/FVC, forced expiratory flow 25-75 (FEF25-75) and maximal voluntary ventilation (MVV) and DLCO (diffusing lung capacity of carbon monoxide).

Results

This study was carried out on 50 patients with mean age 50.6 ± 6.12 ranged from 40 to 62. They were 33 males (66%) and 17 females (34%). As regards special habits, there were 34 patients were non smoker (68%), 6 patients were smoker (12%) and 10 patients were ex-smoker (20%). As regard pulmonary function tests, The mean value of percentage of predicted FVC were 84.5 ± 32.7 ranged from 49 to 163, predicted FEV1 were 81.0 ± 27.4 ranged from 43 to 137, predicted FEV1/FVC were 79.7 ± 12.1 ranged from 52 to 99, predicted FEF25-75 were 74.3 ± 24 ranged from 30 to 121, and of MVV were 62.8 ± 17.1 ranged from 19 to 85, As regards upper gastro-intestinal endoscopy, there were 10 patients with GERD grade D (20%) and 40 patients with GERD grade C (80%), As regards chest X-ray, there were 13 patients with reticular pattern (26%) and 37 patients with normal chest X-ray (74%), As regards chest HRCT, there were 29 patients with normal chest HRCT (58%) and 21 patients with fibrotic pattern coinciding with IPF in chest HRCT (42%), As regards DLCO results, there were 26 patients with normal DLCO (52%), 14 patients with moderate restrictive function (26%) and 10 patients with severe restrictive function (16%) as shown in Table 1.

Table 1
Characteristics of patients.

Investigations	±SD	Range
Pulmonary function tests		
FVC	84.5 ± 32.7	49–163
FEV1	81.0 ± 27.4	43–137
FEV1/FVC	79.7 ± 12.1	52–99
FEF25-75	74.3 ± 24.0	30–121
MVV	62.8 ± 17.1	19–85
Studied variable	No	%
Upper GI endoscope		
GERD grade D	10	20
GERD grade C	40	80
Chest X ray		
Reticular pattern	13	26
Normal	37	74
HRCT chest		
Normal	29	58
Intersitial lung disease	21	42
DLCO		
Normal DLCO	26	52
Moderate restrictive	14	26
Sever restrictive	10	16

When the severity of GERD increase the mean value of percentage of DLCO decreased (patients with GERD grade D had the lowest DLCO mean 75.4 ± 26.8) (Table 2).

There was statistically significant negative correlation between grades of GERD and DLCO among studied patients (Fig. 1).

When the grade of GERD increases the degree fibrosis in chest HRCT increase. There was highly statistical significant difference as regard chest HRCT results and DLCO results among studied patients (interstitial lung disease pattern in HRCT was highly significant in patients with moderate and sever restrictive function). (Table 3).

There was statistically significant positive correlation between chest HRCT and grades of GERD (Fig. 2).

Discussion

Idiopathic pulmonary fibrosis (IPF) is a chronic and ultimately fatal disease characterized by a progressive decline in lung function. The term pulmonary fibrosis means scarring of lung tissue and is the cause of worsening dyspnea, Fibrosis is usually associated with a poor prognosis [1] (Figs. 3 and 4).

Gribbin et al., found that the cause of the initiating alveolar epithelial injury is unknown, but postulated mechanisms include immunological, microbial, or chemical injury, including aspirated gastric refluxate. Reflux is promoted by low basal pressure in the lower oesophageal sphincter and frequent relaxations, potentiated by hiatus hernia or oesophageal dysmotility [2].

Microaspiration of nonacid or gaseous refluxate is poorly detected by current tests for gastroesophageal reflux which were developed for investigating oesophageal symptoms. Further studies using pharyngeal pH probes, high-resolution impedance manometry, and measurement of pepsin in the lung should clarify the impact of reflux and microaspiration in the pathogenesis of IPF as said by Simpson et al. [3]. Recently, a strong association between gastroesophageal reflux and idiopathic pulmonary fibrosis has been reported.

Hence the aim of this study was to study the relation between IPF and gastro-esophageal reflux disease and to show the correlation between them.

Naidich et al., found that Chest HRCT has been proposed and accepted as the standard non-invasive method of diagnosing and following IPF in patients with GERD [5].

In susceptible individuals, repeated microaspiration of gastric refluxate may contribute to the pathogenesis of ILD [6]. Age of the patients was significantly high in those with severely decreased DLCO function. Moderately and severely decreased DLCO were significantly higher in males than females. These results are in agreement with Gribbin et al., [2] who reported that interstitial lung diseases were significantly higher in elderly patients. On the other hand, Everett et al., [7] found that there was no relation between age of the patients and development of interstitial lung diseases in patients with GERD.

In this research when the severity of GERD increased the mean value of percentage of DLCO decreased. These results agreed with study done by Eman et al., [8] found that there were statistically significant differences between cases with different grades of reflux as regards DLCO. The grade of reflux was the only independent factor affecting DLCO. On the other hand, Miller et al., [9] reported that there were no relations between grades of GERD and DLCO. These results could be explained by variation of lung affection in patients with GERD either studied patients was with or without pulmonary manifestation and different number of patients in each study.

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