Original Article

Co-morbidities in 99 COPD patients: A case series from Syria

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ABSTRACT

Objectives: To assess the most frequent co-morbidities in chronic obstructive pulmonary disease (COPD) patients. **Patients and Methods:** We studied 99 patients, including 72 males and 67 smokers, presented to our University Hospital in Lattakia, Syria in 2012, with a mean age of 63 years. **Results**: Overall, there were 61% hypertension, 37% ischemic heart disease, 25% diabetes, 45% anemia, and 47% pulmonary hypertension. Other diseases were less significant. Patients who had more severe Global Initiative for Chronic Obstructive Lung Disease stage had a greater number of co-morbidities. **Conclusions:** We recommend as a general practice, to assess cardiac co-morbidities, hypertension, and other co-morbidities in all COPD patients and vice versa. We also recommend performing spirometry in smokers complaining of chronic cough, sputum, or dyspnea for early diagnosis of COPD.

Key words: chronic obstructive pulmonary diseases, co-morbidities, smoking, oxidative stress, inflammation, FEV1

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INTRODUCTION

Chronic obstructive pulmonary disease(COPD) represents one of the highest economic and social burdens among chronic diseases [1]. Delayed diagnosis of COPD affects prevalence and mortality reports [1,2], and there were reports from the World Health Organization (WHO) expecting it to become the third cause of death in 2020. Co-morbidities of COPD play a role in prognosis and mortality, especially cardiac co-morbidity, which is often underestimated [1]. Previous studies mentioned that hypertension, heart failure and ischemic heart diseases, anemia and osteoporosis, anxiety and depression, cachexia, and myopathy are noticed more frequently in COPD patients than in the general population [1,3,4,5].

Tobacco smoking is considered as a major risk factor for cardiac diseases and COPD. However, in COPD, oxidative stress and the consequent release of humeral inflammatory mediators, not only in the lungs but also in the systemic circulation, play an additional role in these co-morbidities [6,7]. In this article, we present our study on co-morbidities and COPD.

MATERIALS AND METHODS

Patients with COPD in 2012, admitted to Lattakia University Hospital, were assessed for co-morbidities. All patients gave their consent to participate in this study.

COPD diagnoses were confirmed by spirometry according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria [forced expiratory volume in 1 second/forced vital capacity (FEV1/FVC) <70% after 4 puffs of bronchodilator]. The test was performed in respect of the ATS/ERS guidelines [8,9]. Accordingly the patients were classified depending on the FEV1 value into four stages according to GOLD: mild COPD (FEV1 ≥ 80% predicted), moderate COPD (FEV1 50–80% predicted), severe COPD (FEV1 30–50% predicted), and very severe COPD (FEV1 < 30% predicted) [1]. Blood gases were also measured.

A questionnaire was distributed to all patients screening for cough, sputum, and dyspnea according to Modified Medical Research Council Questionnaire (mMRC scale), ischemic heart disease, smoking history, and co-morbidities.

Our clinical investigation consisted of measuring blood pressure (considered high if >14 for systolic pressure and >9 for diastolic pressure) by electrocardiograph (ECG), and Cardiac Echo-Doppler. The blood investigation consisted of hemoglobin (Hb), creatinine, fasting blood glucose, and C-reactive protein (CRP). We considered anemia when Hg < 12 g/dL and renal failure when creatinine > 1.2 mg/dL. We also measured bone mineral density for osteoporosis. When lung cancer was suspected, bronchoscopy, fine needle biopsy, or if necessary open lung biopsy was performed to confirm diagnosis.

Analysis for associations was performed by Stata Logiciel. Chi square or Fisher test was performed for association. *P* was considered significant when <0.05.

RESULTS

Our results are presented in tables. The main characteristics of our population are presented in Table 1: 72 of our 99 patients are males; 67% smokers with mean quantity smoked 57 ± 33.77 packs/year. The patient age was 63.17 ± 10.74 years, mean FEV1 and SD 0.52 ± 16 L/sec. Only 4% were stage I COPD by GOLD (FEV1≥ 80%), suggesting a high level of severity and probably reflecting the delay in diagnosis; especially and surprisingly, 38% have respiratory failure (PaO2 < 60 mmgh).

CRP = 52.34 mg/L±49 (the normal is 6), which is very high reflecting the systemic inflammation.

Co-morbidities in the study population are presented in Table 2. The most prevalent co-morbidities were cardiac disorders, with heart failure in 47%, ischemic heart diseases in 37.37%, pulmonary hypertension in 47.47%, and hypertension in 61% of all subjects. Other co-morbidities were less frequent.

Table 1: Characteristics of our population of COPD patients (*n* = 99)

Age (mean and SD)	63.17 ± 10.74 years
Gender	72% male
FEV1 (mean and SD)	0.52 L/s ±16
FEV1 GOLD Stage*	I (4%), II (42%), III (39%), IV (24%)
FEV1/FVC after bronchodilators (mean and SD)	0.59 ± 0.10
Smokers	67%
Pack/year (mean and SD)	57 ± 33.77
Cough	72%
Dyspnea mMRC scale**	0 (6%), 1 (22%), 2 (33%), 3 (24%), 4 (14%)
Respiratory failure (PO2 < 60 mmHg)	38%
CRP (mean and SD)	52.34 mg/L ± 49
Hb	12.42 ± 2.11 g/dL
Renal failure (*n*)	13 (13.13%)
Glycemia	115 ± 30 mg/dL

*Degree of airflow limitation according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD); ** Modified Medical Research Council (mMRC) Questionnaire for assessing the severity of breathlessness

Table 2 : Percentage of co-morbidities in COPD patients (*n* = 99)

Hypertension	61.62%
Diabetes	25.25%
Heart failure	47%
Ischemic heart diseases	37.37%
Atrial fibrillation	13.13%
Anemia	44%
Pulmonary hypertension	47.47%
Cancer	20%
Osteoporosis	25%

Note: 88% have more than one co-morbidities. COPD: chronic obstructive pulmonary disease.

Table 3 represents the number of co-morbidities according to the GOLD stage (based on FEV1% predicted after bronchodilators): the frequency of diabetes, heart failure, and pulmonary hypertension is significantly associated with GOLD stage of FEV1 ($P = 0.01$ for diabetes, 0.003 for heart failure, and 0.0001 for pulmonary hypertension, respectively).

As shown by Table 2, over 88% of patients have more than one condition of co-morbidities. The number of co-morbidities >3 is significantly associated with the GOLD degree of severity based on FEV1 value (Table 3; $P = 0.0001$).

DISCUSSION

COPD is characterized by persistent inflammation that is usually progressive and associated with enhanced chronic inflammatory response in airway and the lung tissues in response to noxious particles and gases (cigarette smoke). Co-morbidities contribute to the overall severity of symptoms in individual patients. The chronic and progressive airway limitation characteristic of COPD is caused by lung inflammation leading to small airway fibrosis, air trapping, and the resulting breathlessness [1].

Bearing in mind the suffering of Syrians currently, it is our duty to improve the clinical services in Syria, including gaining a better understanding of the integrated management of co-morbidities in all COPD patients, especially cardiac ones, and vice versa to screen for non-diagnosed COPD in cardiac patients exposed to risk factors (smokers). We believe that this is the first report emerging from Syria concerning COPD and its co-morbidities.

Our main results are the significant association of COPD with heart failure and pulmonary hypertension; hypertension is present in 61%.

Co-morbidities could be explained by systemic inflammation. The chronic inflammation in the respiratory tract of COPD patients is an abnormal exaggerated response to noxious particles and gases resulting from severe exposure to irritants like cigarette smoke. Oxidative stress plays a major role, and oxidants are released from inflammatory cells such as macrophages and neutrophils; these are present not only in the lungs, but also in systemic circulation, which could play a big role in the occurrence of co-morbidities [1,6,7].

Although risk factors are the same for these co-morbidities (smoking), these conditions are more prevalent in COPD patients than in the general population [1,3,4,5].

In a study from Spain, Almagro *et al.* highlighted in a multicenter study in 398 COPD patients, 11% females, and mean FEV1 < 43% that, hypertension is present in 55% and 61% in our series. Twenty seven percent have diabetes and 25.25% in our study. Forty seven percent in our study have heart failure and 27% in their study; 33% in their study have anemia and 44.9% in our study [3].

An American series studied 1003 patients in 2011 [4], and they found the prevalent co-morbidities, including hypertension (55%), depression (37%), and osteoporosis (28%).However, we did not determine depression in our study.

In a multicenter study published by the International Primary care Respiratory Group (IPCRG) in 2008 [5], the number of co-morbid conditions was 3.2 for patients with COPD [5]. In our results, 88% of patients have more than one co-morbidity, with more than three conditions associated with the GOLD degree of severity (Tables 2 and 3).

Comparing our results to the above-mentioned studies, cardiac co-morbidities and anemia are more prevalent in our population. Further research is needed to explain this issue.

Table 3: GOLD stage and co-morbidities

Co-morbidities	GOLD stage				*P* value
	Mild	Moderate	Severe	Very severe	
Hypertension	75%	47%	69%	75%	0.1
Diabetes	0%	11.9%	31%	46%	0.01
Heart failure	25%	31%	52%	75%	0.003
Ischemic heart diseases	25	38%	28%	50%	0.39
Pulmonary hypertension	0%	26%	55%	83%	0.0001
Cancer	1%	14%	18%	20%	0.15
Hospitalization	25%	33%	62%	83%	0.001
Number of Co-morbidities >3	1 (25%)	16 (38%)	27 (93%)	23(95%)	0.0001

GOLD: Global Initiative for Chronic Obstructive Lung Disease.

We also notice that the number of co-morbidities is positively associated with the GOLD stage of FEV1, which leads us to recommend spirometry in every person having risk factors (e.g., smoking) and complaining of chronic cough, sputum, or dyspnea. Early diagnosis is our ultimate tool to improve COPD care and prevent co-morbidities [1,2,10].

We should assess co-morbidities in all COPD patients and vice versa especially for cardiac co-morbidities. This is especially when we know that treating co-morbidities improves life expectancy [1,11].

As regards the limitations of our study, the number of patients in each category is limited (e.g., only 4 are stage IGOLD). Also we did not assess all co-morbidities (e.g., anxiety and depression, cachexia). For future research, we should first concentrate on how to implement co-morbidity assessment in all COPD patients and in all settings, especially in primary care. Second, we must work for early diagnosis, because our results showed higher co-morbidities in advanced stages of COPD.

In conclusion, although irreversible airflow limitation is the main characteristic of COPD, COPD is also a systemic disease causing co-morbidities. Screening all COPD patients for cardiac diseases, hypertension, osteoporosis, and other co-morbidities, and integrated management should be part of our daily practice [11].

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Conflict of Interest

None declared.

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