Egyptian Journal of Chest Diseases and Tuberculosis (2016) xxx, xxx–xxx

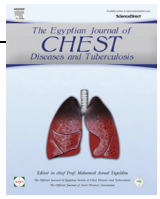
HOSTED BY

ELSEVIER

The Egyptian Society of Chest Diseases and Tuberculosis

Egyptian Journal of Chest Diseases and Tuberculosis

www.elsevier.com/locate/ejcdt
www.sciencedirect.com



Prevalence of concealed and overt chronic renal failure in patients with COPD

Abdelsadek H. Al-Aarag [a], Gehan F. Al-Mehy [a], Osama I. Mohammad [a,*], Rasha M. Hendy [a], Shymaa M. Tawfik [a], Mahmoud H. Imam [b]

[a] *Chest Department, Faculty of Medicine, Benha University, Egypt*
[b] *General Medicine Department, Faculty of Medicine, Benha University, Egypt*

Received 10 August 2016; accepted 8 September 2016

KEYWORDS

COPD;
Renal failure;
Comorbidities

Abstract *Aim:* To assess the prevalence of chronic renal failure (concealed and overt) in patients with COPD.

Patients and methods: This study was conducted on 150 patients who were classified into three groups: Group I: 67 patients with COPD, Group II: 33 COPD patients with co morbidities (diabetes mellitus, hypertension and or ischemic heart disease). Group III: (control group): 50 patients with other diseases such as diabetes mellitus, ischemic heart disease and or hypertension. All patients were subjected to: (1) Full history taking. (2) Complete clinical examination. (3) Anthropometric measurements (weight, height and body mass index). (4) Arterial oxygen saturation. (5) Radiological examination (Plain chest X-ray posterior–anterior view and Pelvi-abdominal ultrasound). (6) ECG and Echocardiography. (7) Spirometry. (8) Laboratory investigations (complete blood picture, erythrocyte sedimentation rate, Liver function tests, serum creatinine, blood urea and uric acid and GFR, total cholesterol, sodium, potassium and chloride concentration).

Results: In group I, there were 8 patients who had CRF (11.94%), 5 patients had overt CRF (7.46%) and 3 patients had concealed CRF (4.48%). In group II, there were 11 patients with CRF (33.33%), 6 patients had overt CRF (18.18%) and 5 patients had concealed CRF (15.15%). In group III, there were 9 patients having CRF (18%), 6 patients had overt CRF (12%) and 3patients had concealed CRF (6%). In COPD (group I and II) the overall prevalence of CRF was 19%.

Conclusion: CRF either concealed or overt may be associated with COPD patients and should be screened, not only by serum creatinine level but also by the estimated GFR to recognize the cases of concealed CRF who have low GFR despite normal serum creatinine level.

* Corresponding author.
E-mail address: osama.thorax@yahoo.com (O.I. Mohammad).

Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

http://dx.doi.org/10.1016/j.ejcdt.2016.09.002

Please cite this article in press as: A.H. Al-Aarag et al., Prevalence of concealed and overt chronic renal failure in patients with COPD, Egypt. J. Chest Dis. Tuberc. (2016), http://dx.doi.org/10.1016/j.ejcdt.2016.09.002

Introduction

COPD is associated with several comorbidities. But it is unknown to which extent it is associated with chronic renal failure [1]. Coronary artery disease, which is highly prevalent in patients with COPD, is associated with vascular kidney disease [2]. Furthermore, both nicotine and selected heavy metals, which are components of smoke, are risk factors for kidney disease. Thus, COPD is expected to be significantly associated with chronic renal failure [3]. Chronic renal failure rises in prevalence with age, and is frequently associated with chronic diseases, such as congestive heart failure and diabetes mellitus. When chronic renal failure presents as comorbidity, it carries negative prognostic implication and impacts the therapeutic strategy [4]. In elderly patients, who are the majority of those suffering from chronic disabling conditions, chronic renal failure is often associated with normal serum creatinine concentration, a condition known as unrecognized or concealed chronic renal failure [5]. In fact, a variable, yet consistent, proportion of patients with COPD have a reduced muscular mass and thus, serum creatinine might be falsely low as the result of decreased creatine release [6]

Aim of the work

The aim of this work was to assess the prevalence of concealed and overt chronic renal failure in patients with COPD.

Subjects and methods

This case control cross sectional study was conducted on 150 patients who were attendant in Benha University Hospitals chest and internal medicine outpatient clinics during the period from October 2013 to April 2015. They were classified into three groups: Group I: 67 patients with COPD. Group II: 33 COPD patients with co morbidities such as diabetes mellitus, hypertension and or ischemic heart disease. All COPD patients were diagnosed according to criteria of GOLD [7]. Group III: (control group): 50 patients with other chronic diseases as diabetes mellitus, ischemic heart disease and or hypertension, all of them were lifelong nonsmokers; they had no symptoms or signs suggestive of any chest diseases.

Exclusion criteria: Patients with diagnosis of cancer, regardless of disease activity, abnormal chest radiography other than that of COPD, Known immune deficiency state as aplastic anemia, leukemia and multiple myeloma, use of drugs which may affect serum creatinine levels or renal function test as ACEI, cyclosporine and chemotherapy drugs (cisplatin, carboplatin, methotrexate and mitomycin), patients with acute or chronic renal failure and on dialysis.

All patients were subjected to the following: (1) Full history taking including history of smoking (2) Complete clinical examination with special attention to manifestations of hyperinflation in the COPD group (increase the antero-posterior diameter, use of accessory muscles of respiration and distant heart sounds). (3) Anthropometric measurements (weight (kg), Height (m), BMI = Wt (kg\Ht (m^2) (4) Arterial oxygen saturation. (5) Radiological examination (Plain chest X-ray posterior-anterior view and Pelvi-abdominal ultrasound). (6) ECG and Echocardiography. (7) Spirometry: by using an automated flow-sensing spirometer (spirolab III Ver 4.3 SN 311860 (Italy)) all COPD patients included in the study performed prebronchodilator and postbronchodilator spirometry according to American Thoracic Society (ATS) criteria [8]. Separate measurements were made before and at least 15 min after two puffs of Salbutamol (200 mg) administered with a metered dose inhaler. Irreversible airway obstruction was defined as a postbronchodilator FEV1/FVC < 0.7 and postbronchodilator change in $FEV_1 < 12\%$ and FEV1 was used to further stage the disease: mild (GOLD stage I, FEV_1 predicted $\geqslant 80\%$), moderate (GOLD stage II, $50\% \leqslant FEV_1$ predicted $< 80\%$), severe (GOLD stage III, $30\% \leqslant FEV_1$ predicted $< 50\%$) and very severe (GOLD stage IV, FEV_1 predicted $< 30\%$ or $30\% \leqslant FEV_1$ predicted $< 50\%$ in the presence of corpulmonale or respiratory failure) [7]. (8) Laboratory investigations: Blood samples were taken for the following investigations:-Complete blood picture -Erythrocyte sedimentation rate (ESR). -Liver function tests: SGPT, SGOT, serum total protein and albumin concentrations. -Kidney function tests: serum creatinine, blood urea -Total cholesterol. -Sodium, potassium and chloride concentration.

9- The GFR was estimated using the Modification of Diet in Renal Disease (MDRD) Study Group equation:

$$170 \times [\text{serum creatinine}]^{-0.999} \times [\text{age}]^{-0.176} \times [\text{blood urea}]^{-0.170} \times [\text{serum albumin}]^{0.318} \times (0.762 \text{ for women}) \times (1.180 \text{ for African-American subjects}).$$ [9]

Patients were categorized according to their renal function as having normal renal function (GFR $\geqslant 60$ mL/min/1.73 m^2), concealed CRF (normal serum creatinine and GFR < 60 mL/min/1.73 m^2), or overt CRF (increased serum creatinine and GFR < 60 mL/min/1.73 m^2). The cutoff used for serum creatinine was 1.26 mg/dL in men and 1.04 mg/dL in women [9].

Statistical analysis

The clinical data were recorded on a report form. These data were tabulated and analyzed using the computer program SPSS (Statistical package for social science) version 16 to obtain: (1) Descriptive statistics were calculated for the data in the form of:- Mean and standard deviation for quantitative data, Frequency and distribution for qualitative data. (2) Analytical statistics: In the statistical comparison between the different groups, the significance of difference was tested using one of the following tests:- Student's *t*-test and Mann–Whitney test:- Used to compare mean of two groups of quantitative data of parametric and non-parametric respectively. Inter-group comparison of categorical data was performed by using chi square test (X2-value) and fisher exact test (FET). Degree of significance: p value < 0.05 was considered statistically significant (S), p value > 0.05 was considered statistically insignificant, p value < 0.01 was considered highly significant (HS) in all analyses.

Results: (Tables 1–8)

Distribution of the studied groups was shown in Table 1.

Group I included 67 patients, 53males (79.1%) and 14 females (20.9%), group II included 33 patients, 22 males

Please cite this article in press as: A.H. Al-Aarag et al., Prevalence of concealed and overt chronic renal failure in patients with COPD, Egypt. J. Chest Dis. Tuberc. (2016), http://dx.doi.org/10.1016/j.ejcdt.2016.09.002