ORIGINAL INVESTIGATION

Mood disorders in elderly patients hospitalized for acute exacerbation of COPD

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Chronic obstructive pulmonary disease (COPD) represents the most common cause of chronic respiratory failure and it is associated with several comorbidities such as depression.

Depression is about four times more frequent in elderly patients with COPD compared to peers who are not affected and its prevalence increases with the degree of disease severity.

The aim of our study was to assess mood and perception of the quality of life in elderly patients hospitalized for acute exacerbation of COPD. For this purpose 35 elderly patients (20 M and 15 F; average age 75.2 \pm 6.4 years) hospitalized for reactivation of COPD were examined; they were subjected to spirometry test for the calculation of FEV1 and to CAT and HAM-D.

Findings show that a greater severity of depressive symptoms is related to a greater severity of COPD exacerbations, disability associated with it and perceived by the patient, as well as a higher number of recovery days and annual acute exacerbations, in particular in female gender.

Key words: Depression, Elderly, COPD

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) represents the most common cause of chronic respiratory failure and it is associated with increasing disability, morbidity and mortality. In the United States, in fact, it is the fourth leading cause of death and the fifth cause of disability and according to World Health Organization (WHO) it will be the third leading cause of death by 2030, second only to cardiovascular diseases and cancer ¹. In Italy an estimate of the prevalence confirms that COPD affects a significant portion of the adult population, about 4.5%, with a gradual age-related increase up to 20% in the population aged 65 years or over ²³.

Depression is about four times more frequent in elderly patients with COPD compared to peers who are not

affected and its prevalence increases with the degree of disease severity.

The estimated prevalence of depression in patients with stable COPD ranges between 10% and 42%, between 19.5% and 50% in patients with exacerbations of COPD and up to 60% in patients on long-term oxygen therapy $^{4.5}$.

MATERIALS AND METHODS

The aim of our study was to assess mood and perception of the quality of life in elderly patients hospitalized for acute exacerbation of COPD, as several studies have shown that depression in adult patients is associated with a worse prognosis in terms of quality of life and life expectancy. It is also a predictor of hospital length of stay (LOS), hospital readmissions and use of health care resources.

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For this purpose 35 elderly patients (20 M and 15 F; average age 75.2 \pm 6.4 years) hospitalized for reactivation of COPD were examined.

The severity of exacerbations was assessed, during the first day of hospitalization, by spirometry ⁶; this test was performed to calculate the forced expiratory volume in one second (FEV₁) expressed as a percentage of predicted values for the patients of similar characteristics (sex, age and height).

COPD Assessment Test (CAT) 7 and Hamilton Rating Scale for Depression (HAM-D) ⁸ were used to evaluate impact of COPD on the patient's quality of life and depressive symptomatology, respectively. The number of COPD exacerbations, defined according to Anthonisen criteria⁹, shown by each patient in the last year prior to hospitalization, was also recorded.

Patients with severe comorbidities according to the score of Cumulative Illness Rating Scale (CIRS > 3), on long-term home oxygen therapy (OLT) and treated with antidepressant drugs were previously excluded.

At the end of the hospitalization we have calculated the number of recovery days required for the stabilization of patients and the discharge home.

Statistical analysis of the data was done using software IBM SPSS- version-21.0.

Sample characteristics are shown in Table I. According

to CAT test, 20% of patients (6 M and 1 F) had low CAT

score, 45.7% (9 M and 7 F) had average CAT score, 14.3% (2 M and 3 F) had high CAT score and 20% (3 M and 4 F) had very high CAT score.

Concerning the mood, the results of HAM-D test showed that 13 patients (9 M and 4 F) were not depressed (score < 8), 13 patients (8 M and 5 F) had mild depression (score 8-16), 9 patients (3 M and 6 F) had moderate depression (score 17-23) and no one had severe depression (score > 23). Globally 73% of female partecipants had depression as compared to 55% of males.

The spirometric evaluation of FEV1 showed a mean percentage score of 51 \pm 11.8, 55 \pm 11.3 versus 47.3 ± 11.3 in males and females, respectively.

The mean number of exacerbations in the last year was 1.6 ± 1.4 , with mean values of 25.1 ± 1.3 in men and 1.9 ± 1.5 in women.

The registered average length of stay was 8.6 ± 3.2 days, longer in females (9.8 ± 3) than males (7.7 ± 3) .

Sperman and Mann-Whitney's correlations were employed to determine the relationship between the examined variables.

There were strongly significative correlations (p < 0.001), positive between HAM-D scores, CAT scores (Fig. 1), number of exacerbation in the last year and hospital length of stay (Fig. 2), and negative between HAM-D scores and FEV1 values (Fig. 3). Furthermore, females were more depressed, with lower FEV1 (p = 0.043) and with a longer length of stay (p = 0.039) as compared to males.

Table I. Characteristics	s of the sample					
Characteristics	Males		Females		Total	
	N (%)	Mean ± SD	N (%)	Mean ± SD	N (%)	Mean ± SD
Sex	20 (57.1)	-	15 (42.9)	-	35 (100)	-
Age	-	74.4 ± 5.67	-	76.3 ± 7.44	-	75.3 ± 6.45
Weight	-	73.1 ± 9.8	-	67.7 ± 15.8	-	70.7 ± 12.87
Height	-	165.3 ± 1.43	-	157.1±1.53	-	161.8±7.37
FEV1	-	55 ± 11.3	-	47.3 ± 11.3	-	51.74 ± 11.84
CAT	-	15 ± 9.11	-	20.8 ± 9.48	-	17.5 ± 9.59
Low score	6	-	1	-	7 (20)	-
Average score	9	-	7	-	16 (45.7)	-
High score	2	-	3	-	5 (14.3)	-
Very high score	3	-	4	-	7 (20)	-
HAM-D	-	8.95 ± 5.2	-	12.73 ± 5.57	-	10.6 ± 5.61
Depression	11	-	11	-	22 (62.9)	-
- Mild	8	-	5	-	13 (37.1)	-
- Moderate	3	-	6	-	9 (25.8)	-
- Severe	0	-	0	-	0	-
No depression	9	-	4	-	13 (37.1)	-
Lenght of stay (LOS)	-	7.7 ± 3	-	9.8 ± 3	-	8.6 ± 3.2
Exacerbations in the	-	1.25 ± 1.3	-	1.9 ± 1.5	-	1.6 ± 1.4

RESULTS

last year



Figure 1. Correlation between CAT and HAM-D scores.



Figure 2. Correlation between hospital lenght of stay and HAM-D scores.

DISCUSSION

Chronic obstructive pulmonary disease (COPD) is a pathological respiratory condition characterized by airflow obstruction, to which alteration of bronchi (chronic bronchitis), bronchioles (disease of the small airways) and lung parenchyma (emphysema) contribute, induced by inhaling harmful substances (especially tobacco smoke) which determine a chronic inflammatory state ¹¹¹. The diagnosis of COPD is based on the presence of respiratory symptoms (cough, chronic sputum production, dyspnea), on a history of exposure to risk factors and on the evidence of airway obstruction using spirometry ²⁶.

Although COPD is primarily recognized as a respiratory disease, it is not limited to the respiratory system but spreads to a systemic level inducing further organ damage. In fact, in addition to causing COPD, smoking, the

80 70 ٠ 60 50 FEV1% 40 30 20 10 0 0 5 10 20 15 25 HAM-D

Figure 3. Correlation between FEV₁ values and HAM-D scores.

first cause of COPD, has systemic effects which can contribute to the development of chronic diseases including cardiovascular, metabolic, kidney diseases and tumors, along with other risk factors such as hyperlipidemia, obesity, hypertension and sedentary lifestyle ⁴. COPD and chronic diseases associated particularly develop in the elderly, and aging itself constitutes an amplifying factor for their development in synergy with the risk factors mentioned above ⁷. Psychiatric comorbidities should certainly be counted among the systemic manifestations of COPD. Depression in particular is seen in COPD more often than not, worsening the patients' level of disability and their perception of the quality of life ^{5 6 12}.

In our study, in fact, using HAM-D as screening test, we found that a large proportion of the enrolled population (about 63%) had depressive symptoms, especially women (about 73%).

Regarding the impact of COPD on quality of life assessed by CAT questionnaire, it was found a high degree of disability in 35% of patients, while only 20% did not report debilitating symptoms due to respiratory disease.

Our sample of hospitalized elderly patients also had a reduction in FEV1, compared to the predicted normal value, around 50% in agreement with the international studies in which a decline of FEV_1 less than 50% of its theoretical value is related to a sharp deterioration of health status and rate of hospitalization ¹³⁻¹⁵.

The days of hospitalization necessary for clinical stabilization and discharge home were higher in females (about 10 days) than the average (about 8 days) and males (about 7 days). In addition, women had a number of exacerbations about twice the average of the sample.

As it was assumed based on international studies on adults $^{16-18}$, in the current study on geriatric inpatients, depression and COPD-related disability have emerged as an important problem among elderly. In fact we found highly significant correlations (p < 0.001), positive between HAM-D scores, CAT scores, number of exacerbation in the last year and hospital length of stay, and negative between HAM-D scores and FEV1 values, such that a greater severity of depressive symptoms is related to a greater severity of COPD exacerbations, disability associated and perceived by the patient, as well as a higher number of recovery days and annual acute exacerbations.

Just as it is shown in the adult population ¹⁹⁻²¹, older women hospitalized for COPD had a greater impairment of mood with depressed mood, a worse perception of their quality of life, a number of exacerbations about twice the average of the sample and a longer hospitalization. Thus, HAM-D test is an excellent indicator of depression in the elderly and to represent the impact of COPD on mood and consequently on the perception of the quality of life, just like CAT questionnaire, especially in female people. If it were administered at the time of admission to hospital, as well as spirometry and CAT, it could be used for predicting the hospital length of stay and even the rehospitalization rate, probably because most depressed patients are less adherent to long-term pharmacoterapy that appears necessary to reduce the frequency of exacerbations, hospitalization and so the health expenditure. Further studies are needed to assess the impact of antidepressant treatment on adherence to drug therapy and frequency of exacerbations in older adults with COPD, especially females, identified by HAM-D.

CONCLUSIONS

Depression is an important comorbidity in elderly hospitalized patients with COPD, especially in women, as it is related to a worse prognosis in terms of both quality of life and life expectancy. Besides, it is emerging as a good predictor of rehospitalization and length of stay. In this regard, the early diagnosis of affective disorder in elderly patients with COPD, followed by administration of HAM-D test, could be a valuable tool for improving the quality of patients' lives, adherence to treatment and so reducing early rehospedalizations in order to allow a less expenditure of health care resources.

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