



Level of Adherence to GOLD Guidelines for Management of Patients with Acute Exacerbation of Chronic Obstructive Pulmonary Disease: Is There a Difference Between Patient Management in Different Hospital Wards?

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Abstract

Background: The purpose of this study was to evaluate the implementation of GOLD guideline in patients with an acute exacerbation of Chronic Obstructive Pulmonary Disease (COPD).

Methods: In a cross-sectional study, all patients with COPD exacerbation referred to Shariati hospital from January 2014 to March 2015 were investigated. The level of adherence to GOLD guideline in three areas of hospital admission, therapeutic components of inpatient management (pharmacologic treatments, respiratory support) and discharge plan was assessed via reviewing patients' medical profile. Each subject was classified as complete, non-complete and not evaluated in terms of adherence to the guideline.

Results: In this study, 125 patients with mean age of 67.64 ± 1.71 years including 100 (80%) males were studied. Also, 104 and 21 patients were hospitalized in pulmonology and general medicine wards, respectively. In the present study, the adherence to GOLD recommendations for hospital admission, pharmacologic treatment and non-pharmacologic management were 92, 97.6 and 44.2%, respectively. Despite the high level of adherence to pharmacologic management, total adherence to non-pharmacologic interventions was poor.

Conclusion: Although high level of adherence to pharmacological management of COPD was observed, there was overtreatment particularly in case of antibiotics prescription. In addition, non-pharmacological management was not considered in over half of the patients.

Keywords: Anti-bacterial agents, Chronic obstructive pulmonary disease, Hospitalization, Humans

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Introduction

The main characteristic of Chronic Obstructive Pulmonary Disease (COPD) is irreversible obstruction of airways (1). Not only is COPD a direct cause of death in 7.8% of the whole deaths of the globe, but it is also considered the third major cause of death in smokers with malignancy and cardiovascular diseases (2). At the present time, COPD exacerbation is considered an acute deterioration in respiratory indications which engender changes in patients' daily medications (3). One of the pivotal incidents during disease progression is COPD exacerbation which causes adverse impact on patients' quality of life, aggravation of the symptoms and patient's performance decreased lung function, increased risk of readmission, mortality, and socioeconomic costs (4). Therefore, appropriate treatment has tremendous effect on clinical course, quality of life and burden of the disease (5). Global initiative for COPD (GOLD) was first introduced in 2001, in order to provide evidence-based standards for improving diagnosis, treatment and prevention of COPD (6,7). Previous studies indicated that adherence to GOLD guidelines would improve quality of care, reduce proceeding exacerbation of risk and subsequently result in reduced mortality (6-8). The poor adherence to guideline recommendations has been reported in several studies (9). In a study by Masoompour *et al* in Iran, the overall adherence to GOLD guideline was reported 67.2% (10). They focused on pharmacologic management (10) but other issues in a typical episode of COPD exacerbation like use of non- invasive ventilation, advice to smoking cessation and vaccination or pulmonary rehabilitation, had not been considered. In this study, the level of adherence to GOLD guideline, particularly adherence to GOLD guidelines in general medicine and pulmonology wards of Shariati Hospital, was thoroughly investigated.

Materials and Methods

This cross-sectional study was carried out in a 14-month period during 2014-15 in Shariati Hospital, Tehran, Iran. The study was approved by ethics committee of Tehran University of Medical Sciences and ethical principles of Declaration of Helsinki were observed. The participants of this study were 125 patients with previous COPD diagnosis

admitted during an acute deterioration of respiratory symptoms. In our study, the diagnosis of aggravation was exclusively based on clinical presentation such as an acute change in dyspnea severity, increase in sputum production and cough which led to additional admission. It is worth mentioning that patients who concurrently had asthma or other chronic lung diseases and decompensated heart failure were excluded.

The data was extracted from patients' medical records during their admission including medical history, prescribed medications, lab tests, imaging, residents' and attending notes. For determining the level of adherence to GOLD guideline, patients' medical records were reviewed during admission. Then, the findings were compared with GOLD recommendations. Our focus was on 2014 GOLD recommendations for hospital admission, therapeutic components of inpatient management (pharmacologic treatments, respiratory support) and discharge plan as listed in tables 1 and 2. The level of adherence for each case has been rated as complete, non-complete and not evaluated. In the case of adherence to guideline, the patients were categorized in 3 distinct groups in each field. In complete adherent group, all recommendations were followed. In non-complete adherent group, the recommendations were partially conducted and in not evaluated group, the data in their records were insufficient. Also, any difference in COPD management between pulmonologist and internist was assessed. Throughout the study period, the 2014 GOLD guideline for evaluation was utilized.

Statistical analysis

All data were expressed as mean \pm SD for continuous variables and frequency percentage for categorical variables. Data was analyzed using SPSS software version 22.

Results

In a cross-sectional study, 125 patients with diagnosis of COPD exacerbation were admitted to the Shariati Hospital. The participants' mean age was 67.64 \pm 11.71 years. The admission rate (ratio) at pulmonology and general medicine wards was 104(83.2%) and 21 (16.8%) patients, respectively.

The demographic and clinical characteristics of the participants are summarized in table 2. According to

the guideline, hospital admission was indicated for 115 (92%) patients. Chest X-ray (CXR) and Arterial Blood Gas (ABG) were done for all patients.

Overall, 62 (49.6%) cases had previous spirometry and the mean \pm SD of FEV1/FVC, FEV1 and FVC of the patients were 64.09 ± 15.74 , 47.75 ± 28.34 and 56.98 ± 21.91 , respectively. On admission, based on ABG, 52 (41.6%) cases had respiratory acidosis, 94 (75.2%) had hypoxemia and 87 (69.6%) had

hypercapnia. Table 3 shows the level of adherence to GOLD recommendations in our study population.

All patients received short acting beta agonists and anticholinergics in accordance with GOLD guideline. Corticosteroid and prednisolone 30-50 mg per day or equivalent had been prescribed in 120 cases for 10-14 days. Antibiotics were prescribed for nearly all patients while according to 2014 GOLD guideline (Table 1), antibiotics should be given only for 102

Table 1A. GOLD recommendations for hospital admission and inpatient management

Potential indication for hospital admission	
Acute deterioration in symptom intensity	
Unresponsiveness to initial treatment	
Frequent exacerbations	
Insufficient home support	
Pharmacologic treatments	
Short acting bronchodilators	For all patients
Systemic corticosteroid	For all patients
Antibiotics	For only patients with all three cardinal manifestations (Dyspnea, increase in sputum volume and purulence), critically ill and intubated patients
Respiratory support	
Non-invasive ventilation	Patients with respiratory acidosis (Arterial pH \leq 7.35 or PCO ₂ \leq 45 mmHg), severe dyspnea with signs of respiratory muscle fatigue, persistent hypoxemia despite supplemental oxygen therapy
Mechanical ventilation	

Table 1B. GOLD recommendations for patient's discharge plan

Reassessment of inhaler technique	
Advice for smoking cessation	
Recommendations for vaccination especially pneumococcal vaccine	
Assessing the need for long term oxygen therapy	
Referring to pulmonary rehabilitation	

Table 2. Clinical characteristics, pharmacologic treatment, respiratory support of the study population

Mean age	67.64 \pm 11.71yr
Male gender	100(80%)
Previous physician-diagnosed COPD	109(87%)
Previous hospital admission	98(78.4%)
Previous inhaler use	99(79.2%)
Oxygen therapy at home	71(56.8%)
Pharmacologic treatment	
Short acting beta agonists	124(99.2%)
Short acting inhaled anticholinergic	124(99.2%)
Systemic corticosteroid	120(96%)
Antibiotics	124(99.2%)
Respiratory support	
Non-invasive ventilation	40(32%)
Invasive mechanical ventilation	20(16%)

Table 3. The level of adherence to GOLD recommendations for prevention of COPD exacerbation

	Complete adherence	Non-adherence	Not-evaluated
Smoking cessation	78(62.4%)	29(23.2%)	18(14.4%)
Vaccination	31(24.8%)	82(65.6%)	12(9.6%)
Pulmonary rehabilitation	19(15.2%)	94(75.2%)	12(9.6%)
Inhaler technique	93(74.4%)	20(16%)	12(9.6%)

(81%) of our cases. In our study, xanthine derivative (Aminophylline, theophylline) had not been started for any patient. There was no statistically significant difference between pulmonary and general medicine ward in pharmacologic treatment.

All patients received respiratory support. Non-Invasive Ventilation (NIV) was used for 40 (32%) patients and 20 (16%) patients were finally intubated. The success rate of NIV in our study was 80%. Table 3 exhibits the level of adherence to GOLD recommendations for prevention of COPD exacerbation. Based on the results, the level of adherence to the GOLD guidelines in all aspects of non-pharmacological management was poor across the wards and no significant difference between pulmonary and general medicine wards was observed.

Our mean hospital stay was 11.3 ± 6.26 days; 13 (10.4%) patients died during admission and 42 (33.6%) had been readmitted during the month after discharging from the hospital.

Discussion

Based on our investigation, the adherence to GOLD recommendations for hospital admission, pharmacologic treatment and non-pharmacologic management were 92, 97.6 and 44.2%, respectively. In comparison to Tang *et al*'s study (11), our population was slightly younger (67.5 vs. 72.5 years) but longer hospital stay (median length of stay: 10 days vs. 5 days) and higher mortality rate (10.5 vs. 5%) were documented. These findings might be due to our patients' delay in recognition of exacerbation symptoms or seeking medical care or more severe baseline disease. More than half of our patients had previous history of COPD exacerbation and had received supplemental oxygen at home similar to previous studies (10-12). Adherence to GOLD recommendations for using short acting bronchodilators was high. Virtually all of our patients

had received antibiotics because of overprescribing. According to the guideline, antibiotics should be prescribed exclusively for patients whose dyspnea, sputum volume and purulence had been increased simultaneously or patients under critical condition or mechanical ventilation (non-invasive or invasive). Antibiotics overuse may be ensued from physicians' practice based on personal opinion and patient demands rather than evidence based recommendations (11,13,14). Corticosteroids were given to 90% of patients. Although GOLD guide recommends a dose of 40 milligram prednisolone per day for 5 days in newer revision (15), in this study, glucocorticoid was given by intravenous route for a longer time in many occasions. This finding is similar to the findings of a wide variety of conducted studies (10,11). The common types of non-adherence to corticosteroid were incorrect dosage and length of treatment (10,11,16). Thirty percent of patients required advanced respiratory support. NIV was used for 40 (32%) cases. Eight of them finally were intubated. The success rate of NIV in our study was 80% which is comparable with results of many randomized clinical trials (17). In a previous study, which had been conducted in Iran between 2011-12, 18.8% of patients needed mechanical ventilation. They were intubated due to the lack of set up for NIV at that time (10). Our study shows Iranian physicians follow the guidelines for NIV in their practice. After an episode of COPD exacerbation, patient education is as important as other aspects of COPD exacerbation management. Our results revealed that total adherence to non-pharmacologic interventions was poor which is compatible with previous studies (18-22). This aspect of COPD management is ignored even in patients with chronic stable COPD referred to outpatient clinics (23,24). The main limitation may be lack of time. Tang *et al* reported that none of their patients was vaccinated or advised during admission and only 17% of patients were referred to pulmonary

rehabilitation (11). In our study, the most followed recommendations based on patients' medical records were reassessment of inhaler techniques and advice for smoking cessation. Adherence to recommendations for vaccination especially pneumococcal vaccine was poor in comparison with other studies. While pulmonary rehabilitation improves exercise capacity and the quality of life (25), it was disregarded in most cases. Current investigation demonstrates that only 15% of patients were referred for pulmonary rehabilitations. The reason for poor adherence to pulmonary rehabilitation seemed to be lack of awareness and familiarity with this facility and limited access to these centers even in Tehran.

Conclusion

Although there was high level of adherence to pharmacological management of COPD, overtreatment in case of antibiotics prescription was observed. Moreover, non-pharmacological management was not considered in over half of the patients.

Conflict of Interest

All authors declare that there are no conflicts of interest.

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