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Original Research Article

Clinical Presentation & Predictors of Outcome in Patients with Chronic Obstructive Pulmonary Disease with Acute Exacerbation: A Cross Sectional Study

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Abstract

Background: Prevention of exacerbations is a key objective in chronic obstructive pulmonary disease (COPD) management. There are patients with COPD that are prone to suffer from recurrent exacerbations and they experience a more severe impairment in health status.

Objective: to study clinical Presentation & Predictors of outcome in patients with Chronic Obstructive Pulmonary Disease with Acute Exacerbation.

Materials & Methods: The present cross-sectional study was conducted on 50 study subjects having COPD with acute exacerbation during period January 2020 to June 2021.

Results: 68 % of the patients studied were more than 60 years of age suggesting that COPD is a disease of the aged. 82% of the patients were males, and all had a history of smoking. This male preponderance was due to greater prevalence of smoking in the male population.

Conclusion: Altered sensorium, Hypotension, Cyanosis, raised JVP, pedal edema, Acidemia, invasive mechanical ventilation, Infection, history of >1 episode of exacerbation, GOLD stage C&D and duration of COPD > 10 years were the predictors of mortality.

Keywords: Chronic Obstructive Pulmonary Disease, Acute Exacerbation, Clinical Presentation, Outcome.

Introduction

Acute Exacerbation of COPD patients often present with increased breathlessness, which is often accompanied by wheezing and chest tightness, increased cough and sputum, change of the color or tenacity of sputum, and fever. Exacerbations may also be accompanied by a number of nonspecific complaints, such as malaise, insomnia, sleepiness, fatigue, depression and confusion. [1] A decrease in exercise tolerance, fever, or new radiologic anomalies suggestive of pulmonary disease may herald AE-COPD. [2] An increase in sputum volume, color and purulence points to a bacterial cause, as does a prior history of chronic sputum production. Patients may

present in altered sensorium, which could be due to carbon dioxide retention and/or dyselectrolytemia.[3]

Acute Exacerbation of COPD (AECOPD) is of major importance since it is a common cause of emergency room visits, and affects the health status, lung function, and is a major cause of morbidity and mortality. It has been observed that majority of patient following an acute exacerbation experience a temporary or permanent decrease in quality of life. [4] Some patients experience frequent episodes and have an increased risk of recurrence or relapse following the initial episode. [5] The variable course of Acute exacerbation in COPD in patients with a similar degree of pulmonary impairment makes the prediction of the outcome very difficult. Lot of studies have tried to correlate the impairment in both respiratory and non-respiratory physiology with the course and progression of the Acute exacerbation COPD. There are many published studies regarding prognostic factors in patients with Acute exacerbation of COPD from the developed countries with diverse results. Acute exacerbation of COPD is a common reason for emergency room visit in hospital, very little data has been documented about this problem from India. [6]

Considering the above facts, the present study was designed to study the clinical presentation and predictors of outcome in the patients with Acute exacerbation COPD.

Materials & Methods

The present hospital based cross-sectional clinical study was conducted in Department of Respiratory Medicine of Dr. Panjabrao Deshmukh Memorial Medical college & Hospital a tertiary Care teaching Hospital. The study period was one and a half years i.e., from Jan 2020 to June 2021. Approval From institutional ethical committee was taken before start of the study.

Considering the prevalence of COPD in India as 3 % [7] with 5 % allowable error at 95 % confidence interval the minimum sample size to achieve desired objective came to be 46.56, thus total 50 study subjects conforming inclusion & exclusion criteria were included in this study.

All patients diagnosed with acute exacerbation of COPD as per GOLD criteria, COPD diagnosed earlier by premorbid pulmonary function testing (when available) and COPD based on the clinical criteria, clinical history with compatible clinical findings and evidence of COPD changes on chest radiograph were included in this study.

Patients not willing to participate in the study. Patients associated with structural lung disease other than COPD. Known cases of Bronchial Asthma as well as Pulmonary Kochs & Active lung Malignancy cases were excluded from the study.

Written and informed consent was taken from the patients. Detailed clinical history along with general and respiratory system examination was carried out and observations were documented in a predesigned & pretested Proforma. All investigations carried by the patient till date were noted.

Data was entered in MS Excel and were analyzed using Statistical Formulas for calculating Mean, Median, Mode and Standard Deviation on the data in MS Excel along with appropriate tests of significance with the help of SPSS software trial version 21. The data was analyzed and the relationship between patients' characteristics and mortality was tested using a t-test in the analysis. A P-value of less than 0.05 was considered to be statistically significant.

Results

Table 1: Sociodemographic profile of study subjects

Parameter	Frequency	Percentage
Age		
< 60	16	32%
60 & above	34	68%
Gender		
Male	41	82%
Female	9	18%
Residence		
Urban	15	30%
Rural	35	70%
Smoking History		
Current Smoker	29	58%
Past Smoker	9	18%
Non-smoker	12	24%
BMI		
<20	35	70%
20-25	12	24%
>25	3	6%
Duration of COPD (years)		
5 and Below	14	28%
6-10	21	42%
11-15	11	22%
>16	4	8%
Comorbidity		
Hypertension	17	34%
DM	6	12%
IHD	7	14%
Other	3	6%

The study was conducted in 50 study subjects, majority study subjects were male (82%) & were above age 60 years (68%). Most of study subjects were resident of rural area (70%). It was found that out of 50 study subjects 29 were habitual of smoking. Majority (70%) were having BMI < 20. While considering the duration of COPD, 42% were having duration 6-10 years. 34% study subjects were having Hypertension along with COPD.

Table 2: symptoms of study subjects

Symptoms	Frequency	Percentage
Cough	50	100.00%
Breathlessness	50	100.00%
Expectoration	48	96.00%
Increased Sputum Purulence	43	86.00%
Fever	32	64%
Wheezing	40	80.00%
Altered sensorium	9	18.00%

(*Multiple choices)

All cases presented with cough, recent worsening of dyspnoea and either increased sputum purulence of sputum volume. More than 64% had a history of fever, while altered sensorium was seen in 18%.

Table 3: Signs of study subjects

Signs	Frequency	Percentage
Use of Accessory muscles of respiration	46	92.00%
Rhonchi	45	90.00%
Crepitations	28	56.00%
Pedal edema	17	34.00%
Cyanosis	15	30.00%
Raised JVP	13	26.00%
Hypotension	9	18.00%

(*Multiple choices)

Majority of the patients presented with accessory muscles use, other predominant signs were Rhonchi, Crepitations, 30% of the patients had cyanosis and more than 26% of the patients presented with signs of raised JVP, hypotension was seen in 18% of the cases.

Table 4: MMRC Dyspnea Grade of study subjects

mMRC Dyspnea Grade	No of cases	Percent
I	7	14
II	19	38
III	16	32
IV	8	16
Total	50	100.0

The majority of the study population had mMRC dyspnea of grade II (38%) followed by grade III (32%) , grade IV (16%) and grade I (14%).

Table 5: Predictors of outcome among the study subjects

Sr. No	Variable	All patients	Death	Recovered	P value
1	Subject	50	6	44	
2	Age (> 60 yrs)	29	5	23	0.132
3	Sex-Male	41	3	38	0.168
4	Duration of COPD (> 10 yrs)	15	5	10	0.01
5	Previous hospitalization	31	5	25	0.1893
6	Altered sensorium	9	5	4	0.005
7	Hypotension	9	4	5	0.04
8	Cyanosis	15	5	10	0.012
9	Raised JVP	13	5	8	0.009
10	Pedal edema	17	5	12	0.017
11	Increased WBC count	33	5	27	0.266
12	PAH	22	4	18	0.823
13	Raised CRP	31	5	26	0.8200
14	pH(<7.35)	21	5	16	0.036
15	PaO2(low)	35	5	29	0.43
16	PaCO2 (high)	26	5	20	0.0916
17	Need for IMV	6	5	1	0.004
18	Infection	16	5	11	0.014
19	P pulmonale	13	2	11	0.71
20	BMI<20	35	4	31	0.73
21	Exacerbation history in Last 1 Year.	35	6	29	0.009
22	Gold Staging 3 and 4	29	6	23	0.0096

In our study out of 50 patients,6 patients required invasive mechanical ventilation of which 5 patients died. A total of 22 variables were compared with patients who

died in the hospital. Univariate sensitivity analysis revealed that duration of COPD (P=0.01), Altered sensorium (P=0.005), Hypotension (P=0.04), cyanosis (P=0.012), presence of infection (P =0.014), pedal edema (P=0.017), raised JVP (P=0.009), low pH (P= 0.036), need for invasive mechanical ventilation (P= 0.004), exacerbation history in last 1 year (P=0.009) and GOLD staging (P=0.0096) as the predictors of death. Patients who survived the episode had a shorter hospital stay compared to those who died.

Discussion

In this present study majority of patients had history of recent worsening of cough (100%), dyspnoea (100%) and increased sputum volume or purulence, more than half (64%) of patients had history of fever prior to the episode of exacerbation. 18% of patients had altered sensorium at the time of presentation, with more than 25 % of the patients had cyanosis, pedal edema and raised JVP. 45 patients had rhonchi at the time of presentation. Similar observations were seen in the study conducted by Sunil Babu M et al. [8] in which breathlessness was present in 100% of patients. Musku M.R et al [9] had similar finding in their study of 50 patients in which the Symptoms at presentation were cough with sputum (92%), breathlessness (96%), Pedal Edema (24 %), fever (16%), and decreased urine output (4%).

The observed findings that a considerable number of patients had fever and altered sensorium at the time of presentation indicate that infection being the major trigger for exacerbation and altered sensorium probably being secondary to CO2 retention.

In our study out of 50 patients 6 patients died in the hospital and remaining were discharged. A total of 22 variables were compared with the patients who died and those who were discharged from the hospital.

In present study, out of the 22 variables 11 variables i.e. Altered sensorium, Hypotension, Cyanosis, Raised JVP, Pedal Edema, pH(<7.35), Need for IMV, Infection, Duration of COPD >10years, Gold Stage C & D, Exacerbation history in the past 1 Year had statistically significant association with increased mortality.

Warren PM, et al [10] studied 95 patients and observed that acidosis and hypotension are the predictors of mortality which correlates with our findings. They, however, also found that increased blood urea concentration was the predictor of mortality, which was not significant in our study.

Defouilloy C et al [11] and Burk et al [12] studied 322 patients and 74 patients respectively and observed that the need for mechanical ventilation was the predictor of mortality which also correlates with our study.

Roberts CM et al [13] studied 1342 patients of COPD with acute exacerbation and observed that acidosis, presence of pedal edema and poor performance status were the predictors of mortality, in our study also we had similar findings with pedal edema (P =0.0177) being significant determinant of mortality.

JJ Soler - Cataluna et al [14] studied 304 patients with AECOPD and observed increased PCO2 as the predictor of mortality, which is a similar finding in our study also.

H Gunen et al [15] prospectively studied 205 patients with COPD with Acute Exacerbation and observed that decreased pO2, increased pCO2 and longer hospital stay were the predictors of mortality. Except for hypoxia, the other two findings correlate with our study.

A study by Ramakrishna et al [16] showed in their study of 48 patients that Overall mortality was 10.46%. Altered Sensorium, Cyanosis, hypotension, Hypoalbuminemia, severe acidosis, hypercapnia and hypoxia at

the time of admission predict adverse outcome. Those who needed IMV had high mortality. Survivors had less hospital stay. [17] In our study also altered sensorium, hypotension, cyanosis, acidosis, Hypercapnia and the need for invasive ventilation had significant results and are the major contributors of mortality in patients.

Conclusion

All the patients who presented to the Hospital had worsening breathlessness, cough, increased sputum volume or purulence as their main complaint. Altered sensorium, Hypotension, Cyanosis, raised JVP, pedal edema, Acidemia, invasive mechanical ventilation, Infection, history of >1 episode of exacerbation, GOLD stage C&D and duration of COPD > 10 years were the predictors of mortality. Patients who survived the episode had a shorter hospital stay when compared to those who died.

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