

A study of clinical profile of patients of COPD with acute respiratory failure at tertiary health care centre

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Abstract

Introduction: Chronic obstructive pulmonary disease (COPD) is characterized by irreversible airway obstruction that leads to chronic disability. **Aims and Objectives:** To Study of clinical profile of patients of COPD with Acute respiratory failure at tertiary health care centre. **Material and Methods:** This was cross-sectional study carried out in the Department of TB Chest and ICU of tertiary health care centre during two year period from June 2014 to June 2016 in the patients who were admitted to ICU for Respiratory failure associated with COPD were included into the Study. The baseline Characters were arranged in the form of mean \pm SD (Mean \pm Standard Deviation) this was compiled by the investigations available with patients case sheets. **Result:** The majority of the Patients were in the age group 60-70 i.e. 32.407 % followed by 50-60 i.e. 26.852 %, in 70-80 were 17.59%, in 40-50 were 12.03% and in >80 were 11.11 respectively. The majority of the Patients were Male i.e. 62.96% followed by females 37.03%. Most of the Patients as per the Causes of Respiratory failure in Association with COPD were Acute COPD exacerbation only in 32.41 % followed by Bronchiectasis in 22.22 %, Pneumonia in 17.59 %, Cardiac in 11.11%, Pneumothorax in 8.33%, ARDS/ Sepsis in 4.63 % and Other were in 3.70% In Baseline ICU Parameters the mean Arterial P^H was 7.22 \pm 0.25, the mean Arterial CO₂ was 60.03 \pm 19.5, the mean Arterial O₂ tension was 209 \pm 102 and Median APACHE II Score was found was 18.5 \pm 6.3. The majority of the Patients improved i.e. 78.70 %, Discharge against Medical advice or Patients referred to higher centre (Super speciality centres) for the expert critical management in 12.96 % and Deaths occurred in 8.33% the factors mostly associated with the deaths were extremely old age, multiple organ failure. **Conclusion:** It can be concluded from our study that Most of the Patients as per the Causes of Respiratory failure in Association with COPD were Acute COPD exacerbation only followed by Bronchiectasis, Pneumonia, Cardiac etc. The majority of the Patients improved and Mortality was found to be 8.33% the factors mostly associated with the deaths were extremely old age, multiple organ failure.


Keywords: COPD, Acute respiratory failure (ARF), APACHE II Score.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is characterized by irreversible airway obstruction that leads to chronic disability. Patients with COPD have a

longstanding downhill course that is interspersed with episodes of exacerbations requiring hospitalization. COPD is known to be a common disease. There is lack of recent data regarding the burden of this disease from India, with only study on prevalence of COPD published in 1981¹. Data from United States indicate that incidence of disease is on the rise². During the year 2000, approximately 24 million adults in United States had evidence of obstructive airway disease. COPD was responsible for 1.5 million emergency department visits, 726,000 hospitalizations, and 119,000 deaths². It is obvious that this disease puts an enormous economic burden on the society. Anderson and coworkers estimated that almost 35-45% of the total per capita health-care costs for COPD are account for by exacerbations alone³. Severe exacerbations requiring hospitalizations are

responsible for a large share of these costs and among these, treatment cost for those who require intensive care unit (ICU) admission is highest. In most of the third world countries, large number of ICU beds are occupied by patients with critical illnesses secondary to various infectious diseases, most of which are reversible. Patients with chronic obstructive pulmonary disease (COPD) requiring admission to the intensive care unit (ICU) usually have severe pre-existing limitation of function. It is commonly believed that these patients have a poor outcome and consume a large amount of intensive care resources, particularly if they need endotracheal intubation. Interpretation of the few existing outcome studies has several problems. Decisions with regard to ICU admission or ventilation of patients with COPD may not only vary between units, but also between physicians.⁴ Some studies include patients for whom the reason for acute deterioration was not primarily an exacerbation of COPD but pneumonia, pulmonary edema, or pulmonary embolism.⁵ There is also a lack of data on long term survival after hospital discharge in this group of patients. We aimed to provide comprehensive data on the prognosis of these patients by documenting in-hospital and long term survival of patients admitted to a tertiary referral ICU over a 6-year period. Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality worldwide.⁶ COPD is the fourth leading cause of mortality and the 12th leading cause of disability. The worldwide prevalence of COPD in 1990 was estimated at 9.34/1000 in men and 7.33/1000 in women.⁷ A review of 11 studies involving patients of COPD with acute respiratory failure found a combined mortality rate of 20.3% and mechanical ventilation (MV) rates in the range of 9.8-67.6%.⁸ In resource-limited settings such as India, there is perennial shortfall in health care resources. Well-equipped critical care beds are at a premium, and the available numbers fall well short of the number of patients that could potentially benefit by admission to these units. Such a scenario makes appropriate utilization of resources, including the critical care beds, imperative. It stands to reason in such a scenario to offer intensive care unit admission to the patients that are at a higher risk of developing complications, including need of MV. Apart from ensuring close monitoring with prompt intervention as needed, such an approach may even aid in obviating the need of MV in some of these patients⁹.

MATERIAL AND METHODS

This was cross-sectional study carried out in the Department of TB Chest and ICU of tertiary health care centre during two year period from June 2014 to June 2016 in the patients who were admitted to ICU for Respiratory failure associated with COPD were included

into the Study. All the necessary data was extracted from the case records. In the two year period total 108 patients were admitted for COPD with Acute respiratory failure. causes of the Respiratory failure secondary to COPD was confirmed by Experts. The baseline Characters were arranged in the form of mean ± SD (Mean ± Standard Deviation) this was compiled by the investigations available with patients case sheets.

RESULT

Table 1: Distribution of the Patients as per the Age

Age group	No.	Percentage (%)
40-50	13	12.03
50-60	29	26.85
60-70	35	32.40
70-80	19	17.59
>80	12	11.11
Total	108	100.00

The majority of the Patients were in the age group 60-70 i.e. 32.407 % followed by 50-60 i.e. 26.852 %, in 70-80 were 17.59%, in 40-50 were 12.03% and in>80 were 11.11 respectively.

Table 2: Distribution of the Patients as per the Sex

Sex	No.	Percentage (%)
Male	68	62.96
Female	40	37.03
Total	108	100

The majority of the Patients were Male i.e. 62.96% followed by females 37.03%.

Table 3: Distribution of the Patients as per the Causes of Respiratory failure in Association with COPD

Causes	No.	Percentage (%)
Acute COPD exacerbation only	35	32.41
Bronchiectasis	24	22.22
Pneumonia	19	17.59
Cardiac	12	11.11
Pneumothorax	9	8.33
ARDS/ Sepsis	5	4.63
Other	4	3.70
Total	108	100

The majority of the Patients as per the Causes of Respiratory failure in Association with COPD were Acute COPD exacerbation only in 32.41 % followed by Bronchiectasis in 22.22%, Pneumonia in 17.59%, Cardiac in 11.11%, Pneumothorax in 8.33%, ARDS/ Sepsis in 4.63 % and Other were in 3.70%.

Table 4: Distribution of the Patients with the Baseline ICU Parameters

Parameters	Mean ±SD (n=108)
Arterial P ^H	7.22 ± 0.25
Arterial CO ₂	60.03 ± 19.5
Arterial O ₂ tension	209 ± 102
Median APACHE II Score	18.5 ± 6.3

In Baseline ICU Parameters the mean Arterial P^H was 7.22 ± 0.25 , the mean Arterial CO₂ was 60.03 ± 19.5 , the mean Arterial O₂ tension was 209 ± 102 and Median APACHE II Score was found was 18.5 ± 6.3 .

Table 5: Distribution of the Patients as per the Outcome

Outcome	No.	Percentage (%)
Improved	85	78.70
DMA /Referred	14	12.96
Deaths	9	8.33

The majority of the Patients improved i.e. 78.70%, Discharge against Medical advice or Patients referred to higher centre (Super speciality centres) for the expert critical management in 12.96 % and Deaths occurred in 8.33% the factors mostly associated with the deaths were extremely old age, multiple organ failure.

DISCUSSION

Various physiological parameters estimated at the time of presentation were analyzed to find predictors of mortality. Only two parameters, namely APACHE II score at admission to ICU and SA in the first 24 hours of admission, were found to be independent predictors of hospital mortality. The same two parameters also predicted development of sepsis on bivariate analysis. Some of the earlier studies have found blood gas parameters like pH¹² and PaCO₂¹³ to be useful in predicting outcome in COPD patients, whereas others^{14, 15, 16} did not. In the present study, although PaCO₂ and HCO₃ were not independent predictors of mortality they tended to be lower in patients who died and the difference was statistically significant on bivariate analysis. Also, mean pH was similar for the two groups. This has not been reported in the earlier studies and investigators in the past have mostly found high PaCO₂ levels to be associated with worse outcome. A possible reason for this finding is that patients with hypercapnia with concordantly high HCO₃ are usually taken care of by mechanical ventilation. On the other hand, low mean PaCO₂ and HCO₃ levels in non-survivors probably reflected underlying metabolic acidosis. It has been reported earlier also that, for similar level of acidosis, patients with respiratory failure resulting in respiratory acidosis have better outcome as compared to patients with metabolic acidosis, that is commonly secondary to associated non-pulmonary organ failure¹⁷. In our study we found that The majority of the Patients were in the age group 60-70 i.e. 32.407 % followed by 50-60 i.e. 26.852 %, in 70-80 were 17.59%, in 40-50 were 12.03% and in >80 were 11.11 respectively The majority of the Patients were Male i.e. 62.96% followed by females 37.03%. This is in confirmation with S. Kumar *et al*⁹. The majority of the Patients as per the Causes of Respiratory failure in Association with COPD were Acute

COPD exacerbation only in 32.41% followed by Bronchiectasis in 22.22%, Pneumonia in 17.59%, Cardiac in 11.11%, Pneumothorax in 8.33%, ARDS/ Sepsis in 4.63 % and Other were in 3.70%. this was similar to Bakeela *et al*¹⁸. In Baseline ICU Parameters the mean Arterial P^H was 7.22 ± 0.25 , the mean Arterial CO₂ was 60.03 ± 19.5 , the mean Arterial O₂ tension was 209 ± 102 and Median APACHE II Score was found was 18.5 ± 6.3 this was in confirmation with S. Kumar *et al* and Bakeela *et al*¹⁸. The majority of the Patients improved i.e. 78.70%, Discharge against Medical advice or Patients referred to higher centre (Super speciality centres) for the expert critical management in 12.96% and Deaths occurred in 8.33% the factors mostly associated with the deaths were extremely old age, multiple organ failure. So in our study the mortality was 8.33 %, In the studies by Costello R¹⁰ *et al* overall mortality rate was 36.6%. There was a high incidence of need of MV (84.1%) that have taken into account all the patients with COPD requiring hospitalization as compared them our study was having less mortality. Mortality rate was in confirmation with and Burk RH *et al*¹¹ i.e. 6%.

CONCLUSION

It can be concluded from our study that Most of the Patients as per the Causes of Respiratory failure in Association with COPD were Acute COPD exacerbation only followed by Bronchiectasis, Pneumonia, Cardiac etc. The majority of the Patients improved and Mortality was found to be 8.33% the factors mostly associated with the deaths were extremely old age, multiple organ failure.

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