

Original Article

Pattern and outcome of admitted cases to Pulmonary Intensive Care Unit in a tertiary care centre of Punjab

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ABSTRACT:

Background: Early appropriate referral of patients to an ICU can significantly reduce mortality in critically ill patients. At the same time improper selection of patients for ICU often limits bed availability in ICU. **Aim:** To study pattern and outcome of patients admitted to pulmonary ICU. **Material and methods:** The present study was conducted in the department of pulmonary medicine, Guru Gobind Singh Medical College and hospital, Faridkot, Punjab and included assessment of patients admitted to medical and pulmonary ICU because of various respiratory diseases. A total of 100 patients with various respiratory diseases were included in the present study. The present study was conducted in the department of pulmonary medicine, Guru Gobind Singh Medical College and hospital, Faridkot, Punjab and included assessment of patients admitted to medical and pulmonary ICU because of various respiratory diseases. A total of 100 patients with various respiratory diseases were included in the present study. **Results:** COPD was the most prevalent respiratory disease in the present study found in 29 (29%) patients, followed by Bronchial asthma(19%), Pneumonia(17%), Pneumothorax(12%), Pulmonary TB (10%), Bronchiectasis(6%), Chronic Empyema(5%) and ILD(2%). In 26% patients, invasive ventilation was given while in remaining 74% patients, non-invasive ventilation was given. Death occurred in 25% patients while the 54% patients were discharged in satisfactory condition and 21% were discharged on request. Nosocomial infection present in 15% patients. Staphylococcus aureus was the most common nosocomial organism isolated in 5% followed by H. Influenzae in 3% and Streptococcus pneumonia in 3% of patients. 76% of the patients had Comorbidities and type 2 DM was the most common comorbidity present in 19% of the cases. Shortest mean duration of ICU stay was for patients with ILD(4.5) followed by Pneumothorax(4.75), Bronchial Asthma(4.84), COPD(4.9), Bronchiectasis(5.5), Chronic empyema(5.6), Pneumonia(6.17) and Pulmonary TB(10). Mortality rate for Pulmonary TB was 70% followed by ILD(50%), Chronic Empyema(40%), Bronchiectasis(33.33%), Pneumothorax(25%), Pneumonia(23.53%), COPD(13.79%) and Bronchial asthma(10.53%). Mortality in patients given invasive ventilation was more 19/26 (73.07%) than with non invasive ventilation 6/74 (8.11%). **Conclusion:** Owing to least mortality and shorter duration of ICU stay, patients with bronchial asthma and COPD should be preferred for pulmonary ICU followed by pneumothorax and pneumonia, which must be preferred over bronchiectasis, chronic empyema and ILD. Pulmonary TB must be given least preference. This message should be directed to all hospitals, primary care, private clinics physicians for respiratory critical cases referral to Pulmonary ICU, as this improves the outcome of patients and limits the economics of their management.

Key Words: Admission, Pulmonary ICU, Outcome.

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INTRODUCTION

Intensive care may be broadly defined as a service for patients who have potentially recoverable conditions, who can benefit from more detailed observation and invasive treatment that can be provided safely in a high dependency area. Since these patients are critically ill, the outcome of intervention is sometimes difficult to predict. In critical care

medicine, intensive care unit results can be assessed on the basis of outcomes such as "death" or "survival" by means of indicators such as mortality rates. Evaluation of the outcomes of medical interventions can assess the efficacy of treatment, making it possible to take better decisions and to ensure management of the high-level resources needed to deliver intensive care services thereby optimizing resource

utilization.¹The modern concept of intensive care is said to have been pioneered by an anesthetist in Denmark over half a century ago during the polio pandemic.²A Clinician has to consider many inter-related factors in making a prognosis regarding outcome in critically ill patients, including age, severity and irreversibility of the acute illness, physiological reserve and response to therapy.³Mortality in patients depends on factors such as demographic and clinical characteristic of population, infrastructure, non-medical factors (management and organization), admission practice and also by ICU performance. ICU beds are limited in any hospital. Rationalized use for needy patients therefore is necessary. Length of stay is, therefore, used to assess quality of care and resource utilization.¹Respiratory ICU (RICU) is defined as “an area for the monitoring and treatment of patient with acute respiratory failure due to primary respiratory cause and of patient with acute or chronic respiratory failure”.³ According to the European Respiratory Society, a RICU is defined by the following characteristics: a nurse-patient ratio 1:3, the presence of multifunctional monitors and life support ventilators, and facility of providing both invasive ventilation and noninvasive ventilation (NIV) in patients with lung failure or more than one organ failure.⁴Transfer of patients to a tertiary care ICU from the emergency department of a referring hospital was associated with significantly better outcomes than transfer from a referring hospital ICU. It is unknown whether or not the patient’s location prior to RICU admission influences in-hospital survival. An analysis of data on this issue could help clinicians and hospital administrators to better understand the role and effectiveness of the RICU.^{4, 5}RICUs are specialised units mainly devoted to the monitoring and treatment of acute on chronic respiratory failure by non-invasive ventilation, but also to weaning from invasive mechanical ventilation.⁶Two most common indications for admission to ICU are status asthmaticus and respiratory failure (3.7% for each).⁷ However, neuromuscular weakness, pneumonia, septic shock, respiratory arrest, congestive heart failure, acute exacerbation of COPD, cardiac arrest are other indications for medico-surgical ICU admission.⁸Critically ill patients are responsible for 10–20% of global hospital costs and the ability to identify critically ill patients who will not survive until hospital discharge may allow identification of high risk patients. It is well accepted that early appropriate referral of patients to an ICU can significantly reduce early and possibly late mortality in the critically ill. At the same time improper selection of patients for ICU who block ICU beds often limits bed availability in ICUs. This in turn, adversely affects the dynamics of the whole hospital.³Aim of the present to assess the study pattern and outcome of patients admitted to pulmonary ICU.

MATERIALS AND METHODS

The present study was conducted in the department of pulmonary medicine, Guru Gobind Singh Medical College and hospital, Faridkot, Punjab and included assessment of patients admitted to medical and pulmonary ICU because of various respiratory diseases. A total of 100 patients with various respiratory diseases were included in the present study. Ethical approval was taken from institutional ethical committee and written consent was obtained after explaining in detail after explaining in detail the entire research protocol. Patients of respiratory diseases admitted to pulmonary ICU and medical ICU at, Guru Gobind Singh Medical College and hospital were included in the study and Patients who refused consent to participate in the study, Patients with age less than 14 years, re-admission to ICU during same hospitalization and Patients with less than 24 hours between ICU admission and discharge were excluded from the study.

CBC, RBS, RFT, LFT, Urine complete examination, Chest X- Ray, Endotracheal secretions or sputum for AFB, KOH mount, Gram stain and culture and sensitivity, Electrocardiography (ECG), ABG and SpO₂ Investigations performed in study subjects. Personal data like Age, Sex, Full clinical examination, Diagnosis, Length of stay in ICU And Duration of mechanical ventilation (if given) were noted.

Outcome was assessed under following headings;

- Discharge under satisfactory condition
- Discharge on request
- Death
- Shifting to ward

STATISTICAL ANALYSIS

Assessment of different outcome variable was calculated in terms of percentages on excel program. All the results were analyzed by SPSS software version 17.0. Chi- square test and One way ANOVA were used for assessment of level of significant. P- value of less than 0.05 was taken as significant.

RESULTS

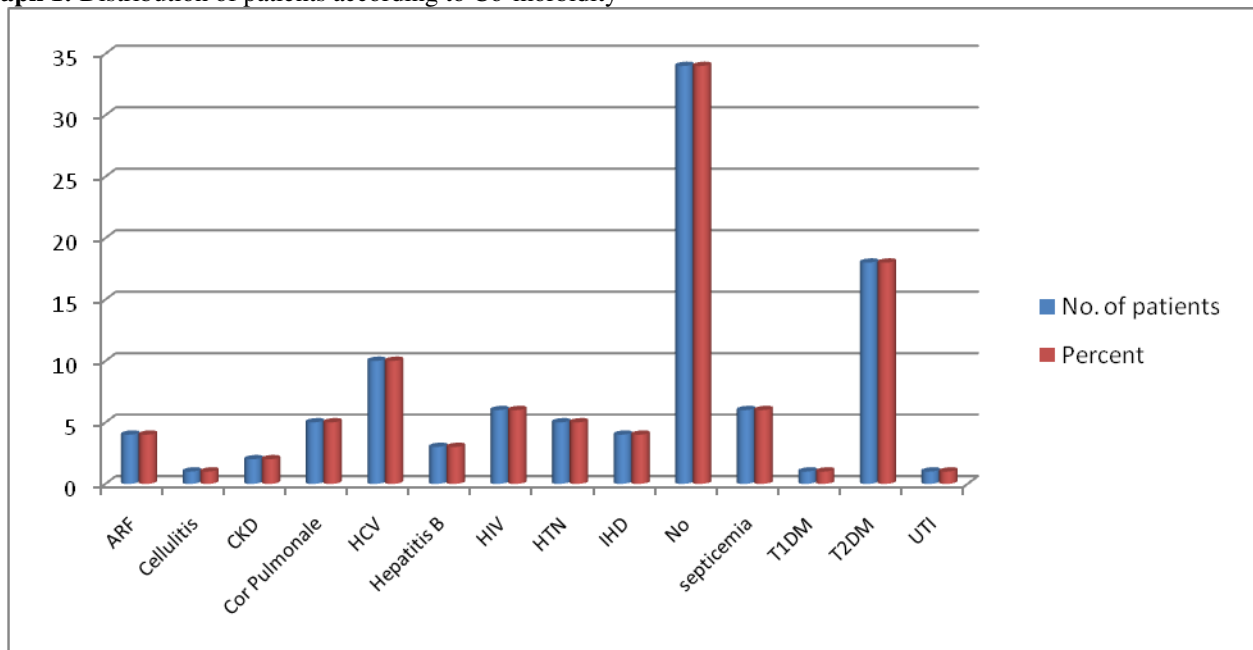
In our study Mean age of the patients was 50.78 years ranging 15 to 87 years. 56% of patients were male and 44% females. COPD was the most prevalent respiratory disease in the present study found in 29 (29%) patients, followed by Bronchial asthma(19%), Pneumonia(17%), Pneumothorax(12%), Pulmonary TB(10%), Bronchiectasis(6%), Chronic Empyema(5%) and ILD(2%). Death occurred in 25% patients while in 54% and 21% patients, discharge was done in satisfactory condition and on request respectively. Nosocomial infection was found to be present in 15% patients. Staphylococcus aureus was the most common nosocomial organism isolated in 5%, followed by H. Influenzae(3%) and Streptococcus pneumonia(3%).

Table 1: Distribution of patients according to the presence of nosocomial infection

Infection	Number of patients	Percentage
Acinetobacter	1	1
H. Influenzae	3	3
KlebsiellaPneumoniae	1	1
Pseudomonas aeruginosa	2	2
Staphylococcus aureus	5	5
S. pneumonia	3	3
Total	100	100

Comorbidity was found to be present in 76% patients, out of which, type 2 DM was the most common comorbidity seen in 19%.

Graph 1: Distribution of patients according to Co-morbidity



Shortest mean duration of ICU stay was for patients with ILD(4.5), followed by Pneumothorax(4.75), Bronchial Asthma(4.84), COPD(4.9), Bronchiectasis(5.5), Chronic empyema(5.6), Pneumonia(6.17) and Pulmonary TB(10).

Table 2: Descriptive analysis

Diagnosis	Mean SpO ₂ at admission	Mean SpO ₂ at discharge	Mean PaO ₂ Torr	Mean PaCO ₂ Torr	Mean Length of stay in ICU days
Bronchial Asthma	66.94	78.94	69.31	87.05	4.84
Bronchiectasis	58.0	43.3	67.3	99.6	5.5
Chronic Empyema	57.2	43.4	63.4	77.6	5.6
COPD	58.24	71.31	65.0	93.17	4.9
Pneumonia	63.41	68.64	63.05	66.58	6.17
Pneumothorax	59.83	67.58	63.5	60.08	4.75
Pulmonary Tb	49.5	16.5	58.8	74.8	10
ILD	42.5	44.5	54.5	85.0	4.5

In 26% patients, invasive ventilation and in 74% patients, non-invasive ventilation was given.

Table 3: Correlation of diagnosis of patients with type of ventilation

Diagnosis	Type of ventilation	
	Invasive	Non- invasive
Bronchial Asthma	4	15
Bronchiectasis	2	4
Chronic Empyema	1	4
COPD	7	22
Pneumonia	7	10
Pneumothorax	0	12
Pulmonary Tb	4	6
ILD	1	1

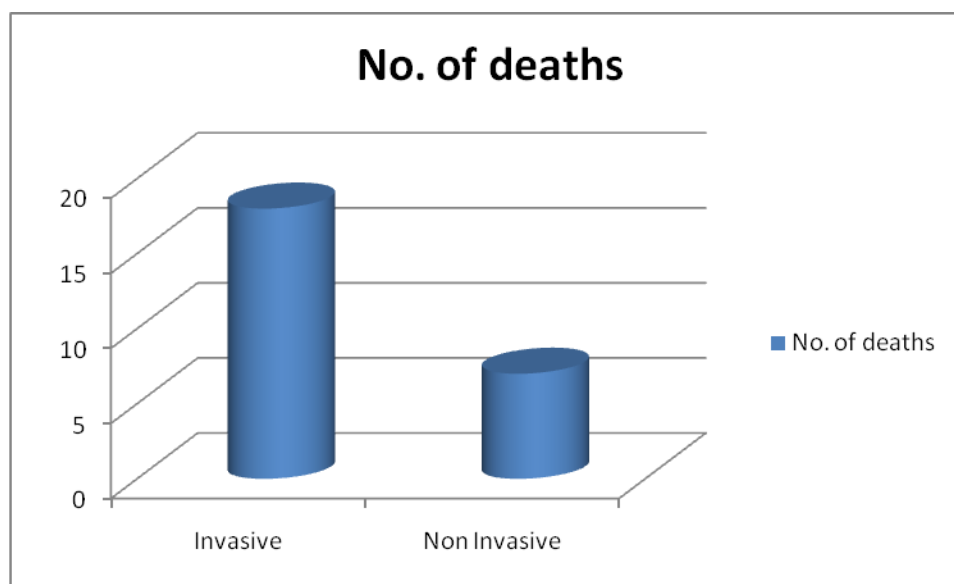
Highest mortality rate was for Pulmonary TB(70%) followed by ILD(50%), Chronic Empyema(40%), Bronchiectasis(33.33%), Pneumothorax(25%), Pneumonia(23.53%), COPD(13.79%) and Bronchial asthma(10.53%).

Table 4: Correlation of diagnosis of patients with treatment outcome

Diagnosis	Treatment outcome		
	Death	Discharge on request	Discharge on satisfactory condition
Bronchial Asthma	2	4	13
Bronchiectasis	2	3	1
Chronic Empyema	2	2	1
COPD	4	5	20
Pneumonia	4	2	11
Pneumothorax	3	3	6
Pulmonary Tb	7	2	1
ILD	1	0	1
Total	25	21	54

Mortality in patients given invasive ventilation was 19/26 (73.07%) & with non invasive ventilation 6/74 (8.11%).

Graph 2: Correlation of type of ventilation with no. of deaths



DISCUSSION

The mean age of the patients in our study was 50.78 years. Our results were in correlation with the results obtained by Ghoneim et al who observed that mean age of the patients admitted to RICU in their study was approximately 59 years.³ In the present study, Out of 100, 56 percent of the patients were males while the remaining were females. Similar results have been observed by Ghoniem and Ceriana et al where males outnumber females in terms of respiratory diseases.^{3, 9} In the present study, COPD was the most common respiratory pathology seen in 29 percent (29 patients) patients. Our results were in correlation with the results obtained by Confalonieri M et al, who observed that COPD was the most common indication for admission of patients in RICU in their study.⁶ In the present study, out of 100 patients, invasive treatment was carried out in 26 percent of the patients, while non-invasive treatment was carried out in 74 percent of the patients. Our results were in concordance with the results obtained by Nava S et al who observed that in their patient population admitted to RICU; invasive treatment was required in approximately 62 percent of the patients.¹⁰ Mortality rate in our study is 25%. Our results were in concordance with the results obtained by Ghoneim AHA et al who observed that 30 percent of the patients of their study, admitted to RICU died.³ Valentini I observed deaths in 28 percent patients of their study population.⁴ In the present study, nosocomial infection was absent in 85 percent of the cases, while among the remaining patients, Staph aureus was the most commonly seen nosocomial infection present in 5 percent of the cases. Our results were in concordance with the results obtained by Dasgupta S et al who reported the absence of nosocomial infection in approximately 87 percent patients of their study population.¹¹ In a study conducted by Potgieter PD et al, nosocomial infection was found to be present in 23.6 percent of the patients admitted to the RICU among which, Staph aureus was found to be the most commonly observed micro-organism.¹² In our study 33% of nosocomial organisms were staph aureus. Wisplinghoff H observed 20% of nosocomial organisms as staph aureus.¹³ We also observed that mortality rate was higher in patients given invasive ventilation (73.07%) than patients given non invasive ventilation 6/74 (8.11%). Our results were in concordance with the results obtained by Ghoneim et al and Stefan MS who showed that mortality rate in mechanically ventilated patients was higher in comparison to non-mechanically ventilated patients.^{3,14}

CONCLUSION

Owing to least mortality and shorter duration of ICU stay, patients with bronchial asthma and COPD should be preferred for pulmonary ICU admission followed by pneumothorax and pneumonia, which must be preferred above bronchiectasis, chronic empyema and ILD. Pulmonary TB must be given least preference.

Patients without need of invasive ventilation have better prognosis than needing one. This may be the strategy, all hospitals and primary care providers should adopt for respiratory critical cases to be referred to Pulmonary ICU, as this improves the outcome of patients and limits the economics of their management.

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