

# Assessment of Correlation of Treatment Outcome and Type of Treatment Among Pulmonary TB Patients Admitted to ICU: An Observational Study

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## ABSTRACT

**Background:** Tuberculosis (TB) remains a significant public health problem worldwide, with an estimated 8.7 million cases and 1.4 million deaths from it in 2011. In-hospital mortality of tuberculosis patients remains high, especially among those requiring admission to the intensive care unit (ICU) and mechanical ventilation (MV). Hence, we planned the present study to assess the correlation between the type of treatment and treatment outcome among pulmonary TB patients admitted to ICU.

**Materials & Methods:** The present study included assessment of correlation between the type of treatment and treatment outcome among pulmonary TB patients admitted to ICU. A total of 20 patients admitted to ICU due to pulmonary TB were included in the present study. Complete demographic and clinical data of all the patients was collected. Detailed information about type of procedure carried out and outcome occurring in all the patients was recorded. All the results were analysed by SPSS software.

**Results:** Mean age of the patients of the present study was 51.7 years. Significant results were obtained while correlating

the treatment outcome and type of treatment among pulmonary TB patients admitted to ICU.

**Conclusion:** Outcome of the pulmonary TB patients admitted to ICU is dependent on the type of treatment followed.

**Key words:** Pulmonary, Intensive Care Unit, Tuberculosis.

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## INTRODUCTION

Tuberculosis (TB) remains a significant public health problem worldwide, with an estimated 8.7 million cases and 1.4 million deaths from it in 2011. TB usually affects the lungs but may present acutely in almost any organ system and mimic other infectious or non-infectious processes. Most studies of TB patients on ICU involve patients with pulmonary TB.<sup>1-3</sup> Common reasons for admission are acute respiratory failure, and development of multi-organ failure (MOF); high rates of acute respiratory distress syndrome (ARDS) are seen, although post mortem studies suggest that confluent tuberculous bronchopneumonia may mimic ARDS.<sup>4-7</sup> In-hospital mortality of tuberculosis patients remains high, especially among those requiring admission to the intensive care unit (ICU) and mechanical ventilation (MV).<sup>7</sup> Under the light of above mentioned data, we planned the present study to assess the correlation between the type of treatment and treatment outcome among pulmonary TB patients admitted to ICU.

## MATERIALS & METHODS

The present study was conducted in the Department of Pulmonary Medicine, Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha (India) and included assessment of correlation between the type of treatment and treatment outcome among pulmonary TB patients admitted to ICU.

Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 20 patients admitted to ICU due to pulmonary TB were included in the present study.

### Inclusion Criteria

- Patients of Pulmonary TB admitted medical ICU

### Exclusion Criteria

- Patients who refused consent to participate in the study
- Patients with age less than 14 years

- Patients with re-admission to ICU during same hospitalization
- Patients with less than 24 hours between ICU admission and discharge

Complete demographic and clinical data of all the patients was

collected. Detailed information about type of procedure carried out and outcome occurring in all the patients was recorded. All the results were analysed by SPSS software. Chi- square test was used for assessment of level of significance. P-value of less than 0.05 was taken as significant.

**Table 1: Mean age of the patients included in the present study**

Parameter	No. of patients	Mean	Std. Deviation
Age (years)	20	51.7	17.4

**Table 2: Distribution of patients according to gender**

Gender	No. of patients	Percentage
Male	11	55
Female	9	45
Total	20	100

**Table 3: Distribution of patients with Pulmonary TB according to type of treatment**

Treatment	No. of patients	Percentage
Invasive	8	40
Non- invasive	12	60
Total	20	100

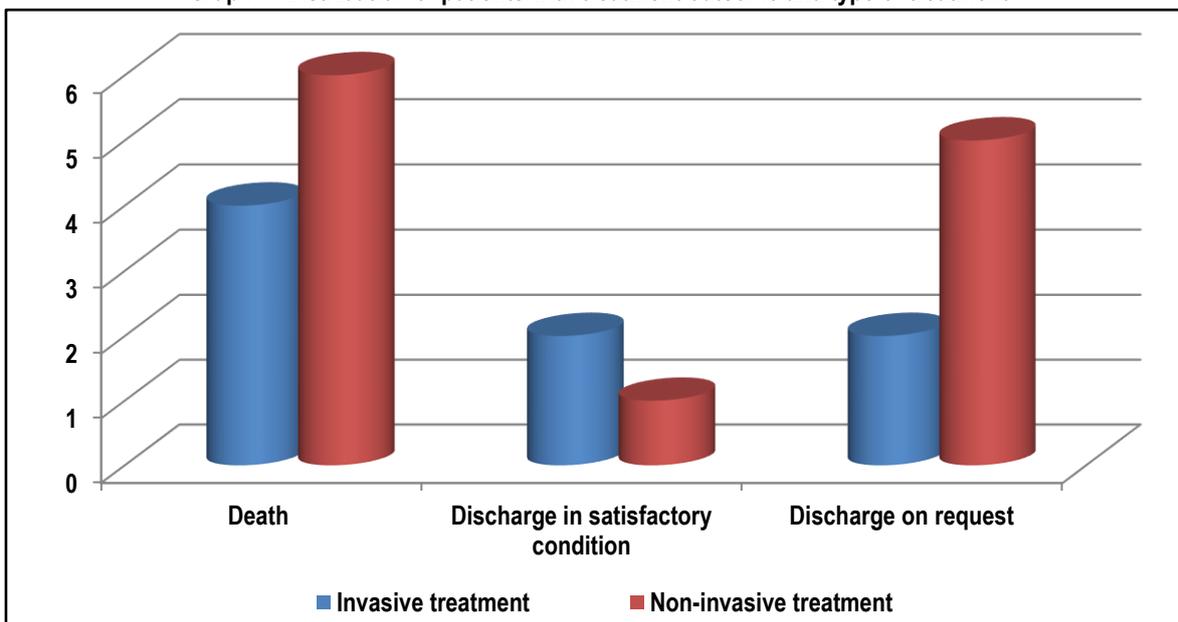
**Table 4: Distribution of patients with Pulmonary TB according to type of treatment outcome**

Outcome	No. of patients	Percentage
Death	10	50
Discharge in satisfactory condition	3	15
Discharge on request	7	35
Total	20	100

**Table 5: Correlation of treatment outcome and type of treatment among pulmonary TB patients admitted to ICU**

Outcome	Invasive treatment	Non-invasive treatment	P- value
Death	4	6	0.02 (Significant)
Discharge in satisfactory condition	2	1	
Discharge on request	2	5	

**Graph 1: Distribution of patients with treatment outcome and type of treatment**



## RESULTS

A total of 20 patients with pulmonary TB were included in the present study. Mean age of the patients of the present study was 51.7 years. There were 11 males and 9 females in the present study. Invasive treatment was carried out in 40 percent of the patients, while non-invasive treatment was carried out in 12 patients. 50 percent of the patients died in the ICU. Discharge on request was done in 7 patients, while discharge in satisfactory condition was done in 3 patients. Table 5 shows the correlation of treatment outcome and type of treatment among pulmonary TB patients admitted to ICU. Significant results were obtained while correlating the treatment outcome and type of treatment among pulmonary TB patients admitted to ICU.

## DISCUSSION

In the present study, a total of 20 patients with pulmonary TB were included. Mean age of the patients of the present study was 51.7 years. There were 11 males and 9 females in the present study. Invasive treatment was carried out in 40 percent of the patients, while non-invasive treatment was carried out in 12 patients. 50 percent of the patients died in the ICU. Discharge on request was done in 7 patients, while discharge in satisfactory condition was done in 3 patients.

Dasgupta S et al (2015) determined the incidence of nosocomial infections acquired in the ICU, their risk factors, the causative pathogens and the outcome in a tertiary care teaching hospital. This was a prospective observational study conducted in a 12 bedded combined medical and surgical ICU of a medical college hospital. The study group comprised 242 patients admitted for more than 48 h in the ICU. Data were collected regarding severity of the illness, primary reason for ICU admission, presence of risk factors, presence of infection, infecting agent, length of ICU and hospital stay, and survival status and logistic regression analysis was done. The nosocomial infection rate was 11.98% (95% confidence interval 7.89–16.07%). Pneumonia was the most frequently detected infection (62.07%), followed by urinary tract infections and central venous catheter associated bloodstream infections. Prior antimicrobial therapy, urinary catheterization and length of ICU stay were found to be statistically significant risk factors associated with nosocomial infection. Nosocomial infection resulted in a statistically significant increase in length of ICU and hospital stay, but not in mortality. Nosocomial infections increase morbidity of hospitalized patients.<sup>8</sup>

Castro-Avila AC et al (2015) determined the effect of early rehabilitation for functional status in ICU/high-dependency unit (HDU) patients. MEDLINE, EMBASE, CINALH, PEDro, Cochrane Library, AMED, ISI web of science, Scielo, LILACS and several clinical trial registries were searched for randomised and non-randomised clinical trials of rehabilitation compared to usual care in adult patients admitted to an ICU/HDU. Results were screened by two independent reviewers. Primary outcome was functional status. Secondary outcomes were walking ability, muscle strength, quality of life, and healthcare utilisation. Data extraction and methodological quality assessment using the PEDro scale was performed by primary reviewer and checked by two other reviewers. The authors of relevant studies were contacted to obtain missing data. 5733 records were screened. Seven articles were included in the narrative synthesis and six in the meta-analysis. Early rehabilitation had no significant effect on functional

status, muscle strength, quality of life, or healthcare utilisation. However, early rehabilitation led to significantly more patients walking without assistance at hospital discharge (risk ratio 1.42; 95% CI 1.17-1.72). There was a non-significant effect favouring intervention for walking distance and incidence of ICU-acquired weakness. Early rehabilitation during ICU stay was not associated with improvements in functional status, muscle strength, quality of life or healthcare utilisation outcomes, although it seems to improve walking ability compared to usual care.<sup>9</sup>

In the present study, significant results were obtained while correlating the treatment outcome and type of treatment among pulmonary TB patients admitted to ICU. Zamzam MA et al (2015) compared the predictive accuracy of four predictive scoring systems in the ICU. A prospective cohort study including consecutively admitted 110 adult ICU patients (88 males) with ARDS from Saudi German Hospital, Madinah, was performed from June 2013 to January 2015. The median age of the patients was 38 years, the median duration of illness before ICU admission was 6 days, and the median duration of ICU admission was 27 days. The APACHE II, APACHE III, SAPS II, and SOFA scores were calculated based on the worst values during the first 24 h of admission. The actual mortality rate (27.3%) was higher than the estimated mortality rates, with the highest predicted rate of 11.3% obtained using the APACHE II. All four severity scores were significantly associated with mortality and explained 83% of its variability. However, after adjustment, only the APACHE III scoring system was a significant predictor. Three scoring systems were significantly associated with mortality and explained almost 70% of its variability, but after adjustment, only the APACHE II was a significant predictor. The combination of the severity score and mortality prediction was a significant predictor of mortality.<sup>10</sup>

## CONCLUSION

From the above obtained data, it can be concluded that outcome of the pulmonary TB patients admitted to ICU is dependent on the type of treatment followed. However; further studies are recommended.

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