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Original Research

Ventilator associated pneumonia in ICU patients

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ABSTRACT:
Background: Hospital-acquired pneumonia (HAP) is the pneumonia after 48 hours or more after admission, which did not appear to be incubating at the time of admission. The present study was conducted to assess ventilator associated pneumonia in ICU patients. **Materials & Methods:** 86 patients who developed pneumonia of both genders were included. Parameters such as incidence of VAP, duration of mechanical ventilation and duration of hospital stay were recorded. **Results:** Diagnosis was meningitis seen in 7 in VAP and 4 in non VAP, GBS in 5 and 2, cardiogenic shock in 10 and 12, dengue shock syndrome in 4 and 7 and hepatic encephalopathy in 6 and 4, stroke in 5 and 2, malaria in 8 and 5 and sepsis in 1 and 4 cases. The Apache II score in VAP was 22.5, in non- VAP was 16.2, mechanical ventilation days was 12.1 and 6.2 respectively. Mean hospital stay was 14.5 and 7.1 respectively. The difference was significant ($P< 0.05$). **Conclusion:** Most common diagnosis was cardiogenic shock. Apache II score and hospital stay was higher among VAP patients as compared to non- VAP patients.
Key words: cardiogenic shock, Sepsis, ventilator associated pneumonia

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INTRODUCTION

Hospital-acquired pneumonia (HAP) is the pneumonia after 48 hours or more after admission, which did not appear to be incubating at the time of admission.[1] The presence of HAP increases hospital stay by an average of 7–9 days per patientalso imposes an extra financial burden to the hospital. The risk of VAP is highest early in the course of hospital stay, and is estimated to be 3%/day during the first 5 days of ventilation, 2%/day during days 5–10 of ventilation and 1%/day after this.[2]Lack of a gold standard for diagnosis is the major culprit of poor outcome of VAP. Fever and leukocytosis are non-specific and can be caused by any condition that releases cytokines.[7] Although microbiology helps in diagnosis, it is not devoid of pitfalls. In fact, it was proven that colonization of airway is common and presence of pathogens in tracheal secretions in the absence of clinical findings does not suggest VAP.[3]

Risk factors include prolonged mechanical ventilation, reintubation after extubation. If the infection occurs within 48 -72 hrs of intubation then it is called early onset type and after 72 hrs of intubation it is called late onset type VAP respectively.[4] Delay in initiating appropriate antibiotic therapy can increase the mortality associated with VAP, and thus therapy should not be postponed for the purpose of performing diagnosis. This initial empirical antimicrobial therapy can be modified based on the knowledge of local microbiological data, patient characteristics, and sensitivity pattern of expected pathogens at the institution.[5]The present study was conducted to assess ventilator associated pneumonia in hospitalized patients.

MATERIALS & METHODS

The present study consisted of 86 patients who developed pneumonia of both genders. All were enrolled after their family members gave written consent.

Data such as name, age, gender etc. was recorded. The severity of illness based on APACHE II score during first 24 hours of admission were noted. Clinical pulmonary infection score (CPIS) greater than six was

used as diagnostic criteria for VAP. Endotracheal aspirate was preferred over protected specimen brush (PSB) sampling and bronchoalveolar lavage (BAL). Parameters such as incidence of VAP, duration of mechanical ventilation and duration of hospital stay were recorded. Results of the study were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Total- 86		
Gender	**Males**	**Females**
Number	50	36

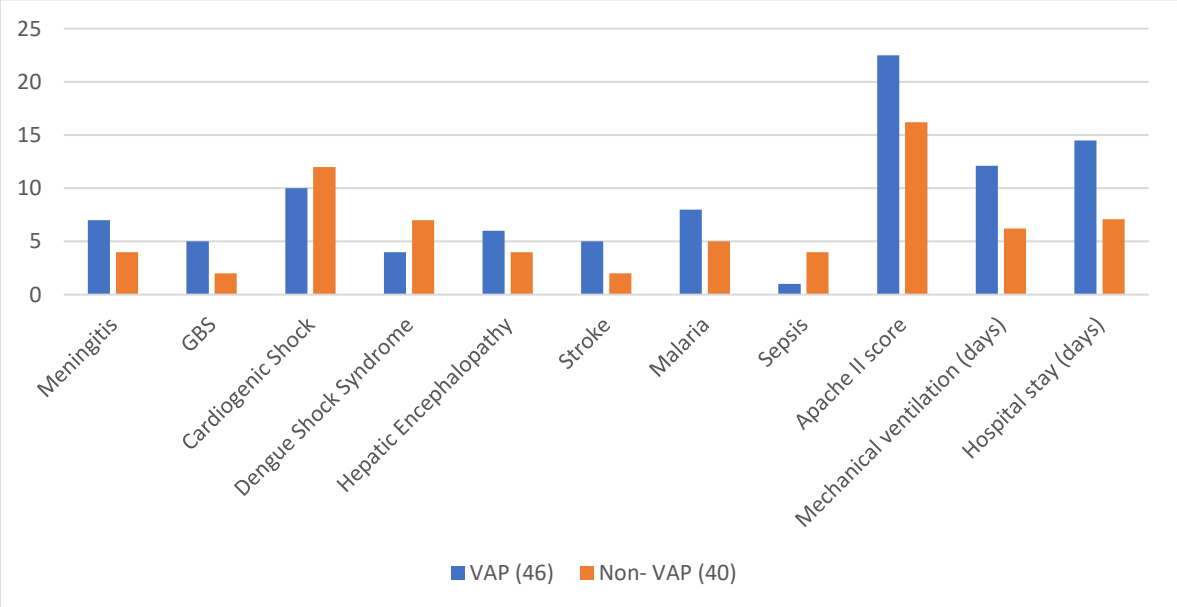
Table I shows that out of 86 patients, males were 50 and females were 36.

Table II: Assessment of parameters

Diagnosis	VAP (46)	Non- VAP (40)	P value
Meningitis	7	4	0.05
GBS	5	2	0.02
CardiogenicShock	10	12	0.92
Dengue ShockSyndrome	4	7	0.03
HepaticEncephalopathy	6	4	0.81
Stroke	5	2	0.02
Malaria	8	5	0.41
Sepsis	1	4	0.15
Apache II score	22.5	16.2	0.05
Mechanical ventilation (days)	12.1	6.2	0.02
Hospital stay (days)	14.5	7.1	0.03

Table II, graph I shows that diagnosis was meningitis seen in 7 in VAP and 4 innon VAP, GBS in 5 and 2, cardiogenic shock in 10 and 12, dengue shock syndrome in 4 and 7 and hepatic encephalopathy in 6 and 4, stroke in 5 and 2, malaria in 8 and 5 and sepsis in 1 and 4 cases. The Apache II score in VAP was 22.5, in non- VAP was 16.2, mechanical ventilation days was 12.1 and 6.2 respectively. Mean hospital stay was 14.5 and 7.1respectively. The difference was significant (P< 0.05).

Graph I: Assessment of parameters



DISCUSSION

Ventilator-associated pneumonia (VAP) refers to bacterial pneumonia developed in patients who have been mechanically ventilated for a duration of more than 48 hours.[6] It ranges from 6 to 52% and can reach 76% in some specific settings.[7]The Clinical Pulmonary Infection Scoring (CPIS) system for diagnosis are as follows- mechanical ventilation for greater than 48 hours, new or persistent or progressive radiographic infiltrates, fever greater than 38.5 Celcius, leukocytosis or leukopenia and positive culture for endotracheal aspirate.[8]The clinical

diagnosis based on purulent sputum may follow intubation or oropharyngeal secretion leakage around airway, chest X-ray changes suspected of VAP may also be a feature of pulmonary oedema, pulmonary infarction, atelectasis or acute respiratory distress syndrome.[9] The present study was conducted to assess ventilator associated pneumonia in hospitalized patients.

In present study, out of 86 patients, males were 50 and females were 36.Joseph et al[10]assessed the incidence and the risk factors for development of VAP in critically ill patients. The incidence of VAP was 30.67 and 15.87 per 1,000 ventilator days in the two different ICUs. In our study 58.3% of the cases were late-onset VAP, while 41.7% were early-onset VAP. Impaired consciousness, tracheostomy, re-intubation, emergency intubation, and nasogastric tubewere significantly associated with VAP. Emergency intubation and intravenous sedatives were found to be the specific risk factors for early onset VAP, while tracheostomy and re-intubation were the independent predictors of late-onset VAP by multivariate logistic regression analysis.

We found that diagnosis was meningitis seen in 7 in VAP and 4 in non VAP, GBS in 5 and 2, cardiogenic shock in 10 and 12, dengue shock syndrome in 4 and 7 and hepatic encephalopathy in 6 and 4, stroke in 5 and 2, malaria in 8 and 5 and sepsis in 1 and 4 cases. The Apache II score in VAP was 22.5, in non- VAP was 16.2, mechanical ventilation days was 12.1 and 6.2 respectively. Mean hospital stay was 14.5 and 7.1 respectively. Mohanty et al[11]assessed 100 patients. The patients were classified into four groups named VAP, non VAP, survivors and non survivors. The incidence of VAP in this study was 30%. The association between genders, age and VAP infection was not found to be significant. There was no significant correlation between the primary disease and development of VAP. Most common organism isolated was P. aeruginosa, (9 isolates) followed by MRSA (7 isolates) and most of them were resistant to commonly used antibiotics.

Gadani et al[12] included 100 patients on ventilatory support. Out of which 37 patients developed VAP. The risk factor significantly associated with VAP was found to be duration of ventilator support, reintubation, supine position, advanced age and altered consciousness. Declining ratio of partial pressure to inspired fraction of oxygen (PaO_2/FiO_2 ratio) was found to be the earliest indicator of VAP. The most common organism isolated in our institution was Pseudomonas. The incidence of early-onset VAP (within 96 hours) was found to be 27% while the late-onset type (>96 h) was 73%. Late-onset VAP had poor prognosis in terms of mortality (66%) as compared to the early-onset type (20%). The mortality of patients of the non-VAP group was found to be 41% while that of VAP patients was 54%. Targeted strategies aimed at preventing VAP should be implemented to improve patient outcome and reduce length of intensive care unit stay and costs.

CONCLUSION

Authors found that most common diagnosis was cardiogenic shock. Apache II score and hospital stay was higher among VAP patients as compared to non-VAP patients.

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