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A STUDY ON THE INCIDENCE OF VENTILATOR ASSOCIATED PNEUMONIA IN THE ICU OF A TERTIARY CARE HOSPITAL

Microbiology

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ABSTRACT

Ventilator Associated Pneumonia (VAP) is defined as pneumonia that occurs 48 h or more after endotracheal intubation or tracheostomy, caused by infectious agents not present or incubating at the time mechanical ventilation was started. VAP increases the length of ICU stay of a patient by around 28% and doubles the risk of mortality as compared with patients without VAP. The aim of the present study is to find the incidence of VAP in ICU patients and the association of the causative organism. Out of 1429 patients on mechanical ventilation, 107(7.48%) fulfilled the criteria for VAP, out of which 45 were of early onset and 62 were of late onset VAP. *The causative organisms were predominantly gram negative bacilli like Klebsiella pneumonia, Pseudomonas and Acinetobacter and few Gram positive cocci like Staphylococcus aureus and Enterococcus*. VAP is a significant problem as it leads to prolonged hospitalization and its implicated financial burden. Prevention strategies and proper bundle care helps in mitigating these problems.

KEYWORDS

Ventilator Associated Pneumonia, ICU, Mechanical Ventilation

INTRODUCTION:

Pneumonia is known to be the second most common nosocomial infection, affecting 27% of all critically ill patients.[1] Ventilator Associated Pneumonia(VAP) is defined as pneumonia that occurs 48 h or more after endotracheal intubation or tracheostomy, caused by infectious agents not present or incubating at the time mechanical ventilation was started.[2] New or progressive infiltrates, systemic infection (fever, altered white blood cell counts), changes in sputum characteristics, and the detection of a causative agent are seen in VAP patients.[3]It can be of two types: (i) early-onset VAP which is defined as VAP that occurs within the first 4 days of ventilation, and (ii) late-onset VAP which is defined as VAP that occurs more than 4 days after initiation of mechanical ventilation[2]. The incidence of VAP increases with the duration of mechanical ventilation.[4] VAP increases the length of ICU stay of a patient by around 28% and doubles the risk of mortality as compared with patients without VAP.[5] The risk factors include oropharyngeal and gastric colonization, thermal injuries; post-traumatic, postsurgical intervention factors such as emergency intubation, reintubation, tracheostomy, bronchoscopy and inserting nasogastric tube; patients' body positioning, level of consciousness, stress ulcer prophylaxis, and use of medications, including sedative agents, immunosuppression and antibiotics .[6,7]

Aims and objectives

1. To find the incidence of VAP in ICU patients
2. To find the association of causative organism

Methodology:

A retrospective study was conducted in the Department of Microbiology in association with 40 bedded multidisciplinary ICU of the Department of Critical Care Medicine of a tertiary care multi-specialty Hospital for the period of January 2019 to June 2019. Patients who received mechanical ventilation for more than 48hrs were included in our study. Detailed history including the name, age, sex, underlying clinical condition, date of admission to the ICU, antibiotic intake, the treatment being administered and clinical outcome of each patient was noted.

The collected data was compiled in Microsoft Excel 2010 and statistical analysis was done using SPSS (Statistical Programme for Social Sciences) software 15 version.

Fisher's exact test was applied when two or more set of variables were compared. **P<0.05** was considered to be statistical

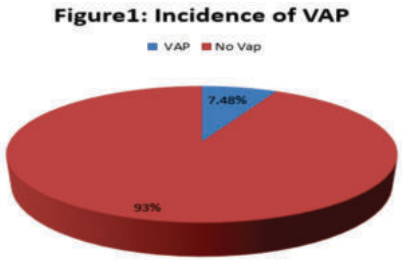
Sample Size:

A total of 1429 patients, who were on mechanical ventilation for more than 48 hrs were included in our study.

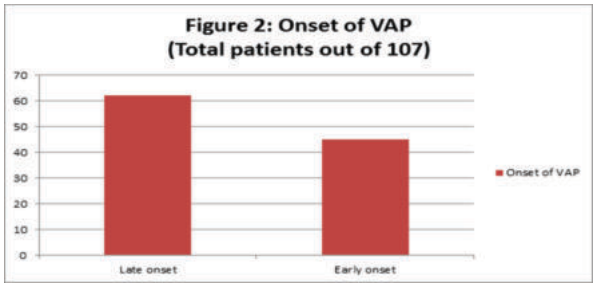
RESULTS

Out of a total of 1429 patients, who were on mechanical ventilation for more than 48 hrs, 107 patients fulfilled the clinical and microbiological criteria for the diagnosis of VAP. Findings are as follows:

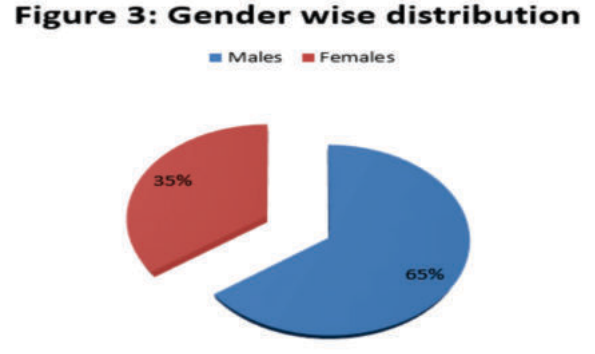
- The incidence of VAP in our study was 7.48%



- Incidence density of VAP was 5.62/1000 ventilator days.
- Out of the 107 cases, 45(42%) were categorized under early onset group and 62 (58%) under the late onset group.



- *The causative organisms were predominantly gram negative bacilli like Klebsiella pneumonia, Pseudomonas and Acinetobacter. Gram positive were mainly Staphylococcus species and Enterococcus. Eleven had no growth on repeated cultures.*
- In relation to gender the incidence of VAP was more among males (65%) than females (35%), however no significant relation was found between gender and VAP.incidence.



DISCUSSION

107 patients of VAP were identified over the study period. The incidence of VAP was 7.48% and VAP rates were found to be 5.62/ 1000 ventilator days. Studies by Chaudhury U et al and Deshmukh B et al found an incidence of 57.14% and 78% respectively, which are quite high compared to our study. [8,9]. However studies by Ali H et al, Mathai et al, Mohanty D et al and Gadani et al have reported significantly lower incidence rates. [10-13].Mortality in the VAP patients was 72.89%(78/107).

Pseudomonas aeruginosa and *Klebsiella pneumoniae* were the commonest organism isolated followed by *Acinetobacter spp.* and *Staphylococcus aureus*. Chaudhury U et al, Deshmukh B et al, Mohanty D et al and Mathai et al also have reported a higher preponderance of gram negative bacilli like *Acinetobacter* and *Pseudomonas* amongst the isolates. [8-9,11-12]

The incidence of VAP was found to be higher in males than females which was not statistically significant. Chaudhury U et al and Ali H et al have reported a higher preponderance of VAP in males than females, however Sharma A et al have reported a higher incidence in females.[8,10,14]

Majority of the patients had diabetes mellitus, hypertension and were immunocompromised before the admission. It is observed that chances of developing VAP were more in patients with co-morbid conditions.

CONCLUSION

VAP is a significant problem as it leads to prolonged hospitalization and its associated financial implications, also leading to more exposure to a widespread range of pathogens , thereby causing increased morbidity and mortality Incidence is directly proportional to the duration of mechanical ventilation, so early weaning needs to initiated soon. Safe practices like hand washing, hygiene awareness, adequate staff training, and an early and prompt response could significantly reduce morbidity and mortality.

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