

Evaluation of Cases of Ventilator Associated Pneumonia Admitted to Medicine Department.

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ABSTRACT

Background: Ventilator associated pneumonia (VAP) is a type of nosocomial pneumonia. The present study was conducted to assess the cases of ventilator induced pneumonia. **Methods:** The present study was conducted in the department of general medicine. It comprised of 126 patients of both genders. Patients who were on mechanical ventilation (MV) for more than 48 hours were monitored at frequent intervals for development of VAP using clinical and microbiological criteria until discharge or death. Colony count was completed and expressed as number of colony forming units per ml (CFU/ml). **Results:** Out of 126 patients, males were 72 and females were 54. Common reason for which patients were admitted were CNS infection seen in 42 cases, CVD in 30, intra- abdominal disease in 12, poisoning in 8, respiratory disease in 6, neurological disorder in 16 and others in 12. The difference was significant ($P < 0.05$). Common bacteria isolated was *Pseudomonas aeruginosa* in 40%, *Klebsiella pneumoniae* in 32%, *Staphylococcus aureus* in 10.6%, *Escherichia coli* in 12% and *Candida albicans* in 5.4%. The difference was significant ($P < 0.05$). **Conclusion:** Ventilator associated pneumonia is a common complication in patients on long standing ventilation. Common bacteria isolated were *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans*.

Keywords: Pneumonia, *Pseudomonas aeruginosa*, Ventilator.

INTRODUCTION

Ventilator associated pneumonia (VAP) is a type of nosocomial pneumonia which occurs in patients who receive mechanical ventilation (MV) via tracheal or tracheostomy tube. Ventilator-associated pneumonia (VAP) occurs 48–72 hours or thereafter following endotracheal intubation, characterized by the presence of a new or progressive infiltrate, signs of systemic infection (fever, altered white blood cell count), changes in sputum characteristics, and detection of a causative agent. VAP contributes to approximately half of all cases of hospital-acquired pneumonia. VAP is estimated to occur in 9–27 % of all mechanically ventilated patients, with the highest risk being early in the course of hospitalization. It is the second most common nosocomial infection in the intensive care unit (ICU) and the most common in mechanically ventilated patients.^[1]

Development of VAP \leq 96 hours of MV is classified as early onset; a delay of more than 96 hours is termed as late onset. Intubation alone is a risk factor

for the development of pneumonia among hospitalized patients. Both the host and intervention associated risk factors increase the mortality among these patients. The end result is either colonization or aspiration of the respiratory contents with potential pathogens.^[2]

The complex interplay between the endotracheal tube, presence of risk factors, virulence of the invading bacteria and host immunity largely determine the development of VAP. The presence of an endotracheal tube is by far the most important risk factor, resulting in a violation of natural defense mechanisms against microaspiration around the cuff of the tube.^[3] The present study was conducted to assess the cases of ventilator induced pneumonia.

MATERIALS AND METHODS

The present study was conducted in the department of general medicine. It comprised of 126 patients of both genders who were admitted to the emergency department. Attendants were informed regarding the study and written consent was obtained.

General information such as name, age, gender etc. was recorded. Patients who were on mechanical ventilation (MV) for more than 48 hours were monitored at frequent intervals for development of VAP using clinical and microbiological criteria until discharge or death.

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Colony count was completed and expressed as number of colony forming units per ml (CFU/ml). The number of CFU/ ml is equal to number of colonies on agar plate \times dilution factor \times inoculation factor. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table 1: Distribution of patients

Total- 126		
Gender	Males	Females
Number	72	54

[Table 1] shows that out of 126 patients, males were 72 and females were 54.

Table 2: Type of diseases

Type of disease	Number	P value
CNS infection	42	0.01
CVD	30	
Intra- abdominal disease	12	
Poisoning	8	
Respiratory disease	6	
Neurological disorder	16	
Other	12	

[Table 2] shows that common reason for which patients were admitted were CNS infection seen in 42 cases, CVD in 30, intra- abdominal disease in 12, poisoning in 8, respiratory disease in 6, neurological disorder in 16 and others in 12. The difference was significant ($P < 0.05$).

Table 3: Microbiological assessment of isolates

Bacteriology	Number	P value
Pseudomonas aeruginosa	40%	0.01
Klebsiella pneumoniae	32%	
Staphylococcus aureus	10.6%	
Escherichia coli	12%	
Candida albicans	5.4%	

[Table 3] shows that common bacteria isolated was Pseudomonas aeruginosa in 40%, Klebsiella pneumonia in 32%, Staphylococcus aureus in 10.6%, Escherichia coli in 12% and Candida albicans in 5.4%. The difference was significant ($P < 0.05$).

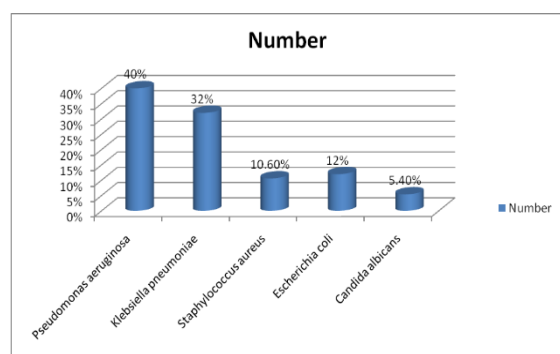


Figure 1: Microbiological assessment of isolates

DISCUSSION

VAP is a major source of increased illness and death. Persons with VAP have increased lengths of ICU hospitalization and have up to a 20-30% death rate. The diagnosis of VAP varies among hospitals and providers but usually requires a new infiltrate on chest x-ray plus two or more other factors. These factors include temperatures of >38 °C or <36 °C, a white blood cell count of $>12 \times 10^9$ /ml, purulent secretions from the airways in the lung, and/or reduction in gas exchange.^[4]

Risk factors for VAP include underlying heart or lung disease, neurologic disease, and trauma, as well as modifiable risk factors such as whether the head of the bed is flat or raised, whether the patient had an aspiration event before intubation and prior antibiotic exposure. Patients who are in the ICU for head trauma or other severe neurologic illness, as well as patients who are in the ICU for blunt or penetrating trauma are at especially high risk of developing VAP. Further, patients hospitalized for blunt trauma are at a higher risk of developing VAP compared to patients with penetrating trauma.^[5] The present study was conducted to assess the cases of ventilator induced pneumonia.

In present study, out of 126 patients, males were 72 and females were 54. We found that common reason for which patients were admitted were CNS infection seen in 42 cases, CVD in 30, intra-abdominal disease in 12, poisoning in 8, respiratory disease in 6, neurological disorder in 16 and others in 12.

Chevret et al,^[6] conducted a study over a period of one year among 2454 patients. The specimens' sputum, bronchoscopic alveolar lavage (BAL) and endotracheal aspirate (ETA) were collected for microbiological confirmation and processed using standard laboratory techniques. Out of 2454 cases, 253 (10.3%) patients developed HAP. The incidence of HAP was higher (55.73%) in the age group more than 60 years. Out of 1352 patients on mechanical ventilation, 62.0% of patients (n=157) developed HAP.

We observed that common bacteria isolated was Pseudomonas aeruginosa in 40%, Klebsiella pneumonia in 32%, Staphylococcus aureus in 10.6%, Escherichia coli in 12% and Candida albicans in 5.4%. Vasuki et al,^[7] found that of the 76 patients, 18 (23.7%) developed VAP during their ICU stay. The incidence of VAP was 53.25 per 1,000 ventilator days. About 94% of VAP cases occurred within the first week of MV. Early-onset and late-onset VAP was observed in 72.2% and 27.8%, respectively. Chronic lung failure, H2 blockers usage, and supine head position were significant risk factors for VAP. Logistic regression revealed supine head position as an independent risk factor for VAP.

Zilberberg et al,^[8] in their cross sectional study recruited 160 hospitalized community-acquired pneumonia (CAP) patients. Out of 160 patients, majority respondents 88 (55%) were males, while 90 (56.25%) had rural residents predominance. It revealed 140 (87.5%) respondents were married, while 18 (11.25%) were < 20 years, 68 (42.5%) were between 20-40 years, 58 (36.25%) from 41-60 years and 16 (10%) were > 60 years of age. There were 110 (68.75%) illiterates from lower socio-economic class. Hemoglobin level was 8-10 gm/dl among majority 80 (50%), and 34 (21.75%) were diabetics.

CONCLUSION

Ventilator associated pneumonia is a common complication in patients on long standing ventilation. Common bacteria isolated were *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans*.

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