Original article

“ISOLATION AND IDENTIFICATION OF AEROBIC BACTERIA FROM VENTILATOR ASSOCIATED PNEUMONIA AND ITS ANTIBIOGRAM FROM TERTIARY CARE CENTER, KANPUR”

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ABSTRACT

Ventilator-Associated Pneumonia (VAP) is the most common hospital acquired respiratory tract infection, developed in patients who have been mechanically ventilated for duration of more than 48 hours. The aim of the study was to isolate aerobic bacteria from Ventilator associated pneumonia and its antibiogram. Material and Methods: This study was carried out at Department of Microbiology, in Rama Medical College Hospital and Research Center. Endotracheal tip, endotracheal aspirate, expectorated sputum in was microbiologically examined. Results: Total 30 samples were collected from VAP suspected patients. Sixty percent of male suffered from VAP. More than 60 year patients were mainly infected with pneumonia. Early onset VAP occurred in 11 (36.66%), while late onset VAP was observed in the remaining 19 (68.33%) patients. Acinetobacter sp. was most predominant isolate (8.26.66%). Isolated pathogen were highly resistant to penicillin, cephalosporins and carbapenems also. Amikacin were found to effective E.coli. Acinetobacter was highly resistant pathogen. Conclusion: Acinetobacter was the predominant isolates from VAP. Microbiological surveillance facilitates the monitoring of changes of dominant microorganisms and antibiotic susceptibilities helping in the decision of empirical treatment regimes and as a result, selecting the right antibiotics.

Key word: Ventilator-Associated Pneumonia, Antibiogram, Acinetobacter.
INTRODUCTION

Ventilator-associated pneumonia (VAP) refers to bacterial pneumonia developed in patients who have been mechanically ventilated for a duration of more than 48 h.\[1\] Ventilator-associated pneumonia (VAP) is one of the most commonly encountered hospital-acquired infections seen in the critical care setting and can be linked to several adverse clinical outcomes. Defined by the United States Centers for Disease Control and Prevention as pneumonia occurring 48 h after the initiation of mechanical ventilation, VAP is associated with increased rates of multidrug-resistant infections increased antibiotic use, prolonged mechanical ventilation time, increased ICU length of stay, and increased hospital length of stay\[2\]. VAP is the second most common cause of the nosocomial infection after urinary tract infection among pediatric and neonatal intensive care unit (NICU) patient\[3\].

Early administration of appropriate empirical therapy for nosocomial pneumonia has been demonstrated to significantly improve survival. For this reason, the most recent guideline by the American Thoracic Society (ATS) and the Infectious Diseases Society of America (IDSA) on the treatment of nosocomial pneumonia recommends empirical therapy.\[4,5,6,7,8\]

The choice of antimicrobial agents is made on the basis of the most likely infecting flora and is modified according to time since admission (ie, 0-4 days or 5 days or more), prior receipt of antibiotics, and the presence of certain risk factors (eg, residence in an extended care facility or receipt of dialysis within the past 90 days for a patient receiving long-term dialysis)\[9\].

Lack of a gold standard for diagnosis is the major culprit of poor outcome of VAP. The clinical diagnosis based on purulent sputum may follow intubation 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.\[10\]

Fever and leukocytosis are non-specific and can be caused by any condition that releases cytokines. 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.\[6,7\] The Clinical Pulmonary Infection Scoring (CPIS) system originally proposed by
Pugin and others helps in diagnosing VAP with better sensitivity (72%) and specificity [11].

This study was undertaken to know the aerobic bacteria from Ventilator associated pneumonia and its antibiogram.

**MATERIAL AND METHODS**

**Study area and Duration:** This study was carried out at Department of Microbiology, in Rama Medical College Hospital and Research Center, from. Specimens were considered adequate for processing by the Microbiology Laboratory. Endotracheal tip, endotracheal aspirate, expectorated sputum in was microbiologically examined[12,13] with clinical correlation like fever (temperature > 38⁰ C), leukopenia (< 4000 WBC) or leukocytosis (> 12000 WBC), altered mental status, age of the patients.

**Results:**

Total 30 samples were collected from VAP suspected patients. Male were more (60%) as compare to female(40%) [Fig 1]. Advance age group patients (>61 yr) were highly infected from VAP followed by 46-60 [Fig 2]. All the patients were intubated..

Early onset VAP occurred in 11 (36.66%), while late onset VAP was observed in the remaining 19(68.33%) patients. Acinetobacter sp. was most predominant isolate (8, 26.66%). Other distribution of bacteria associated with VAP was mentioned in Table 1. Antibiotic resistant pattern of isolates were showed in Fig 3.

![Male and Female distribution](image1)

**Fig 1: Male and Female distribution**

![Age wise distribution of patients](image2)

**Fig 2: Age wise distribution of patients**

**Table 1: Distribution of Bacteria in VAP patients**

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Organism</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acinetobacter spp.</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>K. pneumoniae</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>P. aeruginosa</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>E.coli</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Citrobacter sp.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>
DISCUSSION

Pneumonia is an important cause of morbidity and mortality in hospitalised patients. Total 30 samples were collected from VAP suspected patients. Male were more (60%) as compare to female(40%). Sharma PC et al. [14] found in males incidence of VAP was 45.2% and that in females was 30.9% , other studies also found male were more affected. [15] Advance age group patients (>61 yr) were highly infected from VAP followed by 46-60. Early onset VAP occurred in 11 (36.66%), while late onset VAP was observed in the remaining 19(68.33%) patients, this results were almost similar to study of Sharma PC et al.[14] who reported 40% of cases were early onset VAP and in the present study Acinetobacter sp. was most predominant isolate (33.33%) followed by K.pneumoniae (26.66%), P.aeruginosa (23.33%), E.coli (10%) and citrobacter sp.(6.66%).

Other studies were also found Acinetobacter sp. as a predominant pathogen of VAP. Mohan et al. isolate 54.2% of Acinetobacter sp. from VAP patients[17]. Some studied conducted by Modi Payal P et al found K.pneumoniae was the frequent isolate[18]. David J. Weber et al. and Joseph et al found S.aureus(23%) and Pseudomonas (21.3%) respectively as a predominant isolates[19,20]. While in the present study K.pneumoniae was the second most
common isolate and no gram positive cocci were isolated. This may be because of less study population. All the isolated strains were resistant to commonly used antimicrobial agents. Acinetobacter were highly resistant isolates for carbapenem(90%) also.

Amikacin show resistant to E.coli and P.aeruginosa of 33.3% and 42.8% respectively. K. pneumonia was 75 % and 85.5% resistant to penicillins and cephalosporins respectively. Pseudomonas show better sensitivity for ciprofloxacin.

CONCLUSION

Proper infection control strategies should follow to reduce infection rate of hospitalized patients. Hand washing is widely recognized as an important but underused measure to prevent nosocomial infections including VAP.

REFERENCE

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