Co-Morbidities in Hospital Acquired Pneumonia and Ventilator Associated Pneumonia

Dr. Ria Ann Thomas¹, Dr. Irfan², Dr. BS Verma³, Dr. Deepu CC⁴

¹Assistant Surgeon, CHC Periye, Kasaragod, Kerala India
²Assistant Professor, Department of Respiratory Medicine, Yenepoya Medical College, Mangalore, Karnataka, India
³Professor and Head, Department of Respiratory Medicine, Yenepoya Medical College, Mangalore, Karnataka, India
⁴Assistant Professor, Department of Respiratory Medicine, Yenepoya Medical College, Mangalore, Karnataka, India

*Corresponding author
Dr. Irfan
Email: irfan@yenepoya.edu.in

Abstract: Nosocomial infections are common and can increase disease morbidity in patients. Hospital Acquired Pneumonia (HAP) and Ventilator Associated Pneumonia (VAP) are among the leading causes for nosocomial infections. They also constitute one of the leading causes for morbidity and mortality among the nosocomial infections. The present study was done to evaluate the presence of comorbidities in patients developing Hospital Acquired Pneumonia and Ventilator Associated Pneumonia. The study was conducted on all patients above 16 years of age diagnosed with HAP and VAP admitted and treated at Yenepoya Medical College Hospital, Mangalore from October 2013 to October 2015. It is a descriptive study in which 50 patients of hospital acquired and ventilator associated pneumonias were observed for the presence of any comorbidities. In the 50 cases, it was observed that 72% of them had pre-existing respiratory illness, 42% had Diabetes Mellitus, 38% had Systemic Hypertension and 20% had Ischemic Heart Disease. It was observed that most of the cases of hospital acquired and ventilator associated pneumonias had pre-existing respiratory illness. However, the presence of comorbidities also increased the chance for HAP and VAP.

Keywords: Nosocomial infections, Pneumonia, pre-respiratory illness

INTRODUCTION
Pneumonia is an infection of the pulmonary parenchyma. It is a known fact that patients can acquire infection from hospital. These are known as hospital acquired or nosocomial infections. Pneumonia is the second most common nosocomial infection affecting 9-24% of critically ill patients [1]. It is one of the leading cause of morbidity and mortality among nosocomial infections [2]. Hospital acquired pneumonia (HAP) is pneumonia that occurs 48 hours or more after admission and did not appear to be incubating at the time of admission [3]. Ventilator associated pneumonia (VAP) is a type of nosocomial pneumonia that develops more than 48 to 72 hours after endotracheal intubation [4].

MATERIAL AND METHODS
The study was conducted in patients admitted in Yenepoya Medical College Hospital over a period of 2 years from October 2013 to 2015. The study included 50 patients diagnosed with nosocomial pneumonia. The patients were selected based on the criteria for diagnosis of nosocomial pneumonia according to the Modified Centers for Disease Control and Prevention (CDC) [5, 6].

Inclusion Criteria
All patients above the age of 16 years of age of both gender, who developed nosocomial pneumonia were included in the study. Diagnosis of HAP/VAP was made using the modified CDC Criteria: Chest radiographic opacities (new progressive or persistent infiltrate or cavitation) AND at least two of the following:
1. Fever >38°C or >100.4°F.
2. Leukopenia (<4000 WBC/µL) or Leukocytosis (>12,000 WBC/µL).
3. Altered mental status with no other recognized cause in the elderly.
4. New onset of purulent sputum, or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements.
5. Worsening gas exchange (desaturation, increased oxygen requirements or increased ventilator demand).
6. New onset or worsening cough, or dyspnea, or tachypnea.
7. Rales or bronchial breath sounds.

Exclusion Criteria

Patients below the age of 16 were excluded from the study. Patients who developed respiratory infections less than 48 hours of hospital admission. Those who were discharged from intensive care unit in less than 48 hours or died within 48 hours.

RESULTS AND DISCUSSION

The study included 50 patients with HAP/VAP. 6 patients between the age of 16 to 30, 25 were between the age of 31 to 60 years, 19 were above 60 years. There were 34 males and 16 female patients in the study. 20 patients developed Hospital Acquired Pneumonia while 30 patients developed Ventilator Associated Pneumonia.

<table>
<thead>
<tr>
<th>Comorbidities</th>
<th>Nosocomial Pneumonia</th>
<th></th>
<th></th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HAP (n=20)</td>
<td>VAP (n=30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>10</td>
<td>50%</td>
<td>11</td>
<td>52.4%</td>
<td>21</td>
</tr>
<tr>
<td>Systemic Hypertension</td>
<td>5</td>
<td>25%</td>
<td>14</td>
<td>73.7%</td>
<td>19</td>
</tr>
<tr>
<td>Ischemic Heart Disease</td>
<td>2</td>
<td>10%</td>
<td>8</td>
<td>80.0%</td>
<td>10</td>
</tr>
<tr>
<td>Pre-existing Respiratory Illness</td>
<td>16</td>
<td>80%</td>
<td>20</td>
<td>55.6%</td>
<td>36</td>
</tr>
</tbody>
</table>

Out of the 50 patients studied 36 patients (72%) had pre-respiratory illness including COPD, 21 patients (42%) had Diabetes, 19 patients (38%) had Hypertension and 10 patients (20%) had Ischemic Heart Disease which showed that pre-existing respiratory illness is an important pre-disposing factor for the development of nosocomial pneumonia. This finding was consistent with a study conducted in JIPMER by Noyal Maria Joseph et al [7].

The finding in our study is comparable to the patient statistics in the study conducted by Kuo-Tung Huang where 42 patients of 838 patients with nosocomial pneumonia had ventilator associated pneumonia [8]. Our finding is consistent with the study conducted by Vasuki, who had 253 patients developing HAP of which 26% of IMCU admission were due to cardiac and pulmonary emergencies [9]. Simay Serin et al. conducted a study with 37 patients with VAP, trauma followed by pulmonary disease followed by CNS diseases were among the more common diagnosis at admission who developed VAP during hospitalization. Respiratory failure was seen in 34 cases of VAP [10].

Our study was not in consensus with the findings in the study conducted by Eirini Tsakiridou et al who did not support the hypothesis that HbA1c to be associated with increased risk of VAP in the ICU [11].

In a study conducted by Ozlem Equils et al 448 patients enrolled in the study, 183 were diabetic [12]. Demosthenes Markis et al. studied the Impact of COPD on ICU Mortality in Patients with Ventilator and found that presence of COPD in VAP was an independent risk factor for ICU mortality [13].

Alp E. Güven et al in a prospective study on incidence, risk factors and mortality of nosocomial pneumonia in Intensive Care Units found Coma and COPD seen to contribute to the development of VAP [14] which is in understanding with our present study. Isabel Jimenez-Trujillo observed VAP incidence rates were higher among Type 2 Diabetes Mellitus patients. Mortality was higher for older patients and those with more co-morbid conditions [15]. In a study conducted by Nikhil Sinha it was observed that the prevalence of VAP was more in patients with medical illnesses like diabetes, hypertension and CRF than patients without them [16]. Pneumonia are common to diabetics’ due to colonization in the nasal and oral flora by pathogenic organisms [17]. Co-morbid conditions contributed to development of VAP and increase mortality. Co-morbidities like alcoholism, diabetes, hypertension,
chronic renal failure was found to be significant statistically [18].

CONCLUSION
It is important to have history of the patients’ co-morbidities and any immunosuppressive disease and of medications that could predispose the individual to nosocomial infections. In such situation, it would help in anticipating the patients’ treatment and use of prophylactic measure in preventing nosocomial infections which would potentially complicate the morbidity of the patients and thus increase mortality.

REFERENCES