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ORIGINAL ARTICLE

HEALTH CARE ASSOCIATED INFECTION – AN EMERGING EPIDEMIC?

[*1]A.Salma Hanam, [2]R.Umarani and [3]K.Baburaj

[*1]Post graduate, Department of Medicine, RMMCH, Chidambaram-608002,Tamilnadu
[2]Professor of Medicine, Department of Medicine, RMMCH, Chidambaram-608002,Tamilnadu
[3]Reader of Medicine Department of Medicine, RMMCH, Chidambaram-608002,Tamilnadu

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ABSTRACT

Ventilator Associated Pneumonia (VAP) is one of the commonest infection in intensive care unit.VAP is associated with increased patient's mortality and morbidity. Knowledge about the incidence and risk factor is necessary to implement preventive measures to reduce mortality in these patients.

Keywords: VAP, CPIS, Microorganism, Apache III.

1.INTRODUCTION

The term nosocomial infection has been expanded to 'Health care Associated Infections (HCAI) which includes infections acquired in institutions during hospitalization. Pneumonia is presumed to be the most common infection in the intensive care unit. It is one of the leading cause of morbidity and mortality among the hospital acquired infections. One of the causes for hospital acquired pneumonia (HAP) is ventilator – associated pneumonia (VAP) (Davis, 2006).

Ventilator associated pneumonia (VAP) is pneumonia that develops 48 hours or longer after mechanical ventilation (MV). VAP that occurs within 48 to 72 hours of MV is termed as early onset VAP and VAP that occurs after this period is considered late onset (Langer et al., 1987).

86% of nosocomial pneumonia is associated with mechanical ventilation. Ventilator associated pneumonia is the second most common nosocomial infection in critically ill patients(27%). The incidence of VAP increases with the duration of MV. The mortality rate varies from 27 to 76% (Kollef et al., 1995). Studies in the past have consistently shown that a delay in starting appropriate antibiotic therapy is found to increase the mortality among the patients developing VAP.

Patients developing VAP are often treated empirically with antibiotic regimens based on the possible pathogen. Use of appropriate antibiotics directed towards the most prevalent organism not only improves the cure rate and survival but also reduces the emergence of resistant strain. However many controversies remain regarding the epidemiology, diagnosis, therapy and prognosis of VAP especially in Indian scenario. Hence there is a need for the proposed study.

*Corresponding author: ***Dr.A.Salma Hanam,*** *Post graduate, Department of Medicine, RMMCH, Chidambaram-608002,Tamilnadu*

2.METHODOLOGY

This prospective study was done on patients admitted to the Rajah Muthiah Medical College and Hospital during the period NOV 2014 to SEP 2016, who were on mechanical ventilation for more than 48 hours.

Patients were evaluated for related factors such as age, concomitant diseases, immune suppression (chronic renal failure, diabetes mellitus and steroid therapy), indication for MV, severity of illness based on APACHE III scoring system and Clinical Pulmonary Infection Score (CPIS).Chest radiograph was taken at the time of connecting the patient to ventilator and after 48 hours of mechanical ventilation. Later serial x-rays were taken every 24 hours to look for evidence of evolving pneumonia.

VAP was diagnosed in patients who fulfilled both clinical & microbiological criteria.

Clinical Diagnosis	Clinical Pulmonary Infection Score (CPIS) based on six clinical assessments, each worth zero to two points.
Microbiological Diagnosis	Quantitative endotracheal aspirate culture $>10^5$CFU/ml or >5% cells with intracellular bacteria on direct microscopic examination of gram stained specimen.

CPIS points	0	1	2
Tracheal secretions	Rare	Abundant	Abundant and purulent
Chest X-ray infiltrates	No infiltrates	Diffuse	Localized
Temperature (°C)	≥36.5 and ≤38.4	≥38.5 and ≤38.9	≥39 or ≤36
Leukocytes (per mm³)	≥4000 and ≤11,000	<4000 or >11,000	<4000 or >11,000 plus band forms ≥500
PaO_2/FiO_2 ratio	>240 or ARDS		≤240 and no evidence of ARDS
Microbiology	Negative		Positive

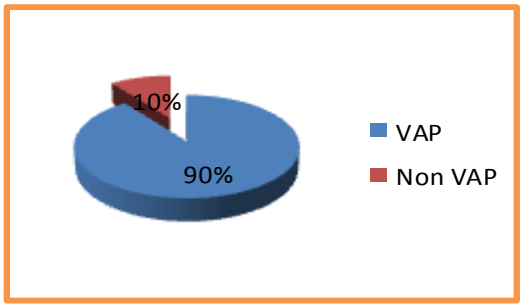
VAP was diagnosed microbiologically in patients with quantitative endotracheal aspirate culture indicative of > 10^5 CFU/ml or ≥5% cells with intracellular bacteria seen on direct microscopic examination of gram stained specimen.

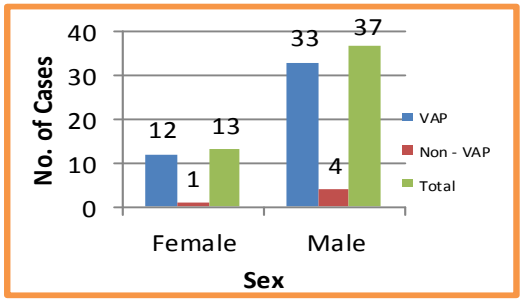
Patients who were less than 48 hrs on ventilation, with prior pneumonia, pregnant patients were not included in our study

3.OBSERVATIONS AND RESULTS

Out of 50 patients studied,45(90%) were diagnosed to have VAP. There was no statistically significant difference in the distribution of VAP in different age groups. In our study,males were 37(74%) in number,of which 33(89.2%) developed VAP. Among 13(26%) female cases,12(92.3%) had VAP.

VAP occurrence was high among patients who had comorbid illness like hypertension and diabetes. Our study had 11(78.6%) hypertensive patients and 13(86.7%) diabetic patients.

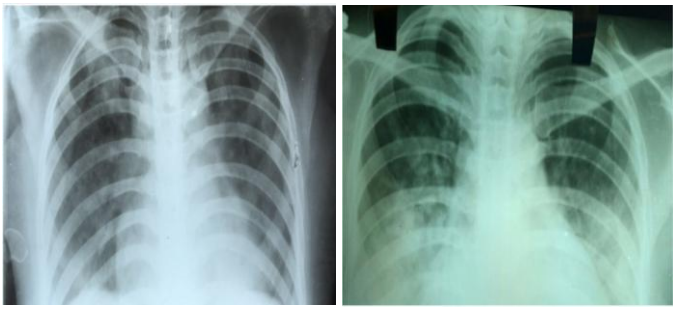




In our study, OPC poisonings was the commonest cause for which patients were intubated followed by hanging. In case of poisoning ,patients who took more than 2 hrs to reach hospital had developed VAP.VAP was found to be high among patients who had CPIS > 6 (Porzecansci and Bowton,2066)

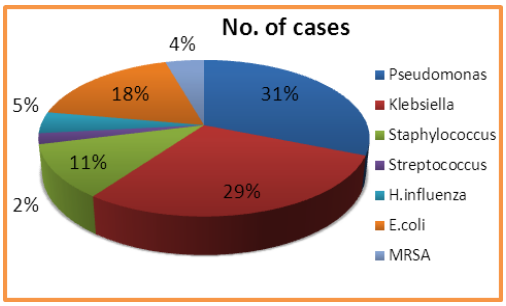
CPIS	No of Pts	VAP	%
0-5	8	4	50%
6-12	42	41	97.6%

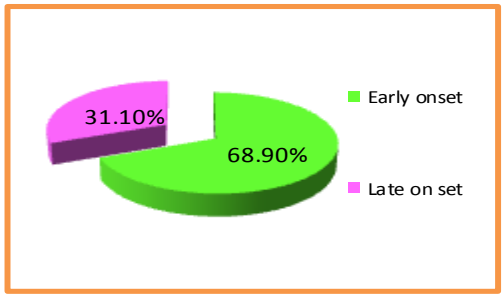
In serial chest X rays taken in our patients with VAP, we found that homogenous and heterogeneous opacity with air bronchogram was common and majority of patients had right middle and lower zone involved.



X ray at day 1 of MV **Day 4 of MV**

Out of 45 VAP cases in our study,31 (68.9%) cases had early onset VAP and 14(31.1%) cases had late onset VAP.Most common organisms isolated were Pseudomonas(31%) and Klebsiella(28.9%) followed by E.Coli(17.8%)(Trouillet et al., 1998)





In our study,patients with VAP had an average APACHE III score of 69.35,compared with non-VAP group whose score was 46 (Rakshit et al., 2005) We found the 'p' value as 0.055 (according to Pearson Correlation) which is significant.

With the help of culture reports,antibiotics were changed accordingly in our study. So 30(66.7%) VAP cases showed improvement,11 (24.5%)cases expired and 4(8%) cases left against advice.

4.DISCUSSION

The Prevalence of VAP in our study in critically ventilated patients was 90%. The reason for high prevalence of VAP may be due to small sample size, presence of co-morbid illness, late presentation and most of our patients were seriously ill.This may necessitate longer duration of MV which is directly proportional to VAP development. We found that the risk of VAP was more in patients who had underlying medical illness like hypertension and diabetes.

Mortality due to VAP was due to combination of factors like severity of underlying disease, presence of co-morbid factors, age of the patient etc. VAP was found to be high among patients who had CPIS more than 6.[4] When the CPIS exceeded 6, there was a good co-relation of the presence of VAP. The CPIS has a sensitivity of 77% and specificity of 42%. Some patients with a low clinical suspicion of VAP (CPIS<6) can have antibiotics safely discontinued after 3 days if the subsequent course suggests that the probability of pneumonia is still low.

Mortality rate was high in early onset VAP patients due to resistant organisms, underlying comorbid illness and also delay in seeking medical attention. The most common organisms causing VAP was Pseudomonas, Klebsiella and E.coli and also found that the incidence of polymicrobial flora was higher in the tracheal aspirates of our patients. The organisms isolated from our patients were found to be sensitive to only few antibiotics which projects the presence of multi-drug resistant organisms. This emphasizes the need for judicious selection of patients for antibiotic therapy.

The prophylactic use of antibiotics is not recommended and exposure to antibiotics is a significant risk factor for colonization and infection with noscomial MDR pathogens. In short, prior administration of antibiotics for short duration may be beneficial in some groups, but when continued for prolonged period, chances of antibiotic resistance are high.

5.CONCLUSION

The prevalence of pneumonia in patients on ventilator for more than 48 hours was high, with slight predominance in extremes of age group.Co-morbid conditions like hypertension and diabetes contributed to development of VAP.Most common organisms werePseudomonas and Klebsiella and these organisms were resistant to commonly used antibiotics.APACHE III score at the time of admissionfound to be a useful parameter for assessing the prognosis of our patients.Antibiotic de-escalation helped in the outcome of our patients with VAP.

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