



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research  
Vol. 10, Issue, 02(A), pp. 30750-30752, February, 2019

**International Journal of  
Recent Scientific  
Research**

DOI: 10.24327/IJRSR

## Research Article

### A CLINICAL STUDY ON VENTILATOR ASSOCIATED PNEUMONIA

Shyam Kumar Kotni\*, Nagarjuna Balla, and Swarna Iatha Devi G

Department Of General Medicine, ASRAM Medical College, Eluru, West Godavari District, Andhra Pradesh

DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1002.3117>

#### ARTICLE INFO

##### Article History:

Received 6<sup>th</sup> November, 2018  
Received in revised form 15<sup>th</sup>  
December, 2018  
Accepted 12<sup>th</sup> January, 2018  
Published online 28<sup>th</sup> February, 2019

##### Key Words:

APACHE III Score, Mechanical  
ventilation, Ventilator-associated  
pneumonia (VAP)

#### ABSTRACT

Ventilator-associated pneumonia (VAP) remains to be the commonest cause of hospital morbidity and mortality in spite of advances in diagnostic techniques and management.

**Aims And Objectives:** This study aims to find out the various risk factors and the common microbial flora associated with VAP.

**Materials and Methods:** All patients requiring mechanical ventilation for more than 48hrs after fulfilling criteria are taken in to the study. It evaluates the use of APACHEIII scores for prognostication.

**Results:** The significant risk factors for development of VAP were prolonged ventilation, high APACHE 3 scores on admission, presence of co morbid condition like diabetes, stroke, renal diseases

Copyright © Shyam Kumar Kotni., Nagarjuna Balla, and Swarna Iatha Devi G, 2019, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

#### INTRODUCTION

Pneumonia is presumed to be the most common infection in the intensive care unit. It is one among 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). 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. VAP that occurs after this period is considered late onset VAP.

Eighty-six percent of nosocomial pneumonias are associated with mechanical ventilation. The incidence of VAP increases with the duration of MV. 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.

However many controversies remain regarding the epidemiology, diagnosis, therapy and prognosis of VAP especially in Indian scenario. Hence there is need for proposed study.

##### Aims and Objectives

1. To study the prevalence of pneumonia in patients on ventilator for more than 48 hours.

2. To study the causative microorganisms for VAP and their antibiotic sensitivity.
3. To study the correlation between patient related factors and incidence of VAP.
4. To study the association between VAP and the severity of illness assessed by APACHE-III scores on admission.

#### MATERIALS AND METHODS

##### Method of Collection of Data

**Study Design-** It is a prospective cohort study among Patients admitted to intensive care unit in our hospital.

A total of 50 patients admitted to the Intensive care unit during the study period requiring MV for longer than 48 hrs formed the study cohort.

##### The following Baseline Investigations Were Done

Blood counts, renal function tests, blood glucose, liver function tests, chest x-ray, ECG, endotracheal aspirate for gram staining and culture, blood culture, ABG.

##### Inclusion Criteria

All patients subjected to mechanical ventilation for more than 48 hours in Critical Care unit constitute the study design.

\*Corresponding author: Shyam Kumar Kotni

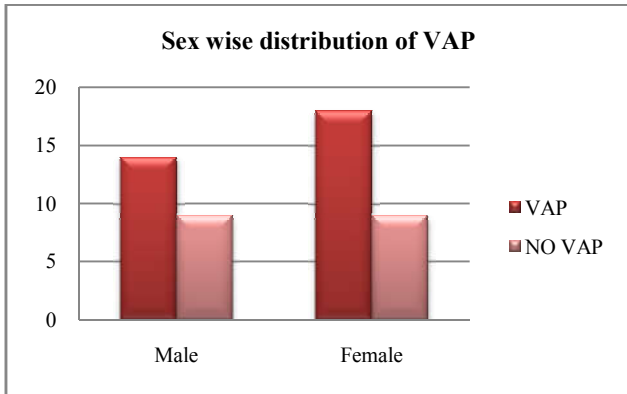
Department Of General Medicine, ASRAM Medical College, Eluru, West Godavari District, Andhra Pradesh

**Exclusion Criteria**

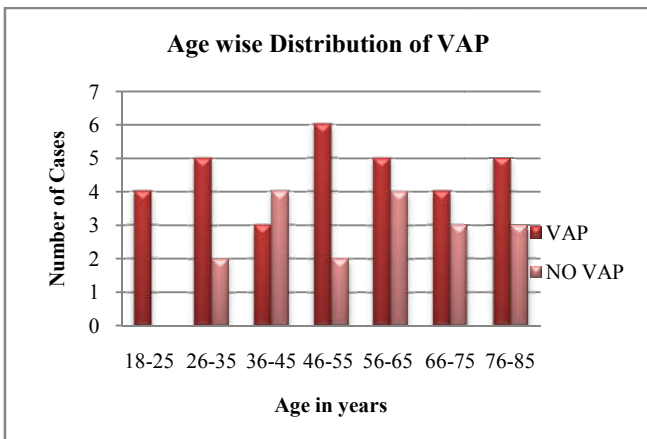
- Patients having Pneumonia prior to MV.
- Patients having pulmonary edema.
- Patients with ARDS.

**RESULTS**

A total of 50 patients admitted to the ICU in our hospital on Mechanical Ventilation for more than 48 hours were studied. Out of 50 patients 32 (64%) patients were diagnosed to have VAP. Our study included 23(46%) female and 27(54%) male patients, out of which 14(60.9%) females had VAP and 18(66.7%) males had VAP.

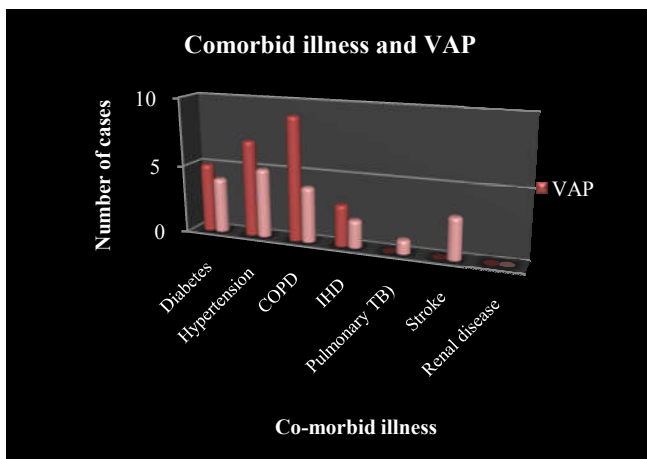


**Fig 1** Sex wise distribution of VAP



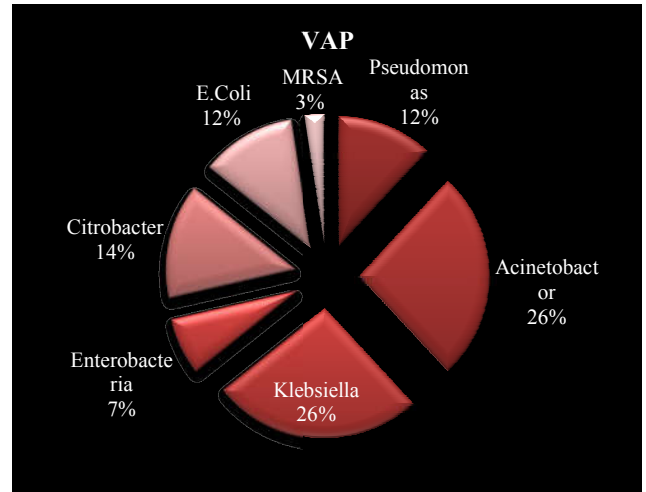
**Fig 2** Age wise distribution of VAP

The age distribution of VAP was studied. In our study it was found that VAP was equally distributed in all age groups.



**Fig 3** Co morbid Illness and VAP

The association with co morbid illness was studied in our patients. It was found that the risk of developing VAP was more in patients who had medical illness like diabetes, COPD, hypertension and IHD than patients without them.



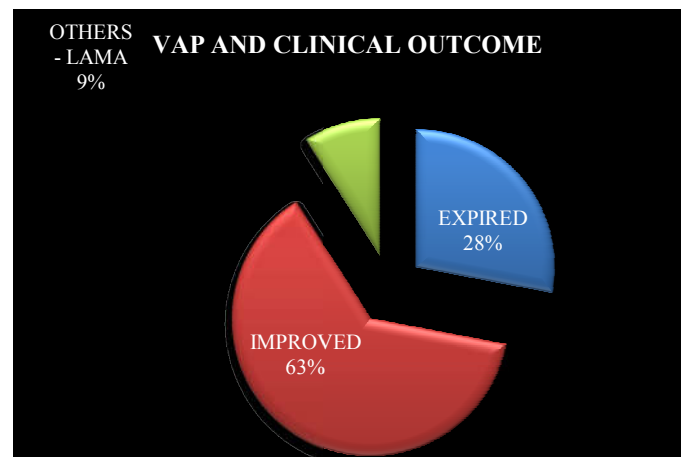
**Fig 4** Causative organisms and VAP

Most common organisms isolated in our patients is Acinetobacter (25%) and Klebsiella (25%) followed by Citrobacter (13%), Pseudomonas aeruginosa (11%), Escherichia coli (11%), Enterobacter (7%) and MRSA (2%).

**Table 1** APACHE III score on hospital admission

APACHE III ON HOSPITAL ADMISSION				
VAP	N- Sample size	Minimum	Maximum	MEAN
PRESENT	32	23	135	69.06
ABSENT	18	22	121	65.83

Above table no: 1 shows association between severity of illness assessed by APACHE III scores on admission and VAP. Patients with VAP had an average APACHE III score of 69.06, compared with non VAP group APACHE III score 65.83.



**Fig 5** VAP and clinical outcome

**DISCUSSION**

VAP is the most common nosocomial infection among patients receiving mechanical ventilation. A total of 50 patients admitted to the ICU who was on mechanical ventilation for more than 48 hours were studied. Out of 50 patients 32 (64%) patients were diagnosed to have VAP. The prevalence of VAP in our study was 64% compared with other studies prevalence

of VAP is 15% Kollef et al study and 27% Chastre et al study. 61% of females and 67% of males in the study group had VAP. There was no sex predilection to VAP in the study and was the same in other studies done by Wagh et al; and Rodriguez et al. In the present study, distribution of VAP was same in all the age groups similar to other Indian studies Rakshit et al; Joseph et al; and Dey et al; The prevalence of VAP was greater in patients with diseases necessitating prolonged mechanical ventilation like poisonings, AIDP, COPD, ACS etc. Most common organisms isolated in our patients is Acinetobacter (25%) and Klebsiella (25%) followed by Citrobacter (13%), Pseudomonas aeruginosa (11%), Escherichia coli (11%), Enterobacter (7%) and MRSA (2%). Patients with neurological disorders and CNS infections in our study group were predisposed to the development of VAP. These patients had impaired consciousness and inadequate cough reflexes which predisposed them for developing VAP. It was found that the risk of developing VAP was more in patients who had medical illnesses like diabetes, COPD, hypertension, IHD than patients without them. This was similar to the studies done by Rakshith et al; and Katherason et al.

## CONCLUSION

The significant risk factors for development of VAP were prolonged ventilation, high APACHE 3 scores on admission signifying severe illness, presence of co morbid condition like diabetes, stroke, renal diseases etc. The patients who developed VAP had prolonged stay in the hospital and high mortality rate (28%) in our study. There was no sex predilection for VAP. VAP was common in extremes of age that is patients below 30 years and patients above 70 years. The prevalence of VAP was greater either in patients with diseases necessitating prolonged MV like poisonings, AIDP, COPD, ACS etc. Most common offending organism isolated in our patients is Acinetobacter and Klebsiella followed by Citrobacter, Pseudomonas aeruginosa, Escherichia coli, Enterobacter and MRSA. Most of the patients showed resistance to commonly used antibiotics like Ceftriaxone, Piperacillin and Tazobactam and Cefepime and Sulbactam. They were sensitive to Gentamicin, Amikacin, Imipenem and Meropenem. APACHE 3 scores within first 24 hours of admission to CCU were used to predict the severity of illness. The patients with higher mean APACHE 3 score at admission had higher mortality and increased incidence of developing VAP. Majority of the patients were found to have late onset VAP. This shows that VAP increases with the duration of MV. The outcome was good after the change of antibiotics in patients with VAP based on culture sensitivity report. Most of the patients with VAP had poor clinical outcome when compared to non VAP patients.

## References

1. Kollef MH, Silver P, Murphy DM. The effect of VAP in determining mortality Chest, 1995 Dec ; 108(6): 1655-62
2. Chastre J, Fagon JY. Ventilator-associated pneumonia. Principles of Critical Care. 1998; 617-47
3. Wagh H, Acharya D .Ventilator Associated Pneumonia – an Overview; BJMP 2009;2(2) 16-19.
4. Rodriguez D O, Cezário R C, Filho P G. Ventilator-Associated Pneumonia (VAP) caused by Multidrug-Resistant (MDR) Pseudomonas aeruginosa vs. Other microorganisms - Risk factors and outcomes; *International Journal of Medicine and Medical Sciences*:1(10) :432-437, 2009
5. Rakshith P, Nagar V S, Deshpande A K. Incidence, clinical outcome and risk stratification of VAP- A prospective cohort study. *Ind J of Crit Care Med*, 2005; 9:211-6
6. Dey A, Bairy I. Incidence of multidrug resistant organisms causing ventilator associated pneumonias in a tertiary care hospital: A nine months prospective study. *Ann of the Med*, 2007; 2: 52-7
7. Joseph NM, Sistla S, Dutta TK, Badhe AS, Parija SC. Ventilator-associated pneumonia in a tertiary care hospital in India: incidence and risk factors. *J Infect Diseases* 2009; 3(10):771-77
8. Katherason Heyland D, Cook D, Dodek P and Muscedere J. A Randomized Trial of Diagnostic Techniques for Ventilator-Associated Pneumonia. The Canadian Critical Care Trials Group. *N Engl J Med*. 2006 Dec 21; 355(25): 2619-30.

### How to cite this article:

Shyam Kumar Kotni., 2019, Nagarjuna Balla, and Swarna latha Devi G., A Clinical Study on Ventilator Associated Pneumonia. *Int J Recent Sci Res*. 10(02), pp. 30750-30752. DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1002.3117>

\*\*\*\*\*