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Original Research Paper

General Medicine

A STUDY OF VENTILATORY ASSOCIATED PNEUMONIA IN ICU OF RURAL HOSPITAL

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ABSTRACT

Introduction: Intensive care units create opportunity for recovery in patients who otherwise may not have died, However, they are at times associated with problem of nosocomial infections. Inspite of availability of newer antimicrobials the treatment of VAP has proved to be difficult. The clinical presentation and organisms causing the VAP are different in different set ups.

Aims and Objectives: To study the incidence ,clinical profile and organisms with antibiogram of VAP.patients admitted in ICU settings.

Materials and Methods: A total of 60 Patients who were admitted in medical intensive care unit on mechanical ventilator who developed pneumonia and fulfilling inclusion criteria were studied. These patients were investigated clinically, radiologically and bacteriologically to determine presence of pneumonia, isolate causative microorganism and presence of co morbid conditions like DM, COPD, CRF etc.

Results and Conclusion: Crepitation (83%) was the commonest sign in patients and early onset VAP. Fever and tachycardia were the commonest sign in patients with late onset (61%) VAP. Overall all the three signs were the commonest in all VAP patients (48% each). Pseudomonas and staphylococcus aureus (21%) each were the commonest bacteria isolated in early onset VAP. Pseudomonas (52%) was the commonest bacteria isolated in patients with late onset VAP. Overall pseudomonas (37%) was the commonest organism isolated in VAP. Hence there is every need for early diagnosis and management of these patients to decrease morbidity and mortality.

KEYWORDS : VENTILATOR ASSOCIATED PNEUMONIA, ICU.

INTRODUCTION

The care of critically ill patients in intensive care unit is a primary component of modern medicine. Intensive care units create potential for recovery in patients who otherwise may not have survived. However, they are associated with problem of nosocomial infections. Nosocomial infections are those which manifest in patients 48 hours after admission to hospital. Critical care units increasingly use high technology medicine for patient care, hemodynamic monitoring, ventilator support, haemodialysis, parenteral nutrition, and a large battery of powerful drugs, particularly antibiotics to counter infection. It is indeed a paradox that the use of high-tech medicine has brought in its wake the dangerous and all too frequent complication of nosocomial infections.

The widespread use of tracheal intubation and mechanical ventilation to support the critically ill has defined an expanding group of patients who are at particularly high risk for development of nosocomial pneumonia [1]. Ventilator associated pneumonia (VAP) is a form of nosocomial pneumonia that occurs in patients receiving mechanical ventilation for more than 48 hours. The incidence of VAP is 9% to 70%, the average incidence is 20% to 25%, in other words one in four mechanical ventilated patients acquires VAP [2]. VAP increases morbidity, period of ventilation and mortality.

AIMS AND OBJECTIVES

To study the incidence of VAP.
To study clinical profile of VAP patients
To study the organisms and culture sensitive antibiotics causing VAP patients admitted in the MICU.

MATERIALS AND METHODS

All patients on mechanical ventilator admitted in Intensive critical care unit.

During the period from September 2015 to June 2017. The study was prospective study.
Methods of collection of data

Sample Size : 60 Patients
Sampling procedure: Consecutive patients in medical intensive care unit on mechanical ventilator who developed pneumonia fulfilling inclusion criteria were studied.

Inclusion criteria

The subjects which are included in this study are those who are on mechanical ventilator for more than 48 hours & one of the following.
Fever >38.3^{0}C.or 36^{c}C
Leucocytosis >12000/cmm, or Leucopenia <4000/cmm

Purulent respiratory secretion with gram stain demonstration & Polymorph cells
Quantitative endotracheal aspirate cultures with growth >10^{6} cfu/ml

Exclusion Criteria:

Patients who are already having respiratory infections, those who developed respiratory infections in less than 48 hours of mechanical ventilation, those who are discharged from MICU in less than 48 hours or died within 48 hours are excluded.

Methods of Study

All adult Patients who developed VAP in critical care units as per definition in inclusion criteria's were investigated clinically, radiologically and bacteriologically to determine presence of pneumonia, isolate causative microorganism and presence of comorbid conditions like DM, COPD, CRF etc.

Outcome was variable and development of VAP which depends on following factors like age, sex, clinical signs and symptoms, comorbid illness, organisms isolated, use of medical devices like RT tube, duration of ventilation etc.

Investigations conducted
Relevant investigations were done in patients who are clinically suspected to have VAP.

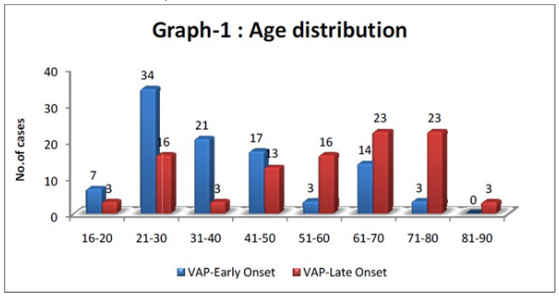
Specific investigations: TLC, DLC, Chest x-ray, Blood culture , Endotracheal aspirate for C/S in deserving candidates, Arterial blood gas analysis

Routine investigations included: Hemoglobin, ESR, Urine examination, FBS, PPBS
HIV,Bl. Urea,Sr. Creatinine, Serum electrolytes, ECG.

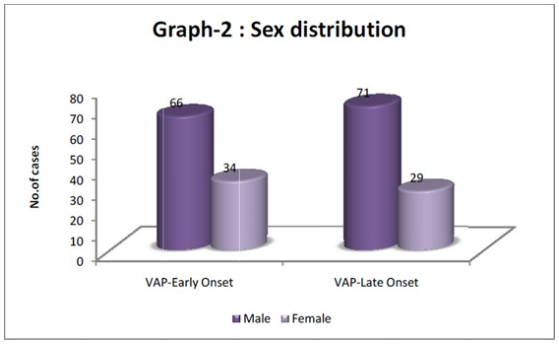
In selected cases, whenever necessary specific investigations such as:
Pleural fluid culture, Endotracheal aspirate for culture sensitivity
All data were entered into a standard Performa and analyzed.

RESULTS

Totally 524 patients were admitted to MICU put on mechanical Ventilator in the span of September 2015 to June 2017 out of which 60 patients who developed ventilator associated pneumonia were selected for this study. Incidence was seen to be 11.45%



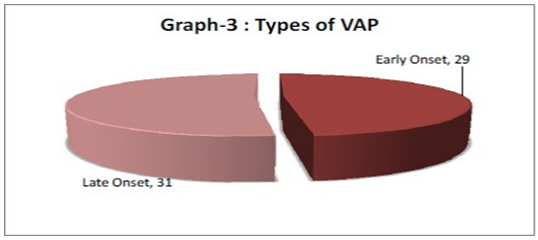
The age of the patients ranged from 16-81 years, the mean age being 48.5 years.

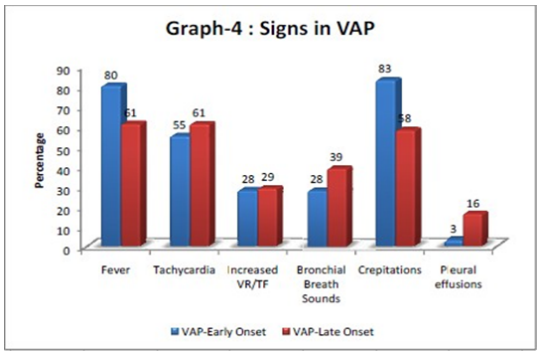


Out of 60 patients with VAP 41 were males (68 %) and 19 were females (32%). Out of 29 patients with early onset VAP, 19 were males (66%) and 10 were females (34%). Out of 31 patients with late onset VAP, 22 were males (71%) and 9 were females (29%).

Primary diagnosis of critically ill patients who developed VAP were –

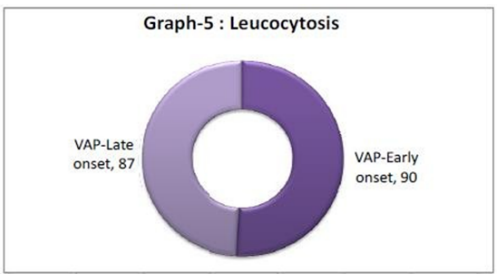
a)OP poisoning-	15
b)IHD + RHD + other cardiac conditions -6c) COPD-	5
d)Stroke-	5
e)Acute abdomen-	5
f)RTA +Head injury-	4
g)GBS-	3
h)DKA-	2
i)Bronchial asthma-	2
j)CRF-	2
k) PUO-	1
l)Carcinoma oropharynx	1
m)Myasthenia gravis-	1

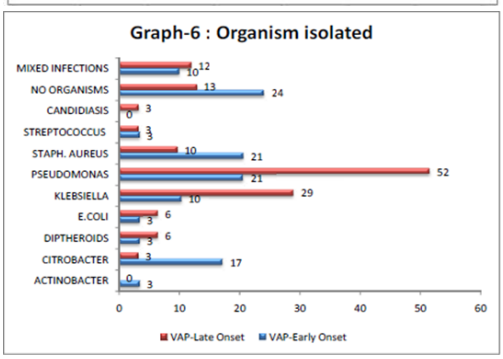




Crepitations is the commonest sign found in the patients with early onset VAP with 83% of patients having it, next commonest signs were fever and tachycardia (80%), increased VR/TF and bronchial breath sounds (28%) and pleural effusion (3%). Fever and tachycardia were commonest sign in patients with late onset VAP with 61% having it and other signs were crepitations (58%), bronchial breath sounds (39%), increased VR/TF (29%) and pleural effusion (16%).

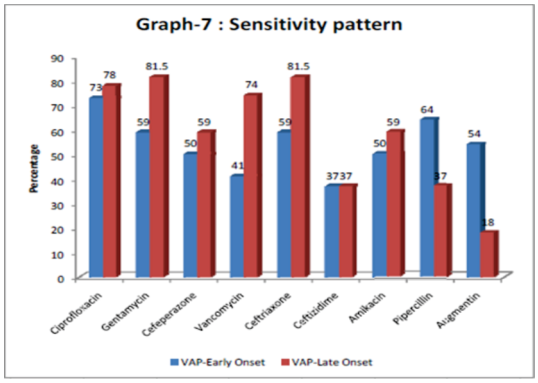
90% of early onset VAP patients had leucocytosis. 87% of late onset VAP patients had leucocytosis.



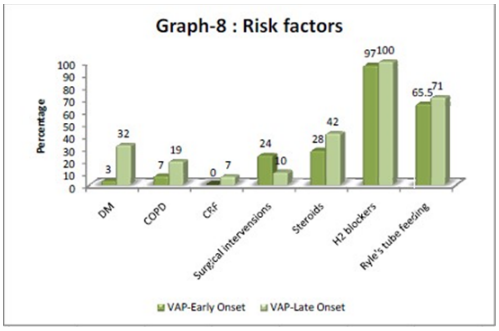


Most common organisms isolated in early onset VAP were pseudomonas and staphylococcus aureus (21% each).Other organisms isolated were Citrobacter (17%), Klebsiella (10%), Mixed infections (10%), Streptococcus, Actinobacter, Diphtheroids, E-coli (3% each), in 24% of cases of early VAP no organism was grown.

Most common organism isolated in late onset VAP was pseudomonas (52%), followed by Klebsiella and Mixed infections (29% each), Staphylococcus aureus (10%), E-coli and Diphtheroids (6% each), Citrobacter, Streptococcus and candidiasis (3% each) and in 13% cases no organisms were grown.



Commonest antibiotic for which most bacteria were sensitive in early onset VAP was



Ciprofloxacin (73%). Other were Piperacillin (64%), Gentamycin (59%), Ceftriaxone (59%), Augmentin (54%), Cefaperazone (50%), Vancomycin (41%), Ceftizidime (37%) respectively.Commonest antibiotic for which most bacteria were sensitive in late onset VAP were Gentamycin and Ceftriaxone (81.5%), followed by Ciprofloxacin (78%), Vancomycin (74%), Cefeperazone and Amikacin (59% each) and Augmentin (18%).

he commonest risk factors predisposing to early onset VAP was use of H2 blockers (97%) followed by Ryle's tube feeding (65.5%), Steroids (28%), Surgical interventions (24%), COPD (7%) and DM (3%).The commonest risk factor predisposing to late onset VAP was again use of H2 blockers (100%) followed by Ryle's tube feeding (71%), Steroids (42%), DM (32%), COPD (19%), Surgical interventions (10%), and CRF (7%).

TABLE – 1: OUTCOME

Outcome	VA P-Early Onset		VAP-Late onset		Total		P* Value,
	No.	%	No.	%	No.	%	Sig
Expired	5	17	23	74	28	47	P<0.001
Recovered	24	83	8	26	32	53	H S

Chi square test

In early onset VAP totally 83% of patients recovered and 17% expired. In late onset VAP totally 74% of patients expired and 26% recovered.

TABLE – 2 : MORTALITY WITH RELATION TO RISK FACTORS

Risk Factors	Total	VAP Early Onset		Total	VAP Late Onset		Total	Total	
		No	%		No	%		No	%
DM	1	1	100	10	8	80	11	9	82
COPD	2	0	0	6	5	83	8	5	63
CRF	0	0	0	2	2	100	2	2	100
Surgical Intervention	7	3	43	3	3	100	10	6	60
Steroids	8	1	12.5	13	8	62	21	9	43
H2 Blockers	28	4	14	31	23	74	59	27	46
Ryles Tube feeding	19	5	26	22	18	82	41	23	56

DISCUSSION

Critically ill patients admitted to ICU benefit from close surveillance, cardiovascular monitoring and invasive devices such as mechanical ventilator, urinary bladder catheterization and vascular acess.[3]

Present study was conducted to determine the clinical pattern of VAP and organisms causing it. Predisposing factors for VAP also studied.Diagnosis of VAP using clinical criteria alone is often not accurate because fever and leucocytosis occur in many febrile conditions and colonization of respiratory tract with gram negative bacilli is common in intubated patients even in absence of pneumonia.[3] Also chest x-ray infiltrates in patients on mechanical ventilator may be due to causes other than pneumonia. Diagnostic bronchoscopy with protected brushing of specimen or BAL culture increase the specificity of diagnosis. [4] However invasive diagnostic testing is not needed routinely to manage suspected VAP[5] and diagnostic bronchoscopy was not used routinely in the present study as it was not considered safe in critically ill patients.

The incidence in our study was 11.45% which is almost in accordance with other studies conducted by Triveedi et al[6], and Fagon et al[7]

The most common organisms isolated in early onset VAP were pseudomonas and staphylococcus aureus. And the most common organisms isolated in late onset VAP was pseudomonas. These results go in accordance with previous studies conducted by Jordi et al 8 and Brennan et al 9.Streptococcus pneumoniae was isolated from two of our patients who were elder and having COPD. This also goes with previous literature.[3]

Total mortality of VAP in our study was 47%, while the study conducted by Rajesh Chawla 10 showed mortality in VAP of 37-43% in India.

The variation and differences in the clinical and bacteriological pattern are related to the ICU case mix and difference in the definition and diagnostic studies used and such differences make direct comparison between studies difficult. Not with standing these reservations this study confirms the magnitude of the problem of VAP. So the best approach to manage this problem seems to be adaptation of preventive strategies.

CONCLUSION

Incidence of VAP was 11.45% in our study. Out of 60 patient studied 29 had developed early onset and 31 had developed late onset.

The clinical examination revealed the patients to have increased body temperature, tachycardia, tubular breath sound and crepitations. The patients with associated pleural effusion had decreased air entry with dull note on percussion.

The most common sign evident in early onset VAP was crepitation (83%) followed by fever and tachycardia (80%), bronchial breath sounds (28%) and pleural effusion (3%).

The most common sign evident in late onset VAP were fever and tachycardia (61%) followed crepitation (58%), bronchial breath sounds (39%), pleural effusion (16%).

90% of early onset and 87% of late onset VAP had leucocytosis.
Most common organisms isolated in early onset VAP were pseudomonas and staphylococcus aureus (21% each). Followed by Citrobacter (17%), Klebsiella (10%), Mixed infections (10%), Streptococcus, Actinobacter, Diphtheroids, E-coli (3% each), in 24% of cases of early VAP no organism was grown.

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