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INCIDENCE OF PNEUMONIA IN CRITICALLY ILL PATIENTS ON VENTILATOR IN BASAVESHWAR TEACHING AND GENERAL HOSPITAL

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ABSTRACT: BACKGROUND AND OBJECTIVES: Nosocomial pneumonia (NP) is defined as parenchymal lung infection, occurring after the first 48 hours of hospital admission. Ventilator Associated Pneumonia (VAP) is the most common cause of nosocomial pneumonia. The clinical presentation and organisms causing the VAP are different in different set ups. Hence early diagnosis and management of these patients will decrease morbidity and also the mortality. **AIM OF STUDY**: Is to find the most common organism, sensitivity, and clinical profile of the patients suffering from VAP. **MATERIALS AND METHODS:** All patients on mechanical ventilation admitted in Intensive Care Units (ICU) of Basaweshwar Teaching and General Hospital attached to M.R.M.C Gulbarga for approximately 2 years from September 2010 to June 2012 were considered. Patients under study were those satisfying inclusion criteria and a detail history and clinical examination of the selected patients was taken. **RESULTS:** 224 patients were put on mechanical ventilator during the study period of them 60 patients developed VAP. Out of 60patients, 29 developed early onset and 31 developed late onset VAP. The most common sign in early onset VAP was crepitation (83%) and late onset were fever and tachycardia (61%). Commonest organism isolated in early onset VAP was Pseudomonas and Staphylococcus aureus (21%) and Pseudomonas (52%) in late onset. Piperacillin, meropenem and vancomycin were the most common antibiotics for which cultures were sensitive in early onset VAP, as compared to meropenem, vancomycin and levofloxacin in late onset VAP. Commonest risk factors in early and late onset VAP was use of H2 blockers (97% and 100%) respectively. late onset VAP had very high mortality rate of 71% as compared to only 17% in early onset VAP. **CONCLUSION:** Keen observation, clinical, radiological examination and culture sensitivity of respiratory secretions of ventilated patients in ICU would help to detect early onset of VAP. This early detection helps to administer the appropriate antibiotics which will reduce the morbidity, duration of hospital stay and mortality.
KEYWORDS: Ventilator associated pneumonia, intensive care unit, culture sensitivity.

INTRODUCTION: Nosocomial pneumonia (NP) accounts for 13–18% of all hospital acquired infections, but are the leading cause of death. It is a major threat to patient admitted intensive care units (ICU) and receiving mechanical ventilation (MV).

In the recent studies, it was shown that ventilator associated pneumonia (VAP) was the most common infectious complication among patients admitted ICU. It results in high mortality and morbidity, prolonged lengths of hospitalization, and also increased cost of hospitalization.

Despite 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. Hence there is every need for early diagnosis and management of these patients to decrease morbidity and mortality and it was shown by the National Nosocomial Infection Surveillance that nosocomial infection is the second most common infection in ICU.

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METHODS: Prospective study of 60 patients on mechanical ventilator admitted in Intensive critical care units of Basaweshwar Teaching and General Hospital M.R.M.C Gulbarga were studied, during the period from September 2010 to June 2012.

Inclusion criteria were Patients on mechanical ventilator for more than 48 hours & one of the following.

a. Fever >38.30 C. or 36 C.
b. Leucocytosis >12000/cu mm, or Leucopenia <4000/cu mm.
c. Purulent respiratory secretion with gram stain demonstration & Polymorph cells.
d. Quantitative endotracheal aspirate cultures with growth >106 cfu/ml.

On all the patients routine hematological investigations were done, causative organisms was isolated on microbiological culture and its sensitivity to antibiotics were determined along with certain significant risk factors like DM, H2 blockers, steroids etc.

RESULTS: Totally 224 patients were admitted to ICU during the study period were put on Mechanical Ventilator and 60 patients developed VAP with this study done between Sept 2010 to June 2012.

Most common primary diagnosis of critically ill patients who developed VAP was OP poisoning (15 patients) followed by stroke (5patients), head injury and snake bite (4%) being the 3rd most common cause.

Out of 60 patients with VAP, 41 were males (68%) and 19 were females (32%). Of the 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%). (Table 1)

Most common signs associated with early onset VAP were crepitation's (83%), Fever (80%), Tachycardia (80%), and bronchial breath sounds (28%) and pleural effusion (3%).

Fever and tachycardia were commonest signs in patients with late onset VAP with 61% having it and other signs were crepitation's (58%), bronchial breath sounds (39%), increased VR/TF 29% and pleural effusion 16%. (Graph 1)

Leukocytosis was seen in both early and late onset VAP patients constituting in 90% and 87% of patients respectively. 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. (Table no 2)

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 in 13% cases no organisms were grown.(table no 2)

Commonest antibiotic for which most bacteria were sensitive in early onset VAP was piperacillin (77%), meropenem(68%), vancomycin (59%), levofloxacin (54%), amikacin (50%), augmentin and Ceftriaxone (50%), ceftazidime (45%) respectively.(graph no 2)

Commonest antibiotic for which most bacteria were sensitive in late onset VAP were meropenem (85%) and vancomycin (77%), levofloxacin (74%), ceftazidime (70%), piperacillin (55%), Ceftriaxone (48%), amikacin (41%), cefaperazone (27%), augmentin (25%). (graph no 2)

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The common risk factor predisposing to early onset VAP was use of H2 blocker (65%), Ryle's tube feeding (65%), steroids (28%), surgical intervention (24%), DM (4%). The commonest risk factor predisposing to late onset VAP was again use of H2 blocker (73%), followed by Ryle's tube feeding (71%), steroid (65%)' DM (32%), surgical intervention (10%), CRF (7%).

In early onset VAP totally 83% of patients recovered and 17% expired. In late onset VAP 74% expired and 26% recovered (graph no 3).

Number of days spent on ventilator was 1120 for late onset VAP with 3.7 VAP rate per 1000 ventilator days as compared to 672 days for early onset VAP and 2.23 VAP rate per 1000 ventilator days.

The mortality was high in patients of early onset VAP with diabetes mellitus (100%). The mortality was high in patients of late onset VAP with CRF (100%) and surgical interventions (100%).

DISCUSSION: Patients admitted in ICU's benefit from proper and closed surveillance of haemodynamic monitors, vascular catheters, urinary catheters and proper hygiene along with preventive measures to prevent VAP.[1]

Present study is undertaken to determine the risk factors causing VAP, most common organism causing VAP and antibiotic best suited for our set up.

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.[1]

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.[2]

However invasive diagnostic testing is not needed routinely to manage suspected VAP 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 2.23 and 3.7 per thousand ventilator days (i.e., VAP Rate) which is almost in accordance with other studies conducted by Krishna et al.[3]

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[4] and Brennan et al.[5]

Total mortality of VAP in our study was 47%, while the study conducted by Rajesh Chawla[6] 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.

CONCLUSION: VAP is an important nosocomial infection especially in patients with mechanical ventilator for long duration and it increases the morbidity, mortality, hospital stay and cost burden.

In the present study out of 224 patients, out of 60 patients who developed VAP over period of 2years, 29 developed early onset and 31 had late onset VAP. Commonest risk factor in both was H2 blockers. Most common organism being pseudomonas in both early and late onset VAP.

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Commonest antibiotic sensitive in early onset VAP was piperacillin as compared to meropenem in late onset VAP. Mortality rate was very high in late onset VAP (74%) as compared to early onset VAP (17%) which was comparatively lower.

So close monitoring in ICU set up and early detection of VAP becomes important and detection of causative organism by microbiological culture methods of respiratory secretions and early institution/ administration of proper treatment would reduce the hospital stay, morbidity and mortality of patients on ventilator.

| Age years	VAP-Early onset		VAP-late onset		Total	
	No.	%	No	%	No	%
Male	19	66	22	71	41	68
Female	10	34	9	29	19	32
Total	29		31		60	

Table 1: SEX DISTRIBUTION

| Organisms	VAP-Early onset		VAP-late onset		Total	
	No.	%	No	%	No	%
Actinobacter	1	3	0	0	1	1.7
Citrobacter	5	17	1	3	6	10
Diptheroids	1	3	2	6	3	5
E.coli	1	3	2	6	3	5
Klebsiella	3	10	9	29	12	20
Pseudomonas	6	21	16	52	22	37
Staph. Aureus	6	21	3	10	9	15
Streptococcus	1	3	1	3	2	3
No organism	7	24	4	13	11	18
Mixed infections	3	10	9	29	12	20

Table 2: ORGANISMS ISOLATED

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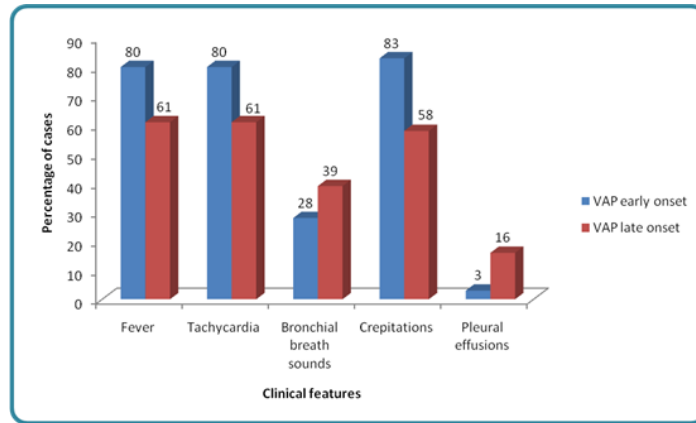
Graph 1: SIGNS OF VAP
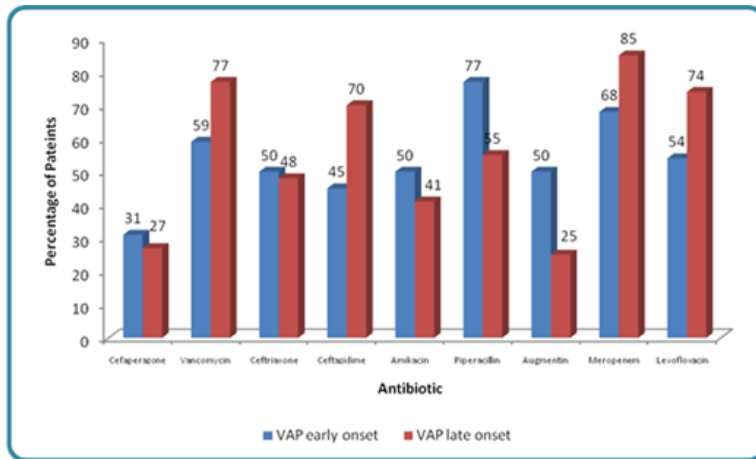
Graph 2: ANTIBIOTIC SENSITIVITY
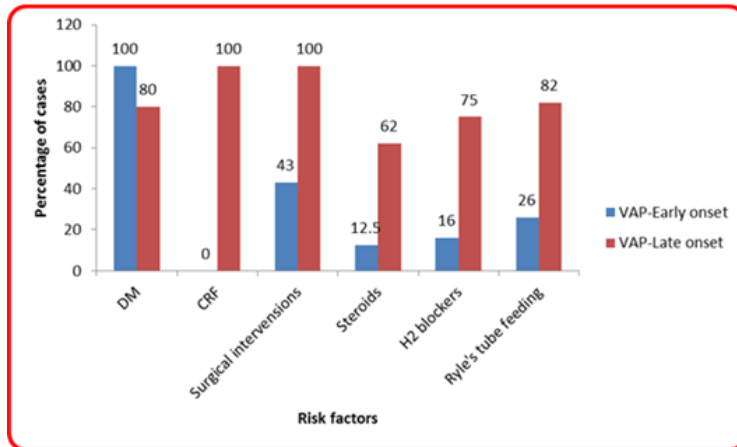
Graph 3: RISK FACTORS

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Date of Submission: 27/10/2014.
Date of Peer Review: 28/10/2014.
Date of Acceptance: 05/11/2014.
Date of Publishing: 07/11/2014.