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Original Research Article

Study of Clinical and Microbiological Profile of Ventilator Associated Pneumonia in Patients

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Abstract:

Background and Objectives: Ventilator associated pneumonia (VAP) is the most frequent intensive care unit acquired infection and is one of the leading causes of morbidity and mortality in ICUs. VAP is defined as pneumonia occurring more than 48 hours after endotracheal intubation and initiation of mechanical ventilation. The aim of our study is to find causative organism of VAP and to determine antibiotic susceptibility and its clinical profile

Materials and Methods: All patients on mechanical ventilation in MICU of GMCH, Bettiah. Study duration of Two years. were considered Patients under study were satisfying the inclusion criteria and detailed history and clinical examination of the patients was performed.

Conclusion: VAP continues to be one of the major causes of both morbidity & mortality in ICUpatients. Proper selection of cases requiring ventilator support may decrease the incidence ofVAP. Proper monitoring & trying to bring the patient out of ventilator as early as possible maygo a long way in reducing incidence of VAP.

Keywords: VAP, pneumonia, MDR.

Introduction

Ventilator associated pneumonia (VAP) is the most frequent intensive care unit acquired infection and is one of the leading causes of morbidity and mortality in ICUs. VAP is defined as pneumonia occurring more than 48 hours after endotracheal intubation and initiation of mechanical ventilation, including pneumonia developing after extubation. Incidence of VAP is approximately 9 - 27% of all intubated patients [1]. Early onset VAP, which occurs during the first four days of mechanical ventilation, usuallyis less severe, associated with better prognosis, and is more likely to be caused by antibiotic sensitive bacteria. Late onset VAP, which develops five or more days after initiation of mechanical ventilation, is caused by multidrug resistant pathogens and is associated with increased morbidity and mortality [2]. Pseudomonas spp., Acinetobacter spp., Escherichia coli, Klebsiella pneumoniae and Staphylococcus aureus have been identified as the common VAP pathogens. The etiologyof VAP varies with different patient populations and types of ICUs. The local microbial flora causing VAP needs to be studied in each setting to guide more effective and rationalutilization of antimicrobial agents [3]

Objectives: To isolate and identify the causative organisms of ventilator associated pneumonia in ICU patients at GMC hospital.

To determine the antibiotic susceptibility patterns in these VAP pathogens.

Materials and Methods

It is a prospective study with case identification considering all patients on mechanicalventilator admitted in MICU were studied. The data was collected from patients on mechanical ventilator admitted tomedical intensive care unit of Government medical College and Hospital Bettiah. West Champaran. study Duration Two years.

Method of collection of data: Sample size :60 patients, Sampling procedure: Patients on mechanical ventilator fulfilling inclusion criteria were taken as a part of study.

Inclusion Criteria: ICU patients who are intubated and on mechanical ventilation for more than 48 hours. Patients in whom VAP is clinically suspected (Centres for Disease Control and Prevention Criteria)>

Exclusion Criteria: Patients who have developed pneumonia within 48 hours of mechanical

ventilation will excluded.

Patient with pneumonia on admission.

All patients in MICU developing VAP full filling inclusion criteria mentioned above were taken into consideration and study of isolation of causative organism and its antibiotic susceptibility were determined along with significant risk factors associated with VAP

Results

Total admission to MICU were 738 of them 234 patients were put on mechanical ventilator & of them 60 patient developed VAP Incidence -25.6 per 1000 mechanical ventilated patients.

Table 1: Age Distribution

Age inyears	Vap early onset		Vap late onset		Total	Percentage
	No	Percentage	No	Percentage		
21-30	5	28	3	7	8	13
31-40	1	6	8	19	9	15
41-50	3	17	10	24	13	22
51-60	5	28	8	19	13	22
61-70	2	11	10	24	12	20
71-79	1	6	2	5	3	5
>80	1	6	1	3	2	3
Total	18		42		60	

In early onset VAP, 28% of patients were in the age group of 21-30 years & 51-60 years , 17% of patients were in the age group of 41-50, 11% of patients were in the age group of 61-70 & 6% respectively in the age group of 31-40, 71- 79 & >80 year age group In the late onset VAP, 24% of patients were in the group of 41-50 years & 61-70 years respectively, 19% of patients were in the group of 31-40 years & 21-60 year group respectively, 7% in the age group 21-30 years, 5% in the age group 71-80 years & 3% in >80 years.

Table 2: Primary diagnosis of critically ill patients whodeveloped VAP

Diagnosis	No of patients	Percentage
Neurological disorders andneuro infection	31	52
Cardiovascular disease	6	10
Respiratory disease	6	10
Poisoning	4	7
Dm with dka and sepsis	3	5
Others	10	17

Among 60 patient who developed VAP 52% were with Neurological disorder, 10% werewith Respiratory, Cardiovascular & Others respectively, 7% with poisoning & 5% with DM & sepsis.

Table 3: types of vap

Vap	No	Percentage
Early	18	30
Late	42	70

Creptation is the most common sign is the most common sign inearly inset VAP with 100% having it, Next common signs were new onset sputum/increased secretion & New onset cough/ dyspnea /tachyonea with 94% followed by leucocytosis (89%), fever (83), worsening gas exchange (56%) & bronchial breath sounds (22%). Creptation & Leucocytosis were the common sign in late onset VAPwith 100% having it followed by New onset sputum secretion or increased secretion & New onset cough /tachypnea (98%), fever (86%), new onset sputum or increased secretion (83%),),worsening gas exchange (76%) & bronchial breath sounds (33%)

In early onset VAP mortality was highest among Pseudomonas & Enterobacter spp 50% followed by Acinetobacte 34%, Mixed infection 29%, E. coli 25% Klebsiella 13% In late onset VAP mortality was highest among Klebsiella 88%, followed byAcinetobacter spp & Mixed infection 86% respectively, Enterobacter 80%, pseudomonas 67%, E. coli 50%, staph aureus 33%

Table 4 : Mortality in Relation to Diagnosis

Diagnosis	No of patients	Mortality	%
Neurological disordersand neuro infection	31	17	28

Cardiovascular disease	6	5	8
Respiratory disease	6	3	5
Poisoning	4	1	2
Dm with dka and sepsis	3	3	5
Others	10	4	7

Mortality was highest among neurological disorder 28%, followed by cardiovascular 8%, others 7%, Respiratory & DM with DKA & sepsis 5% Poisoning 2%.

Discussion

VAP is an important nosocomial infection among ICU patients receiving MV The incidence of VAP 25.6 in our study was high, almost similar to another Indianstudy set R et al(2011) 27.7% F. & Jaimes et al 29%., Dr Ghanshyam B et al 21%, Saroja et al 35.14% & J infect Dev ctries 2009 22.94%

References	Incidence
SET R et al 2011[4]	27.7%
Saroj Golia et al[5]	35.14%
Dr. Ghanshyam B. Borisagar et al.[6]	21%
Fabian Jaimes et al[7]	29%
J Infect Dev Ctries 2009[8]	22.94%
Present Study	25.6

Out of 60 VAP patients 18 (30%) developed early VAP 42(70%) developed lateVAP Most common organism isolated in early onset VAP were klebsiella. Pneumoniae (44%) followed by Acinetobacter spp (33%) & Most common organism isolated in late onset VAP are Acinetobacter (69%), Mixed infection (33%) followed by Klebsielaa (19%). Over all most common organism causing VAP was Acinetobacter 58%, Klebsiella 27%, Pseudomonas 13%.

These results go in accordance with previous studies conducted by Set R et,Saroja et al[5], Dr Ghanshyam B et[a] & J infect Decries

Patients with neurological disorders and CNS infections in our study group weresignificantly 31 of 60 (51.66%) predisposed for the development of VAP. These patients had impaired consciousness and inadequate cough reflexes which predisposed them for developing VAP. The mortality in our study is 55 % while study conducted by while the study conducted by Rajesh Chawla showed mortality in VAP of 37-43% in India.

Reference	Mortality
Pawar Rakshit et al[9]	37%
Kollef et al.[11]	37.5%
Fagon et al.[10]	53%
Rajesh Chawal	37-43%
Present Study	55%

Mortality is high among Acinetobacter 58% followed by mixed infection35% klebsiella 27%. Mortality was more with more than one comorbid condition that is with DM/HTN/IHD/CKD 90% (9 out of 10) The variation and differences in the clinical and bacteriological patternare 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

VAP continues to be one of the major causes of both morbidity & mortality in ICU patients. Proper selection of cases requiring ventilator support may decreasethe incidence of VAP. Proper monitoring & trying to bring the patient out of ventilator asearly as possible may go a long way in reducing incidence of VAP

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