ORIGINAL RESEARCH PAPER

Respiratory Medicine

STUDY OF MICROBIOLOGICAL PROFILE OF VENTILATOR ASSOCIATED PNEUMONIA

Dr Ameet H	Senior Resident, Department Of Pulmonary Medicine, Aiims, Patna.
Dr. Ankita	Dnb Resident, Department Of Anaesthesia, Blk-max Hospital, New Delhi.
Dr Gulshan Kumar*	D.m. Resident, Department Of Neuroanaesthesiology And Critical Care, Aiims, New Delhi *Corresponding Author.

ABSTRACT

Ventilator associated pneumonia is defined as pneumonia occurring more than 48 hrs after endotracheal intubation, during mechanical ventilation or after extubation. VAP developed during the first 4 days of mechanical ventilation is early onset, usually less severe mostly caused by antibiotic sensitive bacteria's and with better prognosis. [2,3] Whereas late onset VAP develops 5 or more days after the initiation of mechanical ventilation, and is due to multidrug resistant (MDR) pathogens and is usually associated with increased morbidity and mortality. Common pathogens causing VAP includes Pseudomonas Spp. Escherichia coli, Klebsiella pneumonia and Staphylococcus aureus with varying prevalence. Due to the increased incidence of MDR organisms in intensive care units (ICU), early and correct diagnosis of VAP is mandatory for optimal antibiotic therapy. The present study was conducted on 200 patients with clinically suspected as VAP admitted to intensive care unit. This study will helps to detect pathogens commonly associated in causation of VAP, also to determine their antibiotic susceptibility pattern. This study will also help to decrease the complications associated with VAP in critical care units[4,5].

INTRODUCTION:

VAP is significant cause of morbidity and mortality in ICU patients. VAP occur only in patients who have been intubated and undergone mechanical ventilation for > 48 hour or after extubation. The risk of VAP increases with prolonged mechanical ventilation. [1,3]

Early onset VAP is usually caused by antibiotic sensitive community acquired bacteria within first 96 hour of mechanical ventilation and had good prognosis. VAP that develops 5 days after initiation of mechanical ventilation has an increased likelihood of being caused by multidrug resistant bacteria's with bad prognosis.

Risk factors for the development of VAP are old age, chronic lung disease, aspiration, reintubation, ARDS and premorbid conditions like diabetes, renal failure. [2,3]

Common pathogens causing VAP includes Pseudomonas Spp. Escherichia coli, Klebsiella pneumonia and Staphylococcus aureus. [4,6]

Clinical manifestations of VAP includes fever, tachypnoea, tachycardia, worsening oxygenation, leucocytosis, increase in respiratory secretion and pulmonary consolidation on physical examination along with a new or changing radiographic in filtrate.

Investigations for VAP mainly includes complete blood examination, chest x ray and respiratory tract secretion for gram stain, culture and sensitivity.

Early diagnosis and adoption of practices known to prevent VAP can reduces mortality and decreases the development of MDR organisms. Overall rate of VAP is 13.6 per 1000 ventilator days. However the individual rate varies according to patient group, risk factors and hospital settings.

Aims And Objectives:

1) Study of clinical and microbiological profile of ventilator associated pneumonia.

2) To isolate and identify the causative organism of ventilator associated pneumonia in critical care patients on mechanical ventilator

3) To study antibiotic sensitivity of VAP causing organisms.

MATERIALS AND METHODS:

An observational prospective study was done in ICU setup after institutional ethical approval and informed written consent of attendants. 200 patients were included in study.

Inclusion criteria:
1) Critical care patients who are intubated and on mechanical ventilation for more than 48 hours.
2) Age 12-65 yrs.
3) suspected VAP.

Exclusion criteria:
1) Patients who developed pneumonia within 48 hours of mechanical ventilation.
2) Age< 12 years and paediatric patients.
3) Immunocompromised patients.

METHOD:

This prospective study was conducted on 200 patients of clinically suspected VAP, who were on mechanical ventilator for more than 48 hour admitted in ICU, after taking written and informed consent of patients.

All patients were subjected to detailed history and thorough clinical examination. Investigations conducted are complete blood picture, CRP, ESR, urine routine, blood sugar, chest x ray, endotracheal aspirate culture and sensitivity, blood culture and sensitivity and arterial blood gas analysis.

All data were entered into standard proforma and analysed. Patients were evaluated clinically, radiologically and bacteriologically to determine the presence of pneumonia, isolate the causative microorganism and sensitivity to antibiotics and presence of DM, COPD, CKD, IHD etc.

OBSERVATIONS AND RESULTS:

The incidence of occurrence of VAP in our study was found to be approximately 20%.

Among 200 patients who developed VAP, in our study, 35% were females and 65% were males.

The most diagnosed condition of the patients who developed VAP were CNS related conditions 26% like CVA infracts, meningitis, stroke etc, CVS related conditions 14% like Acute attack of MI, Angina, Valvular heart diseases etc.

The most common co-morbid condition found is Hypertension 30% and Diabetes 22%.

The most common AMA's agent used in our study were beta lactams and Klebsiella was the most common isolate in cultures.

It was a positive point that 60% of the patients were either discharged or shifted to general wards after recovering. 15% left the treatment against medical advice. The overall mortality rate was observed to be 25%.

Table 1 : Diagnosis At The Time Of Admission In Icu

DIAGNOSIS	PATIENTS
CVS CONDITIONS	26%
CNS CONDITIONS	14%
RS DISEASES	12%
HAEMATOLOGICAL DISEASES	16%
HEPATIC DISEASES	10%
TOXICITY	9%
OTHERS	13%
TOTAL	100%

Table 2: Comorbid Conditions

COMORBIDITIES	PATIENTS
HYPERTENSION	30%
DIABETES	22%
ISCHAEMIC HEART DISEASE	15%
THYROID DISORDERS	2%
COPD	10%
SMOKING	5%
SUBSTANCE ABUSE	4%
OTHERS	12%
NIL	0%
TOTAL	100%

Table 3: Causative Organism

KLEBSIELLA	36%
E.COLI	25%
PSEDOMONAS	18%
ACENOBACTER	13%
STAPHLOCOCCUS	11%

Table 4: Antibiotic Sensitivity

ANTIBIOTIC SENSITIVITY	PATIENTS
BETA- LACTAMS	35%
FLUOROQUINLONES	20%
AMINOGLYCOSIDES	13%
MACROLIDES	11%
NITROIMIDAZOLES	8%
OXAZOLIDINONES	4%
GLYCOPEPTIDES	4%
LINCOSAMIDES	2%
ANTITUBERCULAR	3%

Table 5 – Outcome Of Patients

OUTCOME	PATIENTS
DISCHARGED	60%
EXPIRED	25%
LEFT AGAINST MEDICAL ADVICE	15%
TOTAL	100%

DISCUSSION:
The incidence of ventilator associated pneumonia is 20% in our study which is in accordance with 15-30% incidence as quoted by various studies and literature.

This may be attributed to better patient and doctor compliance, along with correct diagnosis and proper treatment as well as implication by nursing staff as prescribed by doctor.

In study done by Gupta et al. and Alwadhi et al. most of the patients having VAP during course of treatment had respiratory pathology as primary Diagnosis where as in our study most patients were admitted in ICU with CVS and CNS ailments.

In our study hypertension was most commonly associated Comorbidity followed by Diabetes. In study done by Patel et al. and doshi et al. Diabetes was more commonly encountered comorbidity.

In consensus with other studies, we encountered Klebsiella as most common culture isolate. Beta-lactams with or without beta-lactamase inhibitors are most widely used drugs across various setups for ventilator associated pneumonia as initial therapy and majority of patients respond very well to it.

CONCLUSION:
Ventilator associated pneumonia is a major complication in ICU patients leading to significant morbidity and mortality. Incidence of ventilator associated pneumonia can be drastically reduced and even prevented by use of aseptic and sterile precautions. Institution of simple measures like strictness of hand hygiene and good endotracheal/ tracheostomy tube suctioning to more intensive measures like selective decontamination of oral cavity, Selective decontamination of gut shoul be instituted to prevent this very avoidable complication.

REFERENCES:
1) Akca O, Koltka K, Uzel S, Cakar N, Pembeci K, Sayan MA, et al.Risk factors for early- onset, ventilator-associated pneumonia in critical care patients: Selected multiresistant versus non-resistant bacteria.Anesthesiology 2000;93(3):638–645
2) Bochicchio GV, Joshi M, Bochicchio K, Tracy K, Scalea TM. A time-dependent analysis of intensive care unit pneumonia in trauma patients. J Trauma 2004;56(2):296–301;discussion 301–293.
3) Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia. Am J Respir Crit Care Med 2005;171(4):388–416.
4) Husni RN, Goldstein LS, Arroliga AC, Hall GS, Fatica C, StollerJK, et al. Risk factors for an outbreak of multi-drug-resistant Acinetobacter nosocomial pneumonia among intubated patients. Chest 1999;115(5):1378–1382.
5) Rello J, Sa-Borges M, Correa H, Leal SR, Baraibar J. Variations in etiology of ventilator- associated pneumonia across four treatment sites: Implications for antimicrobial prescribing practices. Am J Respir Crit Care Med 1999;160(2):608–613.
6) Trouillet JL, Chastre J, Vuagnat A, Joly-Guillou ML, Combaux D, Dombret MC, et al. Ventilator-associated pneumonia caused by potentially drug-resistant bacteria. Am J Respir Crit Care Med 1998;157(2):531–539