Prevalence of Various Bacterial Pathogens Causing Ventilator Associated Pneumonia (VAP) Isolated From ICU in Tertiary Care Hospital

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Abstract: Objective: Ventilator associated pneumonia (VAP) is the most common nosocomial infection diagnosed in the intensive care units (ICUs). The primary objective of the following study is to identify the various bacterial pathogens causing VAP in the ICU. Methods: Study was conducted for a   periods of 9 months from January 2016 to September 2016. Endotracheal aspirate (ETA) and bronchoalveolar lavage (BAL) samples of suspected cases of VAP as per CDC Criteria for VAP 2016 from ICU patients. 339 Sample were received in Bacteriology section in Microbiology Department and processed organisms were isolated and identified by standard microbiological Techniques. The isolates were then subjected to antimicrobial susceptibility testing by modified Kirby Bauer disc diffusion method and results were interpreted as per CLSI Guidelines. Results: The incidence of VAP in our study was 48.16/1000 ventilator days. The incidence of VAP increased as the duration of mechanical ventilation increased and there was a correlation between clinical VAP and its laboratory conformation. Total 339 samples of ET secretion and BAL were received in Bacteriology laboratory. Most common Organism Were isolated is Klebsiella Spp. (22.71 %) and Acinetobacter Spp. (18.28%). Conclusion: The bacteriological approach for the management of VAP helps the clinicians in choosing the appropriate antibiotics. This study showed that quantitative cultures is one of the alternative diagnosis of VAP and initiation of appropriate antibiotic treatment is vital to prevention. Strict adherence to the infection control practices and antibiotic policy is necessary step in decreases the rate of VAP. [Alpesh R NJIRM 2017; 8(2):28-30]

Key Words: Ventilator associated pneumonia, Endotracheal aspirate (ETA) and Bronchoalveolar lavage (BAL)

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Introduction: Ventilator associated pneumonia (VAP) is the most common nosocomial infection diagnosed in the intensive care. Ventilator Associated Pneumonia (VAP) refers to a type of pneumonia that occurs more than 48–72 hours after endotracheal intubation. Risk factors include prolonged mechanical ventilation, reintubation after extubation. Our aim to find the incidence of VAP, total days of mechanical ventilation, days of ICU and hospital stay at our institution, It can be of two types: (i) early onset VAP which is defined as VAP that occurs within the first 4 days of ventilation, and (ii) late onset VAP which is defined as VAP that occurs more than 4 days after initiation of mechanical ventilation. VAP requires rapid diagnosis and initiation of the appropriate antibiotic treatment, since studies have shown that the delayed administration of appropriate antibiotic therapy in patients with VAP has been associated with excess hospital mortality. The incidence rates calculated using 1,000 ventilator days as denominator reflect more accurately VAP risks rates. A number of factors have been suspected or identified to increase the risk of VAP in various studies Therefore, knowledge of the incidence of VAP, associated risk factors and common pathogens causing VAP can help in development of effective preventive measures, which in turn will decrease the mortality and morbidity, duration of treatment and

hospital stay associated with VAP. In the absence of a gold standard, tests such as endotracheal aspirates (ETA) and broncho alveolar lavage (BAL) are considered as optimal for the microbiological confirmation of VAP. Detection of causative organisms and their antibiotic susceptibility is crucial for diagnosis of VAP in order to initiate the appropriate antibiotic treatment thereby reducing the adverse effects of inadequate antibiotic treatment on the patient prognosis and susceptibility testing from the endotracheal aspirates of the clinically suspected patients of VAP.

Methods: Study was conducted for a periods of 9 months from January 2016 to September 2016 at Microbiology Department, B. J. Medical college, Ahmedabad. Endotracheal aspirate (ETA) and bronchoalveolar lavage (BAL) samples of suspected cases of VAP as per CDC Criteria for VAP 2016 from ICU patients. Sample were received in Bacteriology section in Microbiology Department and Proceed Organisms were isolated and identified by standard microbiological Techniques. Patients who received mechanical ventilation more than 48 h were included in our study. Detailed history of previous antibiotic intake, the treatment being administered in the ICU. Any lower respiratory tract infection that developed
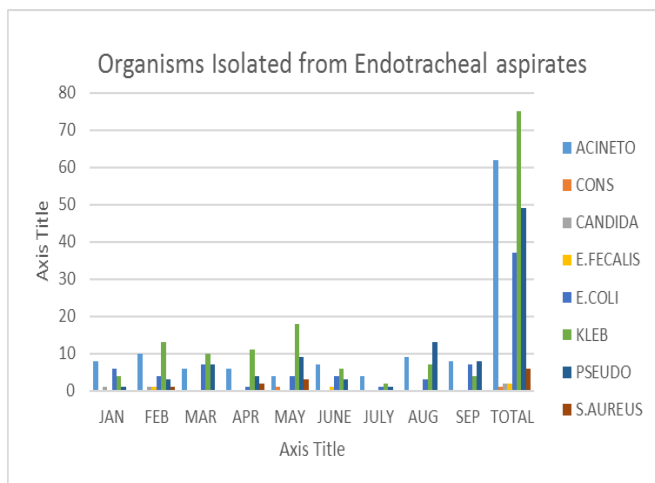
after 48 hr of mechanical ventilation. VAP rate defined as the number of VAPs/1,000 ventilator days. The diagnosis of VAP is based on clinical and microbiological criteria. The diagnosis was confirmed when significant growth was obtained in the samples. Endotracheal aspirate (ETA) and bronchoalveolar lavage (BAL) samples were received from patients admitted in the ICU requiring mechanical ventilation for more than 48 hr. The samples were inoculated on blood agar, MacConkey agar and chocolate agar. Semi quantitative cultures were done. The MacConkey plates were incubated at 37°C while blood agar and chocolate agar were incubated at 37°C in the presence of in the presence of 5-10% carbon dioxide. The isolated colonies were subjected to gram stain and biochemical tests for identification.The isolates were then subjected to antimicrobial susceptibility testing by modified Kirby Bauer disc diffusion method and results were interpreted as per CLSI Guidelines.

Results: The incidence of VAP in our study was 48.16/1000 ventilator days. The incidence of VAP increased as the duration of mechanical ventilation increased and there was a correlation between clinical VAP and its laboratory conformation. Total 339 samples of ET secretion and BAL were received in Bacteriology laboratory in microbiology department. Most common Organism Were isolated is Klebsiella Spp. (22.71 %) and acinetobacter Spp. (18.28%).Patients admitted to the ICU after trauma were at the highest risk of developing VAP with developing pneumonia.

The incidence of VAP increased in patients who were on mechanical ventilation for >15 days as compared to those who were ventilated for less than ≤15 days. There was a total agreement in bacteriology between

semi quantitative Endotracheal aspirate (ETA) and bronchoalveolar lavage (BAL) in our study.Mortality rate was highest in patients infected by acinetobacter Spp.and Klebsiella pneumonie.VAP is associated with increased frequency of bacterial colonization of upper and lower respiratory tract with subsequent overgrowth and pneumonia. Non fermenters such as acinetobacter spp. and pseudomonas spp. were significantly associated with late onset VAP as observed by our study. acinetobacter spp. accounted for the highest number of VAP followed by Klebsiella pneumonie and Pseudomonas spp.
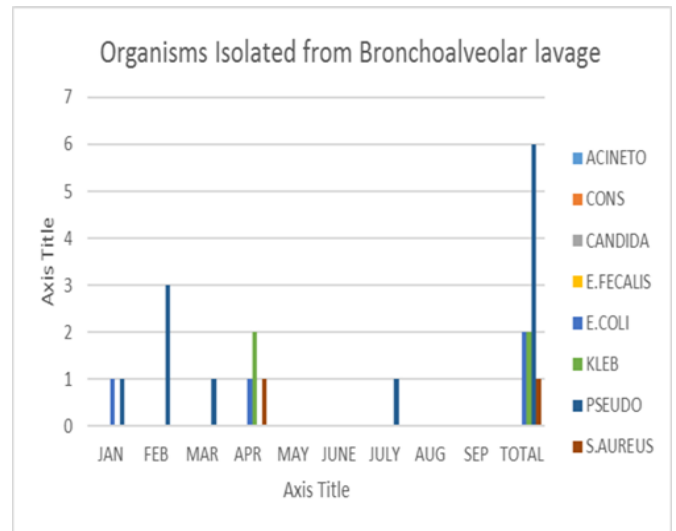
Discussion: Patients who needed more days of mechanical ventilation developed more VAP It is observed that the incidence of VAP increased in patients who were on mechanical ventilation for >15 days as compared to those who were ventilated for less than ≤15 days. often. aetiological agents widely differ according to the population of the patients in the intensive care unit, duration of hospital stay and prior antimicrobial therapy. The acinetobacter baumannii infections is due to its great resistance to the environment which enables it to spread, its limited virulence and its extraordinary ability to develop resistance to all the antimicrobials and spread by aerosols. Multi drug resistant (MDR) organisms are a major threat to VAP patients. The antibiotic resistance pattern of Non fermenters was almost the same in both early and late onset VAP. Many of the early onset VAP cases had the risk factors such as prior antibiotic therapy and current hospitalization for five days or more. That could be the reason for almost similar susceptibility pattern of the isolates from early and

Late onset VAP. Thus, the incidence of VAP increases with the duration of mechanical ventilation.

Risk Factors	
Cardiogenic Shock	Guillain-Barrie Syndrome
Meningitis	Complicated Malaria
Acute Pancreatitis	Head Truma
Hepatic Encephalopathy	Neurosurgery
Dengue Shock Syndrome	Multiple Organ Failure
Cva	Aids
Septicemic Shock	Coma

Intensive Care Unit	Vap in females	Vap in males
Mortality Rate %	43.44 %	52.25 %

Conclusion: The bacteriological approach for the management of VAP avoids the problem of overtreatment by separating colonizers from infecting pathogens. This study showed that the Endotracheal aspirate (ETA) and bronchoalveolar lavage (BAL) is a useful test for early diagnosis of VAP. The antibiotic susceptibility pattern of these isolates will also help the clinicians to choose the appropriate antimicrobial agents for prophylactic as well as treatment purposes.VAP is a serious problem in the ICU leading to longer hospital stay higher treatment costs and increased mortality and morbidity. Prolonged mechanical ventilation is an important risk factor. In addition, prior use of antibiotics increases the risk of acquiring drug resistant pathogens. Effective nursing care and adequate staffing also impact on VAP prevention. Better knowledge of local patterns of pathogens causing VAP can help facilitate treatment choices.

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