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VENTILATOR ASSOCIATED PNEUMONIA IN INTENSIVE CARE UNIT

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Abstract:

Objective: *To determine the ventilator associated pneumonia in intensive care unit.*

Patients And Methods: *A total of fifty patients admitted in intensive care unit were explored and included in this one year cross sectional study. The subjects which are included in this study are those who are on mechanical ventilator for more than 48 hours & one of the following as fever >38.30 °C, leucocytosis >12000/cmm, or Leucopenia <4000/cmm, purulent respiratory secretion with gram stain demonstration & Polymorph cells and quantitative endotracheal aspirate cultures with growth >106 cfu / ml whereas the frequency / percentages (%) and means ±SD computed for study variables.*

Results: *During one year study period total fifty patients of VAP admitted in ICU were explored and study. The mean ± SD for age (yrs) of population was 60.61±7.61 respectively. Regarding gender, male 28 (56%) and female 22 (44%) individuals whereas regarding outcome 70% patients recovered while 30% were expired.*

Conclusion: *In current study the pseudomonas was commonest bacteria overall causing and mortality in VAP (30%) is highly significant.*

Keywords: *Pneumonia, mechanical ventilator and pathogens*

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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 [1]. Critical care units increasingly use high technology medicine for patient care, haemodynamic monitoring, ventilator support, haemodialysis, parenteral nutrition, and a large battery of powerful drugs, particularly antibiotics to counter infection [2]. 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. National Nosocomial Infections surveillance system (NNIS) of USA data suggests nosocomial pneumonia is the second most common nosocomial infection in intensive care units. Additionally pneumonia is associated with the greatest mortality among nosocomial infections and with considerably increased costs of care. 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. 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 [3, 4]. VAP increases morbidity, period of ventilation and mortality. 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.

PATIENTS AND METHODS:

All patients on mechanical ventilator admitted in Intensive critical care unit at tertiary care hospital were recruited and explored in this one year (2017-2018) cross sectional study. All patients on mechanical ventilator admitted to the intensive care unit during the prescribed study period were considered for case identification and study was prospective study. The subjects which are included in this study are those who are on mechanical ventilator for more than 48 hours & one of the following as fever >38.30 C, leucocytosis >12000/cmm, or Leucopenia <4000/cmm, purulent respiratory secretion with gram stain demonstration & Polymorph cells and quantitative endotracheal aspirate cultures with growth >106 cfu/ ml while the exclusion criteria were patients who is already having respiratory infections, those who developed respiratory infections in less than 48 hours of mechanical ventilation, those who are dischaged from MICU in less than 48 hours or died within 48 hours are excluded. All adult Patients who develop VAP in critical care units as per definition in inclusion criteria are investigated clinically, radiologically and bactriologically to determine presence of pneumonia ,isolate causative microorganism and presence of comorbid conditions like DM, COPD,CRF etc. Outcome variable is development of VAP which depends on following factors like age, sex, clinical signs and symptoms, comorbid illness, organism isolated, use of medical devices like RT tube, duration of ventilation etc. All the relevant investigations were done in patients clinically suspected to have VAP as TLC, chest x-ray, blood culture, endotracheal aspirate for C/S in deserving candidates, arterial blood gas analysis and routine investigations included as hemoglobin, urine examination, blood sugar, urea and creatinine and electrolytes. In selected cases, whenever necessary specific investigations such as pleural fluid culture, endotracheal aspirate for culture sensitivity. The data was collected on pre-designed proforma and analyzed in SPSS to manipulate the frequencies and percentages.

RESULTS:

During one year study period total fifty patients were explored and study. The mean ± SD for age (yrs) of population was 60.61±7.61. The demographical and clinical profile of study population is presented in Table 1.

TABLE 1: THE DEMOGRAPHICAL AND CLINICAL PROFILE OF STUDY POPULATION

Parameter	Frequency (N=50)	Percentage (%)
AGE (yrs)		
30-39	04	8.0
40-49	22	44
50-59	12	24
60-70	05	10
70+	07	14
GENDER		
Male	28	56
Female	22	44
RESIDENCE		
Urban	30	60
Rural	20	40
ORGANISM DETECTED		
Actinobacter	03	6.0
Citrobacter	02	4.0
Klebsiella	11	22
Pseudomonas	12	24
Staph aureus	11	22
Candidiasis	03	6.0
Mixed infections	08	16
SENSITIVITY PATTERN		
Ciprofloxacin	09	18
Gentamycin	08	16
Cefeperazone	05	10
Vancomycin	13	26
Ceftriaxone	04	8.0
Ceftizidime	08	16
Amikacin	03	6.0
OUTCOME		
Recovered	35	70
Expired	15	30

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 access. 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. Also chest x-ray infiltrates in patients on mechanical ventilator may be due to causes other than pneumonia [5]. Diagnostic bronchoscopy with protected brushing of specimen or BAL culture increase the specificity of diagnosis. 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 [6]. 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 [7, 8] Total mortality of VAP in our study was 30%, while the study conducted by Chawla R [9] showed mortality in VAP of 37-43%. 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:

In current study the pseudomonas was commonest bacteria overall causing and mortality in VAP (30%) is highly significant while the only strategy which decreases the incidence of VAP is preventive measures.

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