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A STUDY OF MICROBIOLOGICAL PROFILE OF ENDOTRACHEAL SECRETIONS IN PATIENTS ON MECHANIC VENTILATORS:

Pulmonary Medicine

Dr Krishna Prasad R Assistant Professor, Department of Pulmonology (Respiratory and Medicine, TB and Chest), Mysore Medical College, Mysore.

ABSTRACT

The etiologic agents vary according to the population of patients in an ICU, duration of hospital stay, pre-existing illness and prior antimicrobial therapy. To initiate an empiric antimicrobial therapy we should have the knowledge of microbial flora of the locality, such information needs to be analyzed periodically and institution based antibiotic policies formed from time to time and made available to all consultants treating infectious diseases, hence the need for this study.

KEYWORDS

Microbiological Profile, and Sensitivity Pattern of Endotracheal Secretions

Introduction:

Respiratory infections in critically ill patients are associated with high morbidity and mortality. Rapid diagnosis and initiation of appropriate antibiotic therapy is essential for better outcomes. Patients who are intubated and mechanically ventilated are further at risk of acquiring respiratory infections due to complex interplay between the endotracheal tube, host immunity and virulence of invading bacteria, which may lead to Ventilator Associated Pneumonia (VAP). The etiologic agents vary according to the population of patients in an ICU, duration of hospital stay, pre-existing illness and prior antimicrobial therapy. To initiate an empiric antimicrobial therapy we should have the knowledge of microbial flora of the locality, such information needs to be analyzed periodically and institution based antibiotic policies formed from time to time and made available to all consultants treating infectious diseases, hence the need for this study.

Aims and Objectives:

To study the microbiological profile of endotracheal secretions in patients on mechanic ventilators.

Design: It is an cross sectional study.

1. **Source:** Kanachur Institute of Medical Sciences, Mangalore.

Period of Study: April 2013 to December 2014.

INCLUSION CRITERIA:

1. Febrile illness (more than 38^0 C, oral temperature).

EXCLUSION CRITERIA:

1. Congenital anomalies of respiratory tract
2. Steroid and chemotherapy

Results:

Table no.1: SEX DISTRIBUTION

Sex	Total Patients who did not develop respiratory infection		Developed Respiratory Infection	
Male	262		94	
Female	157		103	
Total	419	p-value 0.001	197	p-value 0.42

Table 2: CLINICAL MANIFESTATIONS

Clinical feature	CLINICAL SEPSIS	BLOOD CULTURE POSITIVE SEPSIS	p-value
Respiratory distress	185(44.15%)	96(48.73%)	0.075
Lethargy	265(63.24%)	124(62.94%)	0.9
Sclerema	50(11.93%)	29(14.72%)	0.09
Hypothermia	101(24.10%)	50(25.38%)	0.56
Hyperthermia	37(8.83%)	12(6.09%)0	0.06
Apnea	51(12.17%)	21(10.65%)	0.37

Table no. 3. BACTERIAL PROFILE IN PROVEN SEPSIS

ORGANISM	NO OF PATIENTS
Gram negative	86(43.65%)
Klebsiella	64(32.48%)
E.coli	11(5.58%)
Pseudomonas	6(3.04%)
Proteus	4(2.03%)
Serratio	1(0.5%)
Gram positive	99(50.25%)
Coagulasepositive Staphylococcus	50(25.38%)
CONS	41(20.81%)
Streptococcus pneumonia	8(4.06%)
Candida	12(6.09%)
Total	197

Discussion:

Endotracheal intubation and mechanical ventilation are life-saving procedures done on emergency or elective basis to prevent or combat respiratory failure. Many clinical conditions warrant need for ventilatory support like, life threatening infections, sepsis and acute respiratory distress syndromes, neurological dysfunctions due to poisoning, drug toxicity, cerebrovascular accidents, trauma and others. On one hand while mechanical ventilation helps to prevent deaths due to respiratory failure on the other hand it poses great threat, by leading to life threatening lung infections by itself due to various reasons that by passes host immune responses and infectious organisms getting access either by endogenous or exogenous route resulting in ventilator associated pneumonia (VAP). The presence of an endotracheal tube in the airway, although critical for the management of the mechanically ventilated patient, also contributes to the development of ventilator associated pneumonia by disrupting normal protective mechanism which is associated with the intraluminal formation of biofilm by multidrug resistant organisms. (1) These infections may result from ongoing growth of an agent that existed prior intubation which depend on various factors including pre-existing lung disease, prior colonizing organisms and oral commensals, as a part of systemic dissemination etc. Hence in our study endotracheal secretions were sent for bacteriological culture and sensitivity on the first day of intubation to identify the organisms that already existed at the time of intubation which would help in initiating and or modifying antibiotic therapy appropriately and help in preventing the occurrence of ventilator associated pneumonia (VAP) or Hospital acquired pneumonia (HAP) and help bring about favorable outcome. In our study gram negative enteric bacteria was the most common isolate with Klebsiella being the most common organism followed by Pseudomonas and Acinetobacter which were sensitive to aminoglycosides. Culture positivity was more common in elderly male patients who were smokers, and who were admitted for respiratory causes or patients who had pre-existing lung diseases. No growth or commensals were obtained in predominantly female patients and patients ventilated for other than respiratory causes indicating near normal lung. On review of literature to identify the role of pre-existing organisms as oral commensals or airway colonizing agents in the development of future VAP, a study by Ferrer et al, found airway colonization by potentially pathogenic microorganisms on admission was associated with failure of non-invasive ventilation for exacerbation of COPD. (2) In contrast, in a study of patients admitted to a respiratory intensive care unit, initial tracheal colonization was not associated with mortality or length of stay in a study by Drakulovic

MB et al. (3) In a prospective study of patients with community acquired pneumonia, Ortqvist et al found that respiratory tract colonization was associated with a significantly increased mortality and length of stay but was not a risk factor for nosocomial pneumonia. (4) Lakshmi Durairaj et al studied patterns and density of early tracheal colonization in intensive care unit patients and they did not find any baseline characteristics that predict patterns of colonization, nor did they find association with outcomes.(5) Corne P et al studied the role of nasal carriage of staphylococcus aureus in respiratory tract infections of critically ill patients by molecular evidence, they found that S. aureus strain isolated from nares was genetically identical to that isolated from the bronchial sample of the same patient in 15 out of 16 cases. This genetic identity demonstrates a link between S. aureus nasal carriage and S. aureus pneumonia or bronchitis in the majority of critically ill patients. (6) In a similar prospective study by Garrouste-Orgeas M et al, who looked at oropharyngeal or gastric colonization and nosocomial pneumonia in adult intensive care unit patients, DNA genomic analysis demonstrated that an identical strain was isolated from oropharyngeal or gastric samples and bronchial samples in all but three cases(out of total 31 cases) of pneumonia, due to S. aureus, (7) In majority of the studies there exists a relationship between the organism causing VAP and pre-existing colonizing microbe. A study by Koeman M et al showed that Topical oral decontamination with either chlorhexidine (CHX, 2%) or CHX/colistin (CHX/COL, 2%/2%) reduces the incidence of VAP. (8)

Conclusion:

With an empiric antibiotic regimen, de-escalation is the key to reduce emergence of resistance. Culture of ET aspirate is easy, cost-effective procedure which helps in identifying the organism. Delays in initiation of antibiotic treatment may lead to poor outcomes. There is a risk of emergence of MDR pathogens with inadequate, inappropriate antibiotic treatment. Thus the microbiological profile & sensitivity pattern of the local community helps in framing the appropriate institutional antibiotic policy for better outcomes.

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