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Microbiological profile and sensitivity pattern of endotracheal secretions in mechanically ventilated patients

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Abstract

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. 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. 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.

Keywords: Microbiology, profile, sensitivity, endotracheal, secretions, ventilator

Introduction

Endotracheal intubation and mechanical ventilation are life-saving procedures done on emergency or elective basis to prevent or combat respiratory failure ^[1]. 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 ^[2]. 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) ^[3, 4]. 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 ^[5]. 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 ^[6, 7]. 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.

Aims and Objectives

To study the microbiological profile and sensitivity pattern of endotracheal secretions in mechanically ventilated patients.

Materials and Methods

This study was done in the Department of Pulmonology, Deccan College of Medical Sciences,

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The study was done from September 2013 to August 2014.

Thirty patients were included in the study.

Endotracheal secretions were obtained on the day of intubation by sterile suctioning and the suction catheter tip was subjected for gram stain and culture. The positive culture samples were subjected to drug susceptibility testing.

Inclusion Criteria

Age more than 18 years.

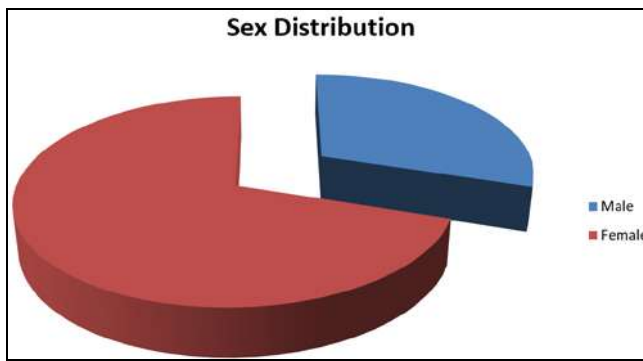
Exclusion criteria

Patients on immunosuppressor drugs or diagnosed to have immunosuppression.

Results:

Table 1: Mean age of the subjects

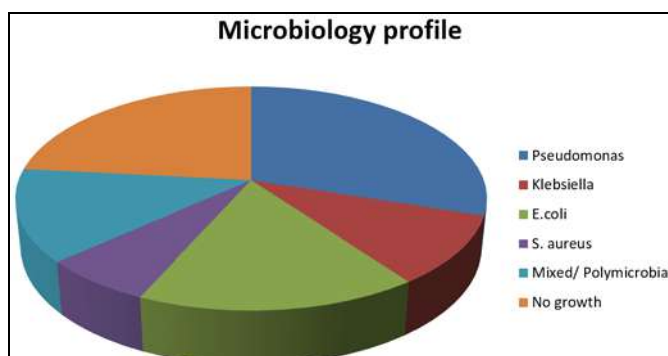
Total	Mean age	Std deviation
30	44.82 years	9.38 years



Graph 1: Sex Distribution

Table 2: Microbiology and sensitivity pattern

Organism	Frequency	Sensitivity	Resistance (most common)
Pseudomonas	09	Amikacin, Gentamycin, Ciprofloxacin	Cefotaxime
Klebsiella	03	Amikacin, Gentamycin, Ciprofloxacin	Co-trimoxazole
E.coli	05	Amikacin, Gentamycin, Imipenem	Amox-coClavulanate, Co-trimoxazole
S. aureus	02	Imipenem	Amikacin, Gentamycin
Mixed/ Polymicrobial	04	-	-
No growth	07	-	-



Graph 2: Microbiology Profile

Discussion

Gram negative organisms susceptible mostly to aminoglycoside & carbapenem group of antibiotics form the predominant isolates in our critical care setup and the risk is higher in patients with pre-existing lung diseases. Initial appropriate empiric antibiotic therapy within few hours of admission to ICU helps in decreasing the mortality and duration of ICU stay. An updated local antibiogram for each hospital and ICU based on local bacteriological patterns and susceptibilities is essential to guide optimally dosed initial empiric therapy. 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.

Conclusion

An updated local antibiogram for each hospital and ICU based on local bacteriological patterns and susceptibilities is essential to guide optimally dosed initial empiric therapy.

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