



SPECTRUM OF PATHOGENIC BACTERIA ISOLATED FROM THE ENDOTRACHEAL TUBE ASPIRATES AND THEIR ANTIBIOTIC SENSITIVITY PATTERN IN A TERTIARY CARE CENTRE RANCHI

Microbiology

Archana*

Junior Resident (Academic),Department of Microbiology,RIMS,Ranchi,jharkhand
*Corresponding Author

Manoj kumar

Prof.and Head. Department of Microbiology,RIMS,Ranchi,Jharkhand.

A.K.Sharma

Associate.Prof. Department of Microbiology,RIMS,Ranchi,Jharkhand

ABSTRACT

Background: Pneumonia is the inflammation of the lung tissue caused by infection of bacteria, virus, fungi. Several bacterial etiological agents are known to cause the infection, studies have shown several gram negative bacteria like *Pseudomonas* spp, *Klebsiella* spp, *Proteus*, *Acinetobacter* spp and gram positive bacteria such as *Streptococcus*, *Staphylococcus* spp are known to cause infection. In the present study we aim to evaluate the spectrum of bacterial isolates and their antibiotic sensitivity pattern isolated from Endo tracheal tube aspirates (ETA). **Materials and Methods:** The retrospective study was carried out in a tertiary care centre over a period of fifteen months of total 858 ETA samples. The isolates were evaluated and identified with antibiotic sensitivity pattern. **Results:** The overall ETA specimen processed in 15 months were 858, in which culture positive were 582 cases (69%). The organisms isolated were *Klebsiella pneumoniae* grown in 309 samples (53%), *Pseudomonas aeruginosa* grown in 157 samples (27%), *Acinetobacter* spp grown in 35 samples (5.8%), *Escherichia coli* grown in 30 samples (5.2%), *Proteus* spp grown in 11 samples (2%) and gram positive cocci grown in 40 samples (7%). In total gram positive cocci isolated, Methicillin resistant *Staphylococcus aureus* were grown in 27 samples. Most of *Klebsiella pneumoniae* isolates came sensitive to Colistin and most of *Pseudomonas aeruginosa* came sensitive to colistin, Meropenem, Imipenem. **Conclusion:** The present study has shown the most common isolate at our tertiary centre was *Klebsiella* spp. followed by *Pseudomonas aeruginosa*, *Acinetobacter* spp, *Escherichia coli* and *Proteus*. In gram positive bacteria the common organism isolated was *Staphylococcus aureus*. Our results contribute to, evaluate the common prevalent organisms causing pneumonia and also helps in improving the epidemiological knowledge.

KEYWORDS

ETA- Endotracheal tube aspirates, MRSA-Methicillin resistant *Staphylococcus aureus*

INTRODUCTION

All over in the world Pneumonia is one of the commonest cause of high mortality and morbidity in patients, due to inappropriate use of antibiotic and lack of adequate therapy. Early identification of pathogenic bacteria and initiation of appropriate antibiotic therapy can affect the successful management of patients and reduction in death rates. For definitive identification of pathogenic bacteria causing Pneumonia, ETA is one of the important specimen. The bacterial spectrum as well as bacterial resistance pattern vary in different geographical regions. In our study we aim to identify the common pathogenic bacteria isolated from ETA specimen and their antibiotic sensitivity pattern.

MATERIALS AND METHODS

The retrospective study and the data analysis has been carried for in the department of Microbiology, RIMS Ranchi for a period of fifteen months from March 2019 to May 2020 for the total number of 858 ETA samples sent for culture and their culture report and antibiotic sensitivity pattern. The study carried out in patients admitted at Trauma centre RIMS, Ranchi with symptoms of pneumonia. All the samples were cultured on blood agar, nutrient agar and MacConkey agar media and culture plates were incubated at 37°C overnight, the identification of culture was carried out using biochemical reactions and sensitivity to various antibiotics was assessed using the Kirby - Bauer disk diffusion method.

RESULTS

In fifteen months duration of study a total 858 cases of ETA specimens were received. From the total 563 were male and 295 were female with mean age of 46.5 years (Min-18 years, Max-75 years). A total of 582 cases were culture positive out of which most common pathogenic bacteria isolated were *Klebsiella pneumoniae* 309 samples (53%), *Pseudomonas aeruginosa* grown in 157 samples (27%), *Escherichia coli* grown in 30 samples (5.2%), *Acinetobacter* spp grown in 35 samples (5.8%), *Proteus* grown in 11 samples (2%) of total positive cases. Methicillin resistant *Staphylococcus aureus* grown in 27 samples (4.6%).

Variable drug resistance pattern were seen in isolated organisms. Most of *Pseudomonas aeruginosa* shown sensitivity to Colistin, Meropenem, Imipenem; intermediate sensitivity to Cefoperazone sulbactam Piperacillin, Tazobactam and resistant for Levofloxacin, Cefazidime, Doxycycline, Cefepime. *Klebsiella pneumoniae* shown

sensitivity to Colistin; intermediate sensitivity to Imipenem, Meropenem and resistant to Levofloxacin, Cefazidime, Doxycycline, Cefepime, Cefoperazone sulbactam. Methicillin resistant *Staphylococcus aureus* shown sensitivity to Vancomycin, Linezolid with intermediate sensitivity to Clindamycin, Levofloxacin and resistant to Erythromycin, Doxycycline, Azithromycin, Gentamycin, chloramphenicol.

Figure 1 *Staphylococcus aureus* grown on nutrient agar

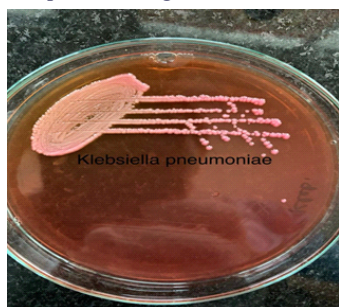


Figure 2 *Pseudomonas aeruginosa* grown on nutrient agar



Figure 3 *Escherichia coli* grown on nutrient agar



Figure 4 Klebsiella pneumoniae grown on Mac conkey agar

DISCUSSION

Pneumonia is the inflammation of the lung parenchyma (bronchioles and alveoli) mainly caused by microorganisms (bacteria, virus, mycoplasmas, fungi) which enter the lower respiratory system. It is one of the leading causes of morbidity and mortality in India and worldwide. Failure of empirical therapy, probably because of insufficient antimicrobial coverage; increasing bacterial resistance underlines the unsuccessful treatment of Pneumonia in India. To reduce the burden of morbidity and mortality in patients it is important to evaluate the types of organisms isolated and their antibiotic sensitivity pattern on time.

In our study 69% of cases were culture positive in contrast to the study carried out by Bhat et al^{9,7} which shown about 35% of cases, but a study conducted by Rahul et al found isolation of organisms in more than 90% of Pneumonia cases^{8,4}. *Klebsiella pneumoniae* were the most common organisms isolated in our study followed by *Pseudomonas aeruginosa* and *Acinetobacter* spp, in contrast to Bhat et al who found *Pseudomonas aeruginosa* as common isolates. In our study *Pseudomonas aeruginosa* are sensitive to Colistin and Carbapenem drugs, whereas most of *Klebsiella pneumoniae* isolated were multidrug resistant and shown sensitivity only to Colistin which is similar to the study conducted by Aliberti S¹¹. Kayeks et al found development of multidrug resistance and declining susceptibility to available antimicrobials in various pathogen¹¹.

CONCLUSION

In ETA culture isolates evaluation at our centre we found the most common isolates were *Klebsiella pneumoniae* which were multi drug resistant and shown sensitivity only to Colistin. *Pseudomonas aeruginosa* were sensitive to both Colistin and Carbapenem drugs. ETA culture helps us in early evaluation and intervention to reduce the morbidity and mortality of cases.

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