International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

Spectrum of Pathogenic Bacteria Isolated from the Endotracheal Tube Aspirates and their Antibiotic Sensitivity Pattern in a Tertiary Care Centre Ranchi

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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 including Pseudomonas spp, Klebsiella spp and gram positive bacteria such as Streptococcus 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 Endotracheal 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 were positive in 582 cases (69%). The organisms isolated were Klebsiella pneumoniae grown in 309 samples (53%), Pseudomonas aeruginosa, grown in 157 samples (27%), Escherichia.coli grown in 64 samples (11%), Proteus grown in 11(2%) and Methicillin resistant Staphylococcus aureus grown in 40 samples (7%). Most of Klebsiella pneumoniae isolates came sensitive to Colistin and 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, 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 – Endo tracheal tube aspirates

1. Introduction

All over in the world Pneumonia is one of the commonest cause of high mortality and morbidity in patients, [3]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.[1, 5]For definitive identification of pathogenic bacteria causing Pneumonia ETA is one of the important specimen[2, 6]ETA contributes as an important specimen in identifying the microbial pathogen to establish proper diagnosis. 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.

2. 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 March2019 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 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.

3. 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 46.5years(Min-18years, Max-75 years). A total of 582 cases were culture positive out of which most common pathogenic bacteria isolated were Klebsiella pneumoniae 53% of 582 cases which is 309.Pseudomonas aeruginosa grown in 157 samples which is(27%), Escherichia.coli grown in 64 samples (11%), Proteus grown in 11 samples(2%) of total positive cases. Methicillin resistant Staphylococcus aureus grown in 40 samples (7%).

Variable drug resistance pattern were seen in isolated organisms. Most of Pseudomonas aeruginosa shown sensitivity to Colistin, Meropenem, Imipenem; intermediate sensitivity to Piperacillin, Tazobactam, with resistancefor Levofloxacin, Ceftazidime, Doxycycline, Cefepime, Cefoperazone sulbactam. Klebsiella pneumoniae shown sensitivity to Colistin ; intermediate sensitivity to Imipenem, Meropenem and resistant to Levofloxacin, Ceftazidime, Doxycycline, Cefepime, Cefoperazone sulbactam. Methicillin resistant Staphylococcus aureus shown sensitivity to Vancomycin, Linozolid with intermediate sensitivity to Clindamycin, Levofloxacin and resistant to Erythromycin, Doxycycline, Azithromycin, Gentamycin.

Figure 1: Staphylococcus aureus grown on nutrient agar

Figure 2: Pseudomonas aeruginosa grown on nutrient agar

Figure 3: Escherichia coli grown on nutrient agar

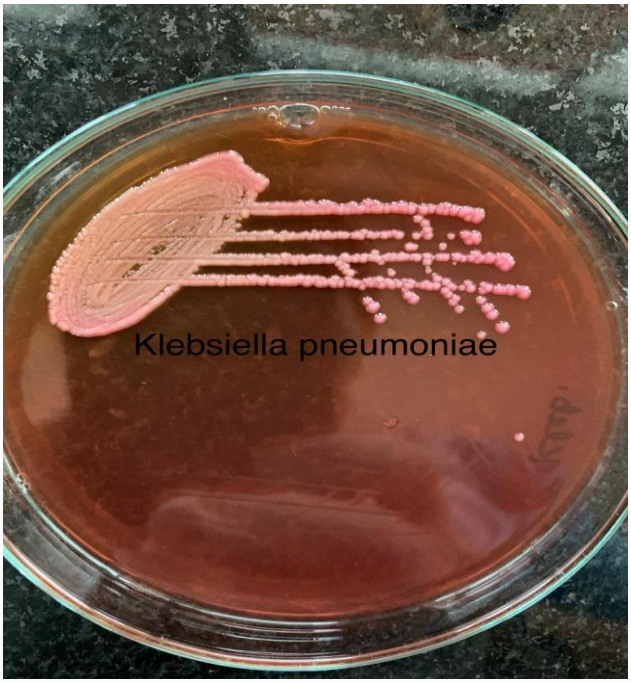

Figure 4: Klebsiella pneumoniae grown on Mac conkey agar

4. 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. Pneumonia is one of the leading causes of morbidity and mortality in India[10] 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 etal[9,] 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].Klebisella pneumoniae were the most common organisms isolated in our study followed by Pseudomanas aeruginosa and Escherichia.coli in contrast to Bhat et al who found Pseudomonas aureginosa as common isolates. In our study Pseudomonas aeruginosa are sensitive to Colistin and Carbapenem drugs, whereas Klebisella pneumoniae shown intermediate sensitivity to Carbapenem drugs and sensitivity to Colistin, when compared to study which shown rise in Carbapenem resistance in isolates[7, 4]. A study conducted by Alibertis S, Kayeks et al found development of multidrug resistance and declining susceptibility to available antimicrobials in various pathogen[11].

5. Conclusion

In ETA culture isolates evaluation at our centre we found the most common isolates were Klebisella pneumoniae which were sensitive to Colistin and intermediate sensitive to Carbapenem drugs, 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.

References

[1] Irma Koivula Marja Sten Pirjo Helena Makela Risk factors for pneumonia in the elderly Am J Med199496431320
[2] David E Cantral Thomas G Tape Elizabeth C Reed John R Spurzem Stephen I Rennard Austin B Thompson Quantitative culture of bronch oalveolar lavage fluid for the diagnosis of bacterial pneumonia Am J Med19939566017
[3] Joseph P. Mizgerd Acute Lower Respiratory Tract Infection N Engl J Med 200835877162
[4] ASisto F Ancona M Meledandri A Pantosti G M Rossolini A Raglio Carbapenem nonsusceptible Klebsiella pneumonia from Micronetwork hospitals Euro Surveill20091720247
[5] A Rano Pulmonary infiltrates in non-HIV immune compromised patients: a diagnostic approach using non-invasive and bronchoscopic proceduresThorax200156537987
[6] Eun Sun Kim Eui-Chong Kim Sang-Min Lee Seok-Chul Yang Chul-GyuYoo Young Whan Kim Bacterial Yield from Quantitative Cultures of Bronchoalveolar Lavage Fluid in Patients with Pneumonia on Antimicrobial TherapyKorean J Intern Med201227215662
[7] K N Brahmadathan P Gladstone P Rajendran Incidence of carbapenem resistant nonfermenting gram negative bacilli from patients with respiratory infections in the intensive care unitsIndian J Med Microbiol200523318991
[8] Rahul Magazine Shobitha Rao Kiran Chawla Bharti Chogtu Bacterial isolates from the bronchoalveolar lavage fluid of patients with pneumonia not responding to initial antimicrobial therapySahel Med J20131631026
[9] Sowmya K N Sevitha Bhat Vishwas Saralaya K Spectrum of bacteria isolated from bronchoalveolar lavage in a tertiary care centreJ Evol Med Dent Sci201432879504
[10] Peto L, Nadjm B, Horby P, Naggn TT, van Doorn R, Van Kinh N, et al. The bacterial aetiology of adult community-acquired pneumonia in Asia .
[11] Aliberti S, Kaye KS. The changing microbiologic epidemiology of community acquired pneumonia. Postgrad Med. 2013;125:31-42.