Content available at: iponlinejournal.com

Indian Journal of Microbiology Research

Journal homepage: www.innovativepublication.com

Original Research Article

Spectrum of pathogenic bacteria isolated from the bronchoalveolar lavage in a tertiary care centre at Hyderabad

Anisha C K[1], H R V Rajkumar[1], A Ravishankar Reddy[1], Ruturaj MK[1], Guru Prasad Manderwad[1,*]

[1] *Dept. of Microbiology, Kamineni Academy of Medical Sciences and Research Centre, Hyderabad, Telangana, India*

ARTICLE INFO

Article history:
Received 11-02-2020
Accepted 29-02-2020
Available online 08-04-2020

Keywords:
Pseudomonas aeruginosa
Symptoms of pneumonia
Bacteria isolated

ABSTRACT

Introduction: Pneumonia is the inflammation of the lung and 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 BAL specimen.

Materials and Methods: The retrospective study was carried out in a tertiary care center over a period of one year. The isolates were evaluated and identified with antibiotic sensitivity pattern.

Results: The overall BAL specimen processed in a year were 90, in which culture were positive in 28 cases (31%). The organisms isolated were Pseudomonas aeruginosa, grown in 15 cases (52%), Klebsiella pneumoniae grown in 7 cases (28%), Escherichia.coli grown in 3 cases (10%) and Streptococcus pneumoniae in 3 cases (10%). Most of the organisms are sensitive to antibiotics.

Conclusion: The present study has shown the most common isolate at our tertiary centre was Pseudomonas aeruginosa, followed by Klebsiella spp and in gram positive bacteria the common organism isolated was Streptococcus pneumoniae. Our results contribute to evaluate the common prevalent organisms causing pneumonia and also helps in improving the epidemiological knowledge.

1. Introduction

Pneumonia is one of the major factors which is known to contribute to high death rates seen all over the world.[1] Through the appropriate usage of antibiotics the pneumonia can be cured, but in several instances due to lack of prompt diagnosis, inappropriate use of antibiotics, and lack of adequate therapy could lead to the death of patients. Early diagnosis and identification of the pathogenic bacteria and initiation of the antibiotic therapy helps and it is crucial for the successful management of the patient.[2,3] The type of specimen is very important in diagnosis of the pneumonia. Bronchoalevolar lavage (BAL) is one of the important specimen for definite identification of bacterial pathogen contributing for the genesis of pneumonia.[4,5] There are several advantages and studies have proved that BAL is one of the important specimen contributing in proper diagnosis through identifying the microbial pathogen in more than 80% of cases. The spectrum of bacteria isolated from the BAL vary in different geographical regions as well as the bacterial resistance pattern. In present study we aim to identify the spectrum of pathogenic bacteria isolated from the BAL 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, Kamineni Academy of Medical Sciences and Research Centre for a period of one year from January 2015-2016 for the total number of BAL sent for culture and their culture report and antibiotic sensitivity pattern. The study carried out

* *Corresponding author*.
E-mail address: gurukmc@gmail.com (G. P. Manderwad).

https://doi.org/10.18231/j.ijmr.2020.011

in patients with symptoms of pneumonia, BAL samples were collected through application of bronchoscopy. All the samples were cultured on blood agar, MacConkey Agar media and Chromogenic 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

A total 90 cases of BAL specimens were received in one year for the bacterial culture from the 55 males and 45 females with the mean age of 50.5 (Min-19 yrs to Max-72 yrs). A total of 28 cases (31%) cases were culture positive in which the Pseudomonas aeruginosa has grown in 15 cases (52%), Klebsiella pneumoniae has grown in 7 cases (28%), Escherichia.coli grown in 3 cases (10%) and Streptococcus pneumoniae in 3 cases 10%).

The organisms isolated have shown variable drug resistance pattern including resistant to ciprofloxacin in 80% of isolates, Azetronam in 40% of cases, cefipime in 40% of cases, and, found sensitive to gentamicin in 80% of cases, carbapenem in 80% of cases, cefazolin in 60% of cases. The Sterptococcus pneumoniae found sensitive to penicillin, gentamicin, erythromycin and vancomycin.

Fig. 1: Streptococcus pneumoniae aeruginosa

4. Discussion

Pneumonia is the inflammatory condition of the lung and main etiological factors for genesis of pneumonia are bacteria. Evaluation of the type of the organisms isolated

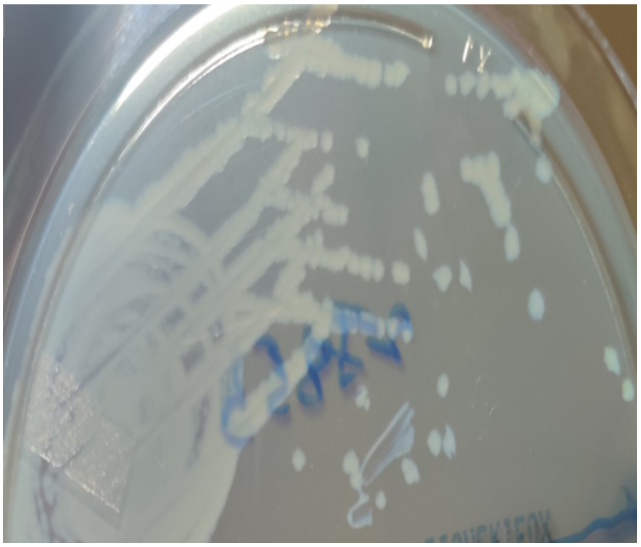

Fig. 2: Pseudomonas aeruginosa

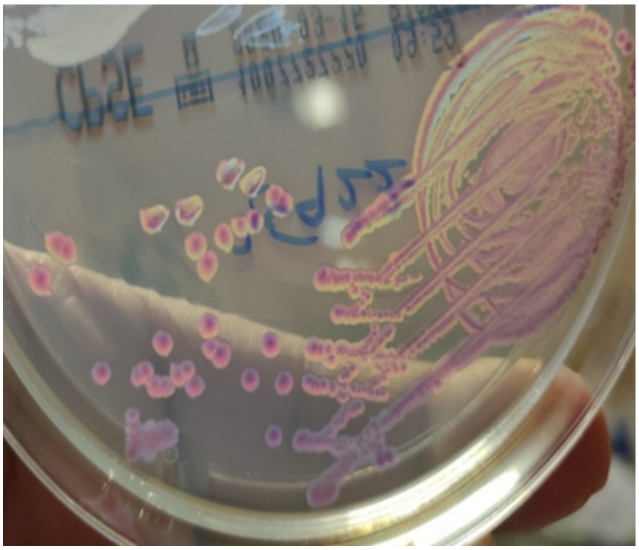

Fig. 3: Escherichia coli

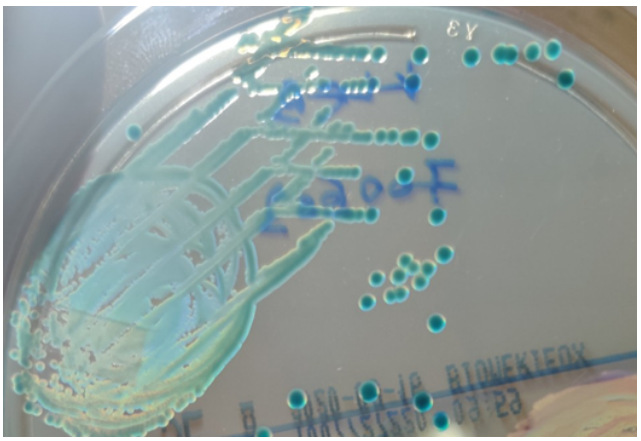

Fig. 4: Klebsiella pneumoniae

and their antibiotic sensitivity pattern helps the clinicians to treat the patient in time and reduces the burden of morbidity and mortality. In the present study 31% of cases were culture positive similar to the study carried Bhat et al[6] which has shown the isolation of bacteria from BAL was about 35% of cases, but the contrast to our study as study conducted by Rahul et al has found the isolation of organisms more than 90% of pneumonia cases.[7] The most common organism isolated in our study was Pseudomonas aeruginosa, similar to the Bhat et al followed by Klebisella and Escherichia.coli species. In the present study we find the gram negative bacteria are highly sensitive to carbapenem drugs when compared to other studies, which has shown rise in carbapenem resistance in isolates from BAL.[8,9] A study conducted by Rahul et al found high prevalence of bacterial drug resistance in bacteria isolated from BAL.[7]

5. Conclusion

We have evaluated the BAL culture isolates at our tertiary centre and found the most common isolate was Pseudomonas aeruginosa which are sensitive to most of the common antibiotics used. The culture of BAL is useful for intervention and treatment to reduce the morbidity and mortality of the patient.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Mizgerd JP. Acute Lower Respiratory Tract Infection. N Engl J Med . 2008;358(7):716–27.
2. Rano A. Pulmonary infiltrates in non-HIV immunocompromised patients: a diagnostic approach using non-invasive and bronchoscopic procedures. Thorax. 2001;56(5):379–87.
3. Koivula I, Sten M, Makela PH. Risk factors for pneumonia in the elderly. Am J Med. 1994;96(4):313–20.
4. Kim ES, Kim EC, Lee SM, Yang SC, Yoo CG, et al. Bacterial Yield from Quantitative Cultures of Bronchoalveolar Lavage Fluid in Patients with Pneumonia on Antimicrobial Therapy. Korean J Intern Med. 2012;27(2):156–62.
5. Cantral DE, Tape TG, Reed EC, Spurzem JR, Rennard SI, Thompson AB. Quantitative culture of bronchoalveolar lavage fluid for the diagnosis of bacterial pneumonia. Am J Med. 1993;95(6):601–7.
6. N SK, Bhat S, K VS. Spectrum of bacteria isolated from bronchoalveolar lavage in a tertiary care centre. J Evol Med Dent Sci. 2014;3(28):7950–4.
7. Magazine R, Rao S, Chawla K, Chogtu B. Bacterial isolates from the bronchoalveolar lavage fluid of patients with pneumonia not responding to initial antimicrobial therapy. Sahel Med J. 2013;16(3):102–6.
8. Sisto A, Ancona F, Meledandri M, Pantosti A, Rossolini GM, Raglio A. Carbapenem nonsusceptible Klebsiella pneumonia from Micronetwork hospitals. Euro Surveill. 2009;17:20247.
9. Brahmadathan KN, Gladstone P, Rajendran P. Incidence of carbapenem resistant nonfermenting gram negative bacilli from patients with respiratory infections in the intensive care units. Indian J Med Microbiol. 2005;23(3):189–91.

Author biography

Anisha C K Post Graduate

H R V Rajkumar Professor and HOD

A Ravishankar Reddy Professor

Ruturaj MK Assistant Professor

Guru Prasad Manderwad Assistant Professor

Cite this article: Anisha C K , Rajkumar HRV, Reddy AR, Ruturaj MK , Manderwad GP. Spectrum of pathogenic bacteria isolated from the bronchoalveolar lavage in a tertiary care centre at Hyderabad. *Indian J Microbiol Res* 2020;7(1):48-50.