"DETECTION OF CARBAPENEM RESISTANCE IN ISOLATES OF KLEBSIELLA SPECIES AT A TERTIARY CARE CENTRE KANPUR"

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ABSTRACT

INTRODUCTION:-Carbapenems are commonly used to treat infections which are caused by multidrug-resistant Enterobacteriaceae.Carbapenem resistant *K. pneumoniae* cause considerable clinical problems because they are resistance to β-lactam antibiotics, fluoroquinolones and to aminoglycosides. **AIMS:-** The present study was undertaken with the aim to detect carbapenem resistance in various clinical isolates with special reference to Klebsiella spp.

MATERIAL AND METHODS:-A study was conducted on 32 *Klebsiella species* strains which were isolated from various clinical samples over a period of 6 month (June 2018-november 2018) in the Department of Microbiology, RMCHRC,Mandhna kanpur. All the isolates resistant to carbapenems were detected by disc diffusion method . All isolates were tested for (MBL) production by Imipenem and Imipenem-EDTA test. **RESULTS:-**Out of 150 clinical sample**s** , 32(21%) were *Klebsiella* isolates. The mean age is 40-60 in which 19(59%) were females, 13(40%) males. Out of 32 *Klebsiella* isolates 21(65.66%) were carbapenem resistant on Muller Hinton Agar and were sensitive to polymixin(100%) and colistin(100%) . MBL was produced in 17(53%) isolates. **CONCLUSION:-** In this study the rate of carbapenem resistance was high(65.66%) ,which is alarming. Hence the combined disc test is a simple test which can be used for differentiation of carbapenemases and it can be easily incorporated in routine microbiology lab testing.

INTRODUCTION

Gram negative bacilli belonging to the Enterobacteriaceae are the most frequently encountered bacterial isolates recovered from clinical specimens. Members of the Enterobacteriaceae may be associated with virtually any type of infectious disease and recovered from any specimen received in the laboratory. Microbiologist must be alert in the emergence of any Enterobacteriaceae that are resistant to multiple antibiotics.Detecting these resistant strains is not only important in treating the patient from whom the isolate is recovered but also has important implications for surveillance of nosocomial infections[1]. Multidrug resistant Klebsiella pneumoniae are an increasingly difficult problem in Indian hospitals. Carbapenems have been the grounding of drug treatment for serious infections caused by these pathogens.Carbapenems are often used as antibiotics of last resort for treating infections due to multidrug resistant gram negative bacilli, because they are stable even in response to extended spectrum and AmpC βlactamases [2]. However, the emergence and proliferation of bacteria resistant to this important group of drug is jeopardizing the use of carbapenems. Resistance to carbapenem mostly is due to production of enzymes Carbapenemases that hydrolyse carbapenems and other β lactams [3]. Carbapenemase enzymes fall into Ambler classification -A, B and D [4]. Carbapenem-resistant Enterobacteriaceae (CRE), specially, the *Klebsiella, Enterobacter* and *Escherichia*, have developed resistance to a group of antibiotics called “Carbapenems”, which are often used as the last line of treatment when other antibiotics are not effective in treating infections caused by them [5]. Moreover, the prevalence of carbapenem resistance in Enterobacteriaceae (CRE) isolated from clinical samples continues to increase throughout the world [6]. The present study was therefore carried out to detect carbapenem resistance profile in *Klebsiella* species.

MATERIAL AND METHODS

The study was conducted on 32 *Klebsiella species* strains which were isolated from various clinical samples over a period of 6 month (June 2018-november 2018) in the Department of Microbiology, RMCHRC,Mandhna Kanpur. All the isolates resistant to carbapenem was

detected by disc diffusion method . All isolates were tested for (MBL) production by Imipenem and Imipenem-EDTA test.

RESULTS

Out of 150 clinical samples , 32(21%) were *Klebsiella* isolates. The mean age is 40-60 in which 19(59%) were females, 13(40%) males. Out of 32 *Klebsiella* isolates 21(65.66%) were carbapenem resistant on Muller Hinton Agar and were sensitive to polymixin (100%) and colistin (100%). MBL was produced in 17(53%) isolates.

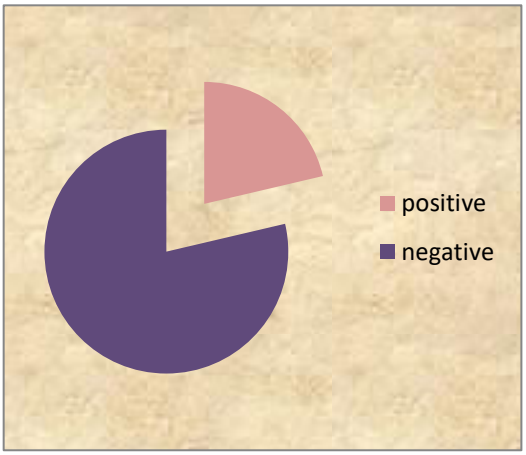

Fig1- Percentage of Klebsiella spp among the clinical samples

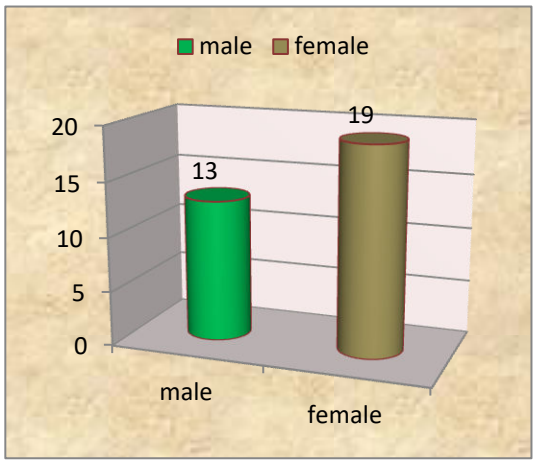

Fig 2- Sex distribution of Klebsiella spp

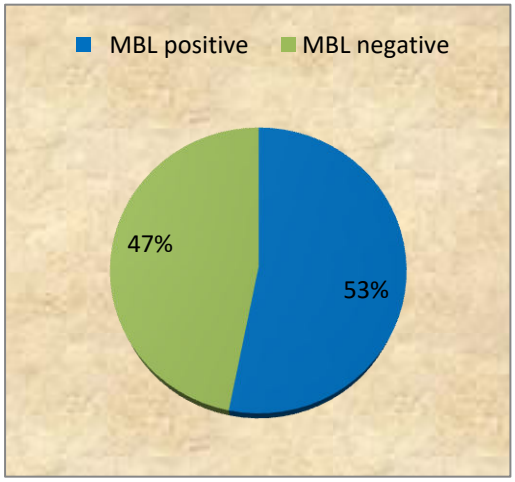

Fig 3- Total percentage of MBL among Klebsiella isolates

DISCUSSION

In our study we found that out of 150 clinical samples , 32(21%) were *Klebsiella* isolates. The mean age is 40-60 in which 19(59%) were females whereas we found that females were more affected than males i.e.,13(40%) males. Out of 32 *Klebsiella* isolates 21(65.66%) were carbapenem resistant on Muller Hinton Agar, this was well in accordance with Nagaraj S *et al*.[7] who also reported 42% carbapenem isolates of *E. coli* and *K.pneumoniae* from urine. Parveen RM [8] reported 37.86% isolates of *K. pneumoniae* from urine. The test isolates were sensitive to polymixin(100%) and colistin(100%) .MBL was produced in 17(53%) isolates. Resistance in *K. pneumoniae* mediated by *K.pneumoniae* carbapenemase (KPC) can accompany other Gram negative resistance mechanisms. The genes of which enzymes are usually present on plasmids and hence can spread easily [9] . This makes it important to constantly keep a check on the prevalence of resistance to antibiotics in commonly encountered pathogens. The present study was conducted keeping this concept in mind.

CONCLUSION

Majority of carbapenem resistance here is due to Carbapenemase production. In our study the rate of carbapenem resistance was high (65.66%) ,which is alarming. Hence the combined disc test is a simple test which can be used for differentiation of carbapenemases and it can be easily incorporated in routine microbiology lab testing. Hence rapid and accurate identification of carbapenem resistance is required for therapeutic and epidemiological reasons so that timely intervention, such as good infection control practices and prudent use of antibiotics will ensure that the spread of carbapenem resistance among organisms is kept under control.

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