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Detection of Carbapenem Resistant Enterobacter Species from Various Clinical Samples using Vitek2 System and Phenotypic Method in a Tertiary Care Hospital - a Comparative Study

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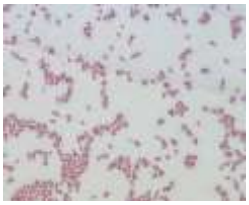
ABSTRACT: Enterobacter species are common pathogens of Enterobacteriacae family responsible for nosocomial infections,especially blood stream infection and to those who are on mechanical ventilation in intensive care units. Treatment of infections due to Enterobacter is difficult maily in countries with low socioeconomic state. Carbapenems are considered as a last resort antibiotic for the treatment of infections due to multidrug resistant Enterobacter spp.the most important resistance mechanism of Enterobacter to carbapenems is carbapenems is carbapenemase production. The treatment options for carbapenem resistance enterobacter are limited; attention is focused on the detection of carbepenem resistance enterobacter spp.

Keywords: carbapenem resistant Enterobacter, Double Disk synergy test, Modified Hodge test

I. INTRODUCTION:

Beta – lactams are one the most frequently used classes of antimicrobials in hospital settings,crucial for the treatment of infections caused by gram negative bacteria[1].Enterobacter species are common pathogens of Enterobacteriacae family responsible for nosocomial infections,especially blood stream infection and to those who are on mechanicalventilation in intensive care units.



Enterobacter is a gram negative,facultative anaerobic, rod shaped, non spore forming bacteria.

Two of its well known species, **Enterobacter aerogenes** and **Enterobacter cloacae** have taken on clinical significance as opportunistic bacteria and have emerged as nosocomial pathogenes from ICU.

As per National Nosocomial Infection Surveillance System,more than one third of Enterobacter spp are resistant to extended spectrum cephalosporins.

However, of late due to the presence of extended spectrum beta lactamase and AmpC enzymes in Enterobacter spp, Carbapenems have become the drug of choice to treat such infections[2].

Carbapenems have been widely used to treat serious multidrug resistant Enterobacter species infection. However,incidence of carbapenem resistant Enterobacter species are rising in several parts of the world and large and sustained outbreaks caused by such bacteria have been described[3].

Hence present study was undertaken to detect Carbapenem resistant Enterobacter species isolates from various clinical samples using Vitek 2 system and phenotypic methods

II. OBJECTIVE:

(1) To isolate Enterobacter species from various clinical samples in patients admitted in different wards and ICUs
(2) To detect carbapenem resistance from the isolates.

III. MATERIAL AND METHODS:

STUDY DESIGN: Prospective study

The study was conducted from September 2018 to February 2019 in the Department of Microbiology of Vydehi Institute of Medical Sciences and Research Centre, Bangalore, Karnataka.

The isolates were obtained from various clinical specimens. Identification was performed by routine conventional microbial culture, biochemical tests and using vitek 2 GNID cards.

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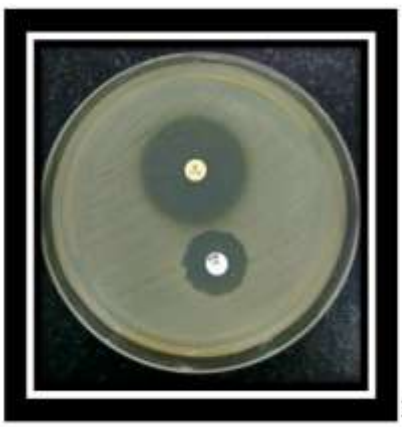
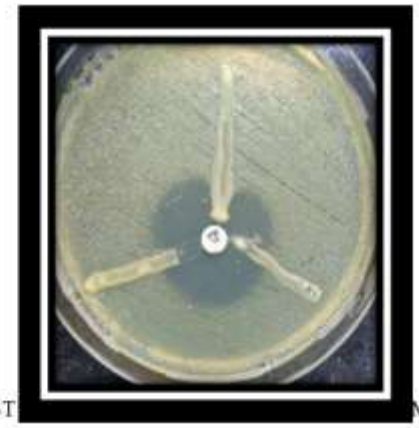
- Automated method: Vitek 2 automated method

- Phenotypic methods:
  - Double disk synergy test
  - Modified Hodge test



DDST



MHT

TOTAL NO.OF ISOLATED ENTEROBACTER	60
CARBAPENEM RESISTANCE DETECTED BY VITEK2SYSTEM	12(20%)
DOUBLE DISK SYNERGY TEST POSITIVE	20(22%)
MODIFIED HODGE TEST POSITIVE	9(15%)
MODIFIED HODGE TEST AND VITEK 2 POSITIVE	7(11%)

IV. RESULT:

In the defined study period 60 Enterobacter species were detected from various clinical samples by standard laboratory procedures. Among 60, 25 isolates were carbapenem resistant, detected by Vitek2 and phenotypic method and most of them were isolated from blood and MICU had the highest prevalence of carbapenem resistant Enterobacter species.

V. CONCLUSION:

Enterobacter species is a significant nosocomial and health care associated pathogen.The present study demonstrates the presence of high level of carbapenems resistant Enterobacter species isolates from various clinical samples. Comparison of multiple phenotypic assays and automated method for the detection of carbapenemases in bacteria indicated that phenotypic methods (DDST and MHT) provides the highest rate of positive tests.

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