

**INTRODUCTION**

- Increasing reports on New Delhi metallo-β-lactamase-1 (NDM-1) producing *Enterobacteriaceae*, particularly *Escherichia coli* and *Klebsiella pneumoniae* constitute a serious threat to global health [1].
- NDM-1 is a novel type of metallo-β-lactamase that hydrolyzes all the β-lactam antibiotics except aztreonam, which is usually inactivated by the coproduction of the extended-spectrum or the AmpC β-lactamases.
- The gene encoding NDM-1 is known as *blaNDM-1*, which is located on a transmissible plasmid and its association with other resistant determinants leads to the extensive drug resistance [1].
- However, the data on the prevalence of NDM-1 producing *Enterobacteriaceae* in Indian hospitals is limited due to constrained resources. Therefore, the present study was designed to evaluate the incidence of *blaNDM-1* gene in *E. coli* and *K. pneumoniae* isolates at a tertiary care referral hospital in Northeast India.

**METHODS**

- A total of 412 consecutive, non-duplicate isolates of *E. coli* (*n* = 221) and *K. pneumoniae* (*n* = 191) were recovered from various clinical samples at a tertiary care referral hospital in northeast India. The samples were obtained from both hospitalized and non-hospitalized patients between August 2011 and January 2012.
- Kirby-Bauer disc diffusion method was performed to determine the susceptibilities of different β-lactam and non-β-lactam antibiotics [2].
- All the isolates with reduced susceptibility to meropenem or ertapenem (diameter of zones of inhibition, ≤ 21mm) were screened for production of carbapenemase [2].
- Minimum inhibitory concentration (MIC) values for imipenem, meropenem, ertapenem, tigecycline and colistin were determined by using Etest strips.
- Metallo-β-lactamase (MBL) production was detected by performing combined disc test by using imipenem discs with and without ethylenediaminetetraacetic acid (EDTA), which chelates zinc required for MBL activity [3].

**RESULTS**

- On the basis of their reduced susceptibility to meropenem or ertapenem, 55 (24.88%) *E. coli* and 52 (27.22%) *K. pneumoniae* were screened for detection of *blaNDM-1* by PCR.
- All the screened isolates were found to be positive for *blaNDM-1* as well as showed positive results in combined disc test for MBL production.
- Each of the *blaNDM-1*-possessing isolates of *E. coli* and *K. pneumoniae* was also found to be positive for two or more additional *bla* genes, such as *blaTEM*, *blaSHV*, *blaCTX-M* and *blaAmpC* genes in the screened isolates were detected by employing multiplex PCRs [4,5].

**CONCLUSIONS**

- The observed high level resistance to the different β-lactam antibiotics, including aztreonam might be contributed by the coexistence of additional *bla* genes in the *blaNDM-1* possessing isolates.
- Our findings showed that all the *blaNDM-1*-possessing isolates were MDR as well as a considerable number of *E. coli* and *K. pneumoniae* isolates possessing *blaNDM-1* were exhibiting pandrug-resistant phenotypes.
- In addition, few of the *blaNDM-1* positive isolates showed reduced susceptibility to tigecycline and colistin, which extremely limits the therapeutic options for infections cause by NDM-1-positive isolates.
- Perceptive of the antibiotic resistance genes in important bacterial pathogens from a geographical area is of paramount importance for surveillance and control of antibiotic resistance.

**BIBLIOGRAPHY**


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