Detection of ESBL in *E.coli* and *K. pneumoniae* isolated from urinary tract infection

Sir,

Microorganisms responsible for urinary tract infection (UTI) such as *Escherichia coli* and *Klebsiella* spp. have the ability to produce extended-spectrum ß-lactamases (ESBL) in large quantities. These enzymes are plasmid borne and confer multiple drug resistance, making urinary tract infection difficult to treat.[1] ESBLs are plasmid mediated, TEM- and SHV-derived enzymes, first isolated in Western Europe in mid-1980s, most commonly in *Klebsiella* spp., followed by *E. coli*.[2] ESBLs are enzymes capable of conferring bacterial resistance to the penicillins, first, second- and third-generation cephalosporins, and aztreonam (but not the cephamycins or carbapenems) by hydrolysis of these antibiotics.[3]

This study was undertaken to find out ESBL production in urinary isolates of *E. coli* and *Klebsiella pneumoniae* and to evaluate double disc synergy (DDS) test against Clinical and Laboratory Standards Institute (CLSI) recommended the phenotypic disc confirmatory test (PCT) test for detection of ESBLs.

A total of 229 isolates [*E. coli* (171) and *K. pneumoniae* (58)] with significant growth were studies. Screening for ESBL production was done by the disc diffusion test recommended by CLSI and screen positive isolates were confirmed by DDS and PCT.

Table 1: Recommended treatment for infections with ESBL-producing organism

Infection type	Therapy of choice	Second line therapy
Urinary tract infection	Quinolones[a]	Amoxicillin/cloxacillin
Bacteremia	Carbapenem	Quinolones[a]
Hospital acquired pneumonia	Carbapenem	Quinolones[a]
Intra-abdominal infection	Carbapenem	Quinolonesa (plus metronidazole)
Meningitis	Meropenem	Intrathecal polymyxin B

[a]If the organism is Quinolone susceptible

Of the 171 *E. coli* isolates, ESBL production was observed in 69 (40.4 %) whereas from 58 *K. pneumoniae*, ESBL production was found in 26 (44.9 %) isolates. Prevalence was more among *K. pneumoniae*. In a study conducted in 2003,[4] the prevalence was only 18.5% amongst *E. coli* isolates and 25.6% among *K. pneumoniae* isolates. Taneja *et al*.[5] have reported 40.2% *E. coli* isolates and 51.2% of *K. pneumoniae* to be ESBL producers. The prevalence of ESBL in this study is high and poses a threat to treatment of serious infections due to these isolates. Most ESBL producing isolates were resistant to ampicillin, co-trimoxazole, ciprofloxacin, and ceftazidime. Under such circumstances the only treatment options are carbapenems and tigecycline that are expensive and often not available in developing countries. However, quinolones may be regarded as the treatment of choice for UTI [Table 1] due to ESBL producing organisms if there is not *in vitro* resistance to these drugs.[3] Unfortunately, increasing resistance of quinolones will limit the role of these in future.

This study evaluated DDS against CLSI recommended PCT for detection of ESBL. Of the two tests used in the study PCT was more sensitive. Eight six (90.5 %) of the 95 ESBL producing strains were detected by DDST. We found that PCT was an inexpensive alternative to DDS for detection of ESBL. DDS lacks sensitivity because of problem of the optimal disc space and correct storage of the clavulanate containing discs. This method is technically simple and inexpensive.[6] All the isolates positive by confirmatory methods should be reported as resistant to all cephalosporins even if the organism is susceptible by routine disc diffusion methods for antibiotic sensitivity.

B. C. Metri, P. Jyothi, B. V. Peerapur[1]

Department of Microbiology, BLDEU's Shri B. M. Patil Medical College, Bijapur, Karnataka, [1]Microbiology, RIMS, Raichur, Karnataka, India

Address for correspondence:
Dr. Metri Basavaraj C,
7, Old Staff Quarters, Near Lingad Gudi, BLDEU's Shri B. M. Patil Medical College Campus, Bijapur, Karnataka- 586 103, India.
E-mail: basucm@rediffmail.com

References

1. Babypadmini S, Appalaraju B. Extended spectrum ß-lactamases in urinary isolates of *Escherichia coli* and *Klebsiella pneumoniae* - prevalence and susceptibility pattern in a tertiary care hospital. Indian J Med Microbiol 2004;22:172-4.
2. Chaudhary U, Aggarwal R. Extended spectrum β-lactamases (ESBL) - An emerging threat to clinical therapeutics. Indian J Med Microbiol 2004;22:75-80.
3. Paterson DL, Bonomo RA. Extended- spectrum ß-lactamases: a clinical update. Clin Microbiol Rev 2005;18:657-86.
4. Tankhiwale SS, Jalgaonkar SV, Ahamad S, Hassani U. Evaluation of extended spectrum beta lactamase in urinary isolates. Indian J Med Res 2004;120:553-6.
5. Taneja N, Rao P, Arora J, Dogra A. Occurrence of ESBL and Amp-C ß-lactamases and susceptibility to newer antimicrobial agents in complicated UTI. Indian J Med Res 2008; 127:85-8.
6. Shukla I, Tiwari R, Agrawal M. Prevalence of extended spectrum-β-lactamase producing *Klebsiella pneumoniae* in a tertiary care hospital. Indian J Med Microbiol 2004;22:87-91.

Access this article online

Quick Response Code:

Website: www.indianjnephrol.org

DOI: 10.4103/0971-4065.103919