Antibiotic Sensitivity and Phenotypic Detection Of ESBL producing E.Coli Strains Causing Urinary Tract Infection In a Community Hospital, Chennai, Tamil Nadu, India.

Corresponding Author:
Dr. Swaminathan Rajan,
Associate Professor, Deputy HoD, Post Graduate and Research Department of Zoology, Pachaiyappa's College, 600030 - India

Submitting Author:
Dr. Swaminathan Rajan,
Associate Professor, Deputy HoD, Post Graduate and Research Department of Zoology, Pachaiyappa's College, 600030 - India

Other Authors:
Dr. J. Veena Prabavathy,
Doctor, Department of Pathology, Heavy Vehicles Factory Hospital, Ministry of Defence, Avadi Chennai-India - India

Article ID: WMC003840
Article Type: Research articles
Article URL: http://www.webmedcentral.com/article_view/3840
Subject Categories: PHARMACEUTICAL SCIENCES
Keywords: Escherichia coli, UTI, Multidrug resistance, ESBL, Third generation cephalosporins

How to cite the article: Rajan S, Prabavathy J. Antibiotic Sensitivity and Phenotypic Detection Of ESBL producing E.Coli Strains Causing Urinary Tract Infection In a Community Hospital, Chennai, Tamil Nadu, India.. WebmedCentral PHARMACEUTICAL SCIENCES 2012;3(11):WMC003840

Copyright: This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC-BY), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Source(s) of Funding:
None

Competing Interests:
None

WebmedCentral Peer Reviewed: Yes
Antibiotic Sensitivity and Phenotypic Detection Of ESBL producing E.Coli Strains Causing Urinary Tract Infection In a Community Hospital, Chennai, Tamil Nadu, India.

Author(s): Rajan S, Prabavathy J

Abstract

Urinary Tract Infection (UTI) forms the largest single group of hospital acquired infections and account for about 40-50% of the total nosocomial infections. In spite of the wide spread availability of antibiotics, UTI remains to be one of the most common infectious diseases diagnosed. Further world wide data shows that there is an increasing resistance among UTI pathogens to conventional drugs. Resistance have emerged even to newer more potent antimicrobial agents. Therefore, the aim of the present study is to determine the prevalence and susceptibility of extended spectrum beta – lactamase in urinary isolates of Escherichia coli (E. coli) in a community hospital, Sundaram Medical Foundation, Chennai, South India. A total number of 562 urine samples suspicious of UTI were analyzed and it was found that 115 cultures were positive for E. coli infection. The study period ranges from March to April 2012. Antimicrobial susceptibility testing was determined to commonly used antibiotics using the modified Kirby-Bauer’s disc diffusion method. ESBL detection was done by the screening method of double disc synergy test and then confirmed by the phenotypic confirmatory test with combination disc as recommended by the Clinical Laboratory Standards Institute (CLSI) and the minimum inhibitory concentration (MIC) method using the E-test strips (AB Biodisk, Sweden). The prevalence of ESBL E. coli was 34.8%. The ESBL producing isolates were significantly resistant to Ampicillin (100%), norfloxacin (98%) and Nalidixic acid (100%) and third generation of cephalosporins (100%) as compared to non-ESBL producers. Multidrug resistance was significantly higher (63.2%) in ESBL positive isolates than non-ESBL isolates (26.3%). Knowledge of the prevalence of ESBL and resistance pattern of bacterial isolates in a geographical area will help the clinicians to formulate the guidelines for antibiotic therapy to avoid inappropriate use of extended spectrum cephalosporins. In conclusion the study of ESBL producing E. coli can be treated with beta lactamase inhibitors like Augmentin and Tazobactum / Pippercillin to some extent. As carbapenems like Imipenem and Ertapenem sensitivity is high, therefore these drugs are the only choice for the treatment of severe or life threatening infections caused by ESBL producing organisms. In order to prevent the outbreaks of this life threatening ESBL producers, certain infection control measures have to be followed. Adequate precautions have to be taken to minimize the risk of cross contamination among patients. Contact precautions by cohort patients during outbreaks and also promoting meticulous hand hygiene practices.

Introduction

Urinary Tract Infection (UTI) forms the largest single group of hospital acquired infections and account for about 40-50% of the total nosocomial infections. It is estimated that there are about 150 million urinary tract infections per annum worldwide (Stamm and Norrby, 2001). It also includes the most common nosocomial infection in many hospitals and accounts for approximately 35% of all hospital acquired infections. The most common etiological agent in Urinary Tract Infection (UTI) is E.coli. Its implication in UTI is around 80- 85% (Salvatore.s, Calton, E. 2011)

In spite of the wide spread availability of antibiotics, UTI remains to be one of the most common infectious diseases diagnosed (Gales et.al., 2000). World wide data shows that there is an increasing resistance among UTI pathogens to conventional drugs. Resistance have emerged even to newer more potent antimicrobial agents.

The review of literature revealed that there is a high prevalence of multi drug resistance E.coli in UTI. The reason of which is due to extended spectrum beta lactamases producing E.coli. Presently these Broad spectrum Beta lactamase producing organisms are a growing worldwide problem (Livermore, 2000).

Extended Spectrum Beta Lactamases (ESBL’s) are defined as β lactamases capable of hydrolyzing oxyiminocephalosporins and are inhibited by β
lactamase inhibitors. The incidence of ESBL producing strains among clinical isolates has been steadily increasing over the past years, resulting in limitation of therapeutic options. Microorganisms responsible for urinary tract (UTI) such as E.coli and Klebsiella spp. have the ability to produce ESBL’s in large quantities. These enzymes are plasmid borne and confer multiple drug resistance making urinary tract infection difficult to treat. The extended spectrum β-lactamase (ESBL) producing strains have variable susceptibility rates for fluoroquinolones, aminoglycosides, and fourth-generation cephalosporins (Lautenbach, 2001 and Kariuki et al., 2007).

Over the years, many new β-lactam antibiotics have been developed, however, with each new class of antibiotic, a new β-lactamase emerged that caused resistance to that class of drug. Presumably, the selective pressure imposed by the use and overuse of new antibiotics in the treatment of patients has resulted in the emergence of new variants of β-lactamase (Narayanaswamy et al., 2010). Therefore, antimicrobial resistance surveillance is necessary to determine the size of problem and to guide empirical selection of antimicrobial agents for treating the infected patients. Hence, the present study was conducted in a leading community hospital, Sundram Medical Foundation in Chennai, South India. The purpose of the study is to find out the prevalence of ESBL producers in urinary isolates of E.coli and also their susceptibility to commonly used antibiotics including the sex and the age group of people who are more susceptible for infection.

Materials and methods

A total of 562 patients suspicious of Urinary Tract Infection (UTI) were investigated in the laboratory for urine culture test during the period of March to April 2012. The isolates were non-repetitive (one per patient) and were obtained consecutively from urine specimens in both outpatient and inpatient from Department of Microbiology, a leading Community Hospital, Sundram Medical Foundation, Chennai. The flow chart showing the protocol of experimental design is presented (Fig. 1).

Isolation of Pathogens
The urine specimen was inoculated in two types of media plates Mac conkey agar and Blood agar by standard culture techniques. A calibrated loop (4mm diameter) delivering 0.01ml of urine was used to inoculate the sample. The plates are incubated at 35°C to 37°C for 24 hrs before the plates were inspected for growth.

Identification of Isolates
Identification of the isolated organism was done on the basis of routine biochemical tests and gram staining was performed to confirm the gram negative bacilli. Apart from colony morphology the routine biochemical tests were performed to confirm the organism that is fermentation of lactose, ability to produce Indole, reaction on triple sugar Iron agar (TSI), citrate and urease utilization and motility of organism along with mannitol fermentation. (cheesbrough, 1989). Out of 115 isolates, 40 isolates were found to be ESBL producers by phenotypic confirmatory test. This was further confirmed by double disc diffusion technique and by using the E-test strips. The study revealed that 100% agreement of the two methods - phenotypic confirmatory test and MIC E-test strips in detection of ESBL producers. The confirmed isolates of E. coli were maintained at 4°C on Nutrient agar slants.

Initially, a total of thirteen antibiotics were used in the study which includes Ampicillin (30 µg), cephalexin (30µg), ciprofloxacin (15 µg) Nitrofurantoin (300µg), Gentamycin (10 µg), Norfloxacin (10 µg), Co-trimazazole (25 µg), Ofloxacin (5 µg), Amoxycillin / clavulanic acid (30 µg), Cefuroxime (30 µg) Amikacin (10 µg), Ceftazidime (30 µg) and Cefpodoxime (10µg).The disc used were purchased from Himedia, India and Oxoid, UK.

Susceptibility tests were done on fresh pure cultures of the isolated organism by Kirby & bauer’s method on Muller Hinton agar plates (Agarwal 1974) as described by the Clinical Laboratory standards Institute (CLSI) standards.

The organism that showed resistance to cephalosporin groups were further tested using a list of higher antibiotics such as Ertapenem (30µg), cefotaxime (30µg), Tazobactum / Piperacillin (30 µg), Imipenem (10 µg), Aztreonam (30 µg), Cefuroxime (30 µg) and ceferazone (30 µg).

The diameter of the zone of complete inhibition was measured to the nearest whole millimetre (mm) by a ruler. The zone of inhibition of bacterial growth around the disc is measured in mm which represents susceptibility of the organism to that particular drug. The test interpretation was done in comparison by the control strain of E. coli ATCC 25922 strain (Himedia, India).

ESBL screening and detection
Based on the routine antibiotic disc sensitivity test, isolates that exhibited intermediate susceptibility or resistance to any one of the third generation
cephalosporins ceftazidime / cefatoxime were short listed to detect and confirm ESBL production (Jalapoor et al., 2009; Washington et al 2006). The ESBL screening was done by using the manual CLSI 2005. An inhibition zone of < 18mm for cefatoxime and < 14m for ceftazidime indicated that the isolated strain is probably an ESBL producer.

**Double disc diffusion testing**

A Mueller-Hinton agar plate is inoculated with a suspension made from an overnight Nutrient agar culture of the test strain as recommended for a standard disk diffusion susceptibility test. Disks containing the standard 30 µg of ceftazidime, ceftriaxone, aztreonam, and 10 µg of cefpodoxime are placed 15 mm apart (edge to edge) and from an amoxicillin-clavulanic acid disk containing 10 µg of the latter compound which is placed in the centre of the plate. The disk edge-to-edge distance recommended here is that reported as having greater sensitivity than the previous distance of 20 to 30 mm. Following incubation for 16-20 hours at 35°C, any enhancement of the zone of inhibition between a beta-lactam disk and that containing the beta-lactamase inhibitor indicated the presence of an ESBL.

**Confirmation of ESBL using E-test**

The confirmation of ESBL was also performed by E-test ESBL strips (E-test Biomerieux, Sweden) and the test was performed in accordance to the manufacturer’s instructions. Double ended strips containing gradient of ceftazidime and ceftazidime + clavunic acid at the other end were tested. The presence of ESBL was confirmed by the appearance of phantom zone below the formation of TZ inhibition ellipse and clavunate caused a more than or equal to three doubling concentration decrease ratio of > 8 in the MIC values of ceftazidime.

**Results**

Out of 562 urine samples processed, 115 cultures were positive for E.coli. The remaining 447 cultures showed a growth of other organisms like Klebsiella, Pseudomonas, Proteus, staphylococci and Enterococci, some of the cultures showed No significant bacteriuria (negative).

All the 115 isolates of E.coli were taken up for study in which it is observed that more organisms were isolated from adult women (51.3%) compare to those from men (48.6%) (Table 1). Further it was also observed that the people belonging to the age group of 51 - 70 years are more affected by the dreadful ESBL producing E. coli (Table 2).

Out of 115 isolates 40 (34.8%) isolates were inferred to be ESBL producing E. coli in which (20.8%) were females and (13.9%) were males. The non ESBL producers were 75 (65.2%) patients. Hence, the prevalence of ESBL producing E. coli is found to be more among women when compared to men (Table 2 and Table 3).

It is also observed that children in the age group of 0-10 years also had UTI with ESBL producing E.coli (Table-2)

Antiobigram by Kirby & Bauer’s method was carried out for all the 115 identified isolates of E. coli. A total of 13 antibiotics were used initially and for the isolates that are found to be multi drug resistant i.e., at least to five antibiotics. Further, higher group of antibiotics including Aztreonam, Imipenem and Ertapenem were tested (Table 4).

The percentage of resistance clearly indicates that ESBL producers are totally not responding to Ampicillin (100%), Cephalexin (100%), ciprofloxacin (98%), Norfloxacin (98%), Ofloxacin (98%), Cefuroxime (100%), ceftazidime (100%), Cepodoxime (100%) and cefotoxime (100%)

After determining the percentage of resistance of ESBL E. coli its sensitivity percentage was also calculated in-order to give a clear conclusion of the list of susceptible antibiotics to which the ESBL producers responds (Table 5).

Both the Beta lactum and Non Beta lactum antibiotics tested for susceptibility revealed the following percentage of susceptibility have been found i.e., Nitrofurantoin (87.5%), Amoxyclav (75%), Amikacin (97.1%), Ertapenem (94.4%), Piperacillin / Tazobactum (94.2%), Cefperazone / sulbactum (95%), and Imipenem (100%). Therefore, it is inferred that all the isolated ESBL producers were resistant to third generation cephalosporins like ceftazidime, cepapodoxime, cefatoxime and cefuxorexime but are still sensitive to carbapenems like Imipenem and Ertapenem and also highly responds to combination of drugs like Piperacillin/Tazobactum and Cefperazone/sulbactum.

**Discussion**

*E. coli* causing UTI’s began to be reported from earlier this decade from USA, Saudi Arabia, India, Japan, Nepal, China and Brazil (Ruman Mowla et al., 2011). The present study clearly shows that there is a high prevalence of ESBL *E. coli* in urinary isolates and its resistance to commonly used antibiotics is found in community hospital, Sundram Medical Foundation,
Chennai, India. The prevalence of E. coli infection was almost 40%.

The overall prevalence of ESBL producers was found to vary greatly in different geographical areas and in different institutes. Previous studies from India have reported ESBL production varying from 28% to 84% (Narayanaswamy et al., 2010). It may be noted that urinary tract infection is the most commonly encountered infection found in adult women in many parts of the world. Reports of high incidents of community acquired urinary tract infections are available from Asia, Pacific, Denmark, Japan, India, Russia and the USA (Ruman Mowla et al., 2011). Further the incidence of Urinary tract infections by ESBL producing E. coli was found highest in India (60%) followed by Hong Kong (48%) and Singapore (33%) (Hseuh, Hoban et al., 2011).

A point of interest noted in the present study is that all the strains were at least resistant to 3-5 antibiotics which includes the first and second generation of cephalosporins. The resistance was very high to Ampicillin (80%), Cephalexin (73%). Cepodoxime 84% and Ceftazidime (75%) which is comparable with the other studies of Padmini et al., 2004; Mary Farkosh 2007 and Lautenbach et al., 1998.

Almost all the ESBL-positive isolates were found to be resistant to Ampicillin and sensitive to Imipenem, which again advocates the usage of carbapenem antibiotics as the therapeutic alternative to β-lactam antibiotics. The total resistance of these antibiotics might be due to continuous use of it for many years and may also be due to empirical treatment.

Conclusion

In conclusion, the present study clearly highlight that all the isolated ESBL producers were resistant to third generation cephalosporins like ceftazidime, cefpodoxime, cefotaxime and cefuroxime but are still sensitive to carbapenems like Imipenem and Ertapenem and also highly responds to combination of drugs like Piperacillin / Tazobactum and Cefperazone / sulbactum.

The findings of the present study showed an increase in the prevalence of resistance to a number of commonly used antibiotics to an alarming level. Many isolates were found to be resistant to atleast 3 - 5 antibiotics. In view of this emerging drug resistance the practice of routine ESBL testing for uropathogens along with conventional antibiogram would be useful for all cases which will help in the proper treatment of the patient and also prevent further development of bacterial drug resistance. Drug resistance surveillance in hospital is necessary to know the impact of higher drug resistance of the urinary isolates prevailing in their population which will lead to the formation of a strict antibiotic policy thereby reducing the resistance level.

Certain general precautions are to be followed to control the outbreaks of infections due to ESBL organisms. A proper use of antimicrobial agents will mostly control the emergence of resistant strains. Precautions to be taken to prevent the nosocomial spread of ESBL producing E. coli infection. Control measures and education programs are necessary to avoid the problem of ESBL’s. In addition to that clinicians must depend on more laboratory guidance, while laboratory must provide resistant patient data for better management more rapidly.

Acknowledgement

The authors thank the Pachaiyappa’s Trust Board, Chennai and Principal, Pachaiyappa’s College, Chennai for their support for carrying out the research project.

The authors thank Dr. T. Vaidehi, MD., HoD, Department of Microbiology, Sundaram Medical Foundation, Chennai for performing the experiments for the project.

The author thanks Dr. M. S. Prasad, MS., Chief Medical officer and Dr. Geetha Vedavayasan, Chief Medical officer/IC of HVF Hospital, Ministry of Defence, Avadi, Chennai for their constant encouragement and support.

References

1. Akram Hassan mekki Extended Spectrum beta Lactamases among multi drug resistant Escherichia coli and Klebsiella species causing Urinary tract infections in Khartoum JBR Vol. 2 (3) PP 18 -21, August 2010, ISSN 2006/9871@2010


8. Habeeb Khadri, Mohammed Alzohairy High prevalence of Multi drug resistance (MDC) and extended spectrum beta lactamase among community acquired Urinary tract infection (CAUTI) Journal of Bacteriology Research vol 1 (9) Pp105-110 December 2009. ISSN 2006 9871@2009 Academic journals.


Illustrations

Illustration 1

Flow chart showing the protocol of proposed study

Urine samples → Isolation of pathogens

Mac conkey agar → Blood agar

Pinkish dry Lactose Fermented colonies ↓ Greyish Flat colonies without Lysis

Isolation of E. coli by its colony morphology

Biochemical testing for confirmation of E. coli

Antibiotic sensitivity testing by Kirby & Bauer Method

Isolation of ESBL producing E. coli using the screening tests

Double disc diffusion testing → E-test using ESBL E-strips

Antibiogram study of ESBL E.coli

Interpretation of results based on Antibiotic sensitivity pattern of different age group and sex and the susceptibility pattern of ESBL E. coli.
Illustration 2

Table 1: Prevalence of E. coli in Males

<table>
<thead>
<tr>
<th>Total. No. of Positive E. coli</th>
<th>No. of Males affected</th>
<th>No. of Females affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>% of positivity</td>
<td>48.6%</td>
<td>51.3%</td>
</tr>
</tbody>
</table>
Illustration 3

Table 2: Determination of ESBL and non ESBL producers among positive cultures

<table>
<thead>
<tr>
<th>Age group</th>
<th>Total No of E.coli Positive</th>
<th>ESBL Producers</th>
<th>NON ESBL producers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 10 yrs</td>
<td>09</td>
<td>04</td>
<td>05</td>
</tr>
<tr>
<td>11 - 20 yrs</td>
<td>01</td>
<td>00</td>
<td>01</td>
</tr>
<tr>
<td>21 - 30 yrs</td>
<td>14</td>
<td>02</td>
<td>12</td>
</tr>
<tr>
<td>31 - 40 yrs</td>
<td>14</td>
<td>03</td>
<td>11</td>
</tr>
<tr>
<td>41 - 50 yrs</td>
<td>10</td>
<td>04</td>
<td>06</td>
</tr>
<tr>
<td>51 – 60 yrs</td>
<td>20</td>
<td>12</td>
<td>08</td>
</tr>
<tr>
<td>61 - 70 yrs</td>
<td>24</td>
<td>08</td>
<td>16</td>
</tr>
<tr>
<td>71 - 80 yrs</td>
<td>18</td>
<td>07</td>
<td>11</td>
</tr>
<tr>
<td>80 &amp;above</td>
<td>05</td>
<td>0</td>
<td>05</td>
</tr>
<tr>
<td>TOTAL</td>
<td>115</td>
<td>40(34.8%)</td>
<td>75(65.2%)</td>
</tr>
</tbody>
</table>
Illustration 4

Table 3: Prevalence of ESBL E.coli between Males and Females.

<table>
<thead>
<tr>
<th>Total no. of ESBL E.coli</th>
<th>No. of Females</th>
<th>No. of Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>% of prevalence</td>
<td>20.8%</td>
<td><strong>13.9%</strong></td>
</tr>
</tbody>
</table>
Illustration 5

Table 4: Percentage of Resistance of Non-ESBL and ESBL E. coli

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>% of Resistant Non-ESBL (n= 75)</th>
<th>% of Resistant ESBL (n= 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>73</td>
<td>100</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>54</td>
<td>98</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>Norfloxacin</td>
<td>56</td>
<td>98</td>
</tr>
<tr>
<td>Co-trimoxazole</td>
<td>52</td>
<td>72.5</td>
</tr>
<tr>
<td>Ofloxacin</td>
<td>49</td>
<td>98</td>
</tr>
<tr>
<td>Amoxyclov</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>42</td>
<td>100</td>
</tr>
<tr>
<td>Antimicrobial</td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Amikacin</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>Cepodoxime</td>
<td>84</td>
<td>100</td>
</tr>
<tr>
<td>Ertapenem</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Cefatoxime</td>
<td>41</td>
<td>100</td>
</tr>
<tr>
<td>Pip/tazo</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Cefoperazone /sulbactum</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Imipenem</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Aztreonam</td>
<td>69</td>
<td>80</td>
</tr>
</tbody>
</table>
Illustration 6

Table 5: Susceptibility pattern of ESBL producing E. coli.

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Total No. of Isolates</th>
<th>No. of Susceptible Isolates</th>
<th>% of Susceptibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>40</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>40</td>
<td>35</td>
<td>87.5</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>40</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>Norfloxacin</td>
<td>40</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>Co-trimoxazole</td>
<td>40</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>Ofloxacin</td>
<td>40</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Amoxyclav</td>
<td>40</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drug</td>
<td>Sensitivity</td>
<td>Resistant</td>
<td>% Sensitivity</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Amikacin</td>
<td>40</td>
<td>34</td>
<td>97.1</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cefpodoxime</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cefatoxime</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ertapenem</td>
<td>36</td>
<td>34</td>
<td>94.4</td>
</tr>
<tr>
<td>Piperacillin/Tazobactum</td>
<td>35</td>
<td>33</td>
<td>94.2</td>
</tr>
<tr>
<td>Cefoperazone/sulbactum</td>
<td>40</td>
<td>38</td>
<td>95</td>
</tr>
<tr>
<td>Imipenem</td>
<td>36</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>Aztreonam</td>
<td>25</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>
Reviews

Review 1

Review Title: Antibiotic sensitivity and phenotypic detection of ESBL producing E.coli strains causing urinary tract infection (UTI) in a community hospital at Chennai, Tamil nadu, India

Posted by Dr. Appavu G Arulnathan on 02 Jan 2013 04:58:47 AM GMT

What are the main claims of the paper and how important are they?:
Commonly used antibitics to treat UTI had been screened with a fair number of samples from suspected patients to see the efficacy of them. In a world of ever increasing use of antibiotics to treat patients it is very important to test and find out the result of the usage and to recommend the suitability of drugs in case of development of resistance is a constant endeour of medical researchers. in this aspect the study is quite relevant.

The methodology used for for this study is quite adequate and a fair number of samples have been tested in the specified period of time frame

Adequate survey of literature had been carried out upto 2011 which itself suggests the sequence of the study in its right time frame

The of the result systematic order of testing the samples for the presence of UTI which is followed by the administration of antibiotics and the suitability of the concerned drug were well documented using standard procedures

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?
Since the procedured were conducted through standardised laboratory proceurdes I have nothing to comment about it

Valid procedures and lab practices have been followed

A molecular level study could be carried out if resources permit.

A molecular level study could be carried out if resources permit.

Rating: 6

Comment:
By and large the paper brings out the result of a systematic evaluation antibiotic usage among human subjects

Competing interests: Reproductive technology, Embryo preservation and Transfer

Invited by the author to make a review on this article?: Yes

Have you previously published on this or a similar topic?: No

Experience and credentials in the specific area of science:
More than 15 years

How to cite: Anonymous. Antibiotic sensitivity and phenotypic detection of ESBL producing E.coli strains causing urinary tract infection (UTI) in a community hospital at Chennai, Tamil nadu, India[Review of the article 'Antibiotic Sensitivity and Phenotypic Detection Of ESBL producing E.Coli Strains Causing Urinary Tract Infection In a Community Hospital, Chennai, Tamil Nadu, India.' by ],WebmedCentral 1970;4(1):WMCRW002429
Review 2

Review Title: Antibiotic Sensitivity and Phenotypic Detection Of ESBL Producing E.Coli Strains Causing Urinary Tract Infection In a Community Hospital

Posted by Dr. Swaminathan Rajan on 24 Nov 2012 02:24:20 PM GMT

What are the main claims of the paper and how important are they?:
The main claims of the paper is to find out the prevalence of ESBL producers in urinary isolates of E.coli and also their susceptibility to commonly used antibiotics including the sex and the age group of people who are more susceptible for infection.

Yes, the research work is aimed to find out the suitable antibiotic to cure the UTI in the patient as the resistant type of bacteria are developed.

Yes, the results are discussed with the earlier research papers and the conclusion is inferred.

Yes, the experiments are designed in such a way the results are supporting the claims.

If a protocol is provided, for example for a randomized controlled trial, are there any important deviations from it? If so, have the authors explained adequately why the deviations occurred?
The flowchart is given and there is no deviation.

Yes, the experiments are designed following the international research papers and the results are reproducible.

It is sufficient.

It is sufficient.

Rating: 8

Comment:
The findings of the present study showed an increase in the prevalence of resistance to a number of commonly used antibiotics to an alarming level. Many isolates were found to be resistant to at least 3 - 5 antibiotics. In view of this emerging drug resistance the practice of routine ESBL testing for uropathogens along with conventional antibiogram would be useful for all cases which will help in the proper treatment of the patient and also prevent further development of bacterial drug resistance. Drug resistance surveillance in hospital is necessary to know the impact of higher drug resistance of the urinary isolates prevailing in their population which will lead to the formation of a strict antibiotic policy thereby reducing the resistance level.

Competing interests: Yes, I am a Scholarly Reviewer & Faculty of WebmedCentral

Invited by the author to make a review on this article?: No

Have you previously published on this or a similar topic?: Yes

References:

How to cite: Rajan S. Antibiotic Sensitivity and Phenotypic Detection Of ESBL Producing E.Coli Strains Causing Urinary Tract Infection In a Community Hospital[Review of the article 'Antibiotic Sensitivity and Phenotypic Detection Of ESBL producing E.Coli Strains Causing Urinary Tract Infection In a Community Hospital, Chennai, Tamil Nadu, India.' by ] WebmedCentral 1970;3(11):WMCRW002350
Disclaimer

This article has been downloaded from WebmedCentral. With our unique author driven post publication peer review, contents posted on this web portal do not undergo any prepublication peer or editorial review. It is completely the responsibility of the authors to ensure not only scientific and ethical standards of the manuscript but also its grammatical accuracy. Authors must ensure that they obtain all the necessary permissions before submitting any information that requires obtaining a consent or approval from a third party. Authors should also ensure not to submit any information which they do not have the copyright of or of which they have transferred the copyrights to a third party.

Contents on WebmedCentral are purely for biomedical researchers and scientists. They are not meant to cater to the needs of an individual patient. The web portal or any content(s) therein is neither designed to support, nor replace, the relationship that exists between a patient/site visitor and his/her physician. Your use of the WebmedCentral site and its contents is entirely at your own risk. We do not take any responsibility for any harm that you may suffer or inflict on a third person by following the contents of this website.