Frequencies of urinary tract infections among children aged 0-16 years: Distribution and antimicrobial susceptibilities of the strains

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OBJECTIVES

Urinary tract infection (UTI) is the most frequently diagnosed urologic disease, and *Escherichia coli* is the most common etiological agent for all age groups. The aim of this study is to evaluate the antibiotic resistance of the bacterial strains recovered from UTIs from children, and to determine the prevalence of extended-spectrum b-lactamase (ESBL) producing strains in this age group.

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METHODS AND MATERIALS

During the study period 2008-2013, 1400 isolates (1369, 97.8% outpatient; 31, 2.2% inpatient) were collected from patients with UTIs at a tertiary hospital in, Turkey, aged between 0-16 years.Urine samples were inoculated onto eozine-metylene-blue agar and blood agar base. Strain identification and antimicrobial susceptibility of the strains was performed using VITEK-2 Compact automated system (bioMerieux, France). Additionally, Kirby-Bauer disk diffusion test was performed according to CLSI.ESBL screening of the isolates was performed by disk synergy test, and results were confirmed by cefotaxime, ceftazidime, cefotaxime–clavulanic acid (CTC,30/10µg),and ceftazidime–clavulanic acid (CZC,30/10µg) disks, in accordance with CLSI guidelines.

RESULTS

A total of 1400 bacterial strains; 1006(71.9%) *E.coli*, 133 (9.5%)*K.oxytoca*, 159 (11.4%) *K.pneumoniae*, 70 (5%) *P.mirabilis*, 13(0.9%) *P.vulgaris*, 9(0.6%) *M.morgannii*, 6(0.5%) *Serratia* spp, 4(0.2%) *Citrobacter* spp. were recovered from patients, of whom 1369 (97.8%) had community-acquired and 31 (2.2%) had healthcare-associated UTIs. The common bacterial species recovered were *E.coli*, *K.pneumoniae* and *K.oxytoca* respectively both for outpatient and inpatient group. The highest ESBL positivity rate was 23.8% for *E.coli*, 22% for *K.pneumoniae*, 20.3% for *K.oxytoca*, 22.9% for *M.morgannii*, 50% for *C.freundii*,10.6% for *Proteus* spp. strains. TPZ(5.2%), AK(1.7%) and IMP(0.2%) has the highest activity among *E.coli* strains. SXT resistance is alarming with the resistance rates of 44% among *E.coli*. Antimicrobial resistance rates of the strains were shown on Table.

Table. Antimicrobial resistance rates of the strains by ESBL production

Antimicrobial	*E.coli*		*Klebsiella* spp.	
	ESBL(+) (239)	ESBL (-) (767)	ESBL(+) (62)	ESBL (-) (230)
AMP	100	59.5	100	79.1
AMC	32.6	6.1	33.9	8.3
GEN	43.1	7.4	30.6	5.7
AK	6.3	0.3	6.5	-
CXM	99.2	6.3	100	3.9
CRO	99.6	-	100	-
CAZ	95.4	-	100	0.4
CTX	97.1	0.1	100	0.4
FEB	93.7	-	100	-
AZT	94.1	-	100	-
TPZ	18.8	0.9	25.9	0.9
CIP	4.1	7.3	17.7	3.9
SXT	63.6	37.9	64.5	20.9
IMP	0.8	-	3.2	-
FOF	7.1	1.2	-	-
NIT	5	1.6	8.1	5.2

CONCLUSIONS

The increasing prevalence of infections caused by ESBL-producer*E.coli* makes the empirical treatment of UTIs more difficult. A remarkable rate of ESBL-positivity is alarming in our patient group and empirical treatment with cephalosporins should be avoided. Treatment with SXT should be considered cautiously due to the high resistance rates. According to the results of this study, fosfomycin or nitrofurantoin are recommended for the first-line empirical oral treatment of uncomplicated UTIs.