



ETIOLOGICAL STRUCTURE AND ANTIBIOTIC SUSCEPTIBILITY OF CLINICAL ISOLATES FROM URINES

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ABSTRACT

Isolates from urines from University Hospital Stara Zagora were included in the study for 5 years since 2007 till 2011. The most common isolates from urines were *E.coli* 45%, *E.faecalis* 11%, *K.pneumoniae* 9.2%, *P.aeruginosa* 9%. The susceptibility of isolates to antibiotics was determined by the DDM - disk-diffusion method. Of all the *E.coli* 35% were susceptible to ampicillin, 94% to amikacin, 72% to ciprofloxacin. The susceptibility of *E.faecalis* was found as: 85% to ampicillin, 56% to ciprofloxacin. Among *P.aeruginosa* the sensitivity rates were as follows : piperacillin - 79% , ciprofloxacin 68%, Imipenem -95%.

Key words: urinary tract infections, Enterobacteriaceae, Enterococcus, *P.aeruginosa*

INTRODUCTION

Urinary tract infections are one of the most common bacterial infections. The performance of urinary infections ranges from mild symptomatic cystitis to pyelonephritis and septicemia. In most cases you need to begin treatment before the microbiological results. Urinary pathogens permanently change their susceptibility to antibiotics, which results in an increase in their resistance to most often used antibacterials. Etiological structure and antibiotic susceptibility of isolates varies regionally. Therefore, the purpose of this work is to investigate which organisms are most commonly isolated from urines and their susceptibility to antibacterial agents.(1)

MATERIALS AND METHODS

For five years, 2007-2011., 1638 clinically significant isolates from urines of hospital patients from different wards of University Hospital in Stara Zagora were isolated. Routine methods were used for isolation and

identification of microorganisms. The antibiotic susceptibility was determined by disk-diffusion method of Bauer-Kirby.

RESULTS AND DISCUSSION

1638 microorganisms were isolated from urines.

Among isolates from urines Gram-negative microorganisms from family Enterobacteriaceae prevail, followed by the group of non-fermentative bacteria. From Enterobacteriaceae *E.coli* is the most common isolate, especially from women 28.93%: 17.39% male.(2) Among Gram negative nonfermentative the most frequent isolate is *P. aeruginosa* (9%), predominantly in men, which is associated with catheterization and other urological interventions. Among Gram-positive bacteria the most common cause of urinary tract infections is *E.faecalis* 10.74%, again more common in men. On the other hand *S.saprophyticus* is only 1% of our patients, which is explained by the fact that the investigated isolates are from hospital patients with complicated urological diseases while *S.saprophyticus* is typical for ambulatory patients without pre-registered diseases of the urinary system.

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Table 1. The etiological structure of the most common isolates from urines

Microorganism	Total number of isolates	Percentage of total isolates	Percentage of men	Percentage of women
E.coli	759	46.33	17.39	28.93
K.pneumoniae	152	9.27	4.27	5
P.mirabilis	83	5.06	2.13	2.93
E.cloacae	51	3.11	1.89	1.22
E.aerogenes	42	2.56	1.03	1.52
K.oxytica	23	1.40	0.73	0.67
P.vulgaris	10	0.61	0.61	0
S.marcescens	10	0.61	0.36	0.24
P.aeruginosa	148	9.03	5.43	3.60
A.baumannii	73	4.45	2.86	1.58
E.faecalis	176	10.74	6.53	4.21
E.faecium	54	3.29	1.64	1.64
S.aureus	30	1.83	0.73	1.9
S.saprophyticus	16	0.97	0.6	0.36
Candida albicans	10	0.61	0.30	0.31

Total 1638

Distribution of the species isolated microorganisms

Our data on the causes of urinary tract infections is indistinguishable from well-known. (2, 3, 4) E.coli is described to be the cause of 21-54% of urinary tract infections depending on many factors such as initial or recurrent infection, previous antibiotic therapy, comorbidities, previous instrumental interference. In 10.7% of positive urine culture are isolated

Enterococcus. The data from other authors show frequency in urinary infections 6.1-23%, which is in full compliance with our results. (5)

Of a particular interest is the antibiotic susceptibility of the isolates from uroinfections.

Table 2. Summary information on antibiotic sensitivity rates of the most common uroisolates E.coli and K.pneumoniae.

Microorganism	Ampicillin	Piperacillin	Cephalexin	Amoxycillin/clav.	Cefotaxime	Ceftazidime	Amikacin	Ciprofloxacin
E.coli	35	58	69	51	80	86	94	73
K.pneumoniae	0	50	50	36	59	69	86	64

Antibiotic sensitivity of E.coli and K.pneumoniae in percentages (ESBL E.coli 9%, ESBL K.pneumoniae 22%)

E.coli and K.pneumoniae exhibit varying degrees of sensitivity to beta-lactam antibiotics, such as 9% of E.coli and 22% of K.pneumoniae are ESBL positive, which implies resistance to all beta-lactam antibiotics except carbapenems. For comparison with our previous study in 2004

(6) only one isolate showed the presence of ESBL. The strains showed relatively good sensitivity to amikacin. Sensitivity to ciprofloxacin is moderate, which does not make it safe drug of first choice without prior testing in vitro.

Table 3. Antibiotic susceptibility of P.aeruginosa in percentage susceptible strains

Microorganism	Piperacillin	Ceftazidime	Cefepime	Imipenem	Tobramycin	Amikacin	Ciprofloxacin
P.aeruginosa	79	74	73	95	92	85	68

Susceptibility of P. aeruginosa as a percentage

Isolates of *P.aeruginosa* show moderate sensitivity to beta-lactams used for its treatment and ciprofloxacin, which is why their treatment should be performed after the result of antibiogram. The highest sensitivity *P.aeruginosa* shows to carbapenems. Among

aminoglycosides a drug of choice is Tobramycin.

In *P.aeruginosa* strains was observed high sensitivity to imipenem and amikacin. Sensitivity to ciprofloxacin e low 68%.

Table 4. The antibiotic susceptibility of *Enterococcus faecalis* in percentages.

Microorganism	Ampicillin	Gentamicin-HLAG	Vancomycin	Teicoplanin	Ciprofloxacin
<i>E.faecalis</i>	98	76	100	100	56

The susceptibility to Gentamicin e tested with disk 120 mg.

E. faecalis show the highest sensitivity to ampicillin 98%. Half of the isolates were resistant to Ciprofloxacin. Among our isolates there is no resistant to Vancomycin and Teicoplanin isolate. (7, 8)

CONCLUSIONS

1. *E.coli* is the most common isolate from urine, the percentage of isolation of women is higher.
2. The etiological structure of urinary infections in MBAL Stara Zagora is similar to our previous study in 2004.
3. The percentage of isolates from family Enterobacteriaceae rises compared to a similar survey in 2004.
4. Aminoglycosides can be drugs of choice for treatment of urinary tract infections in the family Enterobacteriaceae and *Pseudomonas aeruginosa*.
5. A drug for treatment of *Enterococcus faecalis* is ampicillin.
6. Due to the varied antibiotic sensitivity of uroisolates, treating urinary tract infections should be performed according to the result of antibiogram.

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