PATTERNS OF ANTIMICROBIAL RESISTANCE IN NOSOCOMIAL STRAINS OF *ENTEROCOCCUS* SPP. ISOLATED FROM PATIENTS WITH UTI IN DIFFERENT PARTS OF RUSSIA

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Introduction and Purpose

Nosocomial urinary tract infections (UTI) play significant role and account for up to 40% of all nosocomial infections. Enterococci which are normal inhabitants of the gastrointestinal tract of humans, rank second after *E. coli* as a cause of nosocomial UTI and isolated in approximately 14-17% of cases.[1] *E. faecalis* is a predominant pathogen that responsible for more than 75% of all cases of enterococcal infections, followed by *E. faecium*. Other enterococci are rarely isolated from urine.

The major problem with enterococci is the resistance to antimicrobial agents among which the most important are high-level aminoglycoside resistance, ampicillin resistance and, most recently, spread of glycopeptide resistance.

There are very limited data on antibiotic resistance of enterococci in Russia, particularly causing nosocomial UTI. So, the aim of our multicenter prospective study was to determine the rates of antimicrobial resistance in strains of *Enterococcus* spp. isolated from patients with nosocomial UTI in Russia.

[1] E.Bouza e.a. CMI. 2001; 7: 523-31

Methods

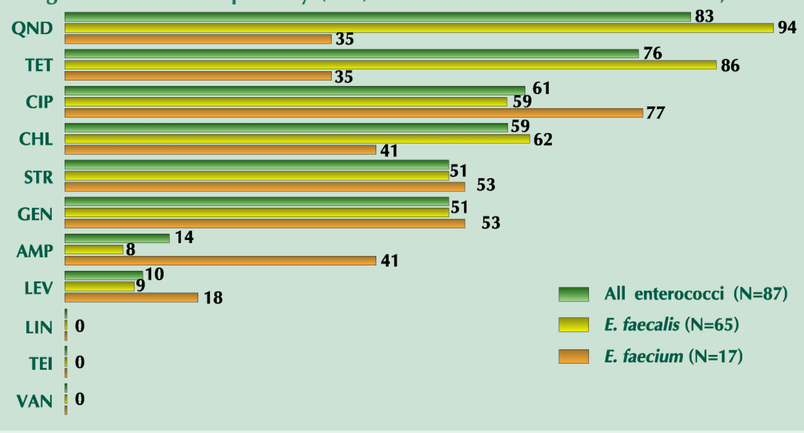
A total of 87 clinical strains of *Enterococcus* spp. isolated in 2001 from urine of patients hospitalized in 10 hospitals in different parts of Russia were included in the study.

Antimicrobials tested in central laboratory were ampicillin (AMP), gentamicin (GEN), streptomycin (STR), vancomycin (VAN), teicoplanin (TEI), linezolid (LIN), tetracycline (TET), chloramphenicol (CHL), quinupristin/dalfopristin (QND), ciprofloxacin (CIP), levofloxacin (LEV) and moxifloxacin (MOX). Antimicrobial susceptibility testing was performed by agar dilution method. The susceptibility testing and interpretation of the results were done according to the NCCLS guidelines with the exeption of moxifloxacin for which there were no recommendations available. *E. faecalis* ATCC 29212 was used as a control.

Results

The majority of isolates (78.2%) were collected from patients hospitalized in surgical units. Sixty five strains (74.7%) out of 87 strains tested were *E. faecalis*, 17 (19.6%) - *E. faecium*, 3 (3.4%) - *E. durans* and 2 (2.3%) - *Enterococcus* spp. Results of susceptibility testing are presented in the Figure 1 and Table 1.

Figure 1. Non-susceptibility (I+R) of tested strains to antimicrobials, %.



The most potent antimicrobials were glycopeptides (vancomycin and teicoplanin) and linezolid with no resistant strains found. The alarmingly high rates of resistance to aminoglycosides (gentamicin and streptomycin) were detected in both *E. faecalis* (50.8%) and *E. faecium* (52.9%).

Ampicillin nonsusceptibility was documented for 7.7% of *E. faecalis* and 41.2% of *E. faecium*. Chloramphenicol displayed low activity against these pathogens: 60.0% and 29.4% were resistant, respectively. Resistance rates to tetracycline were higher than to chloramphenicol with 86.2% of *E. faecalis* and 35.3% of *E. faecium* nonsusceptible, respectively.

The most active fluoroquinolone against all enterococci tested was moxifloxacin with MIC_{50}/MIC_{90} 0.5/2 mg/L, followed by levofloxacin (MIC_{50}/MIC_{90} 2/2 mg/L); the least active was ciprofloxacin with MIC_{50}/MIC_{90} 2/16 mg/L. Among all enterococci 60.9% were nonsusceptible to ciprofloxacin compared to 10.3% of nonsusceptible to levofloxacin strains.

Table 1. Results of susceptibility testing of *E.faecalis* and *E.faecium*

Antimicrobial	*E.faecalis* (N=65)			*E.faecium* (N=17)		
	I + R, %	MIC_{50}/MIC_{90}, mg/L	MIC Range, mg/L	I + R, %	MIC_{50}/MIC_{90}, mg/L	MIC Range, mg/L
AMP	7.7	2/2	1-64	41.2	2/64	1-128
GEN	50.8	256/4096	8-4096	52.9	32/4096	16-4096
STR	50.8	512/8192	128-8192	52.9	512/8192	32-8192
VAN	0	1/2	0.5-4	0	1/2	0.5-2
TEI	0	0.25/1	0.125-2	0	0.25/2	0.125-2
LIN	0	2/2	1-2	0	2/2	1-2
TET	86.2	64/128	0.5-128	35.3	1/128	0.5-128
CHL	61.5	32/64	4-64	41.2	8/64	2-64
QND	93.8	8/16	0.5-16	35.3	1/16	0.5-16
CIP	58.5	2/4	1-128	76.5	2/16	0.5-32
LEV	9.2	2/2	0.5-64	17.6	2/8	0.5-8
MOX	N/A*	0.5/2	0.125-32	N/A*	0.5/2	0.125-8

* No NCCLS interpretive criteria are available

Conclusions

1. The most active antimicrobials against enterococci were linezolid and glycopeptides with no resistant strains found
2. Taking into account good activity of levofloxacin against *E. faecalis* (9.2% of nonsusceptible strains) it could be considered as a possible alternative for the treatment of UTI caused by this pathogen
3. The most important problems determined are the high level of resistance to ampicillin and ciprofloxacin in *E. faecium* and to aminoglycosides in both *E. faecalis* and *E. faecium*

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