A NTIMICROBIAL RESISTANCE OF NOSOCOMIAL STRAINS OF ENTEROCOCCUS SPP. IN RUSSIAN ICUS: RESULTS OF MULTICENTER STUDY

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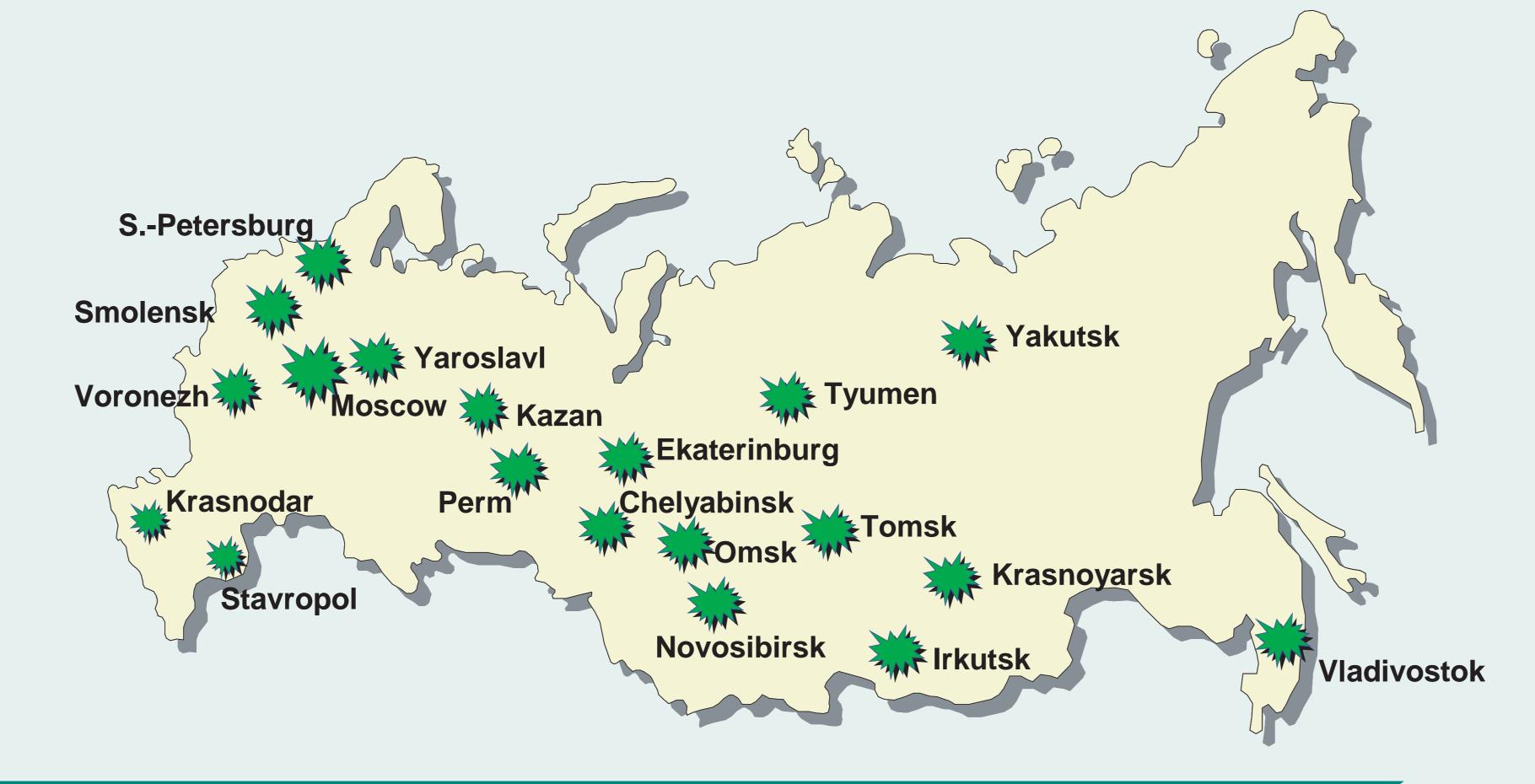
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BACKGROUND

Enterococci are the well-recognised cause of infections in human, especially in inpatients with corresponding risk factors. E. faecalis is a predominant pathogen that accounts for more than 75% of all cases of enterococcal infections, followed by *E. faecium*. Other enterococci are usually isolated from clinical specimens. The most important problem in enterococcal infections is the resistance to antimicrobials, especially in ICUs. At the same time there are limited data on epidemiology of antibimicrobial resistance of Figure 1. Centres participating in the study enterococci in ICUs in Russia. So, the aim of our study was to determine the rates of antimicrobial resistance in nosocomial strains of Enterococcus spp. in Russian ICUs.

METHODS

A total of 542 strains of *Enterococcus* spp. isolated in 2003-2004 from patients with nosocomial infections hospitalized in ICUs of 29 medical institutions from 19 cities in different parts of Russia (figure 1), were studied. Antimicrobial susceptibility testing was performed by agar dilution method according to NCCLS guidelines (2005). Antimicrobials tested included ampicillin (AMP), chloramphenicol (CHL), ciprofloxacin (CIP), gentamicin (GEN), levofloxacin (LEV), linezolid (LNZ), moxifloxacin (MOX), streptomycin (STR), teicoplanin (TEI), tetracycline (TET), vancomycin (VAN). E. faecalis ATCC 29212 was used as a control.



RESULTS

Two hundred ninety two out of 542 strains (53.9%) were E. faecalis, 184 (33.9%) - E. faecium, 66 (12.2%) - were represented by other Enterococcus spp. including E. gallinarum, E. casseliflavus, E. durans, E. avium, E. raffinosus). The location of infection sites is shown in the figure 2.

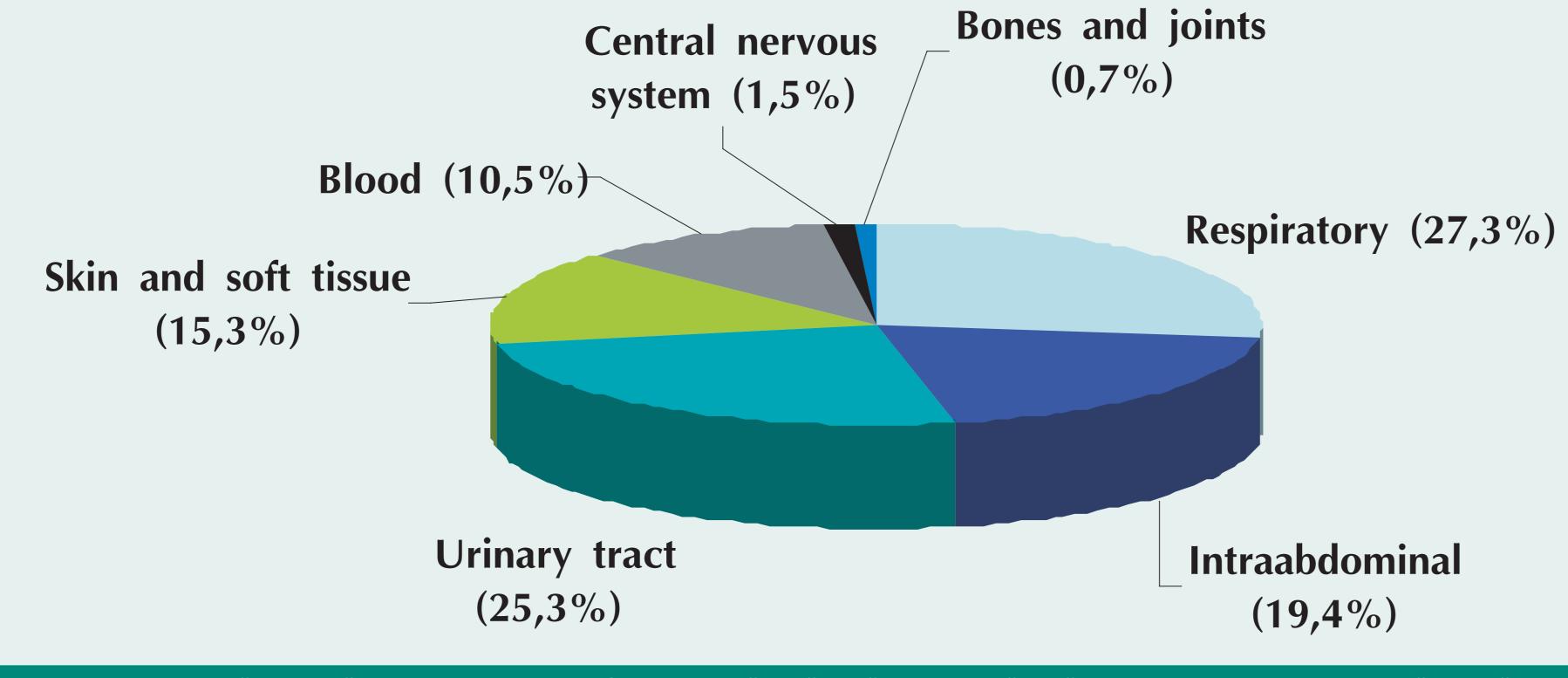


Figure 2. Clinical specimens from which the studied strains were isolated

Results of susceptibility testing are presented in the Table. The most potent antimicrobial was linezolid with no non-susceptible strains found. One strain of E. faecium was resistant to vancomycin and teicoplanin with MICs 64 mg/l and 32 mg/l respectively.

The alarmingly high rates of resistance to aminoglycosides (gentamicin and streptomycin) were detected in both E. faecium and E. faecalis. All strains of E. faecium were non-susceptible to both aminoglycosides tested; only 1% of E. faecalis were susceptible to gentamicin with all strains nonsusceptible to streptomycin.

Ampicillin resistance was documented for 92.4% of E. faecium and 3.1% of E. faecalis.

Other antimicrobials were as well not very potent against enterococci isolated in ICUs. Chloramphenicol ant tetracycline were not active against 47.8% and 60.3% of tested strains, respectively. Fluoroquinolones tested differ in their activity: the most potent was moxifloxacin with MIC_{50}/MIC_{90} 2/32 mg/l, followed by levofloxacin (MIC₅₀/MIC₉₀ $\frac{2}{64}$ mg/l), the least active was ciprofloxacin with MIC_{50}/MIC_{90} 4/256 mg/l.

CONCLUSIONS

- 1) The only antimicrobial to which no resistance has been found was linezolid;
- 2) In spite that resistance to vancomycin already emerged, this drug still demonstrates high activity against enterococci in Russia;
- 2) The most relevant problems were the high rates of resistance to ampicillin in E.faecium and to aminoglycosides in both E.faecalis and E.faecium.

Table. Activity of antimicrobials against tested stra	ins
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	All strains (n=542)		E. faecalis (n=292)		E. faecium (n=184)	
Antimicrobial		MIC ₅₀ /		MIC ₅₀ /		MIC ₅₀ /
	I+R,	MIC ₉₀	I+R,	MIC ₉₀	I+R,	MIC ₉₀
	%	(mg/l)	%	(mg/l)	%	(mg/l)
AMP	37.5	2/128	3.1	1/2	92.4	64/256
GEN	99.1	4096/8192	99.0	32/8192	100	8192/8192
STR	100	1024/8192	100	256/8192	100	4096/8192
VAN	1.8	1/2	0	1/2	1.6	1/2
LNZ	0	2/2	0	2/2	0	2/2
TET	60.3	64/128	68.5	64/128	53.3	16/128
CHL	47.8	8/64	44.5	8/64	57.6	16/32
CIP	79.3	4/256	69.5	2/64	100	32/256
LEV	45.2	2/64	24.3	2/32	77.7	16/128
MOX	35.8	2/32	14.0	0.5/8	69.6	8/32



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