

Antibiotic Resistance of Enterococci Isolated from Premature Born Infants

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INTRODUCTION

Enterococci are normal inhabitants of the gastrointestinal tract of humans. Nearly 50% of newborn infants are colonised with *E.faecalis* by 1 week of age. Colonisation with *E.faecium* is less consistent but appears to be increasing, with carriage in approximately 25% in adults.

Enterococci account for up to 10% of all cases of neonatal bacterial infections. The incidence of neonatal enterococcal infections appears to be increasing, concomitant with prolonged survival of premature infants and frequent use of broad-spectrum antibiotics, especially cephalosporins, in this group of patients. *E.faecalis* accounts for 80% to 90% of enterococcal infection, which usually arise from the patient's indigenous flora. Direct spread from person to person is more important for transmission of *E.faecium*.

The most important virulence factor of enterococci is the resistance to antimicrobial drugs. There are very limited data about antibiotic resistance of enterococci in Russia. However, multiresistant enterococci, especially ampicillin- and gentamicin-resistant, probably do appear to be an increasing clinical concern in some Russian medical institutions and paediatric hospitals.

OBJECTIVE

- To investigate the *in vitro* activity of ampicillin (AM), gentamicin (GM), streptomycin (S), vancomycin (VA), teicoplanin (TEC), chloramphenicol (C), tetracycline (TE), rifampicin (RA), ciprofloxacin (CIP), ofloxacin (OFX), levofloxacin (LVX), grepafloxacin (GPX), sparfloxacin (SPR), and quinupristin/dalfopristin (Q/D) against enterococci isolated from faeces of premature born infants.

MATERIALS AND METHODS

A total of 100 strains of enterococci (61 *E.faecium*, 33 *E.faecalis*, 4 *E.casseliflavus* and 2 *E.durans*) isolated from faeces of 76 premature born infants hospitalised in Smolensk Regional Pediatric Hospital (Russia) were studied. Presumptive identification was done by colony morphology on Bile Esculin agar plates, gram stain and catalase test. Final identification was done by API 20 STREP.

Production of β -lactamases was determined by the nitrocefin test.

Antimicrobial susceptibility testing was performed using the agar dilution method according to NCCLS guidelines where applicable. *E.faecalis* ATCC 29212 strain was used for Quality Control.

RESULTS AND DISCUSSION

Generally *E.faecium* was more resistant than other enterococci to most of tested antibiotics (see Table) with the exceptions of glycopeptides, which were equally active against all species (no strains were fully resistant), and Q/D (3% of resistance in *E.faecium* vs. 15% - in *E.faecalis*).

Only 1 (3%) strain of *E.faecalis* was resistant (MIC 32 mg/l) to AM. Majority (77%) of *E.faecium* were resistant to AM (MICs range 16-64 mg/l). All strains were negative for β -lactamase production.

No *E.faecalis* were resistant to GM, one strain was resistant to S, when most of *E.faecium* (64% and 56%, respectively) demonstrated high level resistance to GM (MICs 1000->2000 mg/l) and S (MICs 4000->8000 mg/l).

New fluoroquinolones such as LVX and SPR were 2-4 fold more active than older compounds.

Antibiotic	<i>E. faecalis</i>			<i>E. faecium</i>		
	MIC ₅₀ /MIC ₉₀	MIC ranges	R %	MIC ₅₀ /MIC ₉₀	MIC ranges	R %
AM	0.5/1	0.25-64	3	32/32	0.5-64	77
GM	4/16	4-256	0	>2000/>2000	4->2000	64
S	64/1000	16-4000	3	4000/>8000	32->8000	56
VA	2/4	0.5-8	9*	2/4	0.5-8	10*
TEC	0.25/0.5	0.125-1	0	0.5/1	0.125-2	0
C	8/32	4-64	39	16/32	2-64	54
TE	1/64	1-128	30	32/>128	1->128	92
RA	8/16	0.5-32	88	8/16	1-32	93
CIP	1/2	0.5-4	12	2/4	0.5-8	73
OFX	2/2	1-4	3	4/8	1-8	75
LVX	1/1	1-2	0	2/4	0.5-4	28*
GPX	0.5/0.5	0.25-1	0	8/16	0.25-32	93
SPR	0.5/0.5	0.25-1	0	1/2	0.25-8	39
Q/D	2/4	0.25-8	15	0.25/1	0.125-4	3

* - intermediate only

CONCLUSIONS

- The above data suggest that the resistance to glycopeptides in enterococci seems not to be a problem in our region
- High rate of resistance to ampicillin and aminoglycosides in *E.faecium* may have clinical significance in treatment of *E.faecium* infections