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ePoster Viewing

Epidemiology of nosocomial infections

Virulence factors and antibiotic resistance in *Enterococcus faecalis* and *Enterococcus faecium* strains isolated from patients hospitalized in the University Hospitals in Bialystok, Poland

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**Objectives:** *Enterococcus* spp. has in recent years become one of the most common etiological factors in nosocomial infections, because of their virulence and resistance to a variety of antimicrobials. The aim of this study was to compare the antibiotic resistance, the prevalence of genes encoding selected virulence factors, hemolytic activity and biofilm forming ability between *Enterococcus faecalis* and *Enterococcus faecium* strains isolated from invasive nosocomial infections.

**Methods:** Fifty *Enterococcus* strains (30 *E. faecalis* and 20 *E. faecium*) isolated from blood, pus, peritoneal fluid and BAL from patients hospitalized in different wards of two University Hospitals in Bialystok, since 11.2013 - 06.2014, were analyzed. Each isolate was identified by VITEK2 system and by PCR with primers targeted to the *ddl* gene. Susceptibility to antibiotics (ampicillin, imipenem, gentamicin, streptomycin, vancomycin, teicoplanin, linezolid and tigecycline) was determined using the E-test method and interpreted according to the EUCAST guidelines. The biofilm forming ability and hemolytic activity were assessed by phenotypic methods. Genes encoding virulence factors (*esp* - enterococcal surface protein, *as* - aggregation substance, *ace* - collagen adhesin) were investigated by PCR using specific primers followed by gel electrophoresis and DNA sequencing. Differences in the prevalence of tested features between *E. faecalis* and *E. faecium* strains were assessed by Chi-square test (significance level  $p < 0.05$ ).

**Results:** The most effective antibiotics against both *E. faecalis* and *E. faecium* strains were linezolid and tigecycline (100% susceptible strains). Resistance to gentamicin was detected in 46.7% *E. faecalis* and 50% *E. faecium* strains, resistance to streptomycin in 47% and 20% strains, resistance to teicoplanin in 3.3% and 20% strains, respectively; these differences were not statistically significant. The statistically significant differences ( $p < 0.05$ ) were found in the case of ampicillin, imipenem (3.3% *E. faecalis* and 95% *E. faecium* resistant strains) and vancomycin (3.3% vs 25% resistant strains).

The ability to produce biofilm was detected in 90% *E. faecium* and 13.3% *E. faecalis*; hemolytic activity in 95% *E. faecium* and 13.3% *E. faecalis* strains (statistically significant differences,  $p < 0.001$ ).

All strains carried one or more of the virulence genes. *Esp* gene was found in 66.7% *E. faecalis* and 95% *E. faecium* strains, *ace* in 50% and 100% strains, respectively. Ninety seven percent of *E. faecalis* strains had *as* gene; that gene were not found in any of the *E. faecium* isolates. All of this differences were statistically significant ( $p < 0.001$ ).

**Conclusions:** *E. faecium* strains causing invasive infections were significantly often *esp* and *ace* positive, had higher antibiotic resistance, were more hemolytic and produce biofilm more often than *E. faecalis* strains. This findings indicate that *E. faecium* infections may cause more serious therapeutic problems.