A92 - Role of deoxyribonucleic acid in microbial biofilm in pathogenesis of bacterial infection

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Introduction:
It has been known about possibility of microorganisms to create specific multi-layered structures called biofilms. Non-cellular deoxyribonucleic acid actively participates in regulation of properties of biofilms. Thus, in biofilms transfer of genetic information including genes responsible for sensitivity to antibacterial drugs occurs much more often than in single-living bacterial cells. However, despite the involvement of extracellular deoxyribonucleic acid in adhesive processes and intercellular interactions, its role has not been fully understood.

Methods:
238 isolates isolated from sputum and pharynx of 175 patients during 2016-2019 were studied. Patients were divided into two groups: the 1st group of 139 people (79,4%) had severe respiratory infections, the 2nd of 36 people (20,6%) - respiratory infections of moderate severity.

Results:
A method was developed for determining percentage of deoxyribonucleic acid in microbial community using 4’6-diamidino-2-phenylindole dihydrochloride. Average age of the 1st group was higher than the second (p<0,05). Pseudomonas aeruginosa had the largest mass of biofilm and percentage of deoxyribonucleic acid in group 1, 48,25 [30,5-70,1] mcg/ml and 5,21 [2,17-7,67] %, p = 0,04. A strong relationship was found between percentage of deoxyribonucleic acid in Pseudomonas aeruginosa and severity of disease, r = 0,73, p<0,05. The incidence of adverse outcomes in isolating antibiotic resistant isolates was higher than in antibiotic sensitive (p<0,05). Analysis of results made it possible to propose fatal outcome when mass of microbial biofilm is > 47,5 mcg/well and percentage of deoxyribonucleic acid is >2,33% (p<0,01).

Conclusion:
Pathogens with high biofilm weight and percent of deoxyribonucleic acid cause disease progression and death.

References: