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Influence of Furamag on the ability of causative agents of acute pyelonephritis in small children to form biofilms

Pyelonephritis in children is one of the leading problems in modern pediatrics. High figures of its prevalence, a tendency to an increased number of children with pyelonephritis dictate the need for serious attention to this problem. The urgency of that problem is due not only according its high prevalence among small children and the large variability in the clinical picture, but also by frequency of latent forms, tendency to recurrence and rare complete recovering.

Effective treatment and prevention of pyelonephritis is impossible without careful study of the factors contributing to the formation and progression of the

disease. But only a few studies have been devoted to identify the risk factors for pyelonephritis progression in children [1, 2]. Today treatment of pyelonephritis remains one of the most urgent tasks of pediatric nephrology. Nowadays, antibioticotherapy is the most developed, but searching for the best drugs in pyelonephritis treatment together with discussion in choosing of optimal schemes for anti-relapse therapy and its duration are continued [3]. All these determine the relevance of study on that topic. Solving of mentioned problems will allow us to prove new approaches in selection of optimal treatment and prevention of acute pyelonephritis in small children.

Objective: to study the ability of microorganisms isolated from small children with acute pyelonephritis to form biofilms under the therapeutic dose of Furamag.

Material and methods. A routine bacteriological method was used for identification of microorganisms [4]. The ability of isolates to form biofilms was studied in 96-wells polystyrene plates. The optical density of formed biofilms was measured by reader "Multiskan EX 355" [5,6]. The sensitivity of microorganisms to Furamag was performed using polystyrene plates [7,8]. Statistics assay of results was provided using the programs "Statistica 6" and "Biostat" for the PC [9,10].

Results and discussions. The results of the study showed that bacterial strains isolated from children under 3 years treated for acute pyelonephritis in State pediatric clinics № 16 of Kharkiv were able to form biofilms with such optical density (OD): *Proteus vulgaris* – 2,89±0,23 units of OD; *Proteus mirabilis* - 2,65±0,18 units of OD; *Escherichia coli* – 2,34±0,14 units of OD; *Klebsiella pneumoniae* – 3,21±0,27 units of OD; *Pseudomonas aeruginosa* – 2,84±0,21 units of OD; *Enterobacter spp.* – 2,14±0,28 units of OD; *Morganella morganii* – 2,08±0,19 units of OD; *Staphylococcus aureus* – 2,81±0,16 units of OD; *Streptococcus pyogenes* – 2,97±0,28 units of OD. These formed biofilms were able to active planktonic cells production: *Proteus vulgaris* – 1,94±0,18 units of OD; *Proteus mirabilis* – 1,78±0,14 units of OD; *Escherichia coli* – 1,27±0,16 units of OD; *Klebsiella pneumoniae* – 2,14±0,14 units of OD; *Pseudomonas aeruginosa* –

1,92±0,18 units of OD; *Enterobacter spp.* – 1,18±0,09 units of OD; *Morganella morganii* – 1,06±0,04 units of OD; *Staphylococcus aureus* – 1,84±0,14 units of OD; *Streptococcus pyogenes* – 1,96±0,18 units of OD, followed by formation of rather dense secondary biofilms with higher resistance to antimicrobial drugs.

The study of microbial isolates ability to form daily biofilms under the influence of the Furamag in a therapeutic dose found that this drug showed high efficiency on planktonic forms resulting in a low capacity for the formation of biofilms by microorganisms isolated from small children with acute pyelonephritis: *Proteus vulgaris* – 2,89±0,23 units of OD; *Proteus mirabilis* – 0,039±0,004 units of OD; *Escherichia coli* – 0,036±0,0,08 units of OD; *Klebsiella pneumoniae* – 0,048±0,006 units of OD; *Pseudomonas aeruginosa* – 0,044±0,008 units of OD; *Enterobacter spp.* – 0,042±0,006 units of OD; *Morganella morganii* – 0,039±0,004 units of OD; *Staphylococcus aureus* – 0,044±0,008 units of OD; *Streptococcus pyogenes* – 0,046±0,004 units of OD.

Thus, the study of Faramag influence of on planktonic forms of microorganisms isolated from small children with acute pyelonephritis showed that in a therapeutic dose it was effective in order to prevent the formation of secondary biofilms, that is why Furamag should be prescribed in pyelonephritis.

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