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**MONITORING OF THE MICROBIAL LANDSCAPE OF CHILDREN WITH CONGENITAL HEART DISEASE**

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A microbiological survey of 704 children admitted to the operative treatment in the Children’s Cardiac Center has been carried out. We studied colonization of the mucous membranes and umbilical wound by opportunistic microorganisms with of basic determinants resistance. This data formed the basis for introduction of microbiological monitoring in the cardiac surgical hospital for the realization carrying out of preventive and control measures.

**Key words:** *microbiological monitoring, determinant of resistance, congenital heart disease*

**Introduction.** In cardiac surgery, there are two global issues that determine the nearest and medium - term prognosis of patients: effective use of methods that determine the dangers of surgery, and infectious complications (IC) [1].

Every year in Ukraine, as in other European countries and the USA, the number of cardiac surgeries performed on the open heart increases. Despite the introduction of new technologies, the problem of infectious complications in cardiac practice remains [2,3]. Healthcare associated infection were occur in the postoperative period, causing an adverse effect on its course and outcome. This pathology leads to increase in terms of hospital stay and cost of funds for treatment.

The strategy of preventing and reducing the frequency of (IC) in children who had cardiac surgery, provides microbiological diagnosis of carrying of opportunistic microorganisms carrier from the stage of admission. At this point, at risk group includes patients with chronic foci of infection, concomitant diseases were previously hospitalized and treated with antibiotics [4]. For efficient antibiotic prophylaxis one should take into account the level of natural resistance and acquired resistance continuing growth of acquired resistance of opportunistic microorganisms, especially family *Enterobacteriacea,* producing extended spectrum *beta-lactamase* - ESBL (ESBL - *extended spectrum beta-lactamases*) [5,6].

**Objective:** To define the features of colonization of mucous membranes and umbilical wounds by of opportunistic microorganisms and their antibiotic resistance in children with congenital heart disease at stage of admission in cardiac surgical hospital.

**Material and methods**

The period from January to December 2015 in Ukrainian Children’s Cardiac Center were executed in 2410 microbiological studies in 704 patients. The average age at the time of the studies was 128±106.5 days (0 days to 1 year ), body weight – was from 2.4 kg to 10 kg (mean weight – 4.3±0.8 kg).

The generally accepted method was used to study clinical material from different biotopes of the body - mucous from the back wall of the pharynx, discharge from the nose and the umbilical wound. For identification and determination of antibiotic sensitivity of clinically important microorganisms bacteriological analyzer VITEC 2 COMPACT (bioMerieux) was used.

Statistical analysis was performed using a computer program WHONET 5.6.

**Results** **and discussion.**

It has been established that 1213 of the total of 1811 investigated strains were gram-positive - 67.0 %, and 399 (22.0 %) – were gram-negative bacteria, the total number of fungal microbiota was - 199 (11.0 %).

The dominant etiological agent which was most frequently isolated from biological materials of respiratory tract, is and remains pathogenic *staphylococcus*, which accounted for 446 isolated strains, representing 24.7 % of the overall structure of opportunistic microorganisms.

In total 963 strains of *Staphylococcus* were isolated which, representing 53.3% of all studied strains. The second place was occupied by *Enterobacreriaceae spp.* family - 216(11.9%) strains were isolated from the overall structure of the opportunistic microorganisms. The fungal microorganisms numbered 199 strains, which is 11.0%.183(10.1%) strains nonferment microorganisms were isolated

(Figure 1).

FIGURE1. THE MICROBIAL LAMDSCAPE OF INFANTS WITH CONGENITAL HEART DISEASE AT THE STAGE OF ADMISSION

From children intestines aerobic gram-negative opportunistic microorganisms were isolated: *Klebsiella pneumoniae*, *E.coli* with hemolytic properties, *Proteus mirabilis*, gram-positive *Staphylococcus*, *Enterococcus.* These bacteria often have determinants of resistance and may be etiologic factors of infectious complications when in hospital hygiene and anti-epidemic measures at the hospital

131 clinical strains of *Klebsiella pneumoniae*, isolated from patients were analyzed for antibiotic resistance. 82.8% of strains studied were resistant to cefazolin. Resistance to generation II cephalosporins - cefuroxime and generation III cephalosporins - ceftriaxone was 66.7%. Karbapenemases *Kl. rneumoniae* had high activity. In particular, resistant to imipenem were 25.2% of the strains were resistant to imipenem and 34.0% - to meropenem. A low activity of aminoglycosides with respect to *Kl. pneumoniae* was noted

Tobramycin-resistant strains were accounted for 42.2%, amikacin and netilmicin – for 30.0% and 30.4% respectively. Resistance to fluoroquinolones (ofloxacin, ciprofloxacin, levofloxacin) was within 20.2% to 31.6%.

Revealed significant differences of in resistance of the strains *St. aureus* to the tested antibiotics of different classes and groups was revealed. Resistance of *St. aureus* to penicillin was the largest - 64.2%. To oxacillin (metilcilіn - MRSA) are resistant (0.7%) strains of *St. aureus*. Resistance to aminoglycosides (amіkaсin, tobramycin, netilmіcin) was within 0.9% to 1.9%. Glycosides (vancomycin) showed moderate activity, 21.7% strains studied were resistant

**Conclusions.**

Results of microbiological monitoring in children with congenital heart disease at the stage of admission to the cardiac surgiсal hospital showed a high frequency of carried of opportunistic pathogens including the determinants of resistance to antibiotics. This calls for the need for correction of violations dysbiotic microbiocenosis.

For the development and implementation of effective approaches to the treatment of infections that are caused by resistant strains of microorganisms,it is necessary to establish a systematic automated microbiological monitoring at the local, regional and national levels.

The information obtained will allow to assess the risks, trends and predicting the likelihood of the spread of microbial resistance and effects on the health of the patient

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