



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(2): 681-683
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www.thepharmajournal.com
Received: 14-12-2018
Accepted: 17-01-2019

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Investigation of oral microbiocenosis in children with oligophrenia

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Abstract

One of the topical problems of modern dentistry is prevention and treatment of diseases of hard tissues of teeth and periodontal tissues in children. This is especially true for children with psycho-neurological disorders. The purpose of the work was to study the microbiocenosis of the oral cavity of children with major dental diseases that suffer from oligophrenia. The material for the study was the microflora of the plaque of the caudal region of the teeth in the examined children. By species composition, 5 types of groupings of microorganisms have been identified. Type 1 refers to representatives of the resident microflora of the oral cavity: lactobacillus, micrococci-producing catalase, as well as *Str. salivarius* - autochthonous microorganism of the oral liquid and mucous membranes. Type 2 was aerobic bacteria - α -hemolytic streptococci, namely: *Str. mutans* - the main carious species and *Str. sanguis* Type 3 includes anaerobic pathogenic bacteria of the genus *Peptostreptococcus* and the *Bacteroidaceae* family. In type 4, the bacteria - etiological agents of purulent-inflammatory processes *Str. pyogenes* and *S. aureus*. To Type 5 included microorganisms, the presence of which indicates deep disorders of the oral microbial - *E. coli* and other enterobacteria, as well as the mushrooms of the genus *Sandida*. Thus, the identification of species that comprise the microbiocenosis of the oral cavity of oligophrenic children, patients with caries and chronic catarrhal gingivitis, can determine the etiological structure of the emergence of major dental diseases in this contingent of patients: low content of symbiotic microflora contributes to the development of oral dysbiosis, streptococcal infection is the cause of development inflammatory process in gums and the emergence of caries of teeth, staphylococcal activation promotes the chronic course of chronic catarrhal gingivitis from ostrennyamy; The association of fungi of the genus *Sandida* with staphylococci and streptococci leads to the maintenance of chronic inflammatory processes in the periodontal disease. The revealed disturbances of the microbiocenosis of the dental plaque in children with oligophrenia are an unfavorable prognostic criterion for their dental status. The foregoing requires further substantiation and development of treatment and prevention measures that will adequately prevent the development of stomatological diseases in children with mental retardation.

Keywords: Children with oligophrenia, oral microbiocenosis, microflora of the plaque of the teeth

1. Introduction

One of the topical problems of modern dentistry is prevention and treatment of diseases of hard tissues of teeth and periodontal tissues in children. This is especially true for children with psycho-neurological disorders [2, 4, 6, 8].

The cavity of the mouth is an ecological system for microorganisms that form a resident microflora, which plays an important role in human health and diseases. Most dental diseases do not have their own specific agent and arise as a consequence of changes in the microbiocenosis of the oral cavity. These dental caries include dental caries and pathology of periodontal tissues [9, 10].

The purpose of the work was to study the microbiocenosis of the oral cavity of children with major dental diseases that suffer from oligophrenia.

2. Materials and methods.

Complex microbiological examination of 24 children-oligophrenic patients with caries and chronic catarrhal gingivitis (main group) and 20 children with normal intelligence, caries and chronic catarrhal gingivitis (comparative group). The control group was made up of 20 children without stomatological and psychoneurological pathology. The material for the study was the microflora of the plaque of the caudal region of the teeth in the examined children. Microbiological studies included the determination of the qualitative and quantitative composition of the biocenosis of the dental plaque [1, 5, 7].

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3. Results of bacteriological studies

By species composition, 5 types of groupings of microorganisms have been identified. Type 1 refers to representatives of the resident microflora of the oral cavity: lactobacillus, micrococci-producing catalase, as well as *Str. salivarius* - autochthonous microorganism of the oral liquid and mucous membranes. Type 2 was aerobic bacteria - α -hemolytic streptococci, namely: *Str. mutans* - the main carious species and *Str. sanguis* Type 3 includes anaerobic pathogenic bacteria of the genus *Peptostreptococcus* and the Bacteroidaceae family. In type 4, the bacteria - etiological agents of purulent-inflammatory processes *Str. pyogenes* and *S. aureus*. To Type 5 included microorganisms, the presence of which indicates deep disorders of the oral microbial - *E. coli* and other enterobacteria, as well as the mushrooms of the genus *Candida* [3].

According to the conducted studies, representatives of type 1, belonging to the symbiotic microflora, in the biotope of children of the main group were found in the smallest amount. Lactobacilli in microbiocenosis of the dental plaque were isolated only in 29.17% of children with oligophrenia (925.61 ± 42.34 CFU / ml), which was 1.9 times less than that of children without psychoneurological deviations - 55% (1682.03 ± 44.38 CFU / ml, $p < 0.01$) and 2.9 times lower than healthy children, where Lactobacillaceae spp. were observed in 85% of the subjects at a concentration of 2344.45 ± 73.95 CFU / ml, $p_1 < 0.01$. The average content of micrococci-catalase producers in the children of the main group was 726.53 ± 32.19 KU / ml, while in the children of the comparative group their concentration was 1129.74 ± 47.28 CFU / ml ($p < 0.01$), and in the control group, *Micrococcus* spp. was the highest - 1893.74 ± 61.27 CFU / ml, $p_1 < 0.01$. *Str. Salivarius*, who is the representative of the autochthonous nonpathogenic microflora of the oral cavity, colonized the examined biotopes in children with oligophrenia (832.03 ± 36.53 CFU / ml) by 1.9 times less than in children without mental retardation (1526.28 ± 52.66 CFU / ml, $p < 0.01$) and 3.6 times less frequently than in healthy children (2955.62 ± 81.94 CFU / ml, $p_1 < 0.01$).

The opposite was the picture of 2 types of groups - opportunistic bacterial species. In the microbial landscape of the plaque children of the main group observed the highest content of cariogenic type *Str. mutans* - 1624.79 ± 52.05 CFU / ml, in the comparison group, this figure was 978.55 ± 44.73 CFU / ml ($p < 0.01$), and in the control group - 512.23 ± 22.18 CFU / ml ($p_1 < 0.01$). Colonization of the biotope of children-oligophrenic by conditional pathogenic form *Str. sanguis* (1436.84 ± 43.52 CFU / ml) was 1.6 times higher than in children without psychoneurological pathology (978.55 ± 44.73 CFU / ml, $p < 0.01$), and at 3, 6 times more than the similar indicator of healthy children (425.17 ± 20.62 CFU / ml, $p_1 < 0.01$).

A special feature of the microbiotacosis of the dental plaque in children with oligophrenia, with caries and chronic catarrhal gingivitis was the detection of high levels of pathogenic anaerobic microorganisms of the genus *Peptostreptococcus* spp and bacterioids: *Peptostreptococcus* spp was sown from 66.67% of the children of the main group, Bacteroidaceae spp - from 58.33% of surveyed The microorganisms were also found in children of the comparative group with caries and HKG, without a burden on their mental history, but in significantly lower numbers: *Peptostreptococcus* spp was detected in 30% of children, Bacteroidaceae spp in 35% of subjects ($p < 0.01$). In

microbiocenosis of the dental plaque children without psychoneurological and dental pathology of microorganisms from groups of type 3 were not met.

Pathogen Pneumonia-Inflammatory Processes *Str. pyogenes* in children of the main group was found in 62.5% of cases with a population density of 1592.34 ± 55.32 CFU / ml. In the comparison group, the frequency of withdrawal of purulent streptococcus was 2.08 times smaller - 30% with a colonization density of 743.22 ± 38.29 CFU / ml, $p < 0.01$. In control group *Str. pyogenes* were isolated only in 5% of the subjects, which was 12.5 times less than in the main group, $p_1 < 0.01$. The high frequency of extraction of *S. aureus* in the microbiocenosis of the dental plaque in children with major dental diseases suffering from oligophrenia was 70.83% with a colonization density of 1745.28 ± 62.54 CFU / ml, however, as in children with caries and HKG, Not burdened with psychoneurological pathology, the frequency of *S. aureus* secretion was 1.6 times lower - 45% at a concentration of 855.79 ± 44.92 CFU / ml, $p < 0.01$. In the biotope of healthy children, gold staphylococcus arose only in 5% of cases, which was 9 times less than in children of the comparison group ($p < 0.01$), and 14.1 times less than in children of the main group ($p_1 < 0.01$).

In children with mental retardation in 8.3% and 12.5% of the examined, microorganisms appeared to indicate significant microbial lesions of the oral cavity - *Escherichia coli* and *Enterobacteriaceae* spp, but these species did not appear in the comparative and control group. It was stated that high seeding of the microbial landscape of the oral cavity with yeast-like mushrooms of the genus *Sandida* was observed in children with oligophrenia. So, if in healthy children, the mushrooms of the genus *Sandida* were sown only in 15% of subjects with low colonization (84.22 ± 10.38 CFU / ml), then in mentally retarded children with caries and chronic catarrhal gingivitis, yeast-like fungi were detected at 79,17% of cases, with a population density of 628.32 ± 19.56 CFU / ml ($p_1 < 0.01$). In children with caries and gingivitis, not burdened with psychoneurological pathology, fungi of the genus *Sandida* were found in the biotope of the oral cavity in 55% of the examined with a colonization density of 328.35 ± 15.96 CFU / ml), $p < 0.01$. In addition, *Candida* species were mostly associated with streptococci and staphylococci.

4. Conclusions

Thus, the identification of species that comprise the microbiocenosis of the oral cavity of oligophrenic children, patients with caries and chronic catarrhal gingivitis, can determine the etiological structure of the emergence of major dental diseases in this contingent of patients: low content of symbiotic microflora contributes to the development of oral dysbiosis, streptococcal infection is the cause of development inflammatory process in gums and the emergence of caries of teeth, staphylococcal activation promotes the chronic course of chronic catarrhal gingivitis from ostrennyamy; The association of fungi of the genus *Sandida* with staphylococci and streptococci leads to the maintenance of chronic inflammatory processes in the periodontal disease. It can be concluded that the revealed disturbances of the microbiotazone of the dental plaque in children with oligophrenia are an unfavorable prognostic criterion for their dental status. The foregoing requires further substantiation and development of treatment and prevention measures that will adequately prevent the development of stomatological diseases in children with mental retardation.

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