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THE ROLE OF THE GENUS CANDIDA FUNGI IN THE ACUTE PURULENT ODONTOGENIC PERIOSTITIS DEVELOPMENT

[1]Bezrukov S. G. [2]Filippova A. A. [3]Filippova L. A., [4]Pritulo L. F.

[1]Doctor of Medicine, Professor, Department of Surgical Dentistry and Maxillofacial Surgery - "V. I. Vernadsky Crimean Federal University" Medical Academy named after S. I. Georgievsky (structural subdivision) – ph.bezrukov@gmail.com, [2]Postgraduate student, Department of Surgical Dentistry and Maxillofacial Surgery - "V. I. Vernadsky Crimean Federal University" Medical Academy named after S. I. Georgievsky (structural subdivision) – filippovaajr@gmail.com, [3]Associate professor, PhD, Department of Surgical Dentistry and Maxillofacial Surgery - "V. I. Vernadsky Crimean Federal University" Medical Academy named after S. I. Georgievsky (structural subdivision) – mila65-00@mail.ru, [4]Doctor of Medicine, Professor, Department of Pediatric Surgery with the course of Urology- "V. I. Vernadsky Crimean Federal University" Medical Academy named after S. I. Georgievsky (structural subdivision) – kafedradx@mail.ru

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Abstract

*The **aim** of the study is to investigate the role of genus Candida fungi, present in the odontogenic foci of chronic inflammation in the development of acute purulent odontogenic periostitis of the jaws.*

***Materials and methods.** The study involved 58 patients of both sexes with a diagnosis of acute purulent odontogenic periostitis.*

***Results.** It was established that in 36,2% of cases genus Candida fungi were identified in the content of subperiosteal abscesses and are signs of high pathogenicity and associations with other microflora and considered to be etiological factor in the development of acute purulent periostitis of the jaws.*

Key words: *acute suppurative odontogeni periostitis, genus Candida fungi, microbiological research.*

Corresponding author:

Lyudmila Filippova,
Associate professor, PhD,
Department of Surgical Dentistry and Maxillofacial Surgery
"V. I. Vernadsky Crimean Federal University"
Medical Academy named after S. I. Georgievsky
(structural subdivision) Kievskaya Str., 142, Simferopol, Crimea, 295043
E-mail: mila65-00@mail.ru

QR code

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INTRODUCTION:

One of the major problems in surgical dentistry is the prevalence of acute purulent odontogenic periostitis. The increase in patients' number with this pathology, despite the permanent growth of dental care quality was discovered. Besides, the periostitis often lead to complications, such as abscess and phlegmon [1, 2].

Causative agents of odontogenic inflammatory diseases, as a rule, are microflora vegetating in the oral cavity (staphylococcus, streptococcus, gram+ or gram–bacterium). However, due to the harmful influence of environmental factors, use of antibiotics and preservatives with meals, decrease in the immunological resistance of the organism and other factors in the development of these processes, the role of conditionally pathogenic microorganisms, in particular fungi of the genus Candida increased [3, 4, 5].

Fungi of the genus Candida, especially C. albicans, are characterized by a wide range of virulence factors and persistence and therefore, they are able to survive in conditions of constant influence of innate and adaptive immunity and induce the development of a number of diseases [6].

Aim: To identify the role of genus Candida fungi, which is present in the odontogenic foci of chronic inflammation, in the development of acute purulent odontogenic periostitis of the jaws.

MATERIALS AND METHODS:

The study involved 58 patients of sexes, who applied to the dental department of the City clinical hospital №7 (Simferopol) with a diagnosis of acute purulent odontogenic periostitis. The comparison groups included patients who were prescribed not only periosteum application with the purpose of drainage of the subperiosteal abscess, but extraction of the causative tooth, not subject to therapeutic and organ-preserving surgical treatment.

The scope of surgical intervention was as follows: under local anesthesia incision of the mucous membrane and periosteum on a transitional fold in the area of greatest inflammatory infiltration was done with the aim of subperiosteal drainage of purulent focus, after that causative tooth was extracted. In the postoperative period antibacterial, anti-inflammatory and restorative therapy and mouth baths with antiseptic solutions were prescribed [1].

To perform microbiological studies swabs from the alveolar socket of the extracted tooth and from the surfaces of the purulent postoperative wounds by sterile cotton swabs were taken. One of them was placed in 5 ml of sterile isotonic solution of sodium chloride, and others in thioglycolic medium to determine anaerobic infections [7]. Collection of material for research was conducted the day of the surgical treatment, as well as 1 and 3 days later. Conventional direct microscopic and bacteriological methods were applied.

After pre-shaking (within 5 min) collected material was inoculated on standard nutrient medium: agar Saburo (to secrete yeast-like fungi), blood and meat peptone agar (MPA). To determine the presence of anaerobic microorganisms' swab of thioglycolic medium was placed in the enrichment medium Kitta-Tarozzi under mineral oil [8]. Sowing on solid nutrient medium was carried out in two ways: the standard application of 0.1 ml of material from the dilutions, followed by rubbing with a spatula on the surface of agar bacteriological loop according to the method of Gould. All the cultures were incubated in a thermostat at 37ºC up to 4 - 5 days. Counting of grown colonies of aerobic and facultative anaerobic microorganisms in the culture of dilutions was performed visually, and then there was calculation of number of colonies in 1 ml on 1 swab in accordance with the recommendations of L. V. Gromashevsky Institute of epidemiology and infectious diseases [5], and also the number of grown microorganisms on the basis of Gould method by using a table was calculated. The result is expressed in number of colony forming units (CFU). Identification of the grown cultures was carried out on the basis of evaluation of the morphological, cultural and biochemical properties using Bergy's" Determinant of bacteria". All the cultures were conducted in triplicates. The growth of anaerobic microorganisms in the environment Kitta-Tarozzi was visually assessed for turbidity of the medium and gas development.

RESULTS AND DISCUSSION:

On the basis of studied material taken from 58 people in alveolar sockets of extracted teeth, genus Candida fungi were diagnosed in 39 patients, that makes 67,24% and in purulent wound - 32 people (55,17%). This relative indicator has not changed for 3 days of the examination undertaken. Quantitative semination index, expressed in CFU increased during the first day after surgery and had no significant deviations till 3 control days. Thus, in the future, our focus of attention was paid to 1 day after the operation, as far as this term can give more information about the wound microflora on the background of peak of severity of local inflammatory reaction.

In 39 people fungous microflora in the alveolar sockets

of infected teeth less than 10^2 CFU on the swab were found in 7 (17,95%) patients. Bacterioscopy showed gram-positive oval or round cells with a distinct nucleus, corresponding to fungi of the genus Candida, sporadic in field of view. In 28 patients (71,79%) – the semination index was in the range of 10^2 CFU, but not more than 10^4 CFU on the swab. Bacterioscopy showed the presence of as individual budding cells and pseudomycelium, especially in those cases when there was detected 10^3 CFU or more in alveolar socket. It is known that a quantitative index to 10^3 CFU per swab is allowed in a healthy person, and in invasive forms of candidiasis fungal microflora of a high degree is detected in the mycelial form [9, 10]. In 4 patients (10,25 %) fungi of the genus Candida were detected in more than 10^4 CFU on the swab, and bacterioscopy was accompanied by pseudomycelia. In all 39 patients fungal microflora was present in association with aerobic, facultative anaerobic and obligate anaerobic microflora, the quantitative indicators which exceeded 10^3 CFU per swab. Identification of isolates was as follows: Candida albicans was diagnosed in 28 patients (out of 39, which makes 71,8%), Candida tropicalis - 4-th patients (10,25%), Candida pseudotropicalis et krusei - in 7 patients (17,95%). Thus, fungi of the genus Candida have been identified in the alveolar sockets of the extracted teeth, they are represented by well-known pathogenic species [10], as well as associations with other non-fungous microflora, which is an indirect indicator of the presence of sufficiently expressed virulence factors in genus Candida fungi, in contrast to the similar microflora, occurring in the form of monocultures [11].

The material of the study, received from postoperative wounds showed some difference in the prevalence of fungal microflora. So, the fungi of the genus Candida were detected in 32 patients (55,17%), it makes 7 patients less than in the study of the microflora of periapical tissue of the infected teeth. In these patients fungal microflora was detected in an amount of less than 10^2 CFU on the swab in the alveolar socket of the tooth, and was not detected in purulent wound. Bacterioscopy showed single cells without the presence of aemulatio forms, which is not evidence of pathogenic activity of Candida in the development of the inflammatory process. In 11 (28,2%) patients the genus Candida fungi were determined in amount more than 10^2 CFU but not more than 10^3 CFU per swab in the purulent wound after periosteum, with no formation of mycelium and the presence of individual cells. In 17 (43,6%) patients — quantitative indicators were at rather high level and made more than 10^3 KOE, but not more than 10^4 KOE on the swab and the smear microscopy showed the presence of yeast and aemulatio forms (filaments pseudomycelium). In 4 (10,25%) cases filaments pseudomycelium were microscopically identified and quantitative indicators made more than 10^4 CFU on the swab. As well as in the results of a microbiological study of the contents of the alveolar socket, the fungal microflora of purulent wounds was associated with aerobic, facultative anaerobic and obligate anaerobic microflora. Species identification and relative ratios did not differ significantly from similar data while examining the contents of periapical tissues.

CONCLUSIONS:

1. Quantitative and qualitative microflora indicators, identified in subperiosteal abscesses and periapical odontogenic inflammation focus, do not have significant difference;
2. In 36.2% cases of genus Candida fungi identified in the content of subperiosteal abscesses are signs of high pathogenicity, and in associations with other microflora are etiological factor in the development of acute purulent periostitis of the jaws.

List of symbols and Abbreviations

CFU – colony forming units

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