

ANALYSIS OF MICROCIRCULATORY DISORDERS IN INFLAMMATORY PROCESSES IN THE MAXILLOFACIAL REGION ON THE BASE OF OPTOELECTRONIC METHODS

¹Pavlov S.V., ²Barylo A.S., ¹Kozlovska T.I., ²Kravchuk P.O.

¹Vinnytsa National Technical University;

²Vinnytsa National Medical University

Introduction. In the pathogenesis of odontogenic inflammatory diseases, an important role plays disruption of blood circulation in the tissues of the maxillofacial region as consider many authors (V.M.Uvarov, M.M. Solovyev, T.M.Alehova). These statements are based on the topographic anatomical, morphological studies and on data of studying the blood coagulation. However, all of these methods allow only indirectly define the state of the regional blood flow [1]. Therefore, use of such actual methods as rheoplethismography and photoplethismography is very perspective. These methods allow studying the pathogenesis of periodontal disease, periodontitis, mumps and other pathological processes in the maxillofacial region.

Materials and methods. In recent years, in the practice of functional diagnostics are introduced photoplethismographic methods for registration of biosignals [2, 3].

These methods based on irradiation the area of the tissue of the biological object by infrared beam and recording the radiation, transmitted through the tissue or reflected from it, by optoelectronic sensor. The use of the last has provided new opportunities for the diagnosis of the state of the cardiovascular system.

Results. As a result of researches that carried out at the Department of Maxillofacial Surgery of the Vinnitsa National Medical University, it was examined 30 patients (21 men and 9 women aged 20 to 60 years) with odontogenic abscesses and phlegmon. Treatment of patients included removal of the causative tooth, opening cellulitis or abscess, ozone therapy with silver ions.

Photoplethismographic studies were carried out on the optoelectronic diagnostic complex for analysis of microcirculatory disorders. The optical radiation was directed to the biological tissue at a distance of 10 mm from the edge of the surgical wound or intended cut. As a control point was symmetric point of study. Photoplethismographic signals (PPGS) were registered in the inflammatory focus and in the control point before the operation, and on the third and fifth day after operation. There were recorded 180 PPGS and the obtained data were processed by designed program «Wosteo» [4, 5, 6, 7].

Discussing of the results. During the analysis of obtained data it was set that PPGS of phlegmon and abscess significantly differed of control. Before surgery, the photoplethismographic index in the inflammatory focus is significantly increased in 2.5-3.5 times. State of venous outflow was sharply deteriorated, that was appeared in the change of form of decaying limb (it that has become more

prominent – 73.3%). Dicrotic jag was less expressed and shifted to the top of the catacrotism (70%). In 22 cases is noted the appearance of additional venous waveform.

The blood flow velocity is reduced due to the further deterioration of the venous outflow. In 76.6% of cases there were additional dicrotic waves, 30% were marked small additional jags on catacrotism.

At the 5-6 days after surgery blood flow was improved in all indicators. Additional waves were disappeared in 46.6%, and were weakened in 53.4%. However, in the case of PPGS of inflammatory focus the difference from control point was remained.

Conclusion. Using of the photoplethysmographic method is allows to assess accurately the level of blood-filling in inflammatory processes, thus, this method has the such positive properties: noninvasive, high degree of sensitivity and reliability, ease of study. Application of this method allows dentists accurately determine: the effectiveness of the treatment; specify the duration of the rehabilitation period; identify various vascular disorders in fractures of the jaw; to evaluate the effectiveness of local anesthesia (anesthesia causes vasospasm, and reducing of the amplitude of the signal is the feature of the effectiveness of anesthesia); to apply this method to plastic surgery and transplantation.

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