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QUALITATIVE ASSESSMENT OF MICROCIRCULATION OF THE BULBAR CONJECTIVA IN DIFFERENT VARIANTS OF THE COURSE OF ACUTE PURULENT RHINOSINUSTAS

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Abstract

An important role in maintaining homeostasis at all levels, i.e., from cells to the whole organism, is assigned to the microhemocirculation system, which combines the microcirculatory system and the rheological properties of the blood. Disruption of microcirculation has a significant impact on the development of pathological processes. The microcirculation system responds early, uniformly and generally to the occurrence of pathological changes in one of its regions. The study of microcirculation also makes it possible to indirectly judge the state of the mechanisms that ensure the regulation of the functional state of microvessels (Petrov V.V., Moldavskaya A.A., Levitan B.N., Khrappo N.S. Hemomicrocirculatory bed and blood rheology in traumatic nosebleeds / / Modern high-tech technologies. – 2005. – No. 4. – P. 29-32; Popelnyuk N.S., Davydkin I.L., Kozlova O.S., Krivova S.P., Kuzmina T.P., Naumova K.V. The problem of studying the processes of microcirculation and blood rheology in the clinic of internal diseases (literature review doi.2S694/U RW .2019.08.2). One of the most important links in the pathogenesis of purulent-inflammatory diseases of the paranasal sinuses are changes in microhemocirculation (Fokkens WJ, Lund VJ, Hopkins C., Hellings PW, Kern R., Reitsma S., et al. European Position Paper on Rhinosinusitis and Nasal Polyps 2020 Rhinology 2020 Suppl. 29: 1-464).

Introduction

To assess the state of the microcirculatory bed of the mucous membrane of the paranasal sinuses, the method of biomicroscopy of the vessels of the conjunctiva of the eyeball is used (Arifov S.S., Bakieva Sh.H. Assessment of microcirculation in children with acute purulent sinusitis. // Materials of the scientific conference of young scientists of the Second Tashkent State Medical Institute dedicated to the 10th anniversary of the independence of the Republic Uzbekistan. - Tashkent. - 2001. - P.23-24.; Bakieva Sh.H. Age-related features of microcirculation disorders in acute purulent sinusitis and methods of their correction // Abstract of thesis. 2001 – p. 11.). The advantages of the method include the harmlessness of the research process, the accessibility of the object, good contrast of the vessels against the white background of the sclera, the presence of a flushing tear fluid that prevents heating and drying of the conjunctiva as a result of the possible thermal effect of the lighting device of the optical equipment. All this makes it possible to conduct research repeatedly during the observation process. The anatomical proximity and commonality

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of blood supply, as well as the innervation of the eyeball and paranasal sinuses, the three-layer architectonics of their microvasculature determine the receipt of reliable information about the state of microcirculation of the paranasal sinuses. A limitation to the use of the method may be the presence of local inflammatory and other pathological conditions of the eyeball at the time of the study.

Target

This work is to study in a comparative aspect the nature of changes in microcirculation, taking into account the functional state of the natural anastomosis of the affected sinuses in patients with acute purulent maxillary sinusitis and ethmoiditis.

Material and research methods

29 patients with uncomplicated acute purulent maxillary sinusitis and ethmoiditis were examined. The choice of this combination of acute purulent rhinosinusitis is due to the most accurate assessment of the patency of the sinus anastomosis. For a visual comparison of changes, patients with unilateral and bilateral purulent inflammation of these paranasal sinuses were included in the development. The age of the patients ranged from 18 to 51 years. There were 16 males, 13 females. The patients came to the clinic on the 5-11th day from the onset of the disease. The diagnosis was established on the basis of patient complaints, medical history, assessment of the condition of organs and body systems, examination of ENT organs, results of radiography of the paranasal sinuses, and a general blood test. 18 patients were diagnosed with bilateral, 11 - unilateral acute purulent maxillary sinusitis and ethmoiditis.

The patients, taking into account the patency of the natural sinus anastomosis, were divided into two groups. The first group consisted of 12 patients with a “block”, i.e., lack of patency of the natural anastomosis of the affected sinuses (7 – bilateral, 5 – unilateral acute purulent maxillary sinusitis and ethmoiditis). The second group included 9 patients with partial obstruction of the patency of the natural anastomosis of the affected sinuses (6 – bilateral, 3 – unilateral acute purulent maxillary sinusitis and ethmoiditis). The third group included 8 patients with free patency of the natural anastomosis of the affected sinuses (5 – bilateral, 3 – unilateral acute purulent maxillary sinusitis and ethmoiditis).

The assessment of the patency of natural sinus anastomosis was carried out on the basis of an assessment of complaints, the course of the disease, the result of anterior rhinoscopy initially and after local use of vasoconstrictor drugs. In 10 cases where it was not possible to assess the patency of the natural anastomosis of the maxillary sinus using the method described above, the S.Z. method was used. Piskunov and co-authors (Piskunov S.Z., Piskunov G.Z., Kharchenko V.V., Dolzhikov A.A. Anatomy and surgery of the nose and paranasal sinuses: monograph. Functional, Kursk, 2004, p. 95).

The control group consisted of 8 healthy individuals.

In order to exclude pathology of the organ of vision, all subjects were examined by an ophthalmologist (determining visual acuity, the state of the anterior segment of the eye, optical media and fundus). Biomicroscopy of the anterior part of the eye was performed by an ophthalmologist. The study was conducted before diagnostic manipulations and again after manipulations aimed at assessing the patency of the natural sinus anastomosis. Biomicroscopy of the anterior part of the eye was performed according to the method developed by N.V. Shulpina

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(Shulpina N.B. Biomicroscopy of the eye. - M.: Medicine, 1974. - 263 p.), usingSlit lamp SL-P-00company "OJSC ZOMZ" Russia. The examination was performed in diffuse and direct focal light at a forty-fold magnification of the slit lamp. To improve the visibility of blood vessels, a red-free filter was used. Biomicroscopy of patients was performed upon admission to the hospital, before the start of treatment procedures. During the study, an analysis of qualitative indicators was carried out - changes around the vessels (perivascular), vascular (vascular) and intravascular (intravascular) phenomena (Shulpina N.B. Biomicroscopy of the eye. - M.: Medicine, 1974. - 263 pp.; Arifov S. S., Sh.

Results and discussion

In the control group, the assessed indicators of microcirculation of the bulbar conjunctiva were as follows: homogeneous continuous and uniform blood flow was observed in the microvessels, the phenomena of perivascular edema, pathological tortuosity of venules, intravascular aggregation of erythrocytes and stasis were not observed.

Changes in microcirculation were detected in all examined patients. The nature, severity, and frequency of detection of microcirculation disorders depended on the prevalence and clinical course of the inflammatory process in the paranasal sinuses. It should be noted that the above changes in both eyes were identical, but predominated in the eye on the side of the inflamed paranasal sinuses.

Intravascular changes manifested themselves in the form of red blood cell aggregation and slowing of blood flow. Aggregation of erythrocytes occurred from single erythrocytes glued together in patients in the third group to a sludge phenomenon in the first group. A slowdown in blood flow velocity was detected in 100% of patients and was largely expressed in venules and capillaries.

Among the vascular disorders in the examined patients, changes in the diameter of blood vessels predominated. Dystonia of arterioles found in patients of the first and second groups was manifested by their narrowing, and changes in the venules were mainly manifested by an expansion of their diameter. Another manifestation of vascular disorders was uneven caliber of venules and, less commonly, arterioles. Irregularity in venules occurred in all patients, and in arterioles only in patients of the first and second groups. In venules, unevenness was manifested by alternating areas of expansion with areas of unchanged diameter, and in arterioles - areas of narrowing and unchanged diameter.

Perivascular changes were less common than others and were recorded only in patients of the first group. The presence of reticulation, areas of desolation, and congestion of venous networks were observed only in patients with polysinusitis.

In patients of the first group, the most pronounced functional changes in the microvasculature of the bulbar conjunctiva were revealed. This was manifested by a significant expansion of venules and arterioles of the 1st order, pathological tortuosity of the venules of the 1st order and individual venules and the order, aggregation of erythrocytes was constantly determined in the arterioles and venules of the 1st and 2nd order of branching, the formation of 58% of the sludge phenomenon and 17% of isolated thrombi, microaneurysms and areas stasis in the capillary network.

Perivascular changes were manifested in 100% of patients by the presence of perivascular edema, of which 75% were throughout the microvasculature, i.e., in the arterial and venous sections and 25% only in the latter. In 50% there was stagnation of the venous networks. The presence of reticulation and areas of rarefaction was established in 33% of patients. In 1 patient (8%) avascular

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zones were identified, which indirectly indicates a decrease in the intensity of transcapillary exchange and the number of functioning capillaries.

In patients of the second group, dilation of the microvessels of the venous section of the microvasculature, pathological tortuosity of the venules of the order, perivascular edema of the venous section and arterioles of the first order, and aggregation of erythrocytes in the venules of the first order were revealed.

In patients in the third group of changes in the microcirculatory bed, a moderate expansion of the venous part of the microcirculatory bed was found, mainly due to venules of the 1st order, as well as short areas of perivascular edema and aggregation of erythrocytes around them. RBC aggregation was observed in 75% of patients. No changes in the arterial link were observed.

In all three groups, with bilateral acute purulent rhinosinusitis, changes in microcirculation in the bulbar conjunctiva were more pronounced compared to a unilateral process.

Conclusions

1. Changes in microcirculation in the bulbar conjunctiva of the eye in the form of dilation of microvessels, the presence of perivascular edema, pathological tortuosity and aggregation of erythrocytes in acute purulent rhinosinusitis are nonspecific, functional in nature and are a protective mechanism of inflammation.
2. The most pronounced qualitative changes in microcirculation in the bulbar conjunctiva were observed with complete closure, then with partial closure and the least - with free patency of the natural anastomosis of the affected sinuses.
3. In bilateral acute purulent rhinosinusitis, changes in microcirculation in the bulbar conjunctiva were more pronounced compared to a unilateral process.

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