ANTISEPTIC PROPERTIES OF PHOTODYNAMIC THERAPY FOR PERITONITIS

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Purpose of the study: substantiation of the possibility of application and development of a method of photodynamic therapy using methylene blue for intraoperative sanitation of the abdominal cavity in generalized peritonitis.

This article presents the experience of using photodynamic sanitation of the abdominal cavity using methylene blue as a photosensitizer at a concentration of 0.05% in generalized peritonitis. For patients in the control group of patients, 0.02% aqueous solution of chlorhexidine was used to sanitize the abdominal cavity. It was found that when using the "FDU-1" apparatus with a wavelength of 630 ± 20nm as a radiation source, the following parameters are required: exposure time 3-5 minutes per irradiation area, output radiation power in continuous mode 100mW / cm2, energy density from 25 to 35 J / cm2. On the basis of the data obtained, it was proved that, in terms of bactericidal properties, 0.02% chlorhexidine solution is inferior to the method of photodynamic exposure with methylene blue. The introduction of the developed method of sanitation of the abdominal cavity made it possible to reduce postoperative complications from 23.5% to 13% and to reduce the average length of hospital stay from 9.3 ± 0.32 to 6.5 ± 0.21 bed-days.

Peritonitis remains an urgent problem in modern abdominal surgery. This is due not only to the persistence of a high level of morbidity and economic costs of treatment, but also to the fact that the mortality rate from this pathology ranges from 11% to 53%, and with the development of multiple organ failure, the mortality rate reaches 80-90%. One of the most important and critical stages of the operation is the sanitation of the abdominal cavity, which largely determines the dynamics of the development of the pathological process, the quality of its implementation, as well as the need for its subsequent treatments. A positive result in the treatment of peritonitis, according to V. Savelyev (2007), 80% depends on the quality of sanitation during the operation and 20% on subsequent measures. Despite the many

proposed methods of sanitation of the abdominal cavity in peritonitis, it is not always possible to completely remove the pathogenic microflora, due to technical difficulties caused by a destructive process or anatomical features, and some methods are laborious or costly. Recently, antimicrobial and anti-inflammatory photodynamic therapy - PDT with the use of photosensitizers has been widely used to combat surgical infections. Many authors note that the bactericidal effect of PDT does not disappear with long-term treatment of surgical infections, while pathogenic microorganisms do not develop resistance to PDT.. A number of authors believe that the effectiveness of the method does not depend on the spectrum of sensitivity of pathogenic microorganisms to antibiotics

Photodynamic damage is local in nature, and the bactericidal effect is limited to the zone of laser irradiation and is not accompanied by the side effects observed with antibiotic therapy/

As photosensitizers used: photoditazine, brilliant green, dimegin, radachlorin, methylene blue (MS), etc. Among photosensitizers, MS is the most accessible and less toxic. The substance was synthesized in 1877 and was originally used in medicine and industry as a dye and pigment. But later it turned out that MS has a wide range of therapeutic properties. MS is known to be an active photosensitizer. This is a group of light-sensitive substances, the effect of which is enhanced by exposure to light of the appropriate wavelength. The photosensitizer transfers the energy of light to oxygen, due to which it goes into the so-called singlet state. Singlet oxygen is chemically very active: it oxidizes proteins and other biomolecules, destroying the internal structures of pathological cells, bacteria, after which they become nonviable. The above facts provide grounds for studying the possibility of using PDT with MS as measures for sanitizing the abdominal cavity in the treatment of generalized peritonitis.