

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



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Bilyk I.I.

**TREATMENT AND PREVENTION OF POSTOPERATIVE COMPLICATIONS OF
DIFFUSE PERITONITIS**

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Introduction. Peritonitis is one of the most serious complications of diseases and injuries of the abdominal cavity and consistently occupies a leading place in the structure of surgical mortality, which, according to various authors, ranges from 1.3% in case of local to 80% in case of widespread peritonitis. An important role in the pathogenesis of peritonitis is played by bacterial contamination of the peritoneum, qualitative and quantitative composition of microbial associations, as well as biological properties of microorganisms. One of the leading links of pathogenesis, which often leads to multiple organ failure and death in peritonitis, is endotoxicosis. Therefore, timely diagnosis of the level of endogenous intoxication and implementation of adequate detoxification therapy is important.

The aim of the study: to investigate the qualitative and quantitative composition of microbial associations, the level of endotoxicosis, and indicators of immunity in patients with diffuse peritonitis when using the sorption method in complex treatment.

Material and methods. 36 patients with diffuse peritonitis as a complication of acute appendicitis were treated. Patients were divided into main (20 people) and control (16 people) groups. Patients of the control group were treated according to generally accepted methods. In the complex treatment of patients of the main group, the sorption method was applied. During the stay of the patients in the hospital, in addition to the generally accepted clinical and laboratory methods of examination, at various times the level of endogenous intoxication, immunological parameters, species composition and population level of microflora of peritoneal exudate were determined in all the patients.

Results. In the patients of the main and control groups, in whom the postoperative period passed without complications, there was a normalization of general blood analysis parameters, biochemical indices, indices of blood toxicity, of cellular and humoral immunity, and a decrease in bacterial contamination. However, in the patients of the main group, the above indices became normal earlier in comparison with patients of the control group, which enabled to reduce the duration of postoperative treatment. The average length of stay in the hospital in patients of the control group was 11.5 ± 0.45 days, in patients of the main group - 9.31 ± 0.57 days.

Conclusions. The use of drainage of the abdominal cavity with the suggested drainage-sorption device in the complex treatment of patients with acute appendicitis complicated by diffuse peritonitis, enabled to reduce the level of endotoxicosis faster, normalize the temperature, activate non-specific protection factors, cellular and humoral links of immunity, compared to conventional treatment. The use of the suggested method of treatment made it possible to reduce the number of postoperative complications and the length of stay of patients in the hospital.

Boiko S.I.

**MORPHOLOGICAL CHANGES OF TISSUES IN PATIENTS WITH CHRONIC
INGUINAL HERNIAS**

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Introduction. During last years the incidence of inguinal hernias grew significantly. The complications development in these patients after inguinal hernioplasty reached 6-18%. It can be explained by the fact that during surgery and postoperative period surgeons don't take all the aspect of complications pathogenesis in elderly patients into consideration.

The aim of the study: to investigate the study was to evaluate the morphological changes of hernia sac and hernia-surrounding tissues with inguinal hernias.

Material and methods. For the research purpose we used bioplates of hernia tissues of 24 patients (aged 60-83, mean 67.47 ± 2.54 yrs.), obtained during the inguinal hernioplasty. Special attention was paid to evaluation of the muscular tissue atrophy and development of cicatrize and inflammatory changes. The following tissues were evaluated: hernia sac, subcutaneous cellular tissue, muscular tissue and, in some cases, preperitoneal cellular fat. Fragments of tissues were preserved and processed in accordance to histological standards.

Results. Principal signs of chronic inflammation of the hernia sac in all 24 patients were studied. In 8 (33.3%) patients isolated inflammation of hernia sac tissues were found, and in 16 (66.7%) patients it was associated with chronic inflammatory changes of hernia-surrounding tissues. In 6 (25.0%) patients with the recurrent inguinal hernias the inflammatory changes of hernia sac and hernia-surrounding tissues were very pronounced and associated with their cicatrize changes. In all patients pronounced atrophic changes of the muscular tissues were determined. Use of suture-free techniques in elderly patients may greatly reduce inflammatory changes impact on healing, though not providing complete protection.

Conclusions. Inflammatory and cicatrize changes after the suture methods of hernioplasty cause ischemia, atrophic and cicatrize changes in muscles during postoperative period, making these methods of surgery not sufficiently effective.

Dudko O.G.

COMPUTER MODELING STUDY OF MECHANICAL STRENGTH OF METAL AND POLYMERIC SCREWS FIXATION IN CORTICAL BONE

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Introduction. Indications for osteosynthesis of bone fractures of extremities are increasing from year to year. Screws can be used alone or in combination with plates and nails. As a bone fracture, healing depends a lot on the stability of its fixation, so each component of the biomechanical system that is fixing bone fragments is important. The fixation properties of screws depends from many factor, such as bone diameter, the thickness of the cortical layer, the quality of bone tissue, the mechanical properties of the material that was used for screws manufacturing. The use of computer modelling helps to study biomechanical interactions between the screw and the bone tissue according to the applied load.

The aim of the study. The aim was to study biomechanical interactions between the screws made of different materials (stainless steel, bioinert polyamide-12 and biodegradable PGA/PLA) and the bone tissue. To perform biomechanical evaluation the computer models of AO screws and cortical layer were made in Autodesk Fusion 360.

Materials and methods. The pull-out loads of 100 N, 500 N, 1000 N, 2000N and 4000 N were modelled and the displacement of screws were determined for various thickness of cortical layer (range from 1mm to 5 mm). For all types of screw material there was the relation between the thickness of cortical layer and the force applied with the displacement of the screw.

Results. With the increasing of the applied force to the stainless steel screw in its axial direction on 100 % (from 2000 N to 4000 N), the displacement was increased (from 1.253 mm to 4.163 mm) on 232 % for cortical layer with the thickness of 2 mm. The maximum stress area for this loading condition increased on 43.2 %, from 14.898 MPa to 21.335 MPa.

The biomechanical results were comparable with our previous laboratory tests, when the mechanical strength was evaluated for stainless steel and PGA/PLA screws 3,5 mm in diameter with unicortical fixation in pig bones. The stability of the screws were similar, but in laboratory test, the maximum load was determined for screws of various sizes and diameters. The average tensile strength of fixation for 3,5 mm PGA/PLA screws was 26,7 kgp, that was 26 % less than of stainless steel screws, and for 4,5 mm screws the difference was 34 %. For bones of a larger diameter, the