The experimental argumentation of alloplasty in case of complicated hernia

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Abstract
The aim of study was to prove the applicability of polypropylene mesh for hernioplasty in cases of infection, phlegmon of hernia sac in the experiment. The experiment was conducted on 150 white male rats "Wistar" weighing 250-300. We concluded, that reaction of tissue to implant mesh matches with reaction of tissue bordering to necrotic cells, and the presence of an infected hernia does not worsen the conditions of integration polypropylene implant with tissues. We showed, that strengthening mesh in tissues observed at 21 day, and the most pronounced effects of fixation - on 90 days after alloplastic hernioplasty of the hernia defect. The results of experimental studies confirm the possibility of using plastic mesh implants for hernia defect in phase of inflammation that often occurs in strangulated hernia.

Keywords: complicated hernia, experiment, alloplasty

1. Introduction
The prevalence of abdominal wall hernia is 10% in the adult population and take 3-4 place in the structure of surgical diseases. Each year, on the planet performed over 20 million operations of hernia, which is 10-15% of all interventions. For plastic hernias of the abdominal wall during 1 year used 1 million synthetic fishing nets \[4\]. In Ukraine, about 13 thousand operations performed on strangulated hernias of the abdominal wall when there is inflammatory exudate, infection in the wound \[1, 2, 3\].

The main method of surgical treatment of complicated hernias is plastic by the local tissues. In patients with large and giant hernias, which are often complicated by strangulation, relapse is 30-50% \[6\]. Notice opportunity alloplastic of abdominal wall by the polypropylene mesh in infected conditions are solitary in nature \[7, 8\].

Outstanding issues of herniology is scientific justification the possibility of surgical alloplastic treatment hernia defect of the abdominal wall hernia in case of jamming with the development of infection wounds, phlegmon of hernia sac, and so on.

The aim of study was to prove the applicability of polypropylene mesh for hernioplasty in cases of infection, phlegmon of hernia sac in the experiment.

2. Materials and Methods. The experimental study was conducted on 150 white male rats "Wistar" weighing 250-300 g, same age, without disease, detained in accordance with generally accepted standards, at least 10 days before the experiment \[9\]. In carrying out the experiment followed the major domestic and international standards in accordance with national "general ethical principles of animal experimentation" (Ukraine, 2001), and in compliance with the provisions of the basic "rules of work using experimental animals" Decree №755 of 12.08.1977, GLP (1981), the Council of Europe Convention for the Protection of Vertebrate Animals and MOH Ukraine №281 from 01.11.2000r. And "general ethical principles of animal experimentation" \[10\].

Experimental tests were performed under general anesthesia, which was performed by intraperitoneal by of 5% kalipsol solution rate of 0.05 ml per 100 g of weight white rat. Taked of the animals from experiment by deep anesthesia \[6\].

Rats operated for the purpose of modeling the abdominal wall hernia by method Harpola A.J in our modification. The technique was follow: in animals was created defect in the abdominal wall size 1, 5-1, 5 cm saving skin-subcutaneous parietal flap. To prevent iatrogenic damages, disclosure of abdomen were used hidropreparation of aponeurosis by saline. The skin sutures superimposed on a thin wire, which did not give rats crack seams. The wounds healed and formed a hernia of the anterior abdominal wall. Modeling phlegm on of hernia bag conducted...
as follow: in the outer surface of the hind legs subcutaneously injected 0.5 mL of 10% solution of calcium chloride [11]. After 48 hours prepared 5% fecal mixture and injected in abdominal wall above the existing hernial protrusion (based on a mixture of 3 mL of 1 kg of weight) [12]. In animals after 2 days in the area of hernia formed abscess.

The rats are divided into 3 groups: group 1 - animals, which held plastic of hernia by polypropylene mesh Linteks esfil standard (St. Petersburg); 2 group - animals who performed plastic of hernia by polypropylene mesh Linteks esfil light; group 3- animals, who performed plastic of hernia by polypropylene mesh Linteks esfil heavy. During surgery-implantation, festering wound was thoroughly washed with 0.02% solution of dekasan, then treated by Octenisept farblos (Germany). During 7 days of test animals injected solution of imunofan and ceftriaxoni intramuscular in back leg, based on body weight. Obtained microbiological results from content of the simulated abscess in the area of hernia in 96% of cases showed intestinal sticks, and in 95% of animals cultured infection that is highly sensitive to the cephalosporin group of antibiotics.

In the postoperative period observed behavior, appetite of rats, wound state with implanted mesh. Deduced from experimental animals at 7, 14, 21 days. For morphological studies the biopsy material was fixed in 10% of neutral formalin solution. Histological sections were stained with hematoxylin and eosin, and threecrom by Masson.

3. Results and Discussion. In postoperative period in 30% of three groups of rats during 3-5 days was observed reduced activity of movements and appetite, which we associate with the development of inflammation in the wound. After the said period in the main part of the rats the mentioned features were disappeared. Inspecting of the operation area shows that the mesh implant germinate throughout the muscles of the abdominal wall, and from the abdomen adhesive process was observed in 68% of cases. Received results of wound seeding only in 22 cases detected staf ilokok, Proteus and Klebsiella. In experimental animals of 3 groups more common skin necrosis in the course of the wound, flushing the wound edges with sero-hemorrhagic, sometimes purulent discharge, small area of colicavation necrosis 7 days after surgery. Granulation tissue forms a clearly delimited shaft like a band for 14 days. In the thick of granulation tissue we detected a large number of fibroblasts, tissue basophils, macrophages, amorphous substance of connective tissue and a small amount of connective tissue fibers. So, we observed reduction in the size of active inflammatory infiltration with increasing reparative properties in the tissue.

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4. Conclusions

1. The reaction of tissue to implant mesh matches with reaction of tissue bordering to necrotic cells, and the presence of an infected hernia does not worsen the conditions of integration polypropylene implant with tissues.

2. Strengthening mesh in tissues observed at 21 day, and the most pronounced effects of fixation - on 90 days after alloplastic hernioplasty of the hernia defect.

3. The results of experimental studies confirm the possibility of using plastic mesh implants for hernia defect in phase of inflammation that often occurs in strangulated hernia.
5. References


