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PREVENTING DAMAGE TO THE NERVES OF THE INGUINAL REGION DURING THE LICHTENSTEIN OPERATION

Hernioplasty takes the first place in the list of operations performed in surgical hospitals. More than 20 million herniotomy operations are carried out in the world every year [7]: more than a million operations in the EU countries, about 700 thousand - in the USA, and around 500 thousand - in Russia [10].

The inguinal localization's share in the list of anterior abdominal wall hernias is about 74.8% [4]. European Hernia Society (EHS) recommends carrying out the Lichtenstein alloplasty or laparoscopic hernioplasty as the primary surgical treatment for inguinal hernias. Laparoscopic surgical methods (TAPP, TER) show minimal percentage of relapses, however, they do have drawbacks (high price, technical complexity, special equipment, a long period of training, high risk of complications).

In the Russian modern economic conditions reliable methods, which include local anesthesia and have a short recovery period, are highly demanded. The Lichtenstein operation is carried out with the use of local anesthesia, is characterized by technological simplicity and is available in every surgical hospital. Reticular graft made it possible to reduce the number of hernias with relapses to 1.2-2.2% [16]. The Lichtenstein operation is considered to be the "gold standard" in the inguinal hernias treatment. However, the absence of relapses after the operation is one of the most important factors concerning the quality of treatment, but it is not the only one. Nowadays, an increasing number of articles cover other aspects of herniotomy. Postoperative pain syndrome is regarded to be one of the main problems associated with the implants use in herniotomy [6]. Intense pain in the inguinal region can be diagnosed any time after the surgery. Chronic pain is pain that lasts more than 3 months after the surgery and negatively affects patient's daily activities. The "mesh inguinodinia" term, which means chronic inguinal pain after the mesh implantation, has been first implemented in 1998 [12]. Pathological pain prolongation is often caused by nerve inflammation. According to European Hernia Society (2012), such a condition is diagnosed in about 10-12% of cases. The onset of persistent neuralgia and paresthesia in the place of operation in 5–20% of cases is associated with compression or nerve damage in the inguinal region caused by the mesh fixing [5]. A number of representative forums were devoted to the issues of postoperative pain syndrome in herniology. At the International Conference on herniology in Hamburg in 2007, three main risk factors of the chronic pain onset were identified: influence of the surgical method, characteristics of the implant and method of its fixation [9]. At the International conference on the etiology of causalgias after hernioplasty operations in Rome in 2008, direct nerve damage was called the main cause of chronic pain after an open or laparoscopic herniorrhaphia [6].

A number of patients experience recurrence of inguinal pain in 3 months after the surgery or more [15]. The cause of recurrent pain is not completely clear now. There might be a connection between late recurrence of pain and restoration of functioning of sensory nerves that have been damaged during the operation. We cannot exclude as well that it is a possible reaction of the organism to a foreign object [6].

There are several ways how to fix the mesh. Self-locking meshes ("Progrip" by Covidien, "Adgezix" by Bard) do not require additional anchoring, but are distinguished by its high price and complexity of fixing it in the wound. Glue fixation (with "Tissukol", "Cyancrylate", "Bio-glue" adhesives) eliminates mechanical damage to the nerve trunks, but it can cause adhesive obstruction. It is as well high priced and is rarely practiced by surgeons. In addition, there is no data on the rate of connective tissue germination through adhesive bonding [2]. Some surgeons do not consider this kind of fixation sufficiently reliable [1,

11]. There is still no consensus on the effect of adhesive on the intensity of chronic pain [6].

In case of laparoscopic surgery on small oblique inguinal hernias, it is possible not to fix the graft, since intra-abdominal pressure causes mesh retention during the first day after the operation [2, 8].

The most frequent method of fixing the mesh during the Lichtenstein operation is still ligature. There are five nerves in the inguinal-femoral region: ilioinguinal, genitofemoral, iliohypogastric, femoral and lateral nerve of the thigh. It is possible to identify the nerves during the surgery in 30-35% of cases [3]. When the graft is fixed to the internal oblique muscle of the abdomen, the branches of the ilioinguinal and iliohypogastric nerves accidentally enter the ligature suture, that leads to the prolonged pain syndrome onset in the postoperative period [14].

Thus, the problem of the influence of different technical treatment methods in case of inguinal hernia on the pain syndrome onset is still relevant.

Objective: studying the possibility of degree of pain reducing in the early and late postoperative period after hernioplasty carried out under the developed method.

Materials and methods.

While searching for the ways to raise effectiveness of treatment for inguinal hernias we developed a combined hernioplasty method, which is a modification of the Lichtenstein operation technique. To fix the graft in a safe and reliable manner we applied a method of attaching the upper edge of the mesh to the inner surface of the aponeurosis of the external oblique abdominal muscle (invention patent of the Russian Federation Nº 2593893, 07/18/2016).

The method is as follows. Dissect the skin, subcutaneous tissue and aponeurosis of the external oblique abdominal muscle under the ordinary method. Isolate the hernial sac from the elements of the spermatic cord all the way to the neck (Fig. 1) and open it along the front surface. Inspect the contents and immerse it in the abdominal cavity. Apply a purse string suture to the area of the neck of the hernial sac (Fig. 2). Using the prolen thread, fix the lower edge of the graft to the poupart ligament with a continuous suture to the point, which is 2 cm more lateral of the internal inguinal ring (Fig. 3). Then form a hole of 8 mm in diameter in the mesh in the projection of the internal inguinal ring center and cut the mesh upwards (Fig. 4). Take the spermatic cord through the prepared hole and place it in front of the mesh. Fix the upper edge of the mesh with a continuous suture not to the aponeurotic part of the internal oblique abdominal muscle, but from the inside to the aponeurosis of the external oblique abdominal muscle up to the dissection point (Fig.5). Restore integrity of the mesh after expanding it in the inguinal space with a continuous suture with the formation of a window for the spermatic cord of the required size.

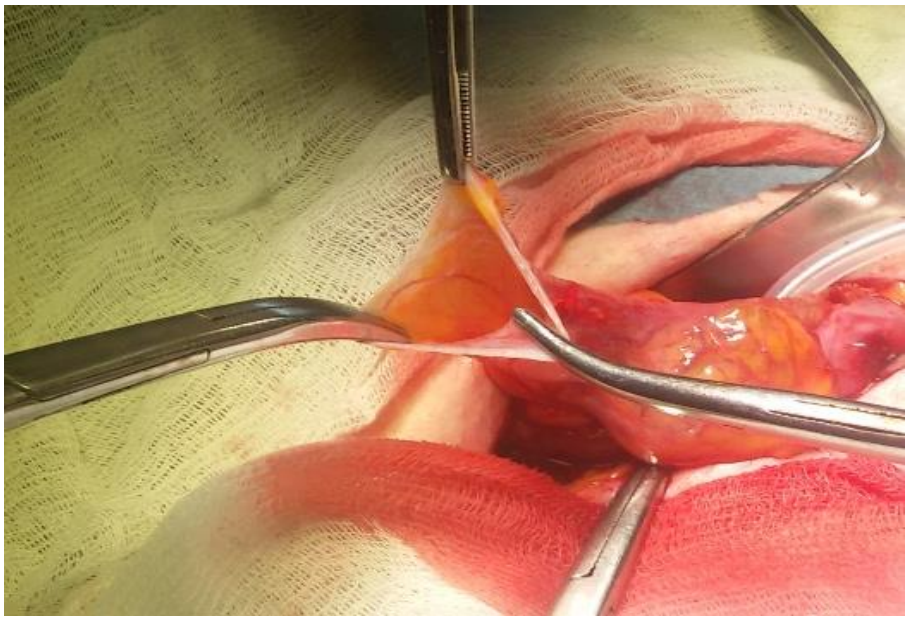

Figure 1
Hernia sac isolated

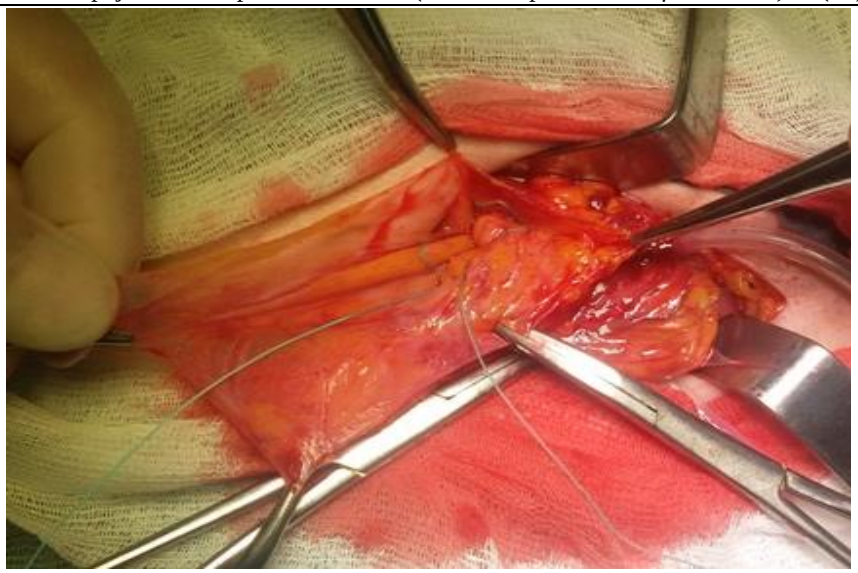

Figure 2
A purse string suture applied to the neck of the hernial sac

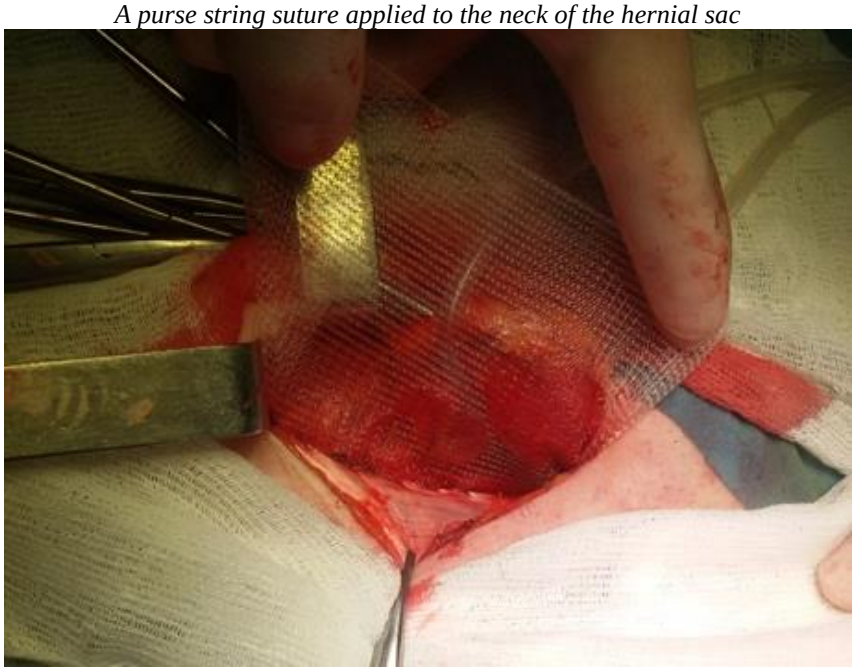

Figure 3
The bottom edge of the graft fixed

Figure 4
The mesh cut upwards

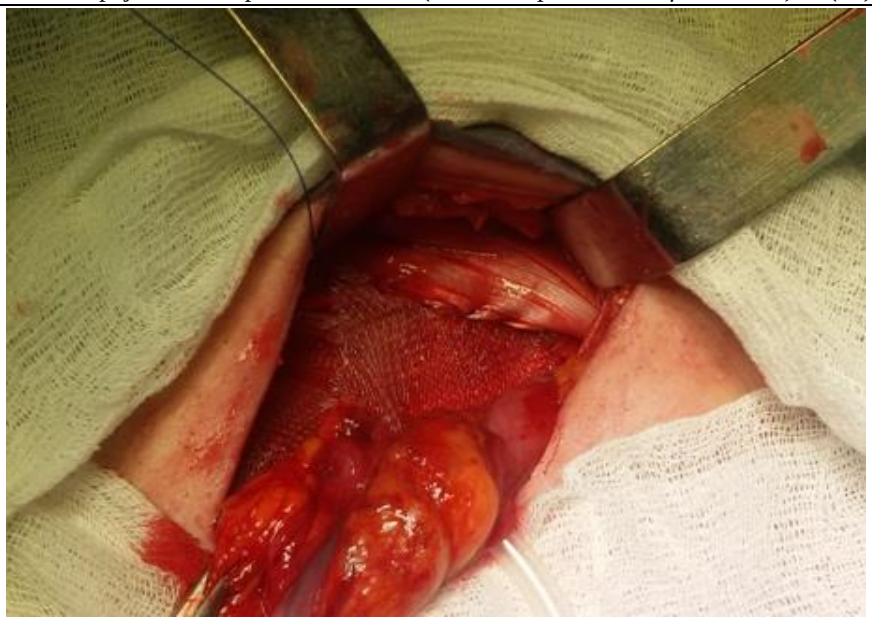

Figure 5
The top edge of the mesh fixed from the inside to the aponeurosis of the external oblique muscle

Sew the aponeurosis of the external oblique abdominal muscle over the spermatic cord edge-to-edge. Complete the operation with a continuous intradermal suture.

Results and discussion. The study includes 195 cases of inguinal hernias - patients from 32 to 74, who had a hernioplasty from 2010 to 2015. 185 patients (94%) are men, 10 (6%) are women. Right-sided hernias were diagnosed in 116 cases (60%), left-sided - in 69 (35%), bilateral in 10 (5%). Oblique hernias were diagnosed in 129 (66%) cases, direct ones - in 66 (34%) cases. All the patients were operated with local infiltration anesthesia - 0.5% novocaine solution after a standard premedication (promedol, relanium). In most cases lightweight polypropylene mesh of 6x11 cm was used. Antibiotic prophylaxis was used in all the cases. Intraoperative complications were not diagnosed. The duration of an operation was 53±6 min. The duration of staying in the hospital was 7±1 days. Some of the patients could be discharged much earlier; however, as they are military personnel they stayed in the hospital until the sutures were removed. In the early postoperative period, four patients had an infiltration in the postoperative wound area, in all cases it was stopped conservatively, with the prescription of non-steroidal anti-inflammatory drugs and antibiotics. Acute urinary retention was diagnosed in three cases of elderly patients with concomitant benign prostatic hyperplasia of the prostate gland, and it was stopped with a temporary installation of a Foley catheter. The degree of pain in the early postoperative period was assessed with the help of VAS. All the patients assessed the intensity of their postoperative pain as moderate on the first day after the surgery and as low in the next 2 or 3 days. Postoperative pain in 176 (90.3%) cases was stopped with the prescription of non-opioid analgesics of standard dosages: ketonal mixed with dimedrol or intramuscular injections of diclofenac. The duration of the pain treatment did not exceed 3 or 4 days. A moderate pain syndrome was diagnosed on the first day after the surgery. Afterwards, the degree of pain decreased to discomfort in the postoperative area. More NSAID injections during the next 3 or 4 days after the surgery were used to reduce the feeling of discomfort and inflammatory reaction in the postoperative area. In 19 (9.7%) cases the postoperative pain syndrome was worse and, in addition to the standard scheme of injections, required intramuscular tramadol solution injections at night. These patients complained of moderate pain in the inguinal region and before surgery, which is likely due to the preoperative neuritis of one of the inguinal nerves. The duration of the pain treatment for these patients was 6±1 day after the surgery. All the patients awoke on the first day after the surgery.

All the patients were examined in different periods of time after the surgery: from one month to five years. Hernia relapses and chronic pain syndrome cases during the indicated period of observation were not diagnosed.

Clinical example.

Patient A., 42, was treated in the surgical department of FSI "CMCH named after P.V.Mandryka" of Ministry of Defense of the Russian Federation with a diagnosis: "Acquired reducible oblique inguinal hernia on the right". He considers himself a patient for about three years, when he first noticed a bulging in the right inguinal region during straining. He did not seek for any medical help. Because of the hernia increase in size and pain in the right inguinal region, he applied to the surgeon and was referred for inpatient treatment. When applied to, he was in satisfactory condition. There were neither respiratory, nor hemodynamic disturbances. Visually, in the right inguinal region, a tumor-like formation of 5x7x6 cm was determined, of soft-elastic consistency, painless, reducible to the abdominal cavity, the external inguinal ring was expanded to 3 cm, the cough impulse symptom was positive. A surgery with local infiltration anesthesia - 0.5% novocaine (350 ml) solution – was

carried out under the present method. During the operation: the posterior wall of the inguinal canal was stretched, the internal inguinal ring was expanded to 3,5 cm. The hernia sac of 6x8x5 cm was placed in the elements of the spermatic cord, isolated up to the neck and opened; the contents – a strand of omentum - were immersed in the abdominal cavity. In the area of the hernial sac neck, a purse string suture was applied from the inside under the visual control. The posterior wall of the inguinal canal was restored by suturing the stretched transverse fascia with a continuous suture without tension. A prolen transplant 6x11 cm was fixed on the prepared bed. The spermatic cord was taken through the prepared hole and placed in front of the mesh. The allograft was fixed with a continuous suture under the described method. Over the spermatic cord, sheets of aponeurosis were stitched edge-to-edge. The wound was sutured under to the ordinary method.

In the postoperative period, no problems were diagnosed. Pain syndrome was negligeable; it was stopped with non-opioid analgesics. The wound closed after the first saturation, the sutures were removed on the 6th day. The patient was examined in one month and one year after the surgery. There is not any data on hernia relapses in this case.

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