

POLYPROPYLENE MESH REPAIR IN FEMORAL HERNIA USING A MODIFIED LICHTENSTEIN PROCEDURE WITH REGARD TO 10 OPERATED CASES

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Abstract: Inspired by Lichtenstein technique (as described by Gavrilas and Oprea in the Romanian surgical literature), the authors introduced the technique for the femoral hernia repair with the intention of tracking the results in time. We mention that femoral hernias are rarely seen in current surgical practice. The purpose of the paper is to present the postoperative outcomes of 10 patients with femoral hernia repair through a modified Lichtenstein technique. Of the 10 cases of femoral hernia, 6 were primary and 4 relapsed, 8 of the 10 patients with concomitant diseases. There was no death or major complication and no relapse during the study period (01.01.2016-31.12.2018). Considering the postoperative outcomes, we consider the following improvements to the Lichtenstein technique bring real benefits in the surgical cure of the femoral hernias: increasing the length of the polypropylene mesh from 2 cm to 6-7 cm; pre-fixing of 2-3 non-absorbable monofilament suture anchored to Cooper's ligament; cutting the mesh excess at about 1 cm from the external opening of the femoral groove and securing it to the pectin fascia; pre-wetting the roll in betadine solution prior to insertion into the femoral canal; isolating the external end of the roll from a possible external infection by suturing the subcutaneous tissue with sockets to the absorbable monofilament suture.

INTRODUCTION

Femoral hernia (FH) is a protrusion of the peritoneal sac or preperitoneal lipomatous structure in the femoral canal through the femoral ring. FH was described by Guy de Chaulliac in 1363, being Bassini's merit of performing the first surgery at the end of the 19th century. Today, FH is considered a form of direct hernia, developing through the femoral vessel sheath, which is an extension of the thigh's transverse fascia.(1,2,3)

FH represents about 5% of all hernias, with a sex ratio (male/female) about 3:1. Between 15 and 45% of FH occur after inguinal hernia surgery.(1,4,5) FH presents an increased risk of incarceration and relapse, with a mortality of 5-40%, depending on the time and complexity of the intervention, the age and the presence of associated factors. FH cannot be repaired by external prosthesis. There are various operating procedures, with different outcomes. A reference point was the introduction by Uscher (6) in 1963 of polypropylene prosthesis, which soon reduced the recurrence rate to over 50% in all categories of hernia, including FH.(6) Polypropylene is now widely used due to its low cost, resistance to infection, good maneuverability and the ability to maintain its resistance to stretching and tearing over an indefinite period of time. In 1974, Lichtenstein and Shore (6,7) introduced the first "tension free" technique in FH, using a 20x2 cm piece of polypropylene mesh, rolled into a "plug" cigarette, which he inserted through the femoral opening and adapted it to the size of the defect, fixing it with non-absorbable threads to the inguinal ligament and Gimbernat ligament, as well as to the pectin fascia, thus fulfilling a desire subsequently expressed by Stoppa in 1989, namely that the aim of the prosthesis was to integrate the prosthesis in both "inlay mesh" tissue.(2,8)

Inspired by the Lichtenstein procedure, as presented by Gavrilas and Oprea (2,3,4), we decided to introduce it for FH surgery in the Surgery Department of Brad Municipal Hospital,

with the aim of tracking the results in time. We mention that FH is less common in current surgical practice.

AIM

The purpose of the paper is to present the postoperative outcomes of 10 patients with femoral hernia repair through a modified Lichtenstein technique.

MATERIALS AND METHODS

Between 01.01.2016 and 31.12.2018, 186 patients with the diagnosis of inguinal hernia and FH, with the age between 40 and 84, were referred to Department of General Surgery of Brad Municipal Hospital, of whom 14 (7.7%) were FH. Of the 14 patients with FH, in 4 cases classical surgical procedures were used and 10 cases were operated by the Lichtenstein method. Of the 10 patients, 6 were from the urban environment, 4 were from rural areas. From the point of view of the occupational status, 2 were employees, 2 retired and 2 without occupation.

Table no. 1. Distribution of patients with femoral hernia according to sex and age

No. of cases	Sex	Age (years)			
		40-49	50-59	60-69	≥70
4	M	1	1	1	1
6	F	1	3	2	0

Table no. 2. Duration of femoral hernia

No. of cases	Duration (years)			
	≤2	3-5	5-10	≥10
1	1	2	4	3

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Table no. 3. The character of femoral hernia operated

Primary	Recurrent hernia	
	4	
6	1 relapses	2 relapses
	3	1

Table no. 4. Comorbidities of patients with femoral hernia

Without comorbidities	2
Arterial hypertension	6
Diabetes	2
Chronic ischemic heart disease (+/- stent/atrial fibrillation/heart failure)	3
Chronic obstructive bronchopneumopathy	2
Obesity	4
Other	4

RESULTS AND DISCUSSIONS

During the study period, 186 patients with inguinal hernia and FH were operated in the Department of General Surgery of Brad Municipal Hospital, of whom 14 (7.7%) were FH. Of the 14 patients with HF, in 4 cases classical surgical procedures were used and 10 cases were operated by the Lichtenstein technique. In all cases, FH were unilateral, of which in 6 cases the hernias were located on the right side and in 4 cases on the left. A number of 6 cases were simple FH without content, in 2 cases chronically incarcerated omentum was encountered, and 2 cases constituted surgical urgency due to intestinal occlusion.

Preoperative preparation was common for the 8 "cold" interventions and shortened for strangulated FH. On admission, the usual parameters were assessed: blood pressure, weight, height, temperature, laboratory examinations (complete blood count, blood glucose, urea, creatinine, transaminases, pulmonary RX, urinalysis), including special examinations according to comorbidities, especially coagulation tests. The collaboration with the Anaesthesia-Intensive Care specialist was essential, as well as with the cardiologist, diabetologist, internist, in order to choose the most appropriate therapeutic attitude depending on the comorbid affections of the patient and the optimal moment for the intervention. Since all patients had spinal anaesthesia, special attention was paid to coagulation tests and the degree of damage to the vital organs: liver, kidney, heart.

Patients taking oral antiplatelet therapy (non-surgical emergencies) were scheduled 8-10 days after discontinuation. Patients with varicose veins or deep thrombophlebitis, currently or in patients' medical history, compressive bandages were applied to their lower limbs. Removal of local hair and sedative medication were applied the night before surgery. There was no evacuation enema in any patient.

The team of the anaesthesia-intensive care unit where the operated patients were transferred on the morning of surgery was concerned with medication, anaesthesia, intraoperative and postoperative surveillance.

In all patients, the procedure was performed under spinal anaesthesia with *Marcaina heavy 0.5%* in association with *Fentanyl 0.01, -0.02 mg*, with careful intraoperative monitoring. Special attention was paid to aseptic and antiseptic measures in the operating room, with careful control regarding the handling of the polypropylene mesh, the entire surgical team being responsible for preventing mesh infection knowing that this is a primary infection and occurs during surgery.(2,10,11,12)

The surgical intervention we performed was the classic one for FH; we systematically used the inguinal-crural vertical incision centered on the hernia, with a length of about

10 cm, further dissecting and preparing the hernial sac, mobilizing it and circularly controlling its contents and checking the crural opening. After careful opening of the sac, we found the lack of saccular content in 6 cases, and in 2 cases we identified a morphologically modified omental adherent mass, which required resection. The ligation of the sac was made as high as possible so that the ligature knot "entered" the femoral canal.

In the two cases of strangulated FH, we proceeded as follows: after the cautious opening of the hernia sac, we checked the intestinal loop, which was viable, in the case of a patient, presenting a circular strangulation groove. In one of the two cases, we performed kelotomy with the sectioning of the inguinal artery and intraperitoneal reduction of the loop, and in the second case, we performed a seromuscular suture with threads of 10, filling up the strangulation groove.

After the high ligation of the sac, we proceeded to reconstruct the inguinal arcade with non-absorbable insulated threads. Next, we explored the femoral canal by gentle finger fracture in all directions, 4-6 cm in depth. We fabricated the polypropylene mesh roll according to the original procedure, i.e. 20x2 cm, with the help of a Pean clip, as the procedure is described by Lichtenstein.(2,6-15) To increase the safety of sterility, we dampened the material into a solution of Betadine, after which, with gentleness, the roll was inserted through the femoral opening and fitting to its size. The fixation of the roll around the orifice was made with non-absorbable polypropylene "0", monofilament, according to the author's instructions, which we applied to 2 patients. We encountered difficulties in carrying out the posterior sutures, and in controlling the graft's mobility we found a degree of mobility, which attracted our attention to a possible suture failure in the event of a sudden increase in abdominal pressure. Consequently, we considered that the Lichtenstein process could be improved, and, consequently, we made the following adjustments:

- we increased the roll length from 2 to 6-7 cm;
- we mounted 3 non-resorbable polypropylene threads to Cooper's ligament using Reverdin pins, which we anchored on Pean pins, counting on a high degree of solidity of ligatures;
- we wet the mesh in Betadine solution and, after insertion and fitting with the size of the femoral canal, we cut the excess roll to 1 / 1.5 cm outside the femoral opening;
- we passed the posterior ligature hooks previously fixed through the inner and outer margins of the mesh (about 0.6 cm from it) and through the inguinal arcade;
- through the middle thread, both its arms were passed through the mesh and the arcade, with the help of a Pean clip, anchoring them to the inguinal arcade at a distance of 0.5 cm one from the other.

Thereafter, the suture of threads was carefully increased to avoid compression of the femoral vein. The outer portion of the mesh was anchored in addition to 2 non-absorbable threads on the pectin fascia, and we protected it from a possible external infection by suturing the subcutaneous fat tissue with isolated monofilament threads Surgicryl P.C.A. 000 or 0000 absorbable in 21 days, anchored to the mesh, thus helping to quickly incorporate it into tissues.

The skin wound suture has closed the surgery. The duration of surgery was about 60 minutes for the first 3 interventions and 40-45 minutes for the following interventions.

We did not report incidents and intraoperative accidents.

For prophylaxis, the patients were given Ceftriaxonum (3rd generation cephalosporin) in the day the surgery, with antibiotic sensitivity testing for a duration of 6-7 days.

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Thromboembolic prophylaxis was done by administering Fraxiparine at 6-8 hours postoperatively, depending on local bleeding, degree of hepatic impairment, and degree of change in coagulation tests, treatment continued throughout hospitalization. The dose of Fraxiparine was 0.4 u.i. in patients weighing up to 80 kg and 0.6 in those weighing more than 80 kg. In patients previously undergoing anticoagulation therapy, at 2-3 days post-operative, depending on local bleeding, the patient's previous maintenance medication, along with Fraxiparine, was introduced until the INR stabilized to a value between 2 and 3. The intestinal transit resumed in the first 24 hours in all the operated patients, which allowed the progressive introduction of oral nutrition.

The suture threads were extracted 8-12 days after surgery, depending on the wound evolution.

The duration of hospitalization was between 7 and 12 days, with an average of 8.6 days.

During postoperative evolution, there was recorded: acute urinary retention, which required catheterization and for 5 days, the patient presenting prostate adenoma; reduced local bleeding in 2 patients; serous secretions and lymphorrhagia lasting 6-8 days in 2 patients. The local complications encountered in our cases are part of the usual complications in the surgical cure of inguinal and femoral hernias.(16-19)

Upon discharge, the patients were recommended to take a 6-8 week physical rest, continuation of previous treatment for comorbidities, a hypocaloric diet for weight loss in those with obesity, according to body mass index. The sick employees were given medical leave for up to 2 months. Patients were examined in the first week postoperative and later at 1-3-6-12 months, then annually, remaining in our records. After discharge, 3 patients accused local paraesthesia and foreign body sensation, symptoms that spontaneously remitted 6-8 weeks later.

CONCLUSIONS

Between 2016 and 2018, a number of 10 patients with FH underwent Lichtenstein procedure in the Department of General Surgery of Brad Municipal Hospital, of whom 2 by the standard procedure and 8 by the Lichtenstein modified procedure. Of the 10 FH, 6 were primary and 4 recurrent, 8 of the 10 patients with comorbidities. There was no death or major complication and no relapses during the study period.

Taking into account the postoperative results obtained, we consider that the changes we suggested to the Lichtenstein method bring real benefits in the surgical cure of FH: increasing the length of the polypropylene roll from 2 cm to 6-7 cm; prefixing of 2-3 non-absorbable monofilament threads anchored to Cooper's ligament; cutting the excess of roll at about 1 cm from the external opening of the femoral groove and securing it to the pectin fascia; pre-wetting the roll in Betadine solution prior to its insertion into the femoral canal; isolating the outer end of the roll from a possible external infection thereof, by suturing the subcutaneous tissue anchored to the mesh with absorbable monofilament threads.

Although various techniques were introduced for femoral hernia repair, there is a need for new procedures to decrease hernia's recurrence rates and to increase patient's quality of life.

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