



Original research

Fibrin glue versus stapler fixation in laparoscopic transabdominal inguinal hernia repair: A single center 5-year experience and analysis of the results in the elderly



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ABSTRACT

Introduction: Inguinal hernia surgery is one of the most common surgical procedures performed worldwide. Some studies demonstrated clear advantages of laparoscopic approach in terms of chronic pain, recurrence rate and daily life activities. Aim of this study was to compare short and long-term outcome of tacks and fibrin glue used during laparoscopic transabdominal hernioplasty (TAPP). **Methods:** This is a retrospective study conducted by our division of General Surgery. From May 2008 to May 2013 we performed 116 hernioplasty with TAPP technique. We compared two groups of patients: a group of 59 patients treated with fibrin glue and a group of 57 patients treated with conventional tacks and the two subgroups of patients over 65 years old. We evaluated: perioperative outcomes, early and late complications. **Results:** There were no significant difference about length of postoperative stay, time to return to work, recurrence rate and complications. **Discussion:** This study demonstrates that fibrin glue are same tolerated than tacks by patients and that the glues lead to the same good results during initial follow-up and in long term data also in the elderly. Meticulous preparation of the groin with preservation of spermatic sheet is in our opinion necessary to provide effective pain reduction and a good result in every TAPP procedure.

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1. Introduction

Inguinal hernia surgery is one of the most common surgical procedures performed worldwide [1].

Laparoscopic approach for hernia repair was initially controversial because various studies reported high recurrence rates [2]. However, during the last 10 years, laparoscopic surgery in hernia repair has made good results; some studies demonstrated clear advantages of laparoscopic approach in terms of chronic pain, recurrence rate and daily life activities [3].

Abbreviations: TAPP, transabdominal pre-peritoneal mesh; GG, fibrin glue group; TG, tacks group; BMI, body mass index.

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This method has become the first choice for inguinal hernia repair in many centers [4].

About recurrence, correct fixation and the right size of the mesh are considered the most important surgical tricks in laparoscopic hernia repair to prevent recurrence and a correct method of fixation of the mesh has been recommended by Deans et al. [5].

About chronic pain, the staples are defined as the most important cause of nerve injury during TAPP. The use of spiral tacker leads to an high risk of injury to the iliohypogastric nerve due to the fixation of the mesh over the muscle [6–9].

These several complication motivated surgeons to use other fixations methods like human fibrin glue and cyanoacrylate. Fibrin glue was first described by Canonico et al. in 1999 during an open hernia repair. The results of these technique are excellent in terms of chronic pain but the use of these glues increases total cost of procedure.

Aim of this study was to compare short and long-term outcome of tacks and fibrin glue used during laparoscopic transabdominal hernioplasty (TAPP).

2. Methods

This is a retrospective study conducted by our division of General Surgery.

From May 2008 to May 2013 we performed 116 hernioplasty with TAPP technique.

Our exclusion criteria were: glaucoma, previous retinal detachment, ASA \geq 4, chronic obstructive pulmonary disease. Routine preoperative anesthesia was performed.

We compared two groups of patients: a group of 59 patients treated with fibrin glue (GG – Glue Group) and a group of 57 patients treated with conventional tacks (TG – Tacks Group) and the two subgroups of patients over 65 years old.

All the procedure was performed by the same surgical team using the same laparoscopic surgical standardized technique. Antibiotic prophylaxis was given as a single dose of a third-generation of cephalosporin.

Patients had comparable age, sex, type of hernia and Body Mass Index (BMI).

We evaluated: perioperative outcomes (operative time, total hospital stay, time to return to activity), early complications (seroma, bleeding, bladder injury) and late complications (recurrence rate, chronic pain, trocar site hernia).

We defined an early complication as the complication that occurred within 1 month after the surgical procedure. We defined chronic pain as pain that persisted for more than 6 months after surgery. The pain was evaluated directly from the patients using Oral Analog Scale. The main follow-up of this study was 31 months.

2.1. Surgical technique

Before surgery all patients received antibiotic and antithrombotic prophylaxis.

The patient is placed in the supine and flat position, with upper limbs abducted, under general anesthesia.

The pneumoperitoneum is created with a Veress needle placed in left hypochondrium. Semm's safety test is always performed to ensure correct intraperitoneal position of the needle and a maximal pressure of 12 mm/Hg is reached.

An umbilical 1 cm scar is performed and the alba aponeurosis and the peritoneum are opened under vision control; then the optical trocar is placed in the abdominal cavity and a 30° angle optic is introduced. It is customary to perform a carefully exploration of the totally of abdominal cavity.

To expose the inguinal hernia the table is rotated to the side opposite the wall defect and the patient was placed in Trendelenburg position.

The surgeon must stand on the opposite side of the hernia and the assistant on the right side of the patient.

After abdominal cavity exploration and all wall defects location, two other trocars are placed under direct vision. In case of bilateral inguinal hernia, all the trocars are placed on the umbilical transverse line (5–12 mm on the right and 5 mm on the left).

In case of unilateral defect the trocar placed in the same side of defect, can be introduced 2 cm above the umbilical transverse line; in the other side the trocar can be placed 2 cm below the umbilical transverse line to avoid collision with the optical trocar. So the operative triangulation is rightly pointed to the defect.

The following anatomical landmarks are identified: anterior superior iliac spine, epigastric vessels and testicular vessels laterally, iliac vessels and spermatic cord or round ligament, Cooper's ligament, symphysis and rectus muscle. An early identification of the epigastric vessels is recommended.

The dissection of the right inguinal area begins with a curved spacious incision of the peritoneum, starting in the region of the

anterior superior iliac spine; the incision going above the myopectineal orifice and the orifice of the wall defect and ending at the medial umbilical ligament. That ligament must not be cut. In case of a prominent fatty ligament, the incision should be enlarged downward or towards the cranium in a "J" shape.

The preperitoneal inguinal area is totally prepared in accordance with a strict concept: before dissecting the myopectineal orifice with the hernial sac, a preparation of the medial and the lateral compartments is always required. Dissection of the hernial sac should not be performed before demonstrating both the compartments clearly.

By following a nonvascular zone, the space of Retzius (medial compartment) as well as the Bogros space (lateral compartment) can be dissected in a blunt manner.

As a matter of principle, accurate hemostasis is required to identify landmarks and obtain excellent exposure.

Dissecting a direct hernia is a simple process: the hernia sac is dissected and separated from the transversalis fascia and reduced into the abdomen.

The femoral hernia orifice is located in an angle formed by the Cooper's ligament and the iliac vein: so the dissection needs to be performed very carefully.

Dissection of the indirect hernia is much more difficult as compared to the direct hernia, especially if the sac is long. To release and separate the hernial sac off the spermatic cord, a fine and superficial coagulation of the adhesions normally suffices.

An hernia sac of very large size (inguino-scrotal hernia) may be sectored at the neck. Extreme care has to be given to control bleeding.

The final step of dissecting the groin includes parietalisation: the peritoneum is dissected off the spermatic cord and the spermatic fascia beyond the middle region of the psoas muscle. The purpose of parietalization is to prevent the mesh from being lifted up by the remaining connective tissue during peritoneal closure; this may especially occur laterally.

During the next step, a rectangle of polypropylene mesh of about 15 × 10 cm is used and tailored to each patient. It is advisable to use a larger mesh (12 × 17) for major defects. The mesh is rolled and introduced into the abdomen through a 5–12 mm trocar, positioned to cover the hernia defect and the entire inguino-femoral region (potential hernia spaces). It's important to ensure that the inferior border of the mesh stays in place when the peritoneum is lifted. The aim of mesh fixation is to prevent graft displacement and consequent recurrence.

In order to fix the mesh we can use tacks or glue. By using two clips the mesh can be fixed to the symphysis and Cooper's ligament. Two other clips are placed on the rectus muscle medial to the epigastric vessels and two other ones at the transverse fascia located lateral to the epigastric vessels. Placing clips below the ileopubic tract and 1–2 cm above is strictly avoided doing so could lead to injuring large vessels (Triangle of doom) or nerves (triangle of pain).

When fibrin glue is used, a special 5 mm laparoscopic applicator is required, and 2 ml of fibrin glue is placed after heating at 37°C, with small drops around the mesh border; there is no need to look for vessels or nerve location.

As soon as the mesh is placed in position, the peritoneal incision must be approximated using a suture (prolene or adsorbable manufactured suture) whose ends get fixed with adsorbable clips or intracorporeal knotting. Peritoneum closure using clips is faster; in the patients treated with fibrin glue needs a running suture, and more laparoscopic experience is required.

At the time of suturing the peritoneum, the intra-abdominal pressure is reduced to 6–8 mmHg. Thereby allowing a tension-free peritoneal closure.

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