LAPAROSCOPIC TOTAL EXTRAPERITONEAL (TEP) REPAIR OF INGUINAL HERNIA: A RETROSPECTIVE CONTROLLED STUDY

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Abstract

Introduction: Inguinal hernia is the most common hernia and inguinal hernia repair is the most frequently performed operation in gerenal surgery. Hernioplasty by laparoscopy was gradually the standard method for inguinal hernia repair all over the world. The objective of this study was to demonstrate the effectiveness and safeness of laparoscopic totally extraperitoneal (TEP) hernia repair. **Materials and methods**: A retrospective analysis of patients, admitted for groin hernia and operated by laparoscopic TEP hernia repair, performed by one surgeon between January 2008 and December 2009 at Centre Hospitalier Emile Mayrisch, Luxembourg. Data were collected regarding general characteristics, complication rates, length of hospital stay and the recurrence rate postoperative of this laparoscopic method. **Results**: 71 patients (68 men and 3 women) underwent laparoscopic TEP hernia repair with an average age of 52.1±14.7 years (range 15 – 82 years); 9.86% of the inguinal hernias were operated bilaterally, peritoneal laceration was noticed during dissection in 12.7%, there was no injury of the inferior epigastric vessels during dissection. Unilateral hernia had an operative time of 44.52 ± 13.6 minutes (range 20 – 75 minutes) and bilateral hernia took 70 ± 12,3 minutes (range 60 – 85 minutes). All of these patients in the study were controlled, 11.3% and 2.8% had seroma at the time 10 days and 3 months postoperative, respectively, there were no recurrences during follow-up ranging from 3 – 24 months (average 12.3 months). **Conclusions**: The laparoscopic TEP hernia repair of inguinal hernia is safe and effective. That laparoscopy method should be the gold standard technique in treatment for the repair of inguinal hernias.

Key words: *hernia – TEP hernioplasty - laparoscopy*

1. INTRODUCTION

Inguinal hernia repair is one of the most frequently performed operation in general surgical practice [8]. In United States, more than 700.000 inguinal hernias had been operated each year [13]. In the Netherlands, 33.500 cases inguinal hernia repairs were peformed annually (involving primary, recurrent and bilateral hernias) [11].

In the past, there were a lot of open techniques for repairing inguinal hernia using an armamemtarium of open tissuebased (Bassini, McVay, Shouldice…) or using a mesh polyprosthesis such a tension free-repair (Lichtenstein in 1974). The standard approach for inguinal hernia repair had changed step by step since 1987, when the first laparoscopic surgery had been reported by Phillip Mouret (France). Laparoscopy surgery became an standard approach for inguinal hernioplasty since Arregui et al.[1] described in the early 1990s the transabdominal preperitoneal repair (TAPP) technique and McKernan and Laws [9] in 1993 also the technique totally extraperitoneal inguinal hernioplasty (TEP), laparoscopy approach for inguinal hernioplasty had become an established technique by the overall safety and efficacy for the repair of inguinal hernias. However, TEP laparoscopic inguinal hernia repair has gained popularity in the past few years and is preferred TAPP repair as it is minimally invasive and avoids entry to the peritoneal cavity [8]. The laparoscopic method has been selected for routine use by most surgeons. [14]

In our department, by a surgeon, more than 100 inguinal hernioplasty were done per year by laparoscopy, and about 50% among of them underwent the technique of totally extraperitoneal inguinal hernioplasty (since 1993). The aim of this retrospective review is to demonstrate the effectiveness and safeness of laparoscopic total extraperitoneal (TEP) hernia repair.

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2. PATIENTS AND METHODS

2.1. Patients

The study was performed in the surgical unit of Department of gerenal surgery at the Centre Hospitalier Emile Mayrisch, Esch sur Alzette, Luxembourg. All of the patients, who underwent operative hernioplasty by laparoscopic TEP for their groin hernia and operated by one surgeon between 1st January 2008 and 31st December 2009, were included.

2.2. Methods

A retrospective controlled study has been done

2.2.1. Surgical procedure

Three infraumbilical midline ports were used.

The first subumbilical was created with an open technique for introducing Hassan trocar for a 10mm 0° telescope. We made a skin incision about 2cm just below the umbilicus, after that the anterior rectus sheath was opened veritically on the side of groin hernia and an initial extraperitoneal space was created anterior to posterior rectus sheath by blunt dissection. A trocar 12mm was introduced into the extraperitoneal space and carbon dioxide was insufflated to achieve extraperitoneal pressure 10-12 mmHg for help to making the working space.

Two accessory 5mm ports were introduced under vision: the first in the midway between ombilicus and pubc symphysis and the second 2cm above the pubic symphysis in the midline.

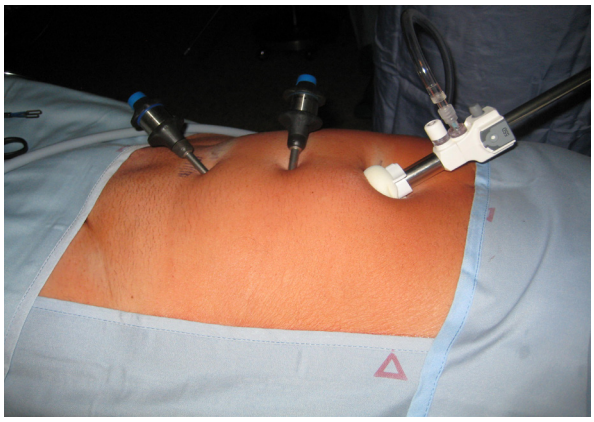

Fig1. Position of ports in TEP repair

The peritoneum was dissected away from the anterior abdominal wall in the midline until the white fascia of pubic symphysis was identified The dissection then proceeded laterally along the pubic symphysis identifying Cooper's ligament, inferior epigastric vessels, cord structures and the hernia sac. With the type direct, dissection the hernia sac from the fascia transversalis was done simple without complications. With the type indirect, the hernia sac was dissected from the cord structures and repositioned. Dissection was continued laterally up to anterior superior iliac spine and exposing the psoas muscle, fascia was preserved over adjacent cutaneous nerves. A space adequate for the placement of a polypropylene mesh was prepared.

The mesh with size 10x15cm was rolled, and take into the extraperitoneal space through the Hasson trocar. Length and width of the polypropylene mesh was decided in centimeters after assessing body habitus, size of defect and extraperitoneal space by the operating surgeon. After spreading and orienting the polypropylene mesh in the extraperitoneal space with the help of graspers adequately, covers the direct, indirect and femoral hernia sites. A fixation of the mesh was realized only in the case of lager direct hernias. The peritoneum was teased down as far back as possible to allow peritoneum and the reduced sac to lie in front of the mesh.

In case of bilateral hernia, two pieces of mesh polypropylene were used. The position of the trocars were changed for direct visualization.

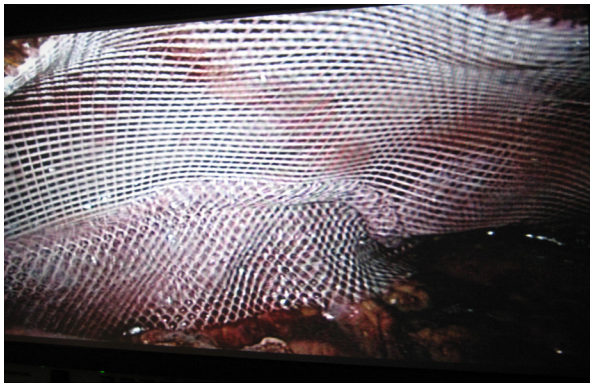

Fig 2. The polypropylene mesh in position in the extraperitoneal space

The extraperitoneal space was desufflated and the 12-mm port at subumbilical were closed with vicryl Ethicon 1.0 and skin incisions sutured with 4.0 Ethilon monocryl intracutaneously.

2.2.2. Data were analyzed including

- Intraoperative characterictis: type of hernia (direct, indirect), bleeding (injury to inferior epigastric vessels, major vascular), complications (such as bowel unjury, bladder neck injury, cord structures injury, peritoneal laceration) and operative time.
- Hospital stay
- Follow-up: All patients are included in a follow-up programme and are requested to attend a specific hernia consultation at 1 week,

3 months, 12 months and 24 months for hematoma formation, chronic pain, infection and recurrence of the hernia.

2.2.3. Statistical analysis

Operative and postoperative variables were analyzed statistically by using computer software SPSS 9.0

3. RESULTS

The retrospective study was performed in the Department of gerenal surgery at the Centre Hospitalier Emile Mayrisch, Esch sur Alzette, Luxembourg., including cousecutive 71 patients, who underwent operative hernioplasty by laparoscopic TEP for their groin hernia between 1st January 2008 and 31st December 2009.

3.1. Age and sex

68/71 (95.8%) patients in our study were men, 3/71 (4.2%) were women, with a mean age of 52.1±14.7 years (range 15 – 82 years)

3.2. Type of hernia

7/71 patients (9.86%) was bilateral hernias.

Of the 78 hernias, 52 patients (66.7%) were of the direct hernias type, 24 patients (30.8%) were of the indirect hernias type and 2 patients (2.5%) include direct with indirect hernias type. There were four patients with recurrence hernia inguinal for open hernioplasty before, 3 patients had underwent operative appendicectomy before on the same side of hernia. One patients with femoral hernias was found.

3.3. Operative details and intraoperative problems

Dissection of extraperitoneal space was performed as easy in 100% patients by operating surgeon, there was no injury of the inferior epigastric vessels during dissetion.

Peritoneal laceration was noticed during dissection in 9/71 patients (12.7%), the patients with peritoneal breach required insertion of Veress needle into the peritoneal cavity to release CO_2 from peritoneal space. About the dissection the sac of hernia (from the fascia transversalis in type direct and from the cord structures in type indirect), there was no injury of cord structures, bladder, major vascular or bowel during dissection or insertion of ports in any of the cases.

Operative time: Unilateral hernia had an operative time of 44.52 ± 13.6 minutes (range 20 – 75 minutes) and bilateral hernia took 70 ± 12.3 minutes (range 60 – 85 minutes).

The mean hospital stay of the patients was 1.3 ± 0.45 days

3.4. Follow-up

At 7 days postoperative: The 1st follow up assessment showed that 8/71 patients (11.27%) with local hematoma, in that 3 cases required aspiration and drainage of hematoma, no mesh infection cases were found.

At 3 months: there were 2 patients with residual seroma, 4 patients had a pain symptoms.

At 12 and 24 months: Seroma was not noted and no mesh infection or recurrence of hernia were recorded at 12 and 24 months follow-up in our study.

4. DISCUSSIONS

Total extraperitoneal (TEP) laparoscopic inguinal hernia repair has become popular as an easy, safe and cost-effective procedure [14]. More recently, the advent of comprehensive training in laparoscopy has allowed TEP to continue evolving and the feasibility of this approach gains recognition as a preferable technique. For the success of the technique, it is necessary to be skilled in laparoscopy surgery and in the anatomy of the abdominal wall. The creation of preperitoneal space is an important step in the TEP hernia repair.

In our study, the great majority of patients were men with 95.8%, women were only with 4.2%. The results showed that the mean age of patients was 52.1±14.7 years (range 15 – 82 years), according with the data reported in literature [3].

4.1. Type of hernias

In the majority of studys about TEP laparoscopic inguinal hernia repair is demonstrated that the rate of bilateral hernias is about 10% in Europe and 14% in USA [1]. Saggar VR and Saganri R in their report in 2007 showed that the rate of occult contralateral hernias is as low as 8% and the rate of bilateral hernia is surprisingly high and led us to assume that a number of occult contralateral hernias have been repaired during the study period. In our study, there were 7/71 patients (9.86%) bilateral hernias.

Of the 78 hernias, 52 patients (66.7%) were of the direct hernias type, 24 patients (30.8%) were of the indirect hernias type and 2 patients (2.5%) include direct with indirect hernias type, according with reported in literature [8].

4.2. Operative details and intraoperative problems

The most important predictor of good hernia repair laparoscopically is the creation of working space so that the hernia sac can be dissected,

all defects identified and a proper size of mesh placed to cover all the defects [1]. In this step, some authors showed that ballon dissection is considered essential, easier, quicker and safe to create the extraperitoneal space [4], [8].

In our study, dissection of extraperitoneal space was performed firstly for direct telescopic dissection and then with as easy in 100 % patients by operating surgeon, there was no injury of the inferior epigastric vessels during dissetion. The dropping of inferior epigastric vessels led to difficulty during lateral dissection. Mahesh C et al has reported that with the balloon for the extraperitoneal space dissection, there were 10,3% was droppings of inferior epigastric vessels [1]. We think that with increasing experience, the technique will be much more easy to control and avoid an injury of epigastric vessels.

Peritoneal tear is the most common reason for the conversion of TEP to TAPP or open approach. Indirect hernias and large hernias had more chance of peritoneal lacerations [8]. Intraoperative peritoneal laceration ranges from 10% to 64% in different series. It not only leads to the loss of extraperitoneal space but also predisposes patients to small bowel adhesions and internal herniation [8], [10]. Indirect hernias had an higher number peritoneal laceration than direct hernias because of the dissection of the hernia sac. Bringman et al [2] reported in their study over fifty percent with peritoneal laceration. Lau et al [7] has described that most peritoneal tears occur during the blunt dissection of indirect hernia sac and the peritoneum from the spermatic cord.

In our data, peritoneal laceration was noticed during dissection in 9/71 patients (12.7%). In case of large peritoneal laceration, which we closed by ligatio. We inserted a Veress needle in the peritoneal cavity for release CO2 from peritoneal space. During the dissection the hernia sac (from the fascia transversalis in type direct and from the cord structures in type indirect), there was no injury of the cord structures, bladder, major vascular or bowel idem for the insertion of ports in any of the cases. In their study, Moreno-Egea A had showed that intraoperative bowel injury, up to 0 – 0.06% in laparoscopic hernia repair, the small bowel is the most frequently injuried segment.

Unilateral hernia had an operative time of 44.52 ± 13.6 minutes (range 20 – 75 minutes) and bilateral hernia took 70 ± 12,3 minutes (range 60 – 85 minutes). Almost reported rates of operative time range from 45 to 82 minutes depend on the experience of surgeons. Mirsa et al has reported in their study that the mean operative time was 75.9 ± 24.1; compare with bilateral and unilateral in two group dissection with balloon and direct telescopic, there was statistically no significant difference [8]. Bringman et al [2] demonstrated that there mean operative time was 54 – 61 minutes.

The mean hospital stay of the patients in our data was 1.3 ± 0.45 days. Mirsa and Bringman et al reported similar results with the duration of postoperative hospital stay of 1.2 days. There was no difference about the time hospital stay in our data, we conclusion that the higher compliations intraoperative and postoperative rates the patients had, the longer hospital stay time was occur.

Seroma is one of the common complications after laparoscopic inguinal hernia repair. Some sugeons in their research suggested that the incidence of hematoma ranges from 1.9% to 11% [2]. In our study, at the first follow-up at 7 days postoperative, the incidence of local hematoma was 11.27% (8/71), all of which could be managed conservatively. After 3 months follow-up, the residuel seroma was seen only in 2 patients (2.8%) and at the time 12 and 24 month follow-up, there were no case with seroma. Some sugeons suggested for decreasing seroma formation in the postoperative period by changing technique such as removing the entire sac in case of indirect hernia or stapling the fascia transversalis to Cooper's ligament in case of direct hernia to avoid cavity formation. With inguinosccrotal hernia, Lau et al suggested that, transecting the indirect sac near the deep ring and leaving the open distal sac may reduce the risk of damaging the vessels and the cord structure, and could reduce the incidence of seroma formation [7].

Pain is the most common concern after hernioplasty inguinal. Pain after hernioplasty should be considered a serious complication when it is severe or persists for a significant period of time after the repair. The reported of the rate for groin pain was range about 5% to 10%. The most common cause of pain after sugery is irritation of ilioinguinal or iliohypogastric nerves. In the study, Om Tantia et al conclusion that the low incidience of groin pain can be achieved by dissecting in the right plane and leaving a thin fibro-fatty in the "triangle of pain" to avoid any injury tho the nerves and by strictly adhering to the protocol of never fixing the mesh at any place below the iliopubic tract [12]. In our study, at the

3-month follow up evaluation of 71 patients, there were 4 patients (5,6%) with a symtompathology of groin pain. After 12 months no cases with pain symptoms was found. Of these 4 cases with pain, all of them had a problem with seroma and required aspiration and drainage. We also agreed with the conclusion that the age <65 years, bilateral and indirect hernias had a positive correlation with higher postoperative pain score [8].

Recurrence is the most important endpoint of any hernia surgery [8]. It requires of anatomy and a through technique of repair to help keep the recurrence in endoscopic repair to a minimum [15]. Phillips Eh et al showed that in 80% of the recurrences after laparoscopic hernia repair, the mesh was too small and did not fully cover the inguinal floor [6]. Fitzgibbons et al [5] concluded that factors leading to recurrence include surgeon inexperience, inadequate dissection, insufficient prothesis size, insufficient prosthesis overlap of hernia defects, improper fixation, prothesis folding or twisting, missed hernias or mesh lifting secondary to hematoma formation. There was no recurrence cases were noted in our study in the immediate postoperative period and during follow-up ranging from 3 – 24 months (average 12,3 months), maybe the size of the cohort was small.

5. CONCLUSIONS

The laparoscopic TEP repair of inguinal hernia has become popular as an easy, safe and cost-effective procedure. This laparoscopic technique should be the gold standard teachnique in treatment for the repair of inguinal hernias.

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