

Total Extra Peritoneal Laparoscopic Inguinal Hernioplasty; Early Experience at the Royal Medical Services Hospitals of Jordan Armed Forces

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ABSTRACT

Objectives: Laparoscopic inguinal hernia repair has been promoted as having significant advantages. The aim of this study is to evaluate the early results of total extra peritoneal laparoscopic inguinal hernia repair at the Royal Medical Services hospitals of Jordan Armed Forces.

Methods: During the period between April 2004 to May 2006, 100 patients underwent total extra peritoneal laparoscopic inguinal hernia repair, the following data were collected; patient age, gender, side and type of hernia, intra-operative complications, conversion of the procedure to other type of repair, operative time, postoperative pain, hospital stay, postoperative complications, chronic pain and recurrence.

Results: Out of the 100 patients, two patients (2%) were females and 98 (98%) were males. Age ranged between 16 and 79 years with a mean of 44.8 years. According to body mass index 22 (22%) patients were moderately obese. All of the patients were fit for general anesthesia. The 100 patients had 115 hernias, 53 (53%) on the right side, 32 (32%) on the left side and 15 (15%) bilateral. Sixty five (56.5%) hernia were indirect, 47 (40.9%) were direct and 3 (2.6%) were pantaloon hernia. Six (5.2%) of the hernias were recurrent. Operative time ranged between 35 to 165 minutes with a mean of 61.3 minutes, in the unilateral hernia the mean operative time was 56 minutes while in the bilateral cases it was 88 minutes. The procedure was converted to open repair in 2% of patients and to trans-abdominal preperitoneal laparoscopic repair in other 2% of patients. Intra-operative complications occurred in 5% of patients while post-operative complications occurred in 9% of patients all of which were mild. Post operative pain was assessed by the visual analogue scale twice; immediately after complete recovery from general anesthesia and in the first post operative day. In the first; it was severe in 9%, moderate in 81% and mild in 10% of patients, while in the second it was severe in 2%, moderate in 12% and mild in 86% of patients. Chronic pain occurred in 3% of patients. Recurrence occurred in 8 (8%) patients, six of them were from the first 50 cases.

Conclusion: Our results in total extra peritoneal laparoscopic inguinal hernia repair were comparable to the results reported in literature regarding complication rate and recurrence rate especially after passing the first fifty cases indicating the effect of learning curve.

Key words: Inguinal hernia, Laparoscopic, Total Extra Peritoneal repair.

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Introduction

Within less than a decade in the 1990s, laparoscopic surgeons described different forms of laparoscopic inguinal hernia repairs, the most

widely accepted of them nowadays are the Total Extra Peritoneal repair (TEP) and the Transabdominal Peritoneal repair (TAPP). The TEP approach supposes an entirely parietal procedure that treats the hernias by combining the

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concepts of Stoppa (preperitoneal repair with giant mesh) and of Lichtenstein (hernioplasty with mesh without tension) but can be carried out by using appropriate laparoscopic instruments that allow the option of a minimally invasive procedure with its demonstrated benefit for the patient.⁽¹⁾

Laparoscopic hernia repair is now widely performed and has been demonstrated to be safe and cost-effective, and is no longer a substitute or modification of other open techniques, but it is a separate therapeutic option for patients, and should not be considered a newer experimental option to treat inguinal hernia, as it has been in use for many years and is now well developed, with consolidated technological support. At the time being there is general agreement that laparoscopic approach is the approach of choice in case of recurrent or bilateral inguinal hernia.⁽²⁾ This study was conducted to evaluate the early results of total extra peritoneal laparoscopic inguinal hernia repair at the Royal Medical Services hospitals of Jordan Armed Forces.

Methods

During the period between April 2004 to May 2006, 100 patients underwent TEP laparoscopic inguinal hernia repair, their data was collected and studied, only patients with urgent obstructed hernia, and patients who were not fit for general anesthesia were excluded from the study. The following data were collected; patient age, gender, side and type of hernia, intra-operative complications, conversion of the procedure to other type of repair, operative time, postoperative pain, hospital stay, postoperative complications, chronic pain and recurrence.

Out of the 100 patients, two patients (2%) were females and 98 (98%) were males. Age ranged between 16 and 79 years with a mean of 44.8 years. According to body mass index 22 (22%) patients were moderately obese. All of the patients were fit for general anesthesia. The 100 patients had 115 hernia, 53 (53%) on the right side, 32 (32%) on the left side and 15 (15%) bilateral. Sixty five (56.5%) hernia were indirect, 47 (40.9%) were direct and 3 (2.6%) were pantaloon hernia. Six (5.2%) of the hernias were recurrent.

All patients were operated upon under general endotracheal anesthesia. The patient is put in the supine position, the whole abdominal wall and genitalia and thighs are scrubbed. The procedure is started by infra umbilical incision at the same side of hernia deep down to the anterior rectus sheath (Fig. 1). The anterior rectus sheath is then incised

for one to two centimeters (Fig. 2), blunt dissection is done behind the rectus muscle dissecting the extra-peritoneal space using the surgeon's index finger, and a 10 millimeters trocar is inserted through this wound into the extra-peritoneal space which is inflated with carbon dioxide to a pressure up to 10-15 millimeter mercury. Two more infra umbilical 5 millimeter trocars are inserted in the midline (Fig. 3). The extraperitoneal space is dissected both sharply and bluntly identifying the anatomical landmarks mainly the inferior epigastric vessels, pubic bone, rectus muscle, the linea alba in the midline, and the spermatic cord. The hernial sac is then identified and its relation to the inferior epigastric vessels is visualized to determine whether the hernia is direct or indirect one. Even with the presence of obvious direct hernia, the cord is dissected gently looking for indirect sac or lipoma of the cord which if present, should be reduced and excised as they can cause hernia-like symptoms in the absence of a true hernia and this can lead to unsatisfactory results, in this stage care should be taken in order not to injure the vas deference and the spermatic vessels (Fig. 4). In case of inguino-scrotal hernia of the sac is dissected for a short distance beyond the internal inguinal ring and transected there with good hemostasis, the proximal part is reduced leaving the distal part in place (Fig. 5). The space is dissected laterally up to the anterior superior iliac spine and medially just beyond the midline in case of unilateral hernia or extended to the contra lateral anterior superior iliac spine in case of bilateral hernia.

A longitudinally rolled 10 x 15 cm polypropylene mesh is introduced through the 10-12 mm trocar of the camera and unrolled inside as a curtain to cover the hernial orifices, then it is fixed by three tissue tacker clips, one in the upper lateral angle, second in the upper medial angle, and the third one over pubic bone. The space is then deflated under vision taking care that the lower edge of the mesh does not roll upward. The incision in the rectus sheath is closed and then the skin wounds.

Patients were allowed to have regular diet after complete recovery from general anesthesia. Post-operative pain is evaluated using the Visual Analogue Scale (VAS) of pain upon immediate complete recovery from anesthesia and in the first post operative day, patients were asked to rate their pain with the VAS which consists of 100 millimeter line, they were asked to mark on the line that represent their level of perceived pain intensity.

Table I. Intra operative complications.

Inferior epigastric vessels injury.	3%
External iliac vein injury	1%
Small intestine injury	1%
Total	5%

Table II. Post operative complications

Scrotal Hematoma.	6 (6%)
Infection.	1 (1%)
Milde Epididymitis.	1 (1%)
Pain from a subcutaneous migration of spiral titanium clip.	1 (1%)
Total	9 (9%)

Zero score represent no pain, scores from 1 to 30 were defined as having mild pain, scores from 31 to 69 were defined as having moderate pain, and those with scores of 70 or more were considered to have severe pain. Patients were given 75 mg intramuscular Diclofinac Sodium as analgesic according to the pain evaluation. They were discharged from the hospital on the first post-operative day to be followed in the outpatient clinic at two weeks interval for one month, then every three months for three years.

Results

Operative time ranged between 35 to 165 minutes with a mean of 61.3 minutes, in the unilateral hernia the mean operative time was 56 minutes while in the bilateral cases it was 88 minutes. The procedure was converted to open repair in two (2%) patients, the first due to bleeding from the inferior epigastric vessels and injury of the small intestine during trying to control this bleeding, the second was due to injury of iliac vein. On the other hand the procedure was converted to trans-abdominal preperitoneal laparoscopic repair (TAPP) in two (2%) patients because we could not enter the extra peritoneal space due to previous mid line laparotomy incision.

Intra-operative complications occurred in 5% of patients (Table I), they included; injury to the inferior epigastric vessels in 3 (3%) patients, injury to small intestine in one (1%) patient, and injury to the iliac vein in one (1%) patient. The injury to the small intestine occurred during re-insertion of the 5 millimeter trocar that slipped out during attempts to stop bleeding from the inferior epigastric vessels. All of these intra operative problems occurred in the first 50 cases of our experience.

Post-operative complications occurred in 9% of patients (Table II). Scrotal hematoma occurred in 6 (6%) patients, all of them responded to conservative treatment and the hematomas disappeared spontaneously in few weeks. Infection occurred in 1 (1%) patient in whom we had to remove the mesh to control the infection. Mild epididymitis happened in

1 (1%) patient and he responded to oral antibiotics and anti inflammatory analgesic drugs. Pain from a subcutaneous migration of the spiral titanium clip occurred in 1 (%) patient; pain disappeared after removal of the clip under local anesthesia. Apart from two cases of scrotal hematomas, all these complications occurred in the first 50 cases.

Post operative pain assessment using the (VAS) as described above showed that; immediately after complete recovery from general anesthesia; it was severe in 9%, moderate in 81% and mild in 10% of patients, while in the first post operative day it was severe in 2%, moderate in 12% and mild in 86% of patients, (Fig. 6). Chronic pain (pain that lasts for more than six months) occurred in 3% of patients. Recurrence occurred in 8 (8%) patients, six of them were in the first 50 cases.

Discussion

Inguinal hernia is the most common hernia, and its repair is one of the most frequently performed operations in general surgery.

Two revolutions in inguinal hernia repair surgery have occurred during the last two decades. The first was the introduction of tension-free hernia repair by Lichtenstein in 1989, which significantly reduced recurrence rates. The second revolution was the application of laparoscopic surgery to the treatment of inguinal hernia in the early 1990s, which led to decrease in postoperative pain and faster recovery along with low recurrence rates.⁽³⁾

Two laparoscopic techniques have become the most common procedures to repair these hernias: the TAPP and the TEP repair. Dulucq JL were the first to perform laparoscopic TEP repair, in June 1990.⁽³⁾

In both methods mesh prosthesis is implanted into the preperitoneal space dorsal to the transversalis fascia. These techniques therefore represent minimally invasive versions of open mesh implantation techniques. In TAPP the surgeon enters the peritoneal cavity and places a mesh through a peritoneal incision over possible hernia sites, while in TEP the peritoneal cavity is not entered and mesh

is used to seal the hernia from outside the peritoneum which is considered to be an advantage for TEP procedure over TAPP.

TEP approach is considered to be more difficult than TAPP but may result in fewer complications. The TAPP approach has been advocated for complicated hernias.

The TEP repair affords efficient access to both groins. It uses a posterior approach and avoids anterior scar tissue in the case of recurrent hernias.⁽⁴⁾

The Royal College of Surgeons' of England review of groin hernia surgery suggests that laparoscopic repair gives less postoperative pain, a faster recovery, and similar recurrence and complication rates to open repair.⁽⁵⁾ The recommendations of the UK National Institute for Clinical Excellence (NICE) advised that laparoscopic hernia should be limited to the recurrent or bilateral hernia and TEP approach is the preferred, and primary unilateral hernia is preferred to be repaired by open tension free repair (Lichtenstein).⁽²⁾ Our comment on these recommendations comes in two points: first; if the surgeon is not trained to do laparoscopic repair for the easier unilateral primary hernia, he will not be able to do laparoscopic repair for the more difficult bilateral or recurrent cases, and second; patients who have bilateral or recurrent hernias are the minority of cases, 10% bilateral and 6% recurrent.⁽⁶⁾ (in our study 15% and 5% respectively), while the majority of patients have primary unilateral hernia, these patients have the right to benefit from the advantages of laparoscopic surgery namely less post operative pain, faster recovery, and early to return for normal activity.

The two most important end points in inguinal hernia surgery are; chronic pain and recurrence. Regarding our study the incidence of chronic pain (pain that lasts for more than six months) was 3%. The reported incidence of chronic pain 6 months to 1 year after inguinal herniorrhaphy varies from 0% to 37%, with most reports being in the range of 10%–20%. In a questionnaire study 1 year after inguinal herniorrhaphy, Morten Bay-Nielsen et al found that 28.7% had groin pain with no difference in the incidence of pain between laparoscopic and open repair.⁽⁷⁾ Another retrospective questionnaire study reported, however, a chronic pain rate of 38.3% after open and 22.5% after laparoscopic repair (P, 0.01).⁽⁸⁾ In a recent Cochrane review including 41 published and unpublished reports involving 7161 patients, laparoscopic repair was also found to lead to a significantly lower incidence

of persisting pain compared with open herniorrhaphy.⁽⁹⁾ Emilie Øberg et al found that chronic groin pain incidence in their patients (who had TAPP) is 4%, which is less than in most other studies.⁽¹⁰⁾

Taylor CJ found that although ongoing chronic pain complicated 14% of these patients who had TEP repair, pain was in almost all cases of a mild and occasional nature that allowed a full return to pre-hernia activities.⁽⁶⁾ These data are similar to findings by other authors.⁽¹¹⁾ Randomized studies have shown significant improvements in post operative pain and rehabilitation rates in comparison to suture repair done by the Shouldice or Lichtenstein techniques.⁽¹²⁾

The second end point in hernia repair surgery is recurrence; this complication became less with introduction of tension free, mesh repair. Recurrence in laparoscopic inguinal hernia repair occur usually early (within 6 months) and it is usually due to technical error.⁽¹³⁾

Mike SL *et al* compared recurrence rates between conventional anterior repair and laparoscopic repair (TEP) Recurrences were diagnosed in 31 patients (6%) in the open-surgery group and 17 (3%) in the laparoscopic-surgery group (P≤0.05). With prolonged follow-up, more recurrences may be expected in the open-surgery group, and these late recurrences may be prevented only by reinforcing the groin region with additional support. A late recurrence after laparoscopic surgery may be uncommon because mesh is used routinely to reinforce the groin region from inside. The rationale for covering the defect in the abdominal wall with mesh from inside is that the repair can better withstand the pressure (which originates inside the abdomen) to which it is subjected. The difference in recurrence rates in the two groups can therefore be expected to increase over time. Early recurrence in general may be caused by technical errors as missing present lateral hernia, insufficient lateral preperitoneal dissection resulting in curled mesh, using small size mesh, and leaving big lipoma of the cord not dissected.⁽¹⁴⁾

In our study we reported 8% (8 hernias) incidence of recurrence, 75% (6 out of 8 hernias) of them were in the first 50 patients which reflects the effect of learning curve.

The European Hernia Trials Group, found that the incidence of recurrence in laparoscopic and Lichtenstein repair were similar (2.3% and 2.9%, respectively).⁽¹²⁾ The experience of the surgeon in



Fig. 1. The starting infra umbilical incision



Fig. 2. Incising the anterior rectus sheath

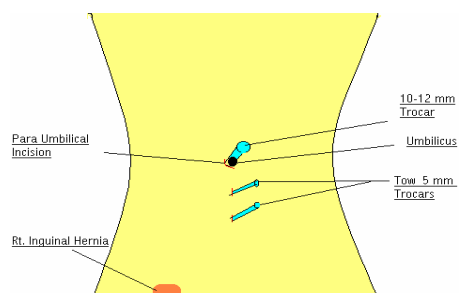


Fig. 3. Insertion of infra umbilical 5 millimeter two trocars

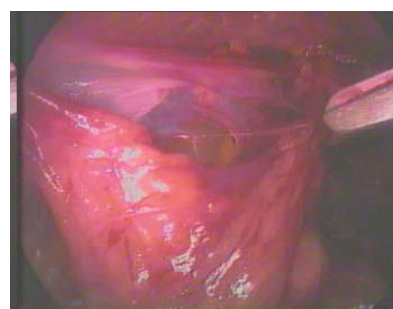


Fig. 4. Indirect hernial sac completely dissected and reduced



Fig. 5. Indirect inguino- scrotal sac, the sac transected beyond the internal ring leaving the distal part in the scrotum

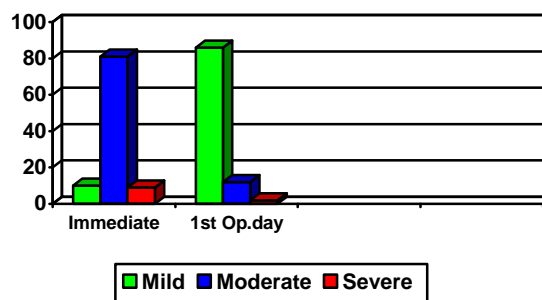


Fig. 6. Post- operative pain assisted by visual analogue scale.

laparoscopic hernia repair was found to play a major role in recurrence rate.

Surgeons who had done more than 250 laparoscopic repairs had a 5% recurrence rate; this rate is half that for “less experienced” surgeons.⁽¹⁵⁾

The patients returned to work sooner after laparoscopic repair than after open repair, as reported in several trials.^(14,16) In Mike SL *et al* study, the difference was appreciable (a median of seven days). This difference may be explained by the absence of an inguinal incision, the absence of dissection of muscle in the groin during laparoscopic repair, and the tension-free repair, as well as the lower complication rate.⁽¹⁴⁾

As what happened to our 8th patient, small bowel injury caused by trocar insertion was reported in

literature,⁽¹⁶⁾ these injuries unless recognized and managed early, fatal complications may be unpreventable.⁽¹⁷⁾

Recently single-incision laparoscopic surgery (SILS) was used to repair inguinal hernia through the TEP approach, the first case in which this technique was used was reported by Filipovic-Cugura J *et al*.⁽¹⁸⁾

Conclusion

Our results in total extra peritoneal laparoscopic inguinal hernia repair were comparable to the results reported in literature regarding complication and recurrence rates especially after passing the first 50 cases indicating the effect of learning curve.

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