

Endoscopic extraperitoneal inguinal hernia repair: a series of 182 repairs

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ABSTRACT

Introduction: The local experience of endoscopic totally-extraperitoneal hernia repair in a major teaching hospital is reviewed.

Methods: Between 1997 and 2003, 141 consecutive patients underwent 182 totally-extraperitoneal hernia repairs for inguinal hernia. 100 patients had unilateral hernia and 41 patients had bilateral hernias. The mean age was 51 years (range 20 to 83 years).

Results: The mean operation duration was 70 minutes. Bilateral repairs took 24 percent longer than for unilateral repairs (82 versus 66 minutes). However, the mean operative duration for the last 55 (30 percent) cases decreased to 55 minutes. Four patients (2.8 percent) had conversion to open surgery and ten patients had minor complications, mostly groin seroma that resolved. Overall, there were seven hernia recurrences (3.8 percent) in the series. However, no hernia recurrence was present in the last 63 patients (45 percent). Recurrences were higher when the mesh was not anchored than when the mesh was fixed with a tacking device (p value is less than 0.01). The mean inpatient hospital stay was 1.4 days. Of the last 30 patients (21 percent), 70 percent were performed as outpatients.

Conclusion: Endoscopic extraperitoneal hernia repair offers the appropriate patient a viable alternative to open hernia surgery. To achieve good results, adequate cases should be performed to overcome the learning curve, and the mesh should be anchored to the inguinal floor to prevent recurrences.

Keywords: endoscopic herniorrhaphy, extraperitoneal inguinal hernia repair, inguinal hernia, laparoscopic surgery

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INTRODUCTION

In 1887, Bassini published his original description of inguinal hernia repair. Since then, many modern

modifications such as the Shouldice repair and the Lichtenstein "tensionless" mesh repair have originated from it⁽¹⁾. Within less than a decade in the 1990s, laparoscopic enthusiasts had already described three forms of laparoscopic repairs, namely: the intraperitoneal mesh (IPOM) repair, the transabdominal preperitoneal repair (TAPP), and the totally-extraperitoneal (TEP) repair⁽²⁻⁴⁾. Laparoscopic hernia surgery has been gaining in popularity in recent years. Several randomised controlled trials and systematic reviews⁽⁵⁻¹¹⁾, which compared laparoscopic repair to open repairs, showed that laparoscopy gave the following benefits: (a) less postoperative pain, less analgesic consumption, earlier return to normal activities and work in the early post-operative period; (b) less long term complications of groin pain and permanent paraesthesia; and (c) fewer recurrences than sutured herniorrhaphy, but with comparable efficacy to open mesh repairs.

The endoscopic totally-extraperitoneal inguinal hernia repair (TEP) does not enter the peritoneal cavity, and reduces the risk of visceral injury, adhesion formation and the development of port site hernias⁽¹²⁾. It gives comparable results to other forms of laparoscopic repair, and for these reasons, it has become the preferred technique of laparoscopic repair of inguinal hernias. We report our local experience and results of TEP at the National University Hospital, Singapore.

METHODS

Between 1997 and 2003, over a period of six years, 141 consecutive patients who underwent TEP at the Department of Surgery of the National University Hospital were prospectively reviewed. Data on patient demographics, types of hernia, operative aspects, post-operative recovery, complications, and results were collected. Patients with unilateral or bilateral reducible inguinal hernia, whether primary or recurrent, were included in the study. Patients with irreducible or obstructed hernia, previous lower abdominal operations, or had other forms of laparoscopic hernia repair (IPOM and TAPP), were excluded.

General anaesthetics with muscle relaxation are administered. A 1cm infraumbilical incision was made,

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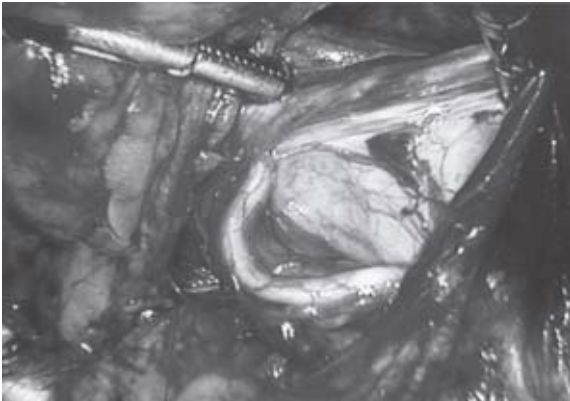


Fig. 1 Endoscopic photograph of the inguinal anatomy shows the inferior epigastric vessels superiorly and the vas deferens entering the deep inguinal ring.



Fig. 2 Endoscopic photograph of the anchored mesh.



Fig. 3 Photograph of abdominal wounds after a bilateral TEP.

the anterior rectus sheath was incised, and the rectus muscle was retracted to expose the posterior rectus sheath. A balloon dissection device (AutoSuture, Tyco) was inserted over the posterior rectus sheath, guided to the pubic symphysis and inflated, resulting in the separation of the peritoneum from the rectus muscle. This creation of the extraperitoneal space allows for laparoscopic dissection to take place. The balloon device was then removed and replaced with a 10mm Hasson cannula and a 10mm angled (30 degrees) laparoscope. Carbon dioxide was insufflated

to a pressure not exceeding 12mmHg. Two 5mm cannulae were inserted in the midline for placement of laparoscopic graspers.

The first step was to identify key anatomical landmarks such as the pubic bone, Cooper's ligament, spermatic cord, inferior epigastric vessels (IEV) running superiorly, and the type of hernia (direct hernia medial to IEV and indirect hernia lateral to IEV). The next step was to reduce the hernia sac from the inguinal wall. The indirect hernia sac was reduced and separated from the spermatic cord. Occasionally, a long indirect sac could not be completely reduced from the deep inguinal ring; in such cases, the sac was divided and the peritoneal side ligated with a laparoscopic ligature (Endoloop, Ethicon, Johnson & Johnson).

In the final step, a rolled polypropylene mesh (8cm by 12cm in size) was inserted through the 10mm port, and with the use of graspers, the mesh was placed horizontally, covering the inguinal wall from the midline of the pubis to lateral to the deep inguinal ring. The mesh was then anchored with laparoscopic tacks (Protack, AutoSuture, Tyco) to Cooper's ligament to prevent any mesh migration. Tacking was avoided near the iliac vessels or laterally near the iliohypogastric nerve, the genitofemoral nerve, and the lateral femoral cutaneous nerve of the thigh. Occasionally, a large piece of mesh (10cm by 15cm) was used without anchoring. In all bilateral repairs, two separate pieces of mesh were placed and fixed. At the conclusion, the gas was released and the three wounds were closed with absorbable sutures.

RESULTS

141 patients underwent 182 TEP repairs. Of these, 100 patients had unilateral hernias and 41 patients had bilateral hernias. 127 patients presented with primary hernia and 14 patients had recurrences from previous open operations. Of unilateral hernias, 62 (62%) were on the right side and 73 (73%) were indirect hernias. Of the 41 bilateral hernias, 12 (29%) were indirect hernias, 10 (24%) were direct hernias, and 19 (46%) were a combination of both types. The mean age was 51 years (range, 20 to 83 years), and 132 patients (94%) were men.

The overall mean operative duration was 70 minutes (range 30 to 140 minutes). There was a mean of 66 minutes for unilateral hernias and a mean of 82 minutes (or 24% longer) for bilateral hernias. However, the mean operative duration for the last 55 (30%) cases was decreased at 55 minutes. Four patients (2.8%) had their operations converted to open surgery because of adhesions that prevented further laparoscopic dissection, and breach in the peritoneum that resulted in the escape of gas

into the peritoneal cavity. Ten patients had minor complications: one with acute urinary retention, one with transient lateral cutaneous nerve paraesthesia, and eight patients with groin seroma (two of which were aspirated). All patients recovered fully. There was no mortality. The mean follow-up period for patients was 6.3 months.

There were seven hernia recurrences (3.8%). The recurrences occurred in the initial part of the series. The recurrences occurred in six unilateral hernia repairs and one bilateral hernia repair. There was no recurrence detected in the last 63 patients (45%). All were direct hernia recurrences and were managed by open surgery. Of the seven recurrences, five (71%) did not have the mesh anchored to the inguinal floor. The recurrence rate was higher when the mesh was not anchored (5 of 44 repairs; 11.4%) than when the mesh was anchored (2 of 138 repairs; 1.4%). This difference was statistically significant ($p < 0.01$; Fisher exact test).

The mean inpatient hospital stay was 1.4 days (1.3 days and 1.6 days for unilateral and bilateral hernias, respectively). 104 patients (74%) underwent overnight stays in hospital, and 26% were managed as ambulatory patients without an overnight stay. However, in the last 30 cases, 70% were managed as ambulatory patients without an overnight stay.

DISCUSSION

Laparoscopic inguinal hernia repair is a relatively new approach in the long history of groin hernia repair. However, it has been shown that the laparoscopic approach remains an alternative and feasible method to open hernia surgery. We demonstrated in this prospective consecutive series over a six year period that TEP hernia repair can be achieved with minimum morbidity. The majority of cases can indeed be performed in the day surgery setting, a learning curve has to be overcome, and the repair can be accomplished with acceptable recurrence rates.

The results from this series are comparable to other reports of endoscopic hernia repair⁽⁶⁻⁸⁾. Large trials, mostly of subjects with primary and unilateral inguinal hernia, have shown that operative duration ranges from 30 to 70 minutes, and recurrence rates range from 1.9% to 6%⁽⁷⁻⁹⁾. When compared to open surgery, laparoscopy results in less wound complications, less postoperative pain, reduced analgesic requirements, faster resumption of normal activities, and lowered overall cost when hospital and economic productivity costs are considered together, even though equipment costs are higher⁽⁸⁾.

The endoscopic approach can be offered to patients with bilateral hernias, where repairs on both sides can

be accomplished through the same wounds, and to those with recurrent hernia from previous open repairs, where no adhesions are encountered in the extraperitoneal space. TEP has clear advantages for both these situations, as recommended by the National Institute for Clinical Excellence⁽¹³⁾. However, patients with primary, unilateral hernia who require rapid recovery from surgery to resume normal activities and work can also benefit from endoscopic repair.

Early forms of laparoscopic repairs, such as IPOM, enter the peritoneal cavity to secure the mesh over the inguinal floor. However, intestinal obstruction may result from bowel that inadvertently becomes adherent to the exposed mesh. This is clearly an undesirable complication. TEP has the advantage of being extraperitoneal, thus minimising the risk of visceral injury and adhesion formation. The laparoscopic approach also significantly reduces long-term morbidity of permanent paraesthesia or groin pain, compared to open surgery (5% vs. 33%) in a recent trial of 400 patients⁽¹⁰⁾. Our results show that 135 patients (96%) have their hernia repaired effectively, and most are now having their surgery as outpatients.

The learning curve for endoscopic hernia repair is one reason why most general surgeons still favour open hernia surgery. The learning curve seems steep, more so for non-laparoscopic surgeons than for dedicated laparoscopic surgeons. This may be because: (1) the anatomy of the inguinal region has to be re-learnt from a laparoscopic viewpoint, i.e. from an interior view rather than the exterior approach as is taught in medical school and surgical training; (2) it is more difficult to operate in a confined extraperitoneal space than it is in the abdomen or thorax; and (3) regular practice is needed for endoscopic techniques of mesh placement and fixation.

Reports have described placing a large piece of mesh over the inguinal floor without fixation⁽¹⁴⁾. This reduces cost and prevents occasional impingement of nerves by the tackers. However, in our series, recurrences were significantly higher when the mesh was not fixed. Such recurrences could be explained by mesh migration, mesh in folding or shrinkage. We therefore favour mesh fixation as it results in less hernia recurrence.

In conclusion, endoscopic extraperitoneal hernia repair when performed by an experienced surgeon, offers the appropriate patient a viable alternative to open surgery. We recommend that initial cases should be performed under the guidance of a skilled surgeon to overcome the learning curve, and that the mesh should be anchored to the inguinal floor to prevent hernia recurrence.

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