

Laparoscopic Management of Groin Hernias Our Early Experience Hosni Mubarak Khan^{1*}, BS Ramesh², Shashank Dev TS³

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Abstract

Introduction: Worldwide, more than 20 million patients undergo inguinal hernia repair annually. The problem of our age is to find an operation that is simple, does not require implantation of a foreign body like mesh and does not produce major complications during or after surgery. While not all hernias require repair, the overwhelming majority of patients will develop symptoms from their hernia which will lead them to seek surgical intervention. There are a variety of surgical techniques available for the repair of inguinal hernias, each with their own set of benefits and challenges. This is our experience in laparoscopic management of groin hernias. **Material:** Prospective study of 47 patients with clinical diagnosed as groin hernia subjected to different laparoscopic techniques for groin hernia from June 2018 to December 2021. The main outcome measurements included the following: operative time, conversion to open, hospital stay, time to return to daily activity and complication like hernia recurrence, vascular injury and mesh infection. **Inclusion Criteria:** All patients with Groin hernias who were managed by TEP or TAPP during the period of study. They were bilateral cases, recurrent hernias, unilateral hernia which are direct or indirect inguinal hernias or both and unilateral femoral hernias. **Results:** A total of 47 patients with groin hernias were corrected with different laparoscopic procedures either TEP or TAPP. They were 43 males and 5 females. The age range was variable from 33 to 52 years (mean 42.32 – 46.46 years). All cases were completed laparoscopically with mean operative time of 77.03 minutes with major intraoperative complications being bladder injury in 1 patient (2.12%) during who were among the early cases and others being Peritoneal tear occurred in 8 patient (17.02%) and injury to inferior epigastric in 2 patient (4.25%); and our major post-operative complication being mesh infection in 2 patient (4.25%) and recurrence in 1 patient (2.12%). Following laparoscopic management of groin hernia, we found out that the mean duration of hospital stay being 2.03 days and return to daily activity being ranging from 13.84 to 20.65 days. **Conclusion:** Our results lead us to believe that laparoscopic management of groin hernia is safe and effective with improving learning curve even though it represents a formidable surgical challenge. It enables the patient to have a better cosmetic outcome, early ambulation, return to daily activity. Hence with improving learning curve laparoscopic management of groin hernias may be a safe alternative to open hernioplasty..

Keywords: hernia, repair

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Introduction

Groin hernia repair is one of the most commonly performed operations by a general surgeon. [1] Historically, repair was conducted via an open approach; however, since the advent of minimally invasive techniques two decades ago, there has been a shift to a laparoscopic approach. Initial drawbacks of the laparoscopic approaches included high recurrence rates, as mesh reinforcement was not routine, as well as postoperative pain due to tack placement. Now minimally invasive inguinal hernia repair is associated with minimal morbidity, mortality, and low recurrence rates. Laparoscopic repair has been associated with decreased postoperative pain, earlier return to work, and improved cosmetic outcomes when compared with an open approach. [2-4] Despite this, there is no definitive evidence that suggests superiority to an open approach. The two main minimally invasive approaches are a transabdominal preperitoneal approach (TAPP) or a total extraperitoneal approach (TEP). Extensive comparison of these 2 techniques has been conducted,

and there is yet to be definitive evidence to support a superior approach. We feel both techniques to be equally effective when performed by an experienced surgeon and choice of approach is at the discretion of the operating surgeon. Advantages of a minimally invasive approach include the ability to address bilateral hernias through the same incisions, as well as, in the setting of recurrent inguinal hernia repair, these approaches can allow for dissection in virgin tissue planes. The most challenging part of these procedures is appropriate identification of inguinal anatomy. It is important to identify major neurovascular structures early and be cognizant about their location through to the completion of the operation. Knowledge of the anatomy also can guide dissection in a safe manner and limit postoperative morbidity.

Material and Methods

This is a prospective study of 47 patients with groin hernias corrected laparoscopically along the period from June 2018 to December 2020. Inclusion criterion: all patients with groin hernias between age group of 18 to 80 years and recurrence following open hernioplasty were included in our study. They were bilateral cases, recurrent hernias, unilateral direct or indirect inguinal hernias or both, unilateral femoral hernias. Data regarding the age, sex, type of hernia, its description, and different laparoscopic techniques applied were collected. The main outcome measurements included the following: operative time, hospital stay, return to daily work, post-operative complication like vascular injury, mesh infection, hernia recurrence.

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Collection of data was obtained from direct contact with the patients and follow-ups.

Surgical procedures

I. Totally Extraperitoneal Hernia Repair (TEP)

Under GA patient in supine position parts prepared and draped. We make a 10 mm infraumbilical incision, usually on the same side as the hernia, or on the larger side in the case of bilateral hernias, slightly off the midline. The anterior rectus sheath is incised and the rectus muscle is retracted laterally and anteriorly to visualize the posterior rectus sheath. This provides safe and direct access to the preperitoneal space. In this technique, care should be taken to avoid injury to the underlying rectus muscle which can lead to bleeding and less than optimal views of the appropriate planes. Preperitoneal space is created using balloon dissector once after confirming trocar in preperitoneal space. Two 5 mm working ports inserted under vision in midline.[5-6]Totally extraperitoneal hernia repair requires the creation of a space that allows insertion of a large enough piece of mesh to appropriately cover the myopectineal orifice without the peritoneal edge slipping below the lower border of the mesh. The inferior epigastric vessels should be identified at the beginning of the procedure and serve as an important landmark. We then perform lateral dissection of the peritoneum, up to the level of the anterior superior iliac spine, followed by medial dissection of Cooper's ligament and the pubic tubercle past the midline. If there is a direct hernia, it is reduced either at the beginning or at the time of the medial dissection. Care should be taken during the dissection of Cooper's, as there are often vessels draped over the ligament that can be easily damaged and lead to unnecessary bleeding. The spermatic

cord and internal ring are lateral to the inferior epigastric vessels; this is where the dissection of an indirect hernia sac should begin. Laterally and inferiorly, an important landmark is the fascia over the psoas muscle (Bogros space) where the mesh needs to lay laterally. This is achieved by beginning the lateral dissection just posterior to the inferior epigastric vessels and following the characteristic white border of the peritoneum. It is important not to violate the fatty plane directly on the psoas, which protects the nerves as they course over the psoas muscle. Superiorly, the dissection should be carried out up to the level of the anterior superior iliac spine. Posteriorly, the peritoneum is reflected to where the vas deferens courses medially or until enough space has been created for an adequate sized mesh to be placed [7-8]. If the dissection of the space is not enough to clear the entire myopectineal orifice, the mesh will be susceptible to folding and increase risk of recurrence or pain due to bunching of the mesh. We have used lightweight polypropylene mesh in our study. Handling of the mesh should be kept to a minimum and it should be kept in its sterile packaging until it is ready for use. Care should be taken to minimize contact of the mesh with the patient's skin. The mesh is rolled like a scroll and introduced through the 10 mm trocar. The previously marked midline of the mesh is aligned parallel to the inferior epigastric vessels and centered around the internal ring for indirect hernias and a little bit more medially for direct defects. The mesh is also aligned to have at least one-third of the mesh lying below the iliopubic tract. Mesh fixation done by two point fixation with fixation being above iliopubic tract and lateral to Cooper's ligament.[9]

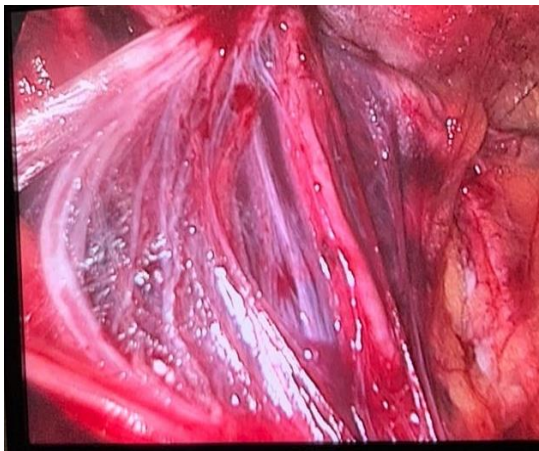


Fig 1: Image showing cord structures with indirect hernial sac

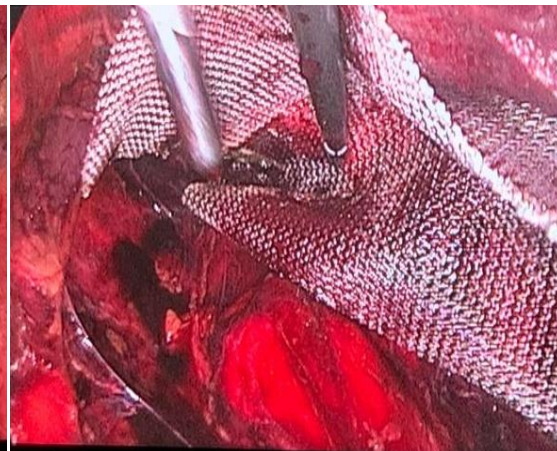


Fig 2: Mesh placement in preperitoneal space



Fig 3: Two point fixation of mesh

II. Laparoscopic TAPP(Transabdominal Pre-peritoneal) Inguinal Hernia Repair

Patient in supine position under GA parts prepared and draped. Access of the peritoneal cavity is achieved using standard techniques with a Veress needle to create the pneumoperitoneum. An incision at the supra umbilicus is then made for placement of a 10 mm trocar. Once access to the peritoneal cavity has been established, an inspection of the abdominal cavity is made in search of other affections.[10-11] We place two additional trocars bilaterally in a horizontal plane with the umbilicus. This moment requires additional care in order to avoid injury of the superficial epigastric vessels. This can be facilitated through their visualization by means of abdominal wall transillumination.[12] the groin anatomy is inspected. The inferior epigastric vessels, the internal inguinal ring with the spermatic vessels, and the vas deferens should be identified. The peritoneum is incised 4–5 cm above the hernia defect or internal ring, from the edge of the median umbilical ligament toward the anterior superior iliac spine. Dissection is performed in the preperitoneal avascular plane between the peritoneum and the transversalis fascia to provide visualization of the myopectineal orifices. It is very

important not to dissect preperitoneal fat from sensitive structures, like psoas muscle and nerves.

After dissection of the preperitoneal space, we should be able to identify the inferior epigastric vessels, vas deferens, spermatic cord, iliac vessels, bladder, psoas, nerves location, and hernia defects. It is important to make a wide dissection sufficiently above and medial to the hernia defect to allow a 3–4 cm of normal fascia to provide sufficient mesh overlap. For an indirect hernia, the cord structures are isolated and dissected free from the surrounding tissues. In the process, the indirect hernia sac is identified, usually found on the anterolateral side of the cord and adherent to it. When separating the sac from the cord, it is important to handle the vas deferens and the spermatic vessels with care to minimize trauma. The mesh (sized at least 15 × 12 cm) is then rolled and placed in the preperitoneal space to cover the entire myopectineal orifices, including the direct, indirect, and femoral hernia spaces. The landmarks for fixation of the mesh are the pubic tubercle, Cooper’s ligament, posterior rectus sheath, and the transversalis fascia at least 3 cm above the hernia defect and the anterior superior iliac spine to prevent movement of the mesh. After the mesh is positioned, the peritoneum is re-closed with a running suture or tacks.

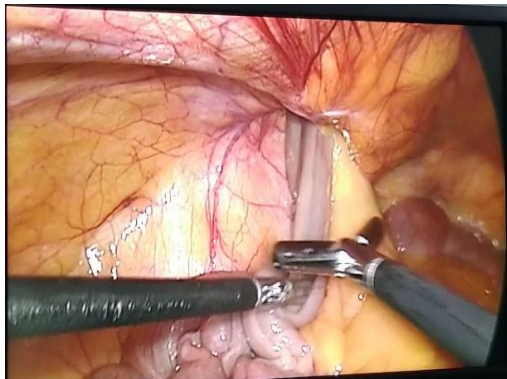


Fig 4: Indirect inguinal hernia with contents being reduced

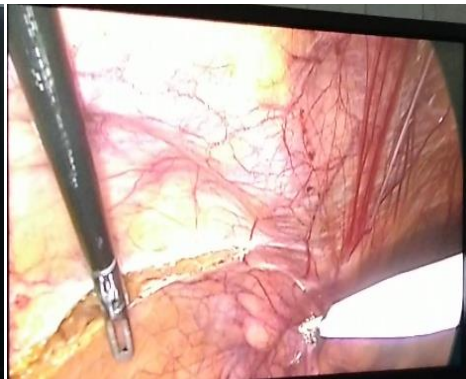


Fig 5: Preperitoneal incision

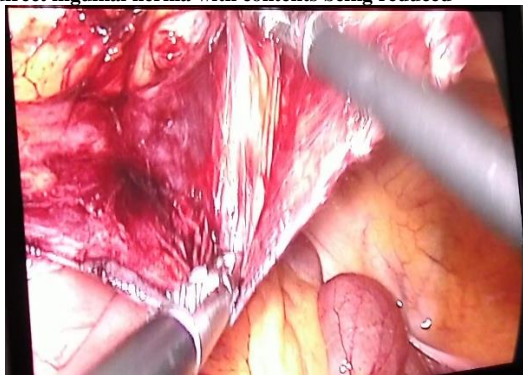


Fig 6: Dissection in preperitoneal plane



Fig 7: Indirect hernial sac being isolated from cord structures

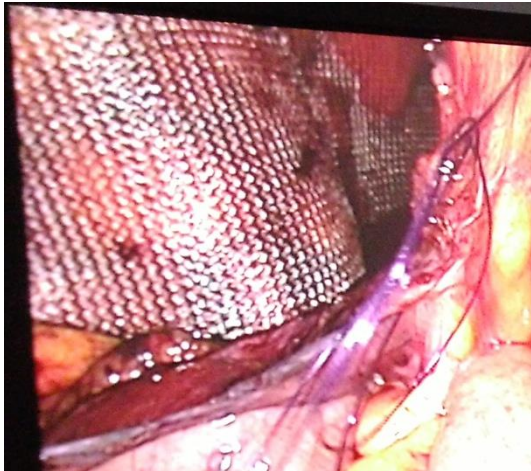


Fig 8: Mesh placement in preperitoneal plane



Fig 9: Closure of peritoneum following mesh placement

Results

A total of 47 patients with groin hernias were managed laparoscopically either by TEP or TAPP in our hospital over a period of June 2018 and December 2020. The data of these patients collected either through direct visit to hospital and or telephonic follow-ups. Our study it is observed that there were 43 male patients and 5 female patients of which 8 patients belonged to age group of below 40 years, 36 patients in the age group between 40 to 50 years and 3 patients above 50 years. In our study most common risk factor being difficulty in micturition in 17 patients followed by chronic cough in 13 patients, obesity in 7 patients, constipation in 3 patients. In our study 6 patient had history of previous surgery of which 3 patients had undergone open appendectomy and 3 patients had recurrence following open hernioplasty. In our study 13 patient had bilateral groin hernias and 34 had unilateral groin hernias, of which 33 patients had direct inguinal hernias, 12 patients had indirect inguinal hernias, 2 patients had femoral hernias and 5 patients had pantaloon hernias. Out of 47 patients in our study 38 patients had under gone TEP procedure and 9 patients had undergone TAPP procedure for groin hernia management. During TEP procedure we had encountered peritoneal tear in 8 patients of which our initial cases were converted to TAPP, but with improving learning curve we have reduced pneumoperitoneum using veress needle and went ahead with surgery. We have also encountered vascular injury in 2 patients due to injury to inferior epigastric artery which was managed by ligation. Other major intra-op complication encountered is bladder injury in 1 patient which was primarily sutured laparoscopically followed by open hernioplasty. We have also encountered a case of

incarcerated femoral hernia which was managed by open hernioplasty. During our post-operative follow up we found out that 4 patients had seroma which was managed conservatively, 2 patients had mesh infection which was treated by mesh extraction posteriorly and followed by open hernioplasty subsequently. We encountered recurrence in 1 patient who has undergone open hernioplasty subsequently. In our study we found out that mean operative time being 77.65(66.05 to 85.36) minutes.

Discussion

In this study, we present our experience about laparoscopic management of groin hernias in 47 patients aiming to access outcome such as operative time, early ambulation, return to daily work, cosmetic outcome and post-operative complications. Inguinal hernias by far are the most common types of hernias. The choice of a method depends on the surgeon; however, the ideal method for modern hernia surgery should be simple, cost effective, safe, tension free and permanent.

But, most guidelines recommend a technique incorporating mesh, either through an open or minimally invasive approach. Open inguinal hernia repair using mesh is most frequently used worldwide, particularly the Lichtenstein repair. When tissue repair is desired, the first choice recommended would be the Shouldice repair. Minimally invasive techniques had begun to gain popularity due to having faster recovery times and less chronic pain if performed by experienced surgeons at a high resource center. However according to 2009 EHS Guidelines describe that no hard conclusions concerning the difference in results: only conclusion (level 2A) was that TAPP seemed to be associated with a higher risk of port site and visceral injuries and TEP a higher conversion rate.

Table 1: Surgical Outcome in Various Studies

	Our Study	Nice Guideline	Cochrane Meta-Analysis by McCormack K
Operative Time	77 min	66.21min	67.39min
Conversion	6.3%(n=3)		0.08%
Mesh Infection	4.2%(n=2)		2.2%
Vascular Injury	2.1%(n=1)	0.13%	3.38%
Length of Hospital Stay	2 Days		1day
Time to Return to Regular Activity	14-21 days	10 days	13.98days
Recurrence	2.1%(n=1)	2.3%	

In comparative study by Flore Varcus et al Of the 90 patients there was no recurrence of the hernia has been found out following laparoscopic management.[13] However two cases of bleeding in the TAPP group; both were managed by laparoscopic sealing of the

damaged vessels. In a review done by Toru Zuiki et al 84 patients previously underwent lower abdominal surgery TEP repair was successfully completed in 75 patients (89%).[14] In the review by R. AlMarzooqi et al of patients repaired using a laparoscopic

technique Minimally invasive approaches to unilateral inguinal hernia repairs remained better option in their series.[5]

A prospective study by ConstantinAurelWauschkuhn et al patients who underwent laparoscopic TAPP the mean duration of surgery for hernia repair was 70 min, but period of disability (14 days) morbidity 1.4%), reoperation (0.5%) and recurrence rate (0.63%). [15]

Conclusion

Following laproscopic management of groin hernias we found out that patient had Minimal post operative pain, early ambulation and return to work with Better cosmesis. Recurrence rate are comparable with reported studies which improves with learning curve .Mesh infection is a dreaded complication and is of multi-factorial etiology. Although our early experience with laparoscopic repair has been promising, long-term outcomes are awaited. With improving learning curve laparoscopic repair of groin hernia may be a safe alternative for open hernioplasty

References

1. Fitzgibbons Jr RJ, Ramanan B, Arya S, Turner SA, Li X, Gibbs JO, et al. Long-term results of a randomized controlled trial of a nonoperative strategy (watchful waiting) for men with minimally symptomatic inguinal hernias. *Ann Surg.* 2013; 258(3): 508–15.
2. Dulucq JL, Wintringer P, Mahajna A. Laparoscopic totally extraperitoneal inguinal hernia repair: lessons learned from 3,100 hernia repairs over 15 years. *Surg Endosc.* 2009; 23(3):482–6.
3. Bittner R et al. Update of guidelines on laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal hernia (International Endohernia Society). *Surg Endosc.* 2015; 29(2): 289–321.
4. Bittner R et al. One-year results of a prospective, randomised clinical trial comparing four meshes in laparoscopic inguinal hernia repair (TAPP). *Hernia.* 2011;15(5):503–10.
5. Tamme C et al. Totally extraperitoneal endoscopic inguinal hernia repair (TEP). *SurgEndosc.* 2003;17(2):190–5.
6. Miserez M et al. A standardized resident training program in endoscopic surgery in general and in laparoscopic totally

extraperitoneal (TEP) inguinal hernia repair in particular. *SurgLaparosc Endosc Percutan Tech.* 2009;19(4):e125–9.

7. Poelman MM et al. EAES Consensus Development Conference on endoscopic repair of groin hernias. *Surg Endosc.* 2013; 27(10):3505–19.
8. Arregui ME, Young SB. Groin hernia repair by laparoscopic techniques: current status and controversies. *World J Surg.* 2005;29(8):1052–7.
9. Kapisris S et al. Laparoscopic transabdominalpreperitoneal hernia repair (TAPP): stapling the mesh is not mandatory. *J Laparoendosc Adv Surg Tech A.* 2009;19(3):419–22.
10. Agresta F, Mazzarolo G, Balbi P, Bedin N. Inguinalscrotal hernias in young patients: is laparoscopic repair a possible answer? Preliminary results of a single-institution experience with a transabdominal preperitoneal approach. *Hernia.* 2010; 14(5):471–5.
11. McCormack K, Wake BL, Fraser C, et al. Transabdominal preperitoneal (TAPP) versus totally extraperitoneal (TEP) laparoscopic techniques for inguinal hernia repair: a systematic review. *Hernia.*2005;9(2):109–14.
12. Roll S, dePaula A, Miguel P, Carim J, Campos FG, Hashiba K. Transabdominal laparoscopic hernioplasty using preperitoneal mesh. In: Radcliffe R, editor. *Inguinal hernia advances or controversies?* Oxford: Oxford University Press; 1994, 261–4p.
13. Rafik Shalaby, Mohamed AbdAlrazek, AdhamElsaied.Fifteen Years Experience With Laparoscopic Inguinal Hernia Repair in Infants and Children 2018;28(1):101-105
14. Al Marzooqi, Review of inguinal hernia repair techniques within the Americas Hernia Society Quality Collaborative R. *Hernia.* 2019; 23:429–438
15. Aurel Wausch.Laparoscopic Inguinal Hernia Repair: Gold Standard in Bilateral Hernia Repair? Results of More Than 2800 Patients in Comparison to Literature by. 2010; 24(12): 3026-30

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