

Research Paper

Medical Science



Laparoscopic Groin Hernia Repair: Is The Learning Curve Really Long?

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ABSTRACT

Laparoscopic groin hernia repair has emerged as an effective alternative method for repair of inguinal hernia. It has become a genuine option in the last 15 years to offer low recurrence rate with a minimal discomfort. However it has not been widely taken up by general surgeons. There is a common misconception that it is much more difficult, takes longer to perform and has more complications. This study has been conducted to evaluate how long it took to overcome the learning curve. Good results with this technique can be achieved. Trans abdominal preperitoneal approach (TAPP) or Totally extraperitoneal (TEP) are safe and good, with TAPP a better view of the anatomy is achieved, which shortens the learning curve. As the number of cases increase the operative time and complication rate decrease. Learning curve consists of three phases, the first phase is the starting curve and seen in the first 25 cases. The second is the phase of stabilization, which is between 25 to 40 cases. The third and last phase is after 45 cases where good results are seen. Time taken for repair reduced from 80 min (average) in the initial cases to 40 min (average) with a mean time of 45 min.

Keywords : laparoscopic hernia repair, TEP, TAPP, learning curve.

Introduction:

Laparoscopic groin hernia was first described by Ger et al in 19901 by stapling the abdominal opening of the patent processus vaginalis. Other techniques like plug and patch and an intra-peritoneal on-lay mesh repair were later developed, but were abandoned because of the complication like mesh erosion into bowel². Anterior repair with mesh as described by Lichtenstein in 1989 had become the gold standard and development of laparoscopic hernia repair was slow till Arregui and colleagues described the Trans abdominal preperitoneal approach (TAPP) in 1992³ and Mckerna and Laws described the Totally extraperitoneal approach (TEP) in 1993⁴. Today all laparoscopic groin hernias are repaired either by the TAPP or TEP method. In the last 15 years more work has been done on hernia surgery than what had been done in the last 150 years. Despite many studies and publications on laparoscopic inguinal hernia repair, acceptance of this procedure is very low.

Material & methods:

This study was done in the Department of Surgery at Smt. Kashibai Navale Medical College & General Hospital, Pune India. 90 patients were included in the study out of which 10 patients wanted a laparoscopic repair. The youngest patient was 20 years and oldest was 60 with a mean of 40 years. Patients with unilateral, reducible, non-complicated hernias with ASA I or II were included in the study. The exclusion criteria were large, irreducible hernias with co-morbid conditions. Patients undergone any abdominal surgery were also excluded from the study. 42 patients (46.6%) had a right inguinal hernia, and 48 patients (53.3%) had a left inguinal hernia. All cases were operated by a single surgeon. The standard technique of 3 ports- one 10mm and two 5mm were used. The TAPP technique was used in 15 cases and TEP in 75 cases. The TEP technique was used more frequently with better understanding of the anatomy.

The two techniques used are described below:

Trans abdominal preperitoneal approach (TAPP)-The position of the surgeon, camera person and video cart is as shown in fig 2. Three ports were used as shown

in fig 6. Hassons method was used for entry into the abdomen. Peritoneal incision (curved) is created 2 cm above and extending from medial umbilical ligament to the level of anterior superior iliac spine. The peritoneal flap is mobilized and the inferior epigastric vessels, symphysis pubis, coopers ligament & pubic rami are exposed. Direct sac is reduced and indirect sac are dissected and ligated with Endo-loop (Ethicon Endosurgery). Large mesh of 15 x 15 cm is cut to required size and fixed. The mesh should cover the myopectineal orifice and be fixed to Cooper's ligament as well as superomedially and superolaterally. The peritoneal flap is then sutured back to cover the exposed mesh. In all cases local anesthetic (10 ml of 0.5% buvicocaine) was used to infiltrate at the port sites to reduce post-op pain. Totally extraperitoneal approach (TEP)-The creation of the preperitoneal space was done by the Mckernan's technique, by exposing the rectus muscle and developing a tunnel between the muscle and underlying posterior rectus sheath. A 10mm blunt cannula is then inserted into this tunnel and CO₂ insufflation at 12mm Hg is started. The space is further created by using a 0 degree laparoscope. No balloon dissectors were used, due to the high cost factor. After the space has been created the 0 degree telescope was replaced with a 30 degree. Anatomical landmarks were identified (pubic bone & inferior epigastric vessels). Two 5 mm ports were then inserted as shown in Fig No.5. Medial and lateral dissection was done. Direct sacs were reduced and indirect sacs were dissected free from the cord structures, and ligated at the neck using an Endo-loop. Complete indirect sac required to be transected, with the proximal edge being ligated with an Endo-loop. Although transection of the hernial sac during laparoscopic TEP repair may cause seromas, it is an alternative technique in cases with difficult complete sac reduction⁵. There were no associated femoral hernias seen. In all cases a mesh (polypropylene) 15 x 15 cms cut to required size was used. Mesh fixation was done in 30 cases (33.3%) Suture in 5 (5.5%), Tacker in 20 (22.2%), subcutaneous suture in 5 (5.5%). Mesh was not fixed in 60 cases (66.6%). In all cases local anesthetic (10 ml of 0.5% buvicocaine) was sprayed in the pre peritoneal space after mesh fixation and was also used to infiltrate

at the port sites to reduce post-op pain⁵. Post-op pain relief was good. Foley's catheter was removed the next day and patient was mobilized. Patients were discharged on 2nd or 3rd post-operative day. They were called for follow up after one week for suture removal. All patients were followed up in the surgical OPD after one, three and six months. All patients are on follow up for the last three years.

Discussion:

Laparoscopic hernia repair is well debated approach to inguinal hernia repair. It has come a long way from stapling to on-lay mesh to the current approach of TAPP & TEP. All surgeries have a learning curve, which consists of three phases:-

First phase - is the starting point (first 25 cases). The surgeon learns how to identify the anatomical landmarks. As the surgeons are not familiar with the inguinal anatomy from this angle, anatomical structure identification is learnt in this stage. The creation and maintaining of the preperitoneal space in TEP repair is also learnt in this phase.

Second phase - is rate of learning (25 to 40 cases). In this phase the surgeon learns how to dissect the sac, how to unroll the mesh and fix it.

Third phase - is stabilization and increase in the performance (after 45 cases). The surgeons overcome the difficulty faced in the earlier two phases and his speed increases. In the first phase operating time and complication tend to more, in the second phase there is less complications and recurrence rate falls. In the third phase the surgeon's performance increases and good results are seen. In our study there was one recurrence (1.11%) and two cases were converted from TEP to TAPP (2.22%). Minor complications occurred in 6 patients (6.6%) surgical emphysema in 2 (2.2%) and abdominal wall seroma in 4 patients (4.4%). All these occurred during the first two phases of the learning curve. In the third phase we had overcome these difficulties and our performance and speed increased. Time taken for repair reduced from 80 min (average) in the initial cases to 40 min (average) with a mean time of 45 min. Hernia repair done with any method has a small recurrence rate, in laparoscopic repair the rate has fallen to 0.7% and 0.4% for TAPP and TEP respectively². In our series the recurrence rate is 1.11%. The recurrence occurred during the first ten cases and was due to inadequate reduction of a direct sac, the patient also had an indirect sac which was ligated with an Endo-loop. The recurrence was seen in the immediate post operative period and was repaired by the open method. As the number of cases will increase this rate of recurrence will fall down to less than 1%. Few of the causes for recurrence are enlisted below- Incomplete dissection of the myopectineal orifice⁶ Cord lipomas⁷ which are not excised. Inadequate reduction of direct sac, and incomplete dissection of an indirect sac. Use of a small mesh Displacement and rolling of mesh. Incomplete dissection of the myopectineal orifice results in missed hernial sac giving rise to recurrence. Cord lipomas which are not excised are also another factor for recurrence. Inadequate reduction of direct sac & incomplete dissection of an indirect sac leads to herniation of the contents and reformation of the hernia. The use of a small mesh increases the recurrence rate⁸. The mesh should cross the midline by 2 cm if fixed and 3 to 4 cm if not fixed. Using a large mesh without fixation has shown to decrease recurrence. Sajid MS⁹ et al in their study showed that non fixation of mesh in laparoscopic hernia repair does not increase the risk of hernia recurrence. Hence we used a large mesh without any fixation in 30 cases. Another study by Teng YJ¹⁰ also showed that non-fixation of mesh in TEP appears to be a safe alternative that is associated with less costs, shorter

operative time, and hospital stay. A study from rural India by Garg P et al¹¹ showed there was no significant difference between fixation and nonfixation of mesh in TEP inguinal hernia repair with respect to postoperative pain, length of hospital stay, resumption of normal activities, seroma formation, and recurrence rate. It is not necessary to secure the mesh during laparoscopic TAPP inguinal hernia repair from the interior. External fixation with use of the port closure needle allows a considerable reduction in cost¹², and we used this method in 5 cases. Displacement of the mesh occurs if the mesh size is small and the area of dissection is large, then the peritoneum can herniate around the mesh and cause a recurrence. Rolling of the mesh also results in exposing a large area where invagination of the peritoneum results in recurrence. As the surgeon becomes more experienced, operating time, complications and recurrences all decrease¹³. The current study was done to see if the learning curve is really long. The first twenty five cases the time taken was longer (average of 80 minutes) but later reduced (average of 40 minutes), also the complication and conversion rates reduced as the number of cases increased. Edwards et al¹⁴ have found that expertise is achieved after approximately 30 to 50 cases, when the operative time, conversions to open procedure, complications, and recurrences significantly decrease. This number is achieved when the surgery is done in the presence of an experienced surgeon. Choi YY et al¹⁵ estimated the learning curve for TEP repair is 60 cases for a beginner surgeon, without the help of any experienced surgeon to guide. A retrospective review by Zendeja Bet al¹⁶ from the Mayo Clinic showed that surgeons can get trained to safely perform the TEP repair with good long-term outcomes.

Conclusion:

Laparoscopic hernia repair offers a safe and effective repair with an acceptable complication rate. The misconception that it is much difficult to perform, takes a longer time and has a long learning curve is cleared with this study. Good results with this technique can be achieved. Both techniques TAPP & TEP are safe and good. As the number of cases increases the time taken and complication rate decreases. Laparoscopic hernia repair has emerged as an alternative method for treating inguinal hernia. TEP repair has a significant advantage over TAPP for significantly reduced postoperative pain¹⁷. The other intraoperative complications, postoperative complications, and cost were similar in both groups. In terms of results, both repair techniques seemed equally effective. TEP is being the preferred approach for inguinal hernia repair, only in complicated hernias (sliding or incarcerated inguinal hernias) the transabdominal preperitoneal repair (TAPP) technique is being used¹⁸. Laparoscopic TEP repair is an excellent mode of treatment, If the standard technique now established is followed, the procedure is easy to learn for a laparoscopic surgeon, the overall morbidity and complications are fewer in number and severity, and recurrence rates are lower¹⁹.

Basic set for laparoscopic hernia repair Patient position

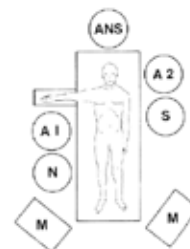


Fig No. 1



Fig No. 2



Right indirect hernia sac being reduced Fig No. 3



Fig No. 4

Port placement for TEP



Fig No.5

Port placement for TAPP



Fig No.6

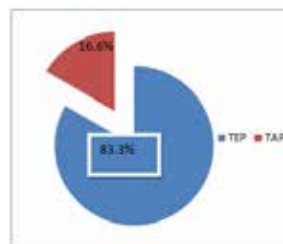


Fig No.7

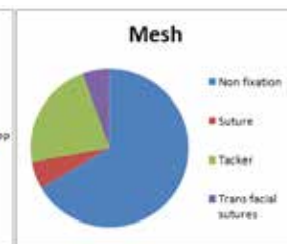


Fig No. 8

REFERENCES

1. Ger R. The laparoscopic management of groin hernias. *Contemp Surg* 1991;39(4):15-9. | 2. Tetik C, Arregui ME, Dulucq JL, et al. Complications and recurrences associated with laparoscopic repair of groin hernias. A multi-institutional retrospective analysis. *Surg Endosc* 1994;8:1316-22 | 3. Arregui ME, Davis CJ, Yucel O. Laparoscopic mesh repair of inguinal hernia using a preperitoneal approach: a preliminary report. *Surg Laparosc Endosc* 1992;2:53-8. | 4. Mckerna JB, Laws HL. Laparoscopic repair of inguinal hernia using a totally extraperitoneal prosthetic approach. *Surg Endosc* 1993;7:26-285. | 5. Choi YY, Kim Z, Hur KY. Transection of the hernia sac during laparoscopic totally extraperitoneal inguinal hernioplasty: is it safe and feasible? *J Laparosc Adv Surg Tech A*. 2011 Mar;21(2):149-52. Epub 2011 Jan 19. | 6. Fitzgibbons JR Jr, Camps J, Cornet DA, et al. Laparoscopic inguinal herniorrhaphy. Results of a multicenter trial. *Ann Surg* 1995;221(1):3-13. | 7. Felix E, Scott S, Crafton B, et al. Causes of recurrence after laparoscopic hernioplasty. *Surg Endosc* 1998;12(3):226-31. | 8. Knook MTT, Weidema WF, Stassen LPS, et al. Endoscopic totally extraperitoneal repair of bilateral inguinal hernias. *Br J Surg* 1999;86(10):1312-6. | 9. Sajid MS, Ladwa N, Kalra L, Hutson K, Sains P, Baig MK. A meta-analysis examining the use of tackler fixation versus no-fixation of mesh in laparoscopic inguinal hernia repair. *Int J Surg*. 2012;10(5):224-31. Epub 2012 Mar 24. | 10. Teng YJ, Pan SM, Liu YL, Yang KH, Zhang YC, Tian JH, Han JX. A meta-analysis of randomized controlled trials of fixation versus nonfixation of mesh in laparoscopic total extraperitoneal inguinal hernia repair. *Surg Endosc*. 2011 Sep;25(9):2849-58. Epub 2011 Apr 13. | 11. Garg P, Nair S, Shereef M, Thakur JD, Nain N, Menon GR, Ismail M. Mesh fixation compared to nonfixation in total extraperitoneal inguinal hernia repair: a randomized controlled trial in a rural center in India. *Surg Endosc*. 2011 Oct;25(10):3300-6. Epub 2011 May 2. | 12. Abdelhamid MS. Transabdominal pre-peritoneal inguinal hernia repair with external fixation. *Hernia*. 2011 Apr;15(2):185-8. Epub 2011 Feb 11. | 13. Bringman S, Ek A, Haglund E, et al. Is a dissection balloon beneficial in totally extraperitoneal endoscopic hernioplasty (TEP)? A randomized prospective multicenter study. *Surg Endosc* 2001;15(3):266-70. | 14. Edwards CC, Bailey RW. Laparoscopic hernia repair. *Surg Laparosc Endosc Percutan Tech* 2000;10:149-53. | 15. Choi YY, Kim Z, Hur KY. Learning curve for laparoscopic totally extraperitoneal repair of inguinal hernia. *Can J Surg*. 2012 Feb;55(1):33-6. doi: 10.1503/cjs.019610. | 16. Zendejas B, Onkendi EO, Brahmabhatt RD, Lohse CM, Greenlee SM, Farley DR. Long-term outcomes of laparoscopic totally extraperitoneal inguinal hernia repairs performed by supervised surgical trainees. *Am J Surg* 2011 Mar;201(3):379-83; discussion 383-4. | 17. Rajapandian S, Senthinathan P, Gupta A, Gupta PD, Praveenraj P, Vaitheeswaran V, Palanivelu C. Laparoscopic totally extraperitoneal repair of inguinal hernia using two-hand approach-a gold standard alternative to open repair. *J Indian Med Assoc*. 2010 Oct;108(10):652-4. | 18. Krishna A, Misra MC, Bansal VK, Kumar S, Rajeshwari S, Chhabra A. Laparoscopic inguinal hernia repair: transabdominal preperitoneal (TAPP) versus totally extraperitoneal (TEP) approach: a prospective randomized controlled trial. *Surg Endosc*. 2012 Mar;26(3):639-49. Epub 2011 Sep 30. | 19. Swadia ND. Laparoscopic totally extra-peritoneal inguinal hernia repair: 9 year's experience. *Hernia*. 2011 Jun;15(3):273-9. Epub 2011 Feb 3. |