

A Study of Initial Experience of Trans-Abdominal Pre-Peritoneal Inguinal Hernia Repair at a Tertiary Care Center

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Abstract

Introduction: Inguinal hernia surgery remains till date one of the most commonly performed surgeries. Overall decrease in recurrence rate along with shorter hospital stay, faster return to normal activities and a lower incidence of post-operative pain has led to the widespread acceptance of laparoscopic hernia repair especially Laparoscopic Transabdominal Preperitoneal repair in the management of inguinal hernia. The study was done to evaluate the initial experience of a tertiary care center in the laparoscopic hernia repair including the intra and post-operative complications and associated technical difficulties.

Methodology: This prospective, descriptive study was performed in 22 patients during the period of 2018 to 2021. The patients were evaluated thoroughly for the predisposing factors, technical aspects of the procedure, intra-operative details, post-operative complications and the time taken for the procedure were noted. The patients were also followed up for a period of 6 months for late complications.

Results: All the patients in the study group were male and majority of them were older than 40 years. Majority of the patients had heavy work as the risk factor and all of them presented with inguinal or inguino-scrotal swelling which reduced by itself. Majority of patients had right indirect and incomplete inguinal hernia. The mean operative time in initial

cases were longer, but on acquiring experience, the operating time came down to approximately 90 minutes. The complications associated with the procedure were minimal with a return to normal routine in a mean of 15 days.

Conclusion: Laparoscopic hernia repair is a significantly lengthier procedure especially in the learning phase of the surgeon's team, but the operative time decreases with increasing experience. Good technique and knowledge about laparoscopic anatomy of inguinal region ensures minimal complications and faster recovery.

Keywords: TAPP; TEP; Laparoscopic Hernia Repair; Inguinal Hernia Surgery.

Introduction

Inguinal hernia surgery remains till date one of the most commonly performed surgeries. Reference to the surgical treatment of an inguinal hernia date back to the 1st century; however formal descriptions of hernia repairs did not appear until the 15th century. The cause of an inguinal hernia is far from completely understood but it is undoubtedly multifactorial. Patent processus vaginalis of posterior inguinal wall is one of the factors associated with inguinal hernia occurrence.

The Hernia surgery has gone through a major evaluation from the days of truss & castration to present days of laparoscopic surgery. Inguinal hernia repair using tension free mesh technique gives a better result than a conventional sutured repair. Overall recurrence rate is decreased along

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with shorter hospital stay, faster return to normal activities and a lower incidence of persisting pain. With the advent of the laparoscope and increasing spectrum of minimally invasive surgery, it was only a matter of time that the laparoscopic surgery which started with laparoscopic cholecystectomy in 1987 entered the realm of inguinal hernia surgery too.

Refinement of laparoscopic technique to the now widely accepted trans abdominal pre-peritoneal hernioplasty (TAPP) approach and total extra peritoneal (TEP) technique has established a sound base for laparoscopic approach to repair of groin hernias.

TAPP the revolutionary concept in laparoscopic hernia surgery was introduced by Arregui¹ in early 1990's. Laparoscopic herniorrhaphy has several advantages as evidenced by several studies. First and foremost aspect from the patient point of view is the reduced post-operative pain and short recovery period. Second, the entire myopectineal orifice can be inspected allowing repair of any unexpected hernias thereby reducing the chance of recurrence. Third, laparoscopic herniorrhaphy avoids the previous operative scars site in patients with recurrent hernias.

The disadvantages of laparoscopic repair include the need for general anesthesia, longer operative time, cost of procedure and the steep learning curve for the surgeon.

The study is to evaluate the feasibility, learning curve of the surgical team, institution shortcomings, scope for improvements, and effectiveness during initial period of starting laparoscopic trans-abdominal pre peritoneal hernia surgery at tertiary care center.

Material and Methods

This prospective, descriptive study was conducted in Department of Surgery, Rabindra Nath Tagore Medical College and attached Maharana Bhupal Government Hospital, Udaipur, Rajasthan during the study period of 2018 to 2021.

Patient Selection

The following criteria were used to select patients to undergo laparoscopic TAPP hernia repair for the purpose of this study.

- Age between 15 to 70 years.
- Clinically diagnosed with inguinal hernia, unilateral or bilateral, primary or recurrent, direct or indirect.

- Fit from cardio-pulmonary point of view to undergo general anesthesia.
- Patients who gave informed consent to undergo the study and be available for follow up.

The following criteria were used to exclude patients from study:

- Patient with strangulated, incarcerated and obstructed inguinal hernia.
- Patient with large, complete, indirect inguinal hernia which are only partially reducible or irreducible. Sir Ganga Ram Hospital Classification Grade-V groin and ventral abdominal wall hernias.²
- Patient with previous operation scar for previous laparotomy with possibility of adhesions to underlying parietal peritoneum.
- Patient with uncontrolled cardio pulmonary conditions like chronic obstructive pulmonary disease (COPD), Hypertension, congestive heart failure (CHF), coronary artery disease (CAD) and otherwise high risk for surgery as per American Society of Anesthesiologists ASA criteria.
- Patients with history of pelvic irradiation.

Preoperative workup

Patients were admitted in the general surgery with the diagnosis of inguinal hernia. After admission preoperative data for laparoscopic inguinal hernia repair (TAPP) were collected on a structured proforma including presenting or abdominal complaints, complete past medical and surgical history (specifically previous hernia surgery). A comprehensive general physical examination along with systemic examination was done. Local examination of hernia sites was carefully done including reducibility, impulse on coughing in inguino-scrotal or purely inguinal swelling.

Operative Procedure

During the surgery, note was made about the anatomical abnormalities, type of hernia, (Direct/ Indirect/both), extent of sac in the inguinal canal, intra-operative complication (like tear of peritoneum, any visceral or vascular injury, bleeding) need for division and ligation of sac or complete reduction, size of mesh applied and whether fixed with tacker and operative time.

Patients were operated under general anesthesia, in a supine position and were catheterized in operation room itself.

Operative Steps

After aseptic skin preparation pneumoperitoneum was created using Veress needle at sub umbilical fold. Insufflation was commenced and was continued until a pressure of 12 mm Hg was reached. A 10mm port was placed through the sub umbilical incision. A 30° telescope attached to the camera, was introduced and the groin area was visualized. Two 5mm lateral working ports were placed under vision, at the level of umbilicus in the mid-clavicular line.

The hernial defect was inspected and the type of hernia (direct or indirect) was confirmed by the position of defect in relation to the inferior epigastric vessels and cord structures.

The peritoneal incision was given from right to left at a point that is midway between the groin crease and the umbilicus. Dissection of direct & indirect hernial sac was done. A polypropylene mesh of 15cm (transverse) X 15cm (vertical) size was rolled and introduced via 10mm port. The mesh was unrolled covering the myopectineal area of hernial side. After the placement of mesh, the peritoneal flap was closed over the mesh using either tackers or sutures. All carbon-dioxide gas was evacuated & ports were removed after lifting the anterior abdominal wall. The 10 mm port was closed with vicryl suture and skin sutures applied. Operation time was noted from the time of first incision to the last skin suture applied.

Post-operatively patient was kept fasting for 6 hours. All the patients received one to three days IV antibiotic and oral antibiotic for 5 days. Patient was mobilized immediately after recovery. Patients were allowed orally when tolerable. Patients were discharged when they were willing and comfortable, were ambulatory and taking orally. Patients were sent home with discharge ticket mentioning type of surgery, per op finding and oral treatment advised. Patients were called on 7th post op day in the OPD for follow up.

Follow up: The patients were received in the OPD for follow up in OPD for complications like hematoma, wound infection, early recurrence etc. Patients were asked if they had resumed work and if not why. They were also asked about their satisfaction about surgery and cosmesis as completely satisfied, moderately satisfied or dissatisfied. Skin suture or staples are removed. The follow up after 1 month and 6 months was obtained by visit.

Data collection and analysis

The proforma was filled systematically for each patient. All the data were compiled on a master chart. Software SPSS 21.0, Stata 8.0 were used for the analysis of the data. Microsoft word and Excel have been used to generate graphs, tables etc.

Observations

This study was done in patients who presented with inguinal hernia in department of general surgery in R.N.T. Medical College, Udaipur. Total 22 patients included in the study were all repaired by TAPP method. None of the patients required conversion from laparoscopic to open method. All patients in the present study were male.

The patients included were in the age group of 15 to 70 years old. The youngest patient was 19 years and oldest patient was 70 years of age. Most of patients (27.27%) fell in age group of 41 to 50 years, followed by 18.18% each in the age group of 21 to 30 years, 51 to 60 years and 61-70 years.

In our study majority (13; 59.09%) of the patients had heavy work as the most common risk factor followed by cough and prostatism each (6; 27.27%) and constipation was least common (2; 9.09%). Multiple risk factors were present in 4 (18.18%) patients.

All the cases in our study presented with inguinal or inguino-scrotal swelling which was reduced by itself or by lying down or manually. All patients presented with bulge or impulse on cough and 63.63% patient were having pain & dragging sensation.

Majority of patents had right (10; 45.45%), indirect (14; 63.63%) and incomplete (20; 90.9%) inguinal hernia and (6; 27.27%) patients had bilateral inguinal hernia.

Table 1: Duration of surgery in the present study.

Type of Operation	No. of Cases	Mean time (Minutes) (Range)
TAPP initial cases	18	106.81 (75-140)
TAPP later cases	04	93.75 (80-105)
TAPP Converted to open	0	0

Operative time was noted in each case from the time of first incision to the last skin stitch applied. The mean operative time in an initial 18 cases of TAPP method was 106 minutes (75-140), in last 4 cases was 93.75 minutes (80-105).

The mesh was fixed with Securestrap (Ethicon) tackers in 20 (90.90%) patients and rest of the patients with ProTack (Covidien) tackers.

In laparoscopic TAPP only in one case (4.54%) tear of inferior flap peritoneal flap was noted due to densely adherent hernial sac with cord structure and there were no major complication like bladder injury, bowel injury or major vascular injury.

There were no post-operative urinary retention, hematoma, hydrocele, port site infection, mesh infection, orchitis and numbness/paresthesia noted. Only one (4.54%) patient developed seroma which was considered as a result of inadequate strapping.

Most of the patients (14; 63.63%) were discharged till 5th post-operative day. Five patients (22.72%) were discharged on post-operative day 6 and rest (3; 13.63%) were discharged on post-operative day 8. Patients were given instructions to decide their own course of hospital stay and most of them wanted to stay back more.

(On the basis of intraoperative & post-operative complications, post-operative pain, hospital stay & return to work).

Table 2: Patient's opinion about surgery in the present study.

Opinion	No. of Patients (%)
Complete satisfaction	21(95.45%)
Moderate satisfaction	1(4.54%)
Dissatisfaction	0

All patients were asked to give their opinion about surgery after removal of the stitches on 8th post-operative day and cosmesis in form of complete satisfaction, moderate satisfaction or dissatisfaction. 21 (95.45%) patients were completely satisfied about their surgery. They had no complication post-operatively and were symptom free on 8th day. One (4.54%) patient had moderate satisfaction about their surgery as they had bilateral hernia.

Table 3: Return to work of the patients in the present study.

	Return to work (In days)
Range	14-25
Mean	18.13
Median	15.5

The mean time of return to work for TAPP repair was 18.13 days & the median time was 15.5 days. There were no case recurrence reported on follow up after 1 month and 6 month is obtained by visit. The median doses of post-operative parenteral analgesic requirement for TAPP repair cases

were 4 doses. The range of duration of parenteral antibiotic use was 2-8 days and median was 3 days. The removal of Foley's catheter in most (7; 31.81%) of cases was on 2nd post op day. There are many problems we faced during our study e.g. anesthetic fitness for general anesthesia, procedure cost (costly tacker), no availability soft mesh and long duration of procedure etc.

Discussion

The present study was carried out on 22 patients admitted in Department of Surgery, R.N.T. Medical College and MB Hospital Udaipur with clinical diagnosis of inguinal hernia from 2018-2021. During the last several decades numerous innovative and creative techniques have been introduced in an effort to manage patients with inguinal hernia. Despite the development of many newer technologies including that of optics, the treatment of inguinal hernia by laparoscopic method has still eluded many of our patients.

An ideal hernia repair should be durable, produce low level of morbidity, allow rapid return to work or recreational pursuits and should be cost effective. The use of prosthetic mesh has emerged superior and procedure of choice; it reduces recurrence by around 50%. The quality of life indicators for hernia repair as assessed by the post-operative pain and return to work strongly favors tension free and laparoscopic approaches.

Laparoscopic hernia repair was first described in 1982 by Ger3 but it was not until 1990 that laparoscopic hernia achieved enough notice to ignite controversy. The long learning curve of laparoscopic repair of inguinal hernia coupled with lack of proper documentation has and is delaying the proficient application of this procedure to the masses though several large published series have reported their experience with laparoscopic mesh repair of inguinal hernia.

The place of laparoscopic inguinal hernia repair is a subject of intense debate and its routine use is controversial. The short-term benefits of laparoscopic repair in terms of less post-operative pain, marginal advantage in reducing time of work and its obvious advantages in recurrent and bilateral hernias are established. Recurrence rate is similar to that of open mesh repair.

Demographic data

Inguinal hernias are more common in elderly male with low socioeconomic status and heavy weight lifting workers. Direct inguinal hernias are more

common in old age group. All the patients in our study were male, which was probably due to the low incidence of inguinal hernia in female in general population. In a study conducted by Malagoni⁴ it was noted that all patients were male. The patients were in the age group of 18 to 70 years. Mean age in the TAPP group was 42.1±15.7 years (p value – 0.411) and Jayaprakash⁵ reported the prevalence of hernia to be more in males than females by ratio of 7:1 & men are 25 times more likely to have a groin hernia than women.

In our study the patients included were in the age group of 15 to 70 years. The youngest patient was 19 years and oldest patient was 70 years. Majority of patients were distributed in age group of 41-50 51-60, and 61-70 years i.e. 27.27%, 18.18% and 18.18% respectively and 36.36% in remaining age group, showing age dependency as reported by Malagoni⁴ and Jayaprakash.⁵

In our study 10 (45.45%) patients had right sided hernia, 6 (27.27%) had left sided and 6 (27.27%) cases had bilateral inguinal hernia. These figures are similar to reported by Malagoni⁴, that inguinal hernia are more common in right side probably because of delay in atrophy of process vaginalis and slower descent of right testis.

Operative time

Operative time was noted in each case from the time of first incision to the last skin stitch applied. The mean operative time of trans-abdominal pre-peritoneal (TAPP) in our study was 106.81 minutes (75-140) in first eighteen cases and 93.75 minutes (80-105) in last four cases, which was in agreement with Corne II⁶ (81min), Millikan⁷ (79min), Vogt⁸ (63min), Stocker⁹ (50 min) and Swanstrom¹⁰ (92 min). The reason for this slight difference might be due to learning curve.

Conversion

In our study none of patient needed conversion to open procedure likely because of proper case selection, sound anatomical knowledge and commitment to completion of procedures laparoscopically. Lal¹¹ and Lau¹² have also reported zero percent conversion rates in their series. In previous studies one of the common causes of conversion to open procedure was cardiorespiratory complications developed intra-operatively. This was in broad agreement to Vogt⁸ (1-2%), Stoker⁹ (1%), Swanstrom¹⁰ (1%), Meddern¹³ (0.5-1%).

Complications

In our study one intra-operative complications, tear in inferior peritoneal flap (4.54%) was noted due to densely adherent hernial sac with cord structure. Other studies have shown variable intra-complication rates, e.g. 5.8% observed by Ramshaw¹⁴, 1.2% reported by Tetik¹⁵ (18 out of 15114 cases) & 0.18% by Felix¹⁶ (2 out of 1115 cases). These intra-complications included nerve injury, vascular injury, and peritoneal injury. All these intra-complications did not develop with TAPP repairs in our study.

In our study there was no bladder or bowel injury. Bladder injuries have been reported (0.6%)¹⁴ as have been bowel injuries (0.13%).¹⁶

In a study on 1514 patients¹⁵, there was a 0.8% complication rate related to laparoscopic technique, 0.2% due to hernia repair technique & 0.6% related to anesthesia.

The incidence of complication in our group was low, which may have been due to commitment as well as due to a smaller number of cases in our series as compared to Tetik¹⁵ & Felix.¹⁶ However, Fitzgibbon¹⁷ reports 5.4% complication rate due to laparoscopic technique.

Regarding post-operative complications, only one (4.54%) patient developed seroma formation which was considered as a result of inadequate strapping, urinary retention was absent in our cases and also no mesh infection was noted. Tetik¹⁵ reports urinary complications in 1.5% & local complication like seroma, hematoma formations in 6.2% patients. Fitzgibbon¹⁷ reported urinary involvement in 5.8% of cases & seroma formation in 3.5% cases.

The higher incidence of seroma formation in these studies was probably related to extensive dissection and intra-operative oozing with use of electrocautery. However we did not note any other complications like hematoma, hydrocele, port site infection and neurological complications in our study. These have been reported to vary between 2.7-13.6% as reported by Felix¹⁶, Tetik¹⁵ and Crawford.¹⁸ Liem¹⁹ reported 1.8% hematoma formation, 4% incidence of wound infection and 1.5% wound abscess. Lal²⁰ reported incidence of minor wound infection but we did not encounter any of these minor complications. This could be due to careful meticulous technique of initial port insertion, pre-operative routine bladder emptying of all patients, routine catheterization and secondary port insertion under vision.

Overall we found laparoscopic technique (TAPP) to be a useful and safe operative procedure for

carefully selected patients with inguinal hernia. A commitment to performing the procedure laparoscopically, close attention to patient and hernia characteristic, adherent to standard operative techniques and anatomic landmarks are likely to go a long way in ensuring good results.

Conclusions

Laparoscopic hernia repair is a significantly lengthier procedure especially in the learning phase of the surgeon, but the operative time decreases with increasing experience. Case selection is important especially in early learning phase when surgeon should select patient with smaller indirect hernia like bubonocele to prevent difficult dissection of sac. The learning curve for laparoscopic repair is considered to be between 100-200 repairs. Results in this study represent a single surgeon experience and early learning curve should be seen in this light. Use of large size mesh 15x15 cm in TAPP reduces chances of recurrence but may be a major factor for higher cost of laparoscopic repair. Good technique and knowledge about laparoscopy anatomy of inguinal region with experience in laparoscopic repair is essential to prevent serious complications like bladder, bowel or other vascular injuries.

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