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Original Research Article

LAPAROSCOPIC TRANSABDOMINAL PREPERITONEAL REPAIR OF INGUINAL HERNIA WITH THREE-POINT SUTURE FIXATION OF MESH: OUR 1-YEAR EXPERIENCE AT A MEDICAL COLLEGE SETTING.

Peer Hilal Ahmad Makhdoomi[1], Farhan Khan[1], Mohammad Zaieem[1], Nowsheen Hamdani[2], Sartaj Ahmad Bhat[1], Ajay Verma[3]

[1]Assistant Professor, Department of General Surgery, Al-Falah School of Medical Sciences and Research Centre, Faridabad, Haryana, India
[2]Assistant Professor, Department of Otorhinolaryngology, Al-Falah School of Medical Sciences and Research Centre, Faridabad, Haryana, India.
[3]Professor and HOU, Department of General Surgery, Al-Falah School of Medical Sciences and Research Centre, Faridabad, Haryana, India.

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Corresponding Author:
Dr. Mohammad Zaieem,
Assistant Professor, Department of General Surgery, Al-Falah School of Medical Sciences and Research Centre, Faridabad, Haryana, India
Email: zaieem2000@yahoo.com

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ABSTRACT

Background: Laparoscopic transabdominal preperitoneal hernia repair is standard management option for adult hernia repair but the ideal method for mesh fixation is still unknown. Our study was designed to evaluate the efficacy of three-point suture fixation of mesh in patient undergoing laparoscopic hernia repair.

Materials and Methods: This was a single-centre, prospective, observational study of 30 patients who underwent LHR for groin hernias between Jan 2024 and December 2024 to evaluate the efficacy of Three-point suture mesh fixation.

Results: Total 30 patients aged between 26 to 65 years with mean age of 49.46 were included in this study and all patients were males. Majority of patients were right sided inguinal hernia (66.66 %). The mean operating time was 72minutes, and the mean mesh fixation time was 15 minutes. Post operative complications were noted, and seroma was found in 6.66% patients, severe postoperative pain in 3.33% patients and recurrence was not found in any patient.

Conclusion: Laparoscopic transabdominal mesh hernioplasty using three-point suture fixation of mesh is cheap and effective method of mesh fixation.

Keywords: TAPP, Mesh fixation, Hernia, LHR.

INTRODUCTION

Laparoscopic hernia repair has gained popularity with passage of time and now it is on verge of treatment of choice for various hernia repairs including inguinal and ventral wall hernia and is widely used in clinical practice. Compared with traditional laparotomy, laparoscopic repair has the advantages of faster postoperative recovery, shorter postoperative hospital stay, and less postoperative pain.[1-3] Inguinal hernia repair is one of the most common procedures that a general surgeon performs.[4] Although the Lichtenstein open mesh repairs have low rates of morbidity and mortality, the minimally invasive approach is associated with less post-operative pain, numbness, hematoma formation and faster return to normal activity.[5,6] It has become the standard of care for many general surgeons.[7] It is one of the recommended treatment modalities in capable hands.[8-10] The increased acceptance of inguinal hernia repair by a laparoscopic approach has led to many confused reports on technique, results, and complications related to this procedure. In 1982, prof Ger reported the first laparoscopic hernia repair in a paper published in 1982.[11,12] This study conducted from August through November 1977 examined the effectiveness of stainless-steel clips to secure the peritoneal opening of known abdominal hernias during laparotomy for other major abdominal procedures. In the thirteenth and final case of the series, an operating laparoscope was used to visualize the peritoneal defect of a right indirect inguinal hernia. The neck of the hernia sac was closed with a

specially devised stapling device passed through a port placed in the right iliac fossa. The staple was constructed of tantalum and measured 12.5mm long in the open position. Ger reported that the first patient to be treated by laparoscopic closure of the neck of the sac was under the care of Dr P. Fletcher of the University of the West Indies, Jamaica.[12] Gynaecologists have been responsible for many of the innovations in laparoscopy, and hernia repair has been no exception. In 1990, Popp published a report of the coincidental repair of an inguinal hernia during laparoscopic uterine myomectomy.[13] In this paper, Popp related that the hernia margins were opposed and secured by Endo sutures tied extracorporeally. A patch of dehydrated dura mater was applied to the sutured area to further cover the repair site. At the annual meeting of the American Association of Gynaecological Laparoscopists (AAGL) in 1989, Bogojavlensky showed a video that demonstrated repair of an indirect inguinal hernia with a laparoscopic stuffing technique.[14] The hernia canal was filled with a plug of polypropylene mesh, and the internal ring was closed with suture placed laparoscopically. In 1990, Schultz and colleagues reported on a plug and-patch technique for hernia repair that expanded on the initial work described by gynecologists.[15] In their technique, the sac of an indirect inguinal hernia was visualized with a laparoscope and grasped on its superior margin with forceps. The peritoneum was incised, and the sac was removed from the musculofascial defect. The hole in the muscle was then filled with rolls of polypropylene mesh tied with dissolvable suture. It was thought that the rolled polypropylene mesh would expand to completely fill the canal once the suture tie was absorbed. After the defect was filled with rolled mesh, one or two pieces of 1 2-inch mesh were laid over the defect, and the cut edges of peritoneum were brought together (over the mesh patch) and secured with Endo clips. Corbitt independently described a similar technique; however, he further ligated the inverted hernia sac with an endoscopic linear stapler.[16]

Both Schultz and Corbitt abandoned the technique of plug and-patch repair because of excessive hernia recurrence and changed their technique to one that utilized a large prosthesis of polypropylene mesh in the pre-peritoneal space that covered the entire Myo pectineal orifice.

In both open and laparoscopic inguinal hernia repairs, several techniques for mesh fixation have been studied in the attempt to keep the mesh in the appropriate position whilst reducing the pain experienced by patients after surgery and limiting the incidence of recurrence. A consensus regarding which technique is optimal has yet to be reached and, at present, the decision about which to use is often based on the surgeon's preference. Suture mesh fixation and tacker mesh fixation were commonly applied for laparoscopic and open hernia repair.[17] mesh fixation has few adverse effects including more tissue damage that can lead to postoperative seroma, more postoperative pain and risk of injury to surrounding structures. Suture fixation is effective in providing higher tensile strength, that may lead to lower recurrence rates. The tack fixation provides low operative time with few postoperative complications including small bowel obstruction and perforation and chronic neuropathic pain.[18,19]

Meshes are designed to be incorporated in local tissue by a fibrotic reaction. Therefore, a good fixation is essential to secure the mesh in its correct position, while the integration process occurs. The proper fixation leads to recurrence rates to below 5%. The most common postoperative complications were mesh migration, chronic pain, infection, and seroma.[20] TAPP hernia repairs, using non-fixation or histoacryl techniques, have obvious advantages that overcome the major drawbacks of tack mesh fixation. First, the use of a large mesh to cover the entirety of the groin area, preventing recurrence of the hernia under tension-free conditions. Second, the non-fixation procedure can avoid the risk of vessel and nerve injury associated to tacker fixation. Third, because of lack of fixation, implanted patches can be adjusted in the tissue to avoid wrinkles in the mesh, further minimizing postoperative foreign body sensation and traction sensation at the surgical site.[21]

MATERIALS AND METHODS

This was a single-centre, prospective, observational study of 30 patients who underwent LHR for groin hernias between Jan 2024 and December 2024, performed in department of general surgery at Al-Falah school of medical sciences and research centre. All patients were thoroughly questioned and examined on an outpatient department basis and on admission individually. They were admitted in our hospital 1 to 2 days prior to surgery. The preanesthetic evaluation was performed by the corresponding anesthesia team. All patients were operated by standard technique of laparoscopic transabdominal repair of inguinal hernia (TAPP)in accordance with recommended guidelines. A total of 30 patients underwent through the procedures and all were performed by a single surgical team. Operative time was recorded from the time of creation of pneumoperitoneum till the closure of ports at the end of the procedure. Mesh fixation time was recorded from the time of insertion of mesh to placement and fixation of mesh with suture. Our preference was to secure the mesh with three non-absorbable sutures (prolene) in the following positions: (1) inferior medial (to Cooper's ligament), (2) superior medial (medial to the epigastric vessels), and (3) laterally above the level of the anterior superior iliac spine. Any intraoperative complications were noted. In the postoperative period patient were monitored in postoperative and general surgery ward. During immediate postoperative period pain was monitored with visual analog scale (VAS), patient was followed up in outpatient department at 1 week ,2 weeks ,1

month and 2 months and postoperative complication, seroma, wound infection and recurrence if any were noted.

Surgical technique: Patient position: The patient was placed in a steep head down (Trendelenburg) position to allow gravity-based retraction of the viscera away from the MPO. We preferentially didn't prefer the use of a Foley catheter unless there was a reasonable expectation that bladder distention would interrupt the progress of the case (e.g., anticipated difficult dissection leading to a lengthy operation, active symptoms of bladder outlet obstruction most typically from benign prostatic issues, or patients who were already catheterized).

Port Placement: After creating pneumoperitoneum with veress needle 10mm optical port with trocar was placed just above the umbilicus the reason of going above the umbilicus was to gain additional space between the optical port and area of interest MPO [Figure 1,2]. Two additional working 5mm ports were introduced just below and lateral to optical port in right and left mid clavicular lines.

Figure 1

Figure 2

Peritoneal Flap Creation: We created peritoneal flap, beginning the dissection well above the hernia defect medially near medial umbilical ligament and lateral moving elliptically downwards just medial to anterior superior iliac spine. The reason for elliptical flap creation was that, we believed it makes suturing of the lateral edge of flap comfortable for the surgeon.

Confirmation of the "Critical View" of the MPO: After doing medial dissection, lateral dissection, middle dissection with reduction of sac and prior to mesh introduction, we reviewed the entire dissection to ensure the adequacy of the preperitoneal space that had been created, to ensure that all fat had been reduced from defects and inspected for any bleeding [Figure 3].

Figure 3

Three point suture fixation of mesh:

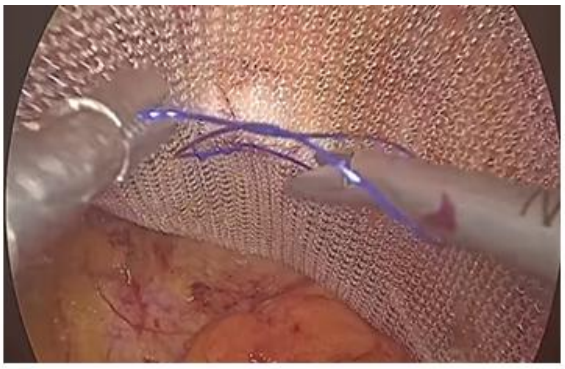

Figure 4

Figure 5

First suture fixation of mesh was done at cooper's ligament. This was technically the toughest suture to give because of less space. Then mesh was fixed at upper end, and suture was given medial to inferior epigastric vessels in retro rectus area. Last suture fixation was done at superolateral area.

Closure of peritoneal flap: Flap was closed using vicryl suture from medial to lateral direction. Because we used elliptical incision while creating peritoneal flaps it created more distance from the working 5mm ports and assisted in hassle free suturing.

RESULTS

Table 1: Age: All patients were aged between 26 to 65 years with mean age of 49.46.

26-35	3
36-45	4
46-55	15
56-65.	8

Table 2: Gender: All patients in our study were males with no females in our study

Male	30
Female	0

Table 3: Type and side of hernia

Patients	Type of hernia.
Direct inguinal hernia	6
Indirect inguinal hernia	20
Unilateral direct and indirect	4
Bilateral hernia	0
Right sided hernia	20
Left sided hernia	10

Majority of patients were right sided inguinal hernia (66.66 %). Indirect inguinal hernia dominated.

Intraoperative and immediate post operative parameters: The mean operative time in our study was 72 minutes and the time to fix mesh with three-point suture fixation was 15 minutes. Mean hospital stay was 2 days.

Table 4

Parameters	Duration
Mean operative time	72 minutes
Mean Time taken for mesh fixation with sutures	15 minutes
Mean hospital stay	2 days

Post operative complications: Our study revealed seroma formation in 6.66% of patients, severe postoperative pain in 3.33% cases and no other complication was noted.

Table 5

Complication.	Percentage
Hematoma.	0.00
Seroma.	6.66
Wound infection.	0.00
Recurrence.	0.00
Severe post operative pain.	3.33

DISCUSSION

Hernia repair with mesh in both open and laparoscopic surgery needs mesh fixation and fixation is point of debate for many years. In our study all patients were males, and the mean age of patients was 49.46. This is in accordance with studies done previously.[22]

Right sided inguinal hernia was most common type of hernia and constituted 66.66% and indirect inguinal hernia dominated. Same findings were observed by Gopi tukar et al.[23] All the patients had unilateral hernia.

In our study the mean operative time was 72 minutes. The operative time included mesh fixation which is technically challenging then placing tac or glue which takes less time. In a study conducted by Gopi tukar et al,[23] the total operative time was increased in group where mesh was fixed with sutures.

Sutures usually require expertise and longer operating times. Both absorbable and nonabsorbable sutures may be used to fix mesh to the abdominal wall. Sutures are usually applied transfascially after reduction of intraperitoneal pressure. Suture type, quantity, and placement vary among surgeons and no "gold standard" technique has been established.[24] In our study we used prolene suture for three-point mesh fixation and mean time to place and fix suture was 15 minutes.

In our study the most common post operative complication was seroma in 6.66% (2 patients), followed by severe postoperative pain in 3.33% (1 patient). Our findings were in accordance with study done by Mir IS et al.[22] In our experience the main reason for seroma was extensive dissection and size of the hernial sac (large complete hernia) requiring more mobilization while dissecting the hernial sac.

Our study showed mean hospital stay of 2 days and study done by Gopi tukar et al23 showed the same results.

Our study showed zero recurrence rate. Studies done by Mir IS et al,[22] showed 0.81% recurrence and Tolga Onder et al,[25] showed zero recurrence. The low recurrence in our study can be attributed to smaller sample size.

CONCLUSION

Laparoscopic transabdominal mesh hernioplasty using three-point suture fixation of mesh is almost equally effective and yet cheaper method as compared to glue or tac fixation but is technically more demanding and time consuming. Thus, we recommend the usage of three-point suture fixation method as an alternative to tac or glue fixation method for TAPP.

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