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Original Article

Comparative Study of Laparoscopic Transabdominal Preperitoneal and Lichtenstein Mesh Repair of Inguinal Hernia

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Abstract

Introduction: Inguinal hernia repair is the most common general surgery procedure performed worldwide. Management of inguinal hernia has undergone significant evolution from primary tissue repair to minimally invasive laparoscopic repair. This study is aimed to compare Lichtenstein open hernioplasty with laparoscopic transabdominal preperitoneal (TAPP) repair.

Materials and Methods: This study comprises 60 patients of uncomplicated inguinal hernias underwent surgery at Guwahati Medical College and Hospital. Lichtenstein open hernioplasty was performed on 30 patients while 30 patients underwent TAPP repair. Data were recorded for intraoperative time, post-operative pain, complications, recurrence, and cost of surgery and compared with the help statistical tools.

Results: The incidence of hernia was common in the older age group, greatest in the 45–64 years age group and men were affected more than women. Patients who underwent Laparoscopic TAPP repair had significantly lesser pain than patients who underwent Lichtenstein hernioplasty. In our study, about overall 76.67% had no complication in any form. (90%, i.e., 27 out of 30 cases in laparoscopic TAPP repair and 63.37%, i.e., 19 cases in Lichtenstein repair) have no complications of any form. Duration of surgery in laparoscopic TAPP repair in our study was 129 min which is 87.34 min longer than Lichtenstein hernioplasty in our study. In our study, we found that duration of hospital stay in Lichtenstein repair is 2 days and 1 day in Laparoscopic TAPP repair. The mean difference of cost was about ₹ 4910.34 between the two groups of surgery. Hence laparoscopic hernia repair is not cost effective. However, we avoided tacker use in our laparoscopic TAPP repair and instead use polypropylene suturing to reduce the cost. No recurrence was found in both Lichtenstein repair and laparoscopic TAPP repair.

Conclusion: TAPP is better than open hernioplasty in terms of post-operative pain, post-operative complications, durations of hospital stay; however, it has some limitations such as steep learning curve, increased operative cost, and operative time and also it is not suitable for complicated hernias.

Key words: Inguinal Hernia, Laparoscopic, Repair

INTRODUCTION

Inguinal Hernia is commonly encountered pathological problem by surgeon in their surgical practice. Hernia surgery has undergone tremendous evolution and refinement since inception. By demonstrating a comprehensive understanding of inguinal anatomy, Bassini (1844–1924)[1] transformed inguinal hernia repair into a successful venture with minimal morbidity to the patient. The principles of the Bassini repair were revitalized within the Shouldice repair, resulting in less recurrence rates. But now the era of tissue-based repairs was supplanted by tension-free repairs with the widespread acceptance of prosthetic materials for inguinal floor reconstruction.

Initially described by Lichtenstein and Shulman,[2] the repair involved placement of aMarlex mesh over the entire floor of the inguinal canal. It is a "tension-free" repair that does not put tension on muscles, contrary to Bassini and Shouldice suture repairs.

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With the advent of minimally invasive surgery, inguinal hernia repair underwent its most recent transformation. Laparoscopic inguinal hernia repair has added to the armamentarium of the general surgeon, providing a technique that lessens postoperative pain and improves recovery. Refinements in approach and technique have led to the development of the intraperitoneal on lay mesh (Fitzgibbons 1990),[3] the transabdominal preperitoneal (TAPP) repair (Arregui 1991), and the totally extraperitoneal (TEP) repair (Duluq 1991).

TAPP repair involves access to the hernia through the peritoneal cavity. Mesh is placed in the preperitoneal space, after incising and dissecting parietal peritoneum, over all the potential hernial sites in the inguinal region. The peritoneum is then closed above the mesh. The potential benefits of using a laparoscopic approach include reduced postoperative pain, earlier return to normal activities, and a reduction in long-term pain and numbness. The repair of bilateral hernias (including occult hernias detected during contralateral inspection at the time of a unilateral repair) may be undertaken during the same operation. However, laparoscopic surgery is associated with additional costs, for the endoscopy system (video unit, monitor, endoscope, and CO_2 insufflator) and instruments (staplers, diathermy scissors, or ports), although these may be reusable and also involves a long learning curve. However, there is still no agreement about which operation is preferable in a given situation and the reported cumulative recurrence rate varies widely.

Aim

The aim of the study was to compare the laparoscopic TAPP witch Open lichtenstin Mesh Repair in terms of duration of surgery, post-operative pain, postoperative complication, time taken for recovery, and recurrence and to determine the cost effectiveness.

MATERIALS AND METHODS

This is prospective study of 60 cases of inguinal hernia admitted and underwent surgery in the Department of General Surgery in Guwahati Medical College and Hospital during 2015-2018. Sixty cases of inguinal hernia were randomly selected and divided into two groups. 30 cases underwent laparoscopic TAPP repair and 30 cases underwent open Lichtenstein mesh repair.

Exclusion Criteria

The following criteria were excluded from the study:

- Children below 12 years
- Patients who presented with complications of inguinal hernia such as obstruction, strangulation or irreducible hernia are excluded from the study
- Previous history of the lower abdominal surgery previous and ASA Gr>3.

Preoperative Treatment Included

The following criteria were included in the study:

- Correction of anemia
- Weight reduction if obese
- Improvement of nutritional status
- Treatment of respiratory infection if any
- Abstinence from smoking/alcohol
- Advice regarding breathing exercises.

The type of anesthesia used was spinal anesthesia for open cases and General anesthesia for laparoscopic hernia mesh repair. A single dose of pre-operative broad spectrum antibiotic given followed by the same in post-operative period. Analgesics used Injection Diclofenac sodium was given postoperatively for first 24 h and oral tablet of Aceclofenac and paracetamol combination thereafter.

After surgery all patients were monitored carefully for pain, bleeding, wound infection, and urinary retention. Immediate post-operative pain was assessed using verbal graphic rating scale. Data recorded carefully and statistical analysis was done using GraphPad InStat version 3.10 for Windows.

RESULTS

In our study, minimum age was 13 years and maximum age was 80 years. And mean age was 47.53 years. Maximum incidence (50%, 30 cases out of 60 cases) is seen in age group between 45 years and 64 years (15 cases, [50%] in Lichtenstein repair group and 15 cases [50%] in Lap TAPP repair group). The difference was not found to be statistically significant on comparing the two groups ($P = 0.8832$). All 60 cases of hernia were males. No female is study group.

The incidence was found to be maximum in right sided indirect inguinal hernia (63.33%, 38 out of 60 cases) (Lichtenstein repair 18 cases and Lap TAPP repair 20 cases), followed by left sided indirect inguinal hernia (25%, 15 out of 60 cases). (Lichtenstein repair 9 cases and Lap TAPP repair 6 cases). However, the difference was not found to be statistically significant in comparing the two groups ($P = 0.8913$).

In our study, mean duration of surgery in Lichtenstein repair is 41.16 min whereas in laparoscopic TAPP repair is 129 min. The difference was found to be statistically significant in comparing the two groups ($P = 0.0008$). Median of verbal rating scale for pain was found to be

4.5 (moderate) for lichtenstin hernioplasty while 2.5 (mild) for TAPP. On comparison *P*-value was found to be 0.0332 which is significant.

In our study, about overall 76.67% patients (27 cases in laparoscopic TAPP repair and 19 cases in Lichtenstein repair) have no complications. In patients undergoing Lichtenstein repair seromas, wound infection, hematoma, and neuralgia are more common than patients undergoing laparoscopic TAPP repair.

Seromas is most common complication in both groups (2 cases [6.67%] in laparoscopic TAPP repair and 6 cases [20%] in Lichtenstein repair).There was no case of hematoma and neuralgia in laparoscopy group. In our study, complications such as wound infections, seromas, hematoma, and neuralgia are more seen with Lichtenstein repair than laparoscopic TAPP repair. The difference was found to be statistically significant in comparing the two groups ($P = 0.0267$).

Time taken to start oral feeding and to start mobilization was 6 h and 12 h respectively in Lichtenstein hernioplasty and 6 h and 10 h, respectively, in Laparoscopic TAPP repair.

The median period of hospitalization was 1 day in case of laparoscopic hernia repair and 2 days in cases of hernioplasty. Post-operative hospital stay ($P = 0.0394$) and start of mobilization ($P = 0.0001$) between two groups was found to statistically significant.

In our study, the patients who came for follow up at 7 days, 3 month, 6 month, and 1 year, no recurrence was found in both Lichtenstein repair and laparoscopic TAPP repair. Few patients did not turn up for follow up. In our study, we found that mean cost of hospitalization in Lichtenstein repair is about 3211.33 INR and in Laparoscopic TAPP repair without tacker is about 8121.67 INR.The difference was found to be statistically significant in comparing the two groups ($P < 0.0001$).

DISCUSSION

In the study of Everhart,[4] the highest incidence was in the age group >65 which was 39.15% and next was 34.20% in 45–64 age group. In study by Abrahamson,[5] the highest incidence was found in age group of 45–64 which was 43% followed by in age group of 15–44 which was 37.40%. In our study, the highest incidence was found in age group of 45–64 which was 50%, followed by in age group of 15–44 which was 28.33%.

The age incidence of our study matches Abrahamson[5] study. In both the studies, age group <15 years was not included. In the study of Rutkow and Robbins,[6,7] right-sided inguinal hernia is most common (51%) followed by the left sided inguinal hernia (41%). Also in the study of Sangwan *et al.*,[7] right-sided inguinal hernia (43.33%) is most common followed by left-sided inguinal hernia (28.12%).

Both the studies match with our study in which right-sided inguinal hernia (65%) is most common followed by the left-sided inguinal hernia (31.67%). In both studies, Rutkow and Robbins and Sangwan *et al.*[6,7] indirect inguinal hernia is most common hernia followed by direct inguinal hernia and bilateral hernia. Both the studies are in consistence to our study in which indirect inguinal hernia is most common (83.33%), followed by direct inguinal hernia (8.32%) and bilateral inguinal hernia (3.33%).

The mean duration for Lichtenstein hernioplasty in our study was 41.66 min which is in comparison to MRC Trial groups[8] (43.3 min), Bringman (45 min), Picchio *et al.*[9] (33.9 min), and Wright *et al.*[10] (45 min).

Duration of surgery in laparoscopic TAPP repair in our study was 129 min which is 87.34 min longer than Lichtenstein hernioplasty in our study. In McCormack and Scott,[11] it is 14.8 min longer, in Memon *et al.*[12] 15.2 min longer and in Chung and Rowland[13] all laparoscopic cases takes longer time. It is due to using suture technique for fixation of the mesh and peritoneum closure, which takes longer time. We avoided tacker to reduce the cost of the procedure. Duration of surgery can be minimized using tacker as a fixation device.

In study by McCormack and Scott,[11] Grant,[14] MRC Trail Group,[8] and Neumayer *et al.*[15] patient undergoing laparoscopic hernioplasty have more complication than open hernioplasty.

In our study, about overall 76.67% patients (27 [90%] cases in laparoscopic TAPP repair and 19 [63.37%] cases in Lichtenstein repair) have no complications. In patients undergoing Lichtenstein repair seromas, wound infection, hematoma, and neuralgia are more common than patients undergoing Laparoscopic TAPP repair. Seromas is most common complication in both groups (2 cases [6.67%] in laparoscopic TAPP repair and 6 cases [20%] in Lichtenstein repair). There was no case of hematoma and neuralgia in laparoscopy group.

In our study, complications such as wound infections, seromas, hematoma, and neuralgia are more seen with Lichtenstein repair than laparoscopic TAPP repair. The

difference was found to be statistically significant in comparing the two groups.

In our study, we found that post-operative oral feeding started is 6 h in both groups which is statistically not significant ($P < 0.5810$). Time taken for patient for mobilization (patient start to sit and walk) is 12 h in Lichtenstein repair and 10 h in Laparoscopic TAPP repair which is statistically significant ($P < 0.0001$).

In our study, we found that duration of hospital stay in Lichtenstein repair is 2 days and 1 day in laparoscopic TAPP repair which is statistically significant ($P = 0.0394$). Overall post-operative recovery is faster in laparoscopic TAPP repair group than in Lichtenstein repair group.

In study by Bisgaard[81] post-operative hospital stay was 1 day for open repair and 2 days for TAPP. In our study, no recurrence is seen in both Lichtenstein repair and laparoscopic TAPP repair after 3 months, 6 months and 1 year of follow-up while in MRC Trial Group (1.9%), Champult (6%), Andersen[16] (2.5%) recurrence seen in laparoscopic group and 0%, 4.9%, 2%, and 0%, respectively, in open hernioplasty group. Hence, more recurrence seen in laparoscopic TAPP repair than open Lichtenstein mesh repair. Absence of recurrence in our study group may be due to small sample size and less duration of follow-up.

In our study, we found cost of hospitalization for laparoscopic TAPP repair in is ₹ 4910.34 more than Lichtenstein hernioplasty. In MRC Trial Group, Andersen *et al.*,[16] Wellwood *et al.*,[17] and Heikkine study cost of laparoscopy was 314 more pound, $1091 higher, $505 more, and $446 more, respectively, than open group. Therefore, cost of hospitalization is significantly more in laparoscopic repair than open repair.[18]

CONCLUSION

The present study is a comparative study of laparoscopic TAPP repair and Lichtenstein tension free mesh repair. There was a marked reduction in postoperative pain in laparoscopic hernia repair compared to the open Lichtenstein hernioplasty. However, we found that the laparoscopic hernia repair is expensive than open repair. However, we tried to bring the cost of laparoscopy procedure as much low as possible by avoiding the use of tacker and instead used polypropylene suturing for mesh fixation and peritoneum closure. There was marked difference in the postoperative complication between the two groups. Patients who underwent open Lichtenstein mesh repair complains of seromas more frequently than laparoscopic TAPP repair. No recurrences were noted during the study period. However, in many studies the recurrence rates were higher in the laparoscopic hernia repair group when compared to the hernioplasty group. There were few limitations to the study, use of polypropylene suturing instead of tacker for mesh fixation and peritoneum closure led to prolonged duration of surgery. Laparoscopic hernia repair is more costly; has a steep learning curve, carries the risk of serious visceral and or vascular injuries if careless. Recurrence rates for endoscopic techniques are generally underestimated because most studies are either not prospective or do not include long-term follow-up evaluation. All cases of inguinal hernia are not suitable for laparoscopic hernia repair as it is contraindicated in strangulated hernia, sliding hernia, irreducible hernia, and patients who are elderly or have co-morbid conditions. Laparoscopic hernia repair cannot be performed under local anesthesia.

The final word on management of inguinal hernia is still to be written. In collecting, assimilating, and distilling the wisdom of today, we must provide a base from which further advances may be made.

Comparison of duration of surgery

	Open lichtenstein repair	Laparoscopic TAPP repair
Mean (in minutes)	41.16	129
Standard deviation	6.52	12.48
Standard error of mean	1.19	2.28

P-value=0.0008

Comparing post-operative pain on verbal rating scale in between two groups

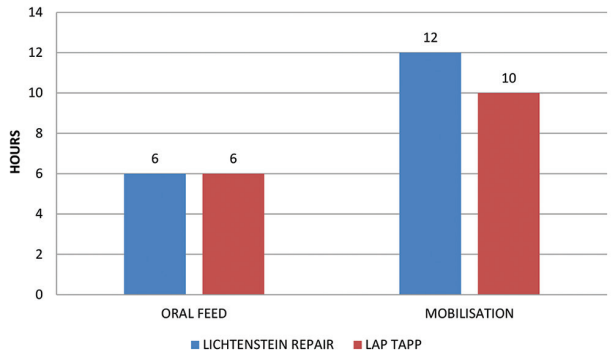
Post-operative pain	Open lichtenstein repair (Cases %)	Laparoscopic TAPP repair (cases/%)	Total (cases/%)
Mild pain VRS (1–3)	10 (33.33)	18 (60)	28 (46.67)
Moderate pain VRS (4–7)	16 (53.33)	11 (36.33)	27 (45)
Severe pain VRS (8–10)	4 (13.33)	1 (3.33)	5 (8.33)
Total	30 (100)	30 (100)	60 (100)

Comparison of post-operative complications between two study groups

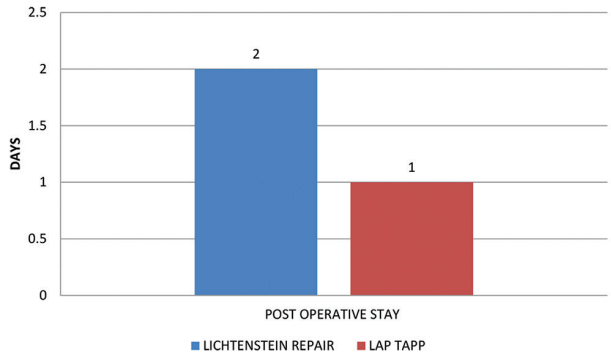
Post-operative complications	Open lichtenstein repair (cases/%)	Laparoscopic TAPP repair (cases/%)	Total (cases/%)
No complication	19 (63.37)	27 (90)	46 (76.67)
Seroma	6 (20)	2 (6.67)	8 (13.33)
Hematoma	1 (3.33)	0(0)	1 (1.67)
Wound infection	2 (6.67)	1 (3.33)	3 (5.00)
Neuralgias	2 (6.67)	0 (0)	2 (3.33)
Total	30 (100)	30 (100)	60 (100)

Chi-square: 4.911, *P*-value=0.0267

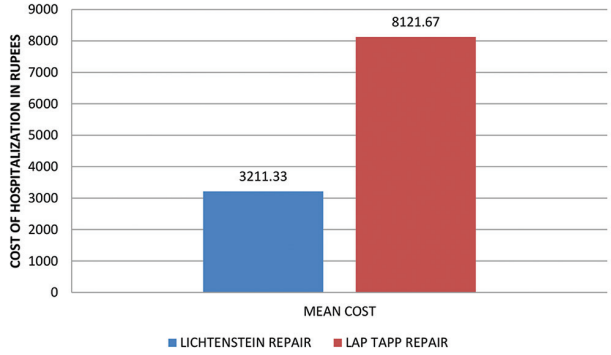
Comparison of Start of Oral Feed and Mobilization in Hours Between Two Groups



Comparison between duration of post-operative hospital stay between two groups



Comparison between costs of hospitalization between two groups



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