

LAPAROSCOPIC (TAPP) VERSUS OPEN INGUINAL HERNIA REPAIR (LICHTENSTEIN). A COMPARATIVE STUDY

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ABSTRACT

Introduction: One of the most commonly performed surgery by a general surgeon is inguinal hernia repair. There have been numerous open surgical techniques and two laparoscopic techniques described in the literature for the treatment of inguinal hernias. The treatment outcome of all these surgeries remains the same which is reducing the hernia and preventing recurrence. Our aim was to compare laparoscopic versus open inguinal hernia repair. **Methods:** One hundred patients with inguinal hernias were randomly divided into two groups. Group one was 68 patients treated by open Lichtenstein repair, while the second group was 32 patients treated by laparoscopic trans abdominal pre-peritoneal (TAPP) mesh repair. The two groups were compared to assess the duration of surgery, intraoperative and post operative complications, postoperative pain, duration of hospital stay, return to normal activity and work, scar size. **Results:** The percentage of males (87%) was higher than females (13%), and the right side (57%) was more common than the left side (23%). The median age of TAPP patients was 48 years, while the median age of Lichtenstein patients was 43 years. The median duration of surgery was higher in TAPP repair (65.2 min vs 43.5 min with p value = 0.002 in unilateral hernias) and (116 min vs 84 min with p value = 0.001 in bilateral hernias). The intraoperative complication rate in TAPP repair was 4.4%, while in Lichtenstein repair it was 9.3% with a p value of 0.5. The postoperative complication rate was 9.4% in TAPP repair and 10.3% in Lichtenstein repair with a p value of 0.2. The median hospital stay was similar, with 7.3 hours for TAPP repair and 6.45 hours for Lichtenstein repair with a p value of 0.2. The time required to return to daily activities was shorter in laparoscopic repair (9.3 days) compared to open repair (13.8 days) with a p value of 0.0001. The average scar size was smaller in laparoscopic repair (3.6 cm) compared to open repair (7.5 cm) with a p value of 0.0001. The pain level after surgery was lower in laparoscopic repair, with a score of 3.9 on the first day, 1.5 on the second day, and 0.5 after a week, while the pain level was higher in open repair, with a score of 5.7 on the first day, 4 on the second day, and 2 after a week. **Conclusion:** Laparoscopic TAPP repair offers a significant advantage over open tension free hernioplasty. It was associated with less post operative pain, faster recovery, but higher operative time, with insignificant difference in early post operative complication. Thus, Laparoscopic TAPP repair should be considered for Bilateral and recurrent hernias and for female in view of lesser post operative pain and scar size, with faster recovery.

KEYWORDS: Inguinal Hernia, TAPP repair, Open hernioplasty, Lichtenstein.

1. INTRODUCTION

The word Hernia is derived from a Latin term meaning a rupture. Inguinal Hernia is one of the most common surgical condition in the world. Its diagnosis is made mostly by clinical examination and if required ultrasound scan can be done. The overall lifetime risk of developing inguinal hernia is 15% in men and less than 5% in women.^[1] After initial peak in infants groin hernia become more prevalent with advancing age. Within the last few years the use of minimal access surgery has expanded to encompass most procedures in general surgery. The use of laparoscopic techniques in the repair

of groin hernia however remains controversial. Long-term recurrence rate remains the most important outcome parameter after repair of inguinal hernia. Therefore, at present, the use of prosthetic material has replaced traditional tissue repairs such as the Shouldice technique. Tension free mesh repair is now the standard of care for inguinal hernia repair in adults.^[2] Laparoscopic hernia repair is similar to the open pre peritoneal approaches and is performed trans-abdominally or totally extra peritoneal. Unlike laparoscopic cholecystectomy, this procedure has been slow to gain acceptance. This reluctance is mainly because of reports of rare serious

complications during and after surgery which include visceral, vascular and nerve injury and small bowel obstruction. A further drawback has been the long learning curve associated with these techniques and a high rate of failure to repair the hernia in this transitional learning period for the surgeon.^[3] The laparoscopic technique has replaced the open approach in many surgical procedures. This development has largely taken place without desirable preceding studies proving the safety and benefit to the patient. Inguinal hernias are common and although the results of surgical repair are often satisfactory, postoperative recovery may be slow and the hernia may recur.³ Laparoscopic techniques for the repair of inguinal hernias have recently been introduced and in several small trials, these techniques have been shown to be superior to open repair in terms of postoperative pain and recovery.^[4] The primary aim of the studies was to compare the treatment groups undergoing open and laparoscopic repair of hernia with respect to time to return to normal physical activity, complications, early recurrence rate.

2. MATERIALS AND METHODS

Patient having bulge / swelling in inguinal region whether unilateral, bilateral, primary or recurrent resulting in discomfort and/or dragging pain with positive cough impulse admitted in surgical wards of a tertiary care hospital were included in the study. The patients were provided with a detailed printed information sheet to explain about nature of disease and detail information of both operative procedure after taking consent, 100 cases were selected according to inclusion criteria. Patient between 14 to 70 years age group with direct / indirect inguinal hernia, Unilateral, bilateral and recurrent hernia and exclusion criteria Patients with strangulated, irreducible and giant inguinal hernia} who attended surgical OPD from 1/1/2022 to

1/1/2023. Each case was thoroughly investigated and cases were taken for surgery. Written informed consent was obtained from patients preoperatively. All operated patients were assessed for intraoperative difficulties, intra-operative complications, duration of surgery, post-operative pain, mobilization, post op complication and duration of hospital stay. Patients were followed after discharge on 7th postoperative day and after one months. They were assessed for duration to return to normal activity.

3. RESULTS

A total of 100 patients were included in the study, with 32 (32%) undergoing laparoscopic TAPP repair and 68 (68%) undergoing open tension-free inguinal hernia repair (Lichtenstein). The median age was 48.3 years in the laparoscopic group and 45.3 years in the open repair group.

In both groups, males were more common than females (84.4% in the TAPP group and 88.2% in the Lichtenstein group). Analysis of Variance (ANOVA) showed no statistically significant variation in the age of patients among the groups ($p = 0.8$). The right side was more commonly involved than the left side (46.9% in the TAPP group and 61.8% in the Lichtenstein group). There was no statistically significant variation for the side involved in both groups ($p = 0.07$).

Indirect hernias were more common in both groups (71.9% in the TAPP group and 64.7% in the Lichtenstein group). The type of inguinal hernia did not show statistically significant differences between the two groups ($p = 0.9$). In the Lichtenstein group, 88.2% were primary hernias, while in the TAPP group, 87.5% were primary hernias. (Table 1).

Table 1: Demographic characteristics of the Inguinal hernia.

	Lichtenstein open repair (n = 68)	Laparoscopic TAPP (n=32)	P-value
Mean Age (year)	45.3	48.3	0.3
male	60 (88.2%)	27 (84.4%)	0.1
Female	8 (11.8%)	5 (15.6%)	
Right	42 (61.8%)	15(46.9%)	0.07
Left	14 (20.6%)	9 (28.1%)	
Bilateral	8 (25%)	8 (25%)	
Direct	24 (35.3%)	9 (28.1%)	0.9
Indirect	44 (64.7%)	23 (71.9%)	
Primary	60 (88.2%)	28 (87.5%)	0.3
Recurrent	8 (11.8%)	4 (12.5%)	

3.1 Outcomes

In unilateral cases, the operating time was greater in the TAPP group (mean 65.28 min) compared to the Lichtenstein group (mean 43.55 min), which was statistically significant ($p=0.002$). Additionally, in bilateral cases, the operating time was significantly greater in the TAPP group (mean 116.27 min) compared to the Lichtenstein group (mean 84.95 min), with a p-value of 0.001 while repairing recurrent inguinal hernias

using laparoscopic surgery took the same amount of time as open surgery due to the access to a new surgical field in laparoscopic. The overall intra-operative complications rate in the TAPP group was 4.4%, while in the Lichtenstein group it was 9.3%, with no statistically insignificant p-value of 0.5. There was one instance of laparoscopic conversion to an open procedure due to difficulty in dissecting the hernia sac. There were no instances of visceral injury or injury to a large vessel in

the endoscopic surgery. However, there was an injury to the femoral artery during patch fixation in open surgery, which was managed by suturing the injury. Additionally, there was one case of perforation of the peritoneum during patch closure at TAPP repair, which was managed by additional dissection of the peritoneum.

There were no significant differences in postoperative stay between the TAPP group (7.3 hours) and the Lichtenstein group (8.4 hours) with a p-value of 0.2. However, patients in the TAPP group returned to work significantly earlier (mean 9.2 days) compared to the Lichtenstein group (mean 14.1 days) with a p-value of 0.0001. Table 2.

Patients were evaluated for postoperative recovery by visual analogue scale (VAS) score and Time to return to Normal activity. Postoperative pain was evaluated on Post Operative Day 1 (POD1), POD2 and POD7 which was higher in open inguinal hernia repair (6.73, 5.10 and 2.19 respectively) as compared to TAPP repair (4.87, 2.54 and 1.57 respectively).

The TAPP repair group also demonstrated favorable outcomes in terms of time to return to normal activity (9.3 days vs 13.8 days) and cosmetically superior results with a smaller scar size (3.6 cm vs 7.5 cm). (table2)

Table 2: Comparison of Laparoscopic TAPP repair and Open Hernioplasty (Lichtenstein).

Characteristics	TAPP Repair	Open Repair (Lichtenstein)	Level of significance (p value)
Operative Time (min) (Unilateral cases)	65.28	43.55	0.002
Operative Time (min) (Bilateral cases)	116.27	84.95	0.0001
Intra-operative Complications	3 (4.4%)	3 (9.3%)	0.5
Postoperative stay (hours)	7.35	8.41	0.2
Postoperative pain score (VAS)			
POD1	4.87	6.7	0.001
POD2	2.54	5.1	0.001
POD7	1.57	2.1	0.001
Time To Return To Normal Activity (days)	9.28	14.12	0.0001
Scar Size (cm)	3.6	7.5	0.0001

The overall Early postoperative complication rate in the TAPP group was (9.4%) while in the Lichtenstein group was (10.3%) with not statistically significant ($p = 0.2$) between the two groups. The spectrum of complications was different in the two groups, with wound infections and seroma & urinary retention being more common in

the Lichtenstein group. There was one patient in the TAPP group who underwent surgical re-intervention within the first 24 hours due to a technical error during the initial surgery, which was managed through open surgery. (Table3)

Table 3: Comparison of Laparoscopic TAPP repair and Open Hernioplasty (Lichtenstein).

Characteristics	TAPP Repair	Open Repair (Lichtenstein)	Level of significance (p value)
Overall Early Postoperative Complications	3 (9.4%)	7 (10.3%)	0.2
Wound seroma	0 (0%)	1 (1.5%)	0.8
Wound infection	0 (0%)	1 (1.5%)	0.8
Urinary retention	1 (3.2%)	3 (4.4%)	0.5
Scrotal edema	1 (3.2%)	2 (2.9%)	0.2
surgical re-intervention within the first 24 hours	1 (3.2%)	0 (0%)	0.7

4. DISCUSSION

Hernias have been a subject of interest since the dawn of surgical history. The history of hernia repair is the history of surgery.^[5] The ideal repair should allow the patient rapid return to work, leisure and recreation at a reasonable cost to the patient and the wider community.^[6] The laparoscopic technique has replaced the open approach in many surgical procedures and now

laparoscopic procedures for inguinal hernia are gradually replacing open procedures, those who favor using the laparoscope for hernia repair state chiefly the belief that laparoscopic hernia repair is more desirable for the patient. The postoperative recovery period, postoperative pain and rapid return to normal occupational activity are considerably less than comparable postoperative characteristics following the "classic" external

approaches to hernia repair.^[7] The Laparoscopic TAPP repair was initially associated with higher operative time and post operative complications but with increasing expertise and advancing technologies these are now comparable to open hernioplasty, In MRC trial^[8] and Wellwood et al.^[9] have comparable operative time.

Repairing recurrent inguinal hernias using laparoscopic surgery was easier and took the same amount of time as open surgery. This is attributed to the access to a new surgical field in laparoscopic surgery compared to open surgery, where adhesions and anatomical distortions posed a challenge to the repair. This underscores the significance of laparoscopic surgery in managing recurrent inguinal hernias.

Visceral injuries e.g. Bladder injury were more common with laparoscopic repair. The urinary bladder may be inadvertently injured during dissection of a direct inguinal hernia sac, but rarely during repair of an indirect defect. Testicular swelling and atrophy is seen after inguinal hernia repair. Edema of the scrotum or testis may be secondary to edema or hematoma of the inguinal canal that tracks inferomedially to the scrotum in a dependent fashion. Alternatively, a tender testicle or an atrophic testicle may be secondary to injury to the blood supply to the genitals during dissection and isolation of the cord.¹ MRC trial⁸ and Doueck et al.^[10] noted lower postoperative complication with TAPP repair. In the MRC Laparoscopic Groin Hernia Trial Group and in other studies follow-up of patients up to 7 days after surgery indicates that laparoscopic hernia repair causes less pain than open repair, assessed by use of analgesics and pain scores.^[8,11] A large number of randomized control trials and meta analyses have shown that patients who undergo laparoscopic hernia repair experiences less pain in the early postoperative period, have lower analgesic and narcotic requirements, better cosmetic and early return to normal activities. Time to return to normal activity was lower in laparoscopic TAPP repair as suggested by MRC trial⁸ and Pironi D et al.^[12]

5. CONCLUSION

Laparoscopic TAPP hernioplasty offers a significant advantage over open tension free hernioplasty. It is associated with less post operative pain and analgesia requirement. The frequency of post operative pain is also less with laparoscopic TAPP hernioplasty as compared to open. Laparoscopic TAPP hernioplasty is associated with early recovery, lower analgesic dose requirement early resumption of normal activity and better quality of life in consideration with bodily pain. However, operative time is prolonged in laparoscopic TAPP Hernioplasty as compared to open. It has no statistical advantage in relation to wound infection, wound seroma and hematoma, scrotal edema, a The choice of the procedure should be based on surgeon or patient preference. In spite of the fact that most hernia repairs are performed as open procedures, there is room for an expansion of laparoscopic hernia repair. Bilateral and recurrent hernias

are well accepted specific indications for laparoscopic repair.

6. ETHICAL APPROVAL

This research received approval from the scientific research ethics committee at Tishreen University and Tishreen University Hospital.

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