

COMPARATIVE STUDY OF CLINICAL OUTCOME OF LAPAROSCOPIC TOTAL EXTRAPERITONEAL REPAIR VS LICHTENSTEIN REPAIR IN 50 CASES OF INGUINAL HERNIA

AUTHORS: -

Dr. Pratik H. Vyas, Associate Professor, Smt. NHL Municipal Medical College, Ahmedabad Pin – 380006.

dr.pratik81@gmail.com

Dr. Kirit D. Parmar, Professor, Smt. NHL Municipal Medical College, Ahmedabad Pin – 380006.

drkiritparmar@gmail.com

Dr. Dhaval G. Patel, Second Year Resident, Smt. NHL Municipal Medical College, Ahmedabad Pin – 380006. dhaval.patel102@yahoo.in

Dr. Ankit Bansal, Smt. NHL Municipal Medical College, Ahmedabad Pin – 380006. drankitbansal90@gmail.com

Dr. Anees S. Puthawala, Smt. NHL Municipal Medical College, Ahmedabad Pin – 380006. anees.puthawala@gmail.com

Corresponding Author:

Dr. Kirit D. Parmar, Professor & Head of unit, Department of General Surgery. drkiritparmar@gmail.com

ABSTRACT

INTRODUCTION

Abdominal hernia includes groin hernia (70%), umbilical hernia (15%), epigastric hernia (7%) and incisional hernia (9%). After Bassini's published paper on the techniques of tissue repair, numerous modifications like use of prosthetic material by Usher and open preperitoneal mesh repair introduced by Stoppa but these were associated with significant postoperative pain and morbidity. The concept of Tension free open mesh repair was first introduced by Lichtenstein. Totally extra peritoneal hernia repair (TEP) is a relatively new technique of repairing inguinal hernias laparoscopically where the dissection and repair are carried out without violating the peritoneal cavity laparoscopically. This study compares the results of laparoscopic hernioplasty by Total Extra-Peritoneal (TEP) technique and Lichtenstein tension free repair hernioplasty technique by open method and determine if the relative advantages achieved could be put in practice in large scale and also identify criteria which may help to choose the patient to a particular type of repair to obtain encouraging results for that particular patient.

METHODS AND MATERIALS:

The present study was carried out with 50 patients admitted in the department of general surgery at our hospital from period May 2018 to December 2019.

Inclusion criteria:

- Patient aged 18 years and above giving written valid consent.
- Patients diagnosed as having unilateral incomplete inguinal hernia.
- Patients medically fit to undergo the procedure.

Exclusion criteria:

- Single or multiple previous lower abdominal surgeries;
- Complicated inguinal hernia, i.e., irreducible, obstructed, or strangulated;
- Uncorrected coagulopathies;
- Patients unfit for general anaesthesia

RESULT

In our prospective Comparative study of laparoscopic and open inguinal hernioplasty, we studied 50 patients with unilateral direct inguinal hernia. Average operative time in open repair was 48 minutes and 70 minutes in laparoscopic repair. In TEP, complications such as difficulty in dissection was seen in 3 patients (12%), accidental opening of peritoneum in 2 patients (8%), and inadequate/inability to insufflate was seen in 1 patient (4%). On postoperative day 7, 8 patients (32%) have mild pain and 3 patients (12%) have moderate pain after open hernia

repair. And rest 14(56%) patients experienced no pain. After laparoscopic hernia repair 16 patients (64%) have no pain and 7 patients (28%) have mild pain and 2 patients (8%) had moderate pain. Duration of hospital stay in open (3.5 days) is more compared to laparoscopic repair (2.5 days). Return to normal routine activities in open repair (15.3 days) is delayed than laparoscopic repair (12.92 days).

CONCLUSION

Here, we have done prospective comparative study of clinical outcome of laparoscopic TEP Vs Lichtenstein open inguinal repair in 50 cases of inguinal hernia. We have reached to following conclusion in our study.

- Incidence of wound infection and scrotal edema are more in open repair then TEP.
- TEP is less painful in the early postoperative period leading to earlier ambulation than open repair.
- TEP results in significantly earlier return to work and better cosmetic results.
- TEP results in decreased hospital stay and faster recovery than open repair.
- Average operative repair in TEP is more (70 mins) compared to open repair (48mins)
- Issue of steep learning curve for laparoscopic surgery should be addressed with better supervision and standardization of training in laparoscopy

KEY WORDS: - Inguinal Hernia, Laparoscopy, Extraperitoneal Repair

INTRODUCTION

Abdominal hernia includes groin hernia (70%), umbilical hernia (15%), epigastric hernia (7%) and incisional hernia (9%). Most abdominal hernia arises in the groin (from the Latin word *inguen*) so named Inguinal because it is the transition zone between the abdomen and thigh. Inguinal canal is a potential weak opening in the lower abdominal wall, which allows the passage of blood vessels, lymphatic, vas deference and nerves to enter the scrotum. Approximately 96% of all the groin hernias are inguinal and remaining 4% being femoral^[1]

Since Bassini published his landmark paper on the technique of tissue repair^[2] in 1887, numerous modifications have been proposed. There has been a revolution in surgical procedures for groin hernia repairs after the introduction of prosthetic material by Usher^[3] in 1958. Open Pre-peritoneal mesh repair by Stoppa^[4] was found to reduce recurrence rate significantly for multi-recurrent groin hernias. However, it was associated with significant postoperative pain and morbidity. The concept of Tension Free Open Mesh Repair was first described by Lichtenstein in 1989^[5]

Totally extra peritoneal hernia repair (TEP) is a relatively new technique of repairing inguinal hernias laparoscopically where the dissection and repair are carried out without violating the peritoneal cavity laparoscopically. McKernan and Law first introduced totally extra peritoneal hernia repair in 1993^[6] Bilateral inguinal hernias and recurrent hernias after open repair are two well- accepted indications for TEP. In patients with bilateral hernias, both sides can be dissected, examined, and repaired using the same ports, thus the morbidity associated with port insertion and wound complications remains low. TEP is technically challenging and the learning curve has been reported to be at least 60 procedures, if not more^[7,8]

Our purpose in this study is to compare the results of laparoscopic hernioplasty by Total Extra-Peritoneal (TEP) technique and Lichtenstein tension free repair hernioplasty technique by open method and determine if the relative advantages achieved could be put in practice in large scale and also identify criteria which may help stratify the patient to a particular type of repair to obtain encouraging results for that particular patient.

AIMS AND OBJECTIVES

The study is prospective study; with intend to address Lichtenstein onlay hernioplasty and total extraperitoneal (TEP) laparoscopic hernioplasty in patients admitted in our hospital from May 2018 to December 2019 with specific observational objectives, as follows –

- To Study and compare the operative time and technique applied in both methods.
- To study, quantify and compare the postoperative pain in patients undergoing Lichtenstein repair and TEP and subsequent need of analgesia and need of antibiotics
- To study and compare recurrence rate and postoperative complications such as wound complications – infection, wound dehiscence and seroma, scrotal edema etc. in patients undergoing Lichtenstein repair Vs TEP.
- To study and compare the duration of hospital stay, duration in which an individual is fit to return to work.

MATERIALS AND METHODOLOGY

The present study was carried out with 50 patients admitted in the department of general surgery at our hospital from period May 2018 to December 2019. A prospective study was planned. Inguinal hernia cases were allocated randomly for open repair and laparoscopic repair and compared. Postoperatively both the groups were given VAS score card to express the intensity of pain and the same were recorded. Also, quality of life was assessed using score card which includes parameters like-day of mobilization, day of discharge, day of return to work etc.

INCLUSION CRITERIA:

- Patient aged 18 years and above giving written valid consent.
- Patients diagnosed as having unilateral incomplete inguinal hernia.
- Patients medically fit to undergo the procedure.

EXCLUSION CRITERIA:

- Single or multiple previous lower abdominal surgeries;
- Complicated inguinal hernia, i.e., irreducible, obstructed, or strangulated;
- Uncorrected coagulopathies;
- Patients unfit for general anaesthesia

METHODOLOGY:

A dose of prophylactic antibiotic was given 30 minutes before surgery. Post operatively the patients were kept nil by mouth and advised complete bed rest till the effect of anaesthesia is completely worn out, till then they are given supportive maintenance intravenous fluids. Patients were advised and encouraged to ambulate and start their activities of daily life as early as possible.

Prophylactic oral antibiotics were given for duration of 5 to 7 days, of which parenteral antibiotics were given for at first 24 hours. Analgesics were given at 12-hour interval for a period of 3 to 5 days, on first POD intravenous analgesics was given then shifted on to oral tablets. Patients were observed for any complications like subcutaneous emphysema, mediastinitis, CO₂ narcosis in the immediate post- operative period and scrotal hematoma, seroma, wound sepsis during their stay in hospital and also assessed for postoperative pain and its severity.

- **Operative Methods:**
 - Patient had undergone either open (Lichtenstein meshplasty) or laparoscopic methods (TEP).
- **Post-operative period:**
 - Nil by mouth till bowel sound returns.

- Intravenous drip given till oral liquids were started.
- Early ambulation encouraged after that.

OBSERVATION AND DISCUSSION

In present study, 50 patients were enrolled as per selection criteria and randomly operated for open and laparoscopic hernia repair. In our Study, out of 50 patients, 25 patients were operated by Lichtenstein tension free repair and 25 patients were operated by Total extraperitoneal repair.

Following are the observation and their relevant discussion between open and laparoscopic method of mesh repair.

TABLE 1: - OPERATIVE TIME

Time(min.)	Open		Laparoscopy	
	(n=25)	%	(n=25)	%
< 30	0	0	0	0
30 – 45	14	56	0	0
46 – 60	9	36	12	48
> 60	2	8	13	52

- From table 1 we see that, most of the open hernia repair (56%) is completed in 30-45 minutes, and in laparoscopic repair (52%) takes more than 60 minutes. Average operative time in open repair is 48 minutes and 70 minutes in laparoscopic repair which is significantly longer. P (<0.001)

TABLE 2: -PER-OPERATIVE COMPLICATIONS

Difficulties	Open	Laparoscopic
Uncontrolled Bleeding	0	0
Difficulty In dissection	0	3(12%)
Accidental opening of peritoneum	0	2 (8%)
Inability /inadequate Insufflation	Not applicable	1(4%)
Injury to visceral Structures	0	0

- Table 2 indicates that no complications were faced in open technique. While in TEP complications such as difficulty in dissection was seen in 3 patients (12%), accidental opening of peritoneum in 2 patients (8%), and inadequate/inability to insufflate was seen in 1 patient (4%).

TABLE 3: POSTOPERATIVE PAIN AT DAY 3

VAS at Day 3				
VAS	Open (n=25)		Laparoscopy (n=25)	
P0	3	12%	7	28%
P1	14	56%	13	52%
P2	5	20%	3	12%
P3	3	12%	2	8%

- From table 3 we see that, 3 patients (12%) were having no pain, 14 patients (56%) have mild pain and 5 patients (20%) have moderate pain after open hernia repair. In laparoscopic group, 7 patients (28%) were pain free, 13 patients (52%) have mild pain and 3 patients (12%) have moderate pain.

TABLE: -4 POSTOPERATIVE COMPLICATIONS

Complication	Open (n=25)		Laparoscopy (n=25)	
	Count	Percentage	Count	Percentage
Surgical Emphysema	0	0%	1	4%
Urinary Retention	3	12%	Catheterized	-----
Scrotal Oedema	5	20%	4	16%
Hematoma	0	0%	0	0%
Seroma	3	12%	0	0%
Chest Infection	0	0%	0	0%
Wound Infection	4	16%	0	0%
Chronic Pain	3	12%	0	0%
Port site Hernia	Not Applicable	-	0	0%
Recurrence	0	0%	0	0%

- From table 4 we see that complications are more in open hernia repair. 3 patients (12%) had retention of urine, 5 patients (20%) have scrotal oedema, and 3 patients (12%) has seroma and 4 patients (16%) had wound infection in open hernia repair. 3 patients (12%) have chronic pain (>90 days) in open hernia repairs while in laparoscopic group, 1 patient (4%) had surgical emphysema and 4 patients (16%) had scrotal oedema.

TABLE 5: - DURATION OF HOSPITAL STAY

Duration of Hospital Stay (Days)	1 to 2	3 to 4	>4	Mean
Open (n=25)	6	14	5	3.5 days
Laparoscopy (n=25)	16	4	5	2.52 days

- From table 5 we see that, mean hospital stay in open repair are 3.5days, and 2.5 days in laparoscopic repair with significant statistical difference(p=0.03)

TABLE 6: - RETURN TO NORMAL ACTIVITIES

Days	10 to 12	13 to 15	16 to 18	>18	Mean
Open (n=25)	5	12	6	2	15.3
Laparoscopy (n=25)	9	10	6	0	12.92

- From table 6 we see that, mean time to return to normal routine activities is longer in open repair with 15.3 days, and 12.92 days in laparoscopic repair (p<0.001).

SUMMARY

In our prospective comparative study of laparoscopic and open inguinal hernioplasty, we studied 50 patients with unilateral direct inguinal hernia.

In our study average operative time in open repair was 48 minutes and 70 minutes in laparoscopic repair while in Lal et. al average operative time in open repair is 54 minutes and 76 minutes in laparoscopic repair.^[9] In Bringman et.al Average operative time in open repair is 45 minutes and 50 minutes in laparoscopic repair.^[10]

In our study on post-operative day 3, 3 patients (12%) were having no pain, 14 patients (56%) have mild pain and 5 patients (20%) have moderate pain after open hernia repair. In laparoscopic group, 7 patients (28%) were pain free, 13 patients (52%) have mild pain and 3 patients (12%) have moderate pain. In Lal et.al the mean pain scores in the TEP group were 2.64 ± 1.4 at 12 h and 1.76 ± 1.4 at 24 h. These scores were significantly lower than the corresponding scores of 3.52 ± 1.7 (p < 0.04) and 2.74 ± 1.5 (p < 0.01) in the open repair group.^[9] In Bringman's study pain score was taken at 2 and 4 hours after operation and on 1st postoperative day. It showed VAS was higher in open than laparoscopic repair.^[10]

In open hernia repair 3 patients (12%) had retention of urine, 5 patients (20%) have scrotal oedema and 3 patients (12%) has seroma and 4 patients (16%) had wound infection. In TEP complications such as difficulty in dissection was seen in 3 patients (12%), accidental opening of peritoneum in 2 patients (8%), and inadequate/inability to insufflate was seen in 1 patient (4%), 1 patient (4%) had surgical emphysema and 4 patients (16%) had scrotal oedema. In Lal et. al no significant complications were recorded.^[9] While in Bringman's study, above mentioned complications were 9% in case of TEP while 21% in case of Lichtenstein method.^[10]

Duration of hospital stay in open (3.5 days) is more compared to laparoscopic repair (2.5 days). In Bringman's study, over 90% patients operated on day care basis and rest were discharged within 24 hours; they have found no intra operative and less postoperative complications.^[10]

Return to normal routine activities in open repair (15.3 days) is delayed than laparoscopic repair (12.92 days). In Lal.et al, the time until return to work was significantly lower in the TEP

group (12.8 ± 7.1) days versus 19.3 ± 4.3 days; than in the open group ($p < 0.001$).^[9] In Bringman's study mean full recovery period for TEP found 14 days while 28 days for open method.^[10]

CONCLUSION

Here, we have done prospective comparative study of clinical outcome of laparoscopic TEP Vs Lichtenstein open inguinal repair in 50 cases of inguinal hernia. We have reached to following conclusion in our study.

- Incidence of wound infection and scrotal edema are more in open repair then TEP.
- TEP is less painful in the early postoperative period leading to earlier ambulation than open repair.
- TEP results in significantly earlier return to work and better cosmetic results.
- TEP results in decreased hospital stay and faster recovery than open repair.
- Average operative repair in TEP is more (70 mins) compared to open repair (48mins)
- Issue of steep learning curve for laparoscopic surgery should be addressed with better supervision and standardization of training in laparoscopy.

REFERENCES

1. Ira MR: Demographic and socioeconomic aspects of hernia repair in the United States in 2003. *The Surgical clinics of North America* 2003;83(5):1045- 1051.
2. Bassini E: Sulla cura redicala dell'ernia inguinale. *Arch Soc Ital Chir* 1887; 4:380-388 quoted by Sakorafas GH, Halikias I, Nissotakis C, et al. Open tension free repair of inguinal hernias; The Lichtenstein technique. *BMC Surgery* 2001; 1:35
3. Usher F, Cogan J, Lowry T. A new technique for the repair of inguinal and incisional hernias. *Arch Surg* 1960; 81: 187-194.
4. Stoppa R E, Rives J L, Warlaumont CR palot JP. Verhaeghe PJ, Delaltre JF. The use of Dacron in the repair of hernias of the groin. *Surg Clin North Am* 1984; 64:269-85
5. Lichtenstein IL, Shulman AC, Amid PK, Montllor MM. The tension free hernioplasty. *Am J Surg* 1989; 157:188-93.
6. McKernan JB, Laws HL. Laparoscopic repair of inguinal hernias using a totally extraperitoneal prosthetic approach. *Surg Endosc.* 1993;7(1):26–8.
7. Choi YY, Kim Z, Hur KY. Learning curve for laparoscopic totally extraperitoneal repair of inguinal hernia. *Can J Surg.* 2012;55(1):33–6.
8. Park BS, et al. Factors influencing on difficulty with laparoscopic total extraperitoneal repair according to learning period. *Ann Surg Treat Res.* 2014;87(4):203-8
9. Pawanindra Lal, Randomized controlled study of laparoscopic total extraperitoneal vs open Lichtenstein inguinal hernia repair. Springer-Verlag New York. *Surgical Endoscopy* (2003) 17: 850–856
10. Patino J: A history of the treatment of hernia. In: *Hernia* 5th edn. Edited by Nyhus LM CR. Philadelphia: Lippincott; 2002: 17-28.

Conflict of Interest:

Nil

Acknowledgement:

Nil

Funding:

Nil