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Original Research Article

Comparison of laparoscopic totally extraperitoneal mesh hernioplasty with Lichtenstein tension free mesh hernioplasty

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ABSTRACT

Background: The purpose of the study was to observe the differences between the two methods of inguinal hernia repair in terms of operative time, postoperative pain, need for analgesia, hospital stay and postoperative complications.
Methods: This prospective study conducted in the department of Surgery, IGMC Shimla, included 40 patients of inguinal hernia who were randomized to TEP and Lichtenstein tension free mesh hernioplasty groups randomly. After thorough clinical examination, whereas all patients with unilateral incomplete inguinal hernia fit for laparoscopic surgery were included in the present study, those with bilateral inguinal hernia, unwilling for laparoscopic surgery or who had complicated and recurrent inguinal hernia, poor cardiopulmonary reserve or were immunocompromised were excluded from the study.
Results: Laparoscopic TEP is significantly lengthier procedure than open Lichtenstein repair especially in the learning phase as the mean operative time of TEP repair was 75.6 minutes and that of open Lichtenstein repair was 54 minutes. Not only postoperative pain recorded by using VAS was significantly less in the in the first 4 postoperative hours there was significantly less consumption of post-operative analgesic in TEP as compared to Lichtenstein group. No major complications in either group but only minor complications were observed in TEP group.
Conclusions: TEP can be recommended to those desiring better cosmetic results and early return to work as TEP was found to be associated with less pain in the first 4 hours after surgery.

Keywords: Lichtenstein tension free mesh hernioplasty, Totally extraperitoneal mesh hernioplasty, Visual analogue scale

INTRODUCTION

The first surgical treatment for inguinal hernia was recorded between 330-250 BC, and today inguinal hernioplasty is the most common surgical procedure performed by general surgeons.[1] The latter part of the eighteenth century heralded dramatic changes as the anatomy of the groin became better understood. Edoardo Bassini (1844-1924) considered the father of modern inguinal hernia surgery, incorporated the developing disciplines of antisepsis and anesthesia with a new operation that included reconstruction of the inguinal floor along with high ligation of the hernia sac. It was only in the middle of the twentieth century that Bassini's concept was improved by Shouldice in 1945, McVay and Anson in 1942, showing the importance of the fascia transversalis. Lichtenstein theorized that by using mesh prosthesis to bridge the hernia defect rather than closing it with sutures, as with the Bassini repair and its modifications, tension is avoided ostensibly resulting in a less painful operation and lower recurrence rates. Lichtenstein repair has now become the method of choice

in the United States.[2] Laparoscopic inguinal hernia repair is another method of tension-free mesh repair, based on a preperitoneal approach. Proponents tout quicker recovery, less pain, better visualization of anatomy, utility infixing all inguinal hernia defects and decreased surgical site infections.[3-5] Critics emphasize longer operative times, technical challenges, and increased cost.

Objectives

The objectives of the present study were the comparison of laparoscopic totally extraperitoneal mesh hernioplasty with Lichtenstein tension free hernioplasty in inguinal hernia repair in terms of total operative time, incidence of intra-operative and postoperative complications rate within three months, post-operative pain [assessed by visual analogue score] and duration of postoperative hospital stay.

METHODS

This comparative study was conducted in the Department of Surgery, IGMC, Shimla from 1st June 2012 to 31st May 2013 and included 40 patients who were admitted in department of surgery with inguinal hernia.

Inclusion criteria

All patients with unilateral incomplete inguinal hernia fit for laparoscopic surgery.

Patients with the following conditions were excluded from the study

- Patients with bilateral inguinal hernia.
- Previously operated patients whose earlier surgery scars or adhesions were likely to interfere with the present procedure.
- Unwilling for laparoscopic procedure.
- Complicated inguinal hernia and recurrent inguinal hernia.
- Previous pelvic surgery.
- Poor cardio-pulmonary reserve and immuno compromised state.

Preoperative assessment with complete history and physical examination was done. Patients were examined in both standing and supine position. Swellings other than hernias in the groin were ruled out and so were strangulated and incarcerated hernias. A clear disclosure of the benefits and pertinent risks of both laparoscopic and open approach were made. After taking informed consent, patients were alternated into two equal groups of 20 patients each. Group A included patients in whom Lichteinstein tension free hernioplasty was done and Group B included patients who underwent TEP. The results were statistically evaluated and analyzed by Chi-square test.

Briefly mentioning, in Lichtenstein tension free mesh hernioplasty, polypropylene mesh prosthesis with a minimum size of 16×8 cm for an adult was positioned over the inguinal floor after tailoring its medial end to the standard shape resembling the tracing of the footprint, with a lower sharper angle to fit into the angle between the inguinal ligament and rectus sheath and was secured with a polypropylene suture (2.0) to the insertion of rectus sheath to the pubic bone overlapping the bone by one to two centimetres.

In TEP the patients were placed supine in a 10° Trendelenburg position after putting in a bladder catheter to empty the bladder before the operation and it was performed using three midline ports one 10 mm (Hasons trocar) in infraumbilical region, second 2 cm above the suprapubic region and third inbetween it and the Hasons trocar (both 5 mm). CO_2 was used to insufflate the preperitoneal space to a pressure of 10 to 12 mm of Hg. As in open Lichtenstein tension free mesh hernioplasty, polypropylene mesh of 15×12 cm was used in all cases with minimum 3 cm overlap to cover all potential hernia sites and it was fixed medially at Cooper's ligament and laterally above the iliopubic tract.

Otherwise both operative procedures were completed using standard operative techniques.

Note was made of time taken for each case in each group of techniques as well as of preoperative complications like vascular, visceral or nerve injuries. Postoperative parameters like like pain, pneumoscrotum seroma, hematoma, wound infection, length of hospital stay etc., were recorded as per proforma. Patients were followed up to 6 months and any delayed complication like persistent postoperative numbness, pain or port site or otherwise recurrences was noted.

RESULTS

The age of the patients ranged from 18 to 80 years with a mean of 56 years in the TEP group and from 20 to 84 years with a mean of 60 years in Lichtenstein mesh hernioplasty group. The youngest patient in TEP group was 18 years of age, whereas in Lichtenstein mesh hernioplasty group youngest patient was of 20 years while the oldest patient in both the groups were of 80 and 85 years respectively (Table 1).

Table 1: Depicting age of the patients in TEP and Lichtenstein group.

Age group (in years)	TEP (n=20)	Lichtenstein (n=20)
	N (%)	N (%)
<20	2 (10)	2 (10)
21-35	-	3 (15)
36-50	7 (35)	5 (25)
51-65	6 (30)	5 (25)
>65	5 (25)	5 (25)

Duration of surgery was less than 60 minutes in three and fifteen cases of TEP and Lichtenstein group respectively. Between 61-90 mins, eleven cases of TEP and five cases

of Lichtenstein mesh hernioplasty were done. In 91-120 mins three and between 120-150 mins three cases of TEP were performed as depicted in Table 2.

Table 2: Duration of surgery in TEP and Lichtenstein groups.

Duration of surgery (in minutes)	Lap TEP	Open Lichtenstein
30-60	3	15
61-90	11	5
91-120	3	-
121-150	3	-

Laparoscopic TEP procedure was found to be significantly ($p<0.01$) lengthier than Lichtenstein repair. The post-operative pain was recorded at 2, 4, 8, 16 and 24 hours after operation by using visual analogue scale (VAS) pain scoring system. The mean VAS score out of 10 at 2 hours was 2.64 (±1.6613) in TEP and Lichtenstein groups respectively. The mean pain score of TEP and Lichtenstein repair at 4 hours was 1.76 (±1.3625) and 2.74 (±1.4866) respectively.

Table 3: Mean VAS score in TEP and Lichtenstein groups.

Time after operation (in hours)	TEP	Lichtenstein	P value
2	2.64	3.52	<0.04
4	1.76	2.74	<0.01
8	1.4	1.8	0.06
16	0.72	1.08	0.06

The p value for the mean VAS scores at 2 and 4 hours was less than 0.04 and 0.01 between the TEP and Lichtenstein groups respectively, which was statistically significant. At 8, 16, 24 hours p value was more than 0.05 between the two groups which was statistically insignificant.

Table 4: Complications in both the groups.

Complications	TEP	Lichtenstein
Seroma	2	-
Hematoma	-	3
Wound infection	-	-
Neuralgia	-	-
Pneumoscrotum	3	-
UTI	1	-
Scrotal edema	-	3

Requirement of the rescue analgesic in TEP group was 1.5 and in Lichtenstein group were 3.6 with a p value of less than 0.01, which is statistically significant (Table 3). There were no intraoperative complications in either group. There were three cases of pneumoscrotum in the TEP group detected in the immediate postoperative period, which resolved without intervention. There were two cases of seroma formation, for which needle aspiration was done but no hematoma and wound infection occurred in the TEP group. One case of UTI occurred in the TEP group. In the Lichtenstein group, there were a total of six postoperative complications which included three cases of hematoma and three case of scrotal edema. $P>0.05$ was insignificant (Table 4).

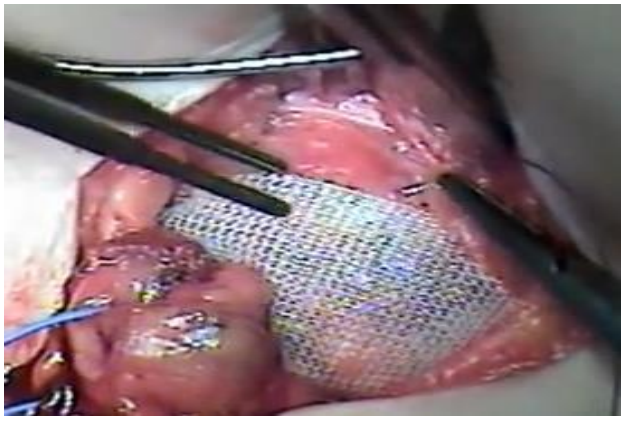

Figure 1: Polypropyelene mesh being placed in Lichtenstein tension free mesh hernioplasty.

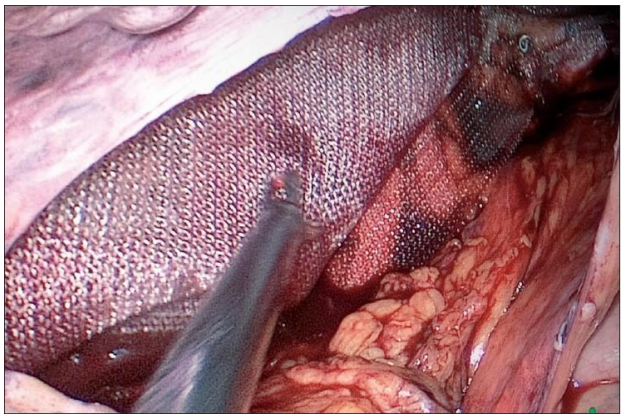

Figure 2: Mesh placement in pre peritoneal space in TEP.

In the TEP group, eleven patients were discharged on first POD while eight were discharged on second POD. Remaining patients were discharged on third POD.

In the Lichtenstein group ten patients were discharged on first POD while eight patients went home on second POD. Two patients were discharged on third POD with a mean of 1.6 and 1.5 respectively in Lichtenstein and TEP group. As p value was >0.05, the difference between two groups was statistically insignificant. There were no recurrences in both the groups over a follow up period of six months.

DISCUSSION

The present study was carried out on 40 patients attending the surgical outpatient clinics of Indira Gandhi Medical College, Shimla, Himachal Pradesh with the diagnosis of inguinal hernia.

Inguinal hernia, most probably has been a disease ever since mankind exisited.[6] The year 1887 was revolutionary year in the history of hernia disease as Bassini combined the principles of asepsis with the reconstruction of the inguinal floor. The fear of operation, disfiguring scars, prolonged recovery time and associated pain has been the major concern of most patients in open hernia repair. Moreover the recurrence rates with previous hernia repairs as in Bassini's approach is ranging from 5-20% and is no longer acceptable.[7] Lichtenstein et al, emphasized the mandatory effective use of mesh reinforcement of inguinal floor, thus reducing the recurrence rate to around 1%.[8] Currently though open hernia repair is preferred by most surgeons but laparoscopic procedures have started catching up, with TEP being the front runner, and the first report of Laparoscopic totally extraperitoneal mesh hernioplasty came in 1982, performed by Ger.[9]

The majority (55%) of patients were in the age range of 35-60 years and the age of the patients in the present study was comparable in both the study groups groups, p value being >0.05.

The mean operative time of TEP repair 75.6 (range 70-150) minutes was significantly higher as compared to that of the open Lichtenstein repair which was 54 (range 45-70) minutes. The operative time improved with the learning curve of the surgeon as it reduced from a mean of 96 minutes in the first 10 cases to 70 minutes in the next 10 cases. This mean operative time of TEP of 75.6 minutes in our series was comparable to the operative time of Kald et al (80 minutes) and was less than the operative time of Ramshaw (89.2 min), while it was higher in our study as compared to Topal et al (42 min) and Spitz et al (65 min).[10-13]

Our results of operative time for TEP and Lichtenstein (75.6 vs 54 min respectively) were comparable to the results of Heikkinen et al in a similar study (67.5 min. vs 53 min).[14]

Postoperative pain was recorded using Visual analogue scale (VAS) pain scoring system. The mean pain score at 2 hours and 4 hours was significantly low in TEP repair as compared to Lichtenstein repair ($p<0.04$ and $<.005$ respectively). The pain scores at 16 hours and 24 hours were less in TEP group but did not reach significant levels ($p=0.06$ and 0.07 respectively). The results are comparable to the results of Liem et al and Champault et al whereas Schrenk et al did not find any difference.[15-17]

The mean postoperative analgesic (inj. lornoxicam) consumption was 1.5 (range 1-3) in TEP group as compared to 3.6 (range 1-5) in open group and was significantly less in TEP group ($p<.001$). This is comparable to the result of Champault et al, whereas Gainant et al, did not find any significant differences.[16,18]

There were no intraoperative complications in both groups. The result was better than that of Ramshaw et al (0.6% bladder injury) and Liem et al (2.25% epigastic artery injury and one case of vas deferens injury) while comparable to the results of Schrenk et al.[11,17,19]

The incidence of seroma formation was 10% (2 cases) in the TEP group. Both cases required needle aspiration and thereafter no recurrences occured. The seroma formation in our study was comparable to studies done by Kald et al (2%), Spitz et al (1.5%) and Liem et al (1%) and less than in the study of Cohen et al (6%).[10,13,20]

There were 3 (15%) cases of hematoma formation in open Lichtenstein group. There was no incidence of Hematoma formation in TEP group in the present study as compared to 1% reported by Halkik et al and 1.8% by Liem et al in one study and 5% in another study.[15,21]

There was no incidence of neuralgia in both TEP and Lichtenstein hernia repair group. Results were similar to the study done by Spitz et al.[13] Pneumoscrotum developed in 3 (15%) cases and was resolved within 3 hours of surgery. It was comparable to Liem et al in one study while in another study, he reported persistence of pneumoscrotum in 1% cases.[15]

There was one case (5%) of urinary tract infection in the TEP group while none in open Lichtenstein tension free hernia mesh hernioplasty group evidence of urinary tract in either group as comparable to Liem et al who reported 3 cases. Overall total number of complications were similar in both groups, similar to that in the studies done by Vidovic et al and Lal et al.[22,23]

The median hospital stay was 1.5 and 1.6 days each in TEP and Lichtenstein group respectively, whereas Liem et al reported it to be 1 day and 2 days respectively, and Topal et al reported as 2 days in TEP group.[12,15] The hospital stay was significantly high in the study by Schrenk et al (4.4 days for TEP and 3.7 days for open).[17]

In our study postoperative stay in TEP and Lichtenstein tension free mesh hernioplasty was statistically insignificant similar to the study done by Langveld et al and Hasan et al.[24,25]

There was no short term recurrence in either TEP or Lichtenstein group, in the present study in the mean follow up period of 24 weeks. In comparison in TEP, recurrence was reported by Ramshaw et al as (0.5%), by Liem et al as (1%) and by O'Riordain et al as (1.6%).[26] Gainant et al reported a recurrence of 1.1% in TEP and 2% in the open group.[18]

CONCLUSION

Though Lichtenstein tension free mesh hernioplasty is the gold standard for inguinal hernia surgery, TEP, a significantly lengthier procedure is associated with less post-operative pain especially in the first 24 hours and in experienced hands can be recommended to those desiring cosmetic results and early return to work.

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REFERENCES

1. Rutkow M. Surgical operations in United States. In Arch Surg. 1997;132:983:90.
2. Amid PK. Lichtenstein tension free hernioplasty: its inception, evaluation and principles. Hernia. 2004;8(1):1-7.
3. Heikkinen T, Bringman S, Ohtonen P, Kunelius P, Haukipuro K, Hulkko A. Five-year outcome of laparoscopic and Lichtenstein hernioplasties. Surg Endosc. 2004;18(3):518-22.
4. Kumar S, Nixon SJ, Macintyre IMC. Laparoscopic or Lichtenstein repair for recurrent inguinal hernia: one unit's experience. J R Coll Surg Edinb. 1999;44:301-2.
5. Beet GL, Dirksen CD, Gom PM, Geisler FE, Baeten CG, Kootstra G. Open or laparoscopic mesh repair for recurrent inguinal hernia? A randomized controlled trial?. Surg Endosc. 1999;13:323-7.
6. Amid P, Shulman AG, Lichtenstein I. The Lichtenstein open tension-free hernioplasty. In: Arregui ME, Nagan RF, eds. Inguinal hernia. Advances or Controversies? Oxford, New York: Radcliffe Medical Press; 1994: 185-190.
7. Rulkow I. The recurrence rate in hernia surgery. Arch Surg. 1995;130:575-8.
8. Lichtenstein IL, Shulman AG, Amid PK, Montllor MM. The pathophysiology of recurrent hernia: a new concept introducing the tension-free repair. Contemp Surg. 1989;35:13-9.
9. Mameren H, Go MNYH. Surgical anatomy of the interior inguinal region. Surg Endosc. 1994;8:1212-15.
10. Johansson Bo, Hallerback B, Glise H, Anesten B, Smedberg S, Roman J. Laparoscopic mesh vs open preperitoneal mesh vs conventional technique for inquinal hernial repair; a radomized multicentre trial. Ann Surg. 1999;230:225-31.
11. Ramshaw BJ, Tucker JG, Duncan TD, Garcha I, Mason EM, Wilson JP, et al. Technical consideration of the different approaches to laparoscopic herniorrhaphy; an analysis of 500 cases. Am Surg. 1996;62:69-72.
12. Topal B, Hourlay P. Totally pre peritoneal endoscopic inguinal hernia repair. Br J Surg. 1997;84:61-3.
13. Spitz JD, Arregui ME. Suture less laparoscopic extraperitoneal inguinal herniorrhaphy unsing reusable instruments; 203 repairs without recurrence. Surg Laparosc Endosc Percutan Tech. 2000;10(1):24-9.
14. Heikkinen TJ, Haukipuro K, Koivukangas P, Hulkko A. A prospective randomized outcome and cost comparison of totally extra-peritoneal endoscopic hernioplasty versus Lichtenstein operation among employed patients. Surg Laprosc Endosc. 1998;8:338-44.
15. Kald A, Anderberg B, Smedh K, Karllsson M. Trans peritoneal or totally extraperitoneal approach in laparoscopic hernia repair: Results of 491 consecutive herniorrrhaphies. Surg Laparosc Endosc. 1997;7:80-9.
16. Chamspault GG, Rizk N, Catheline JM, Turner R, Boutelier P. Inguinal hernia repair, totally preperitoneal laparoscopic approach vs stoppa operation: randomized trial of 100 cases. Surg Laparosc Endosc. 1997;7(6):445-50.
17. Schrenk P, Woisetschlager R, Rieger R, Wayand W. Prospective randomized trial comparing postoperative pain and return to physical activity after trans abdominal preperitoneal, total preperitonieal or Shouldice technique for inguinal hernia repair. Br J Sur. 1996;83:1563-6.
18. Gainant A, Geballa R, Bouvier S, Cubertafond P, Mathonnet M. Prosthetic treatment of bilateral inguinal hernias viz laparoscopic approach or Stoppa procedure. Ann Chir. 2000;125(6):560-5.
19. Liem MSL, Graff YVD, van Steensel CJ, Boelhouwer RU, Clevers GJ, Meijer WS, et al. Comparison of conventional anterior surgery and laparoscopic surgery for inguinal hernia repair. Eng J Med. 1997;336:1541-7.
20. Cohen RV, Alvarez G, Roll S, Garcia ME, Kawahara N, Schiavon CA, et al. Transabdominal or totally extraperitoneal laparoscopic hernia repair?. Surg Laparosc Endosc. 1998;8:264-8.
21. Halkic N, Ksontini R, Corpataus JM, Beslin MB. Laparoscopic inguinal hernia repair with extra peritoneal double mesh technique. J Laparosc Adv Surg Tech. 1999;9:492-4.
22. Vidovic D, Kirac I, Glavan E, Filipovic-Cugura J, Ledinsky M, Bekavac-Beslin M. Laparoscopic TEP vs open Lichtenstein hernia repair: results and complications. J Laparoendoscop Adv Surg Techn. 2007;17(5):585-90.
23. Lal P, Kajla R, Chander J, Saha R, Ramteke VK. Randomized controlled study of Laparoscopic TEP vs open Lichtenstein hernia repair. Surg Endoscopc. 2003;17(6):850-56.
24. Langveld HR, Vant M, Waidema WF, Stassen LP, Steyerberg EW, Lange J, et al. Total extraperitoneal inguinal hernia repair with Lichtenstein: a randomized control trial. Ann Surg. 2010;251(5):819-24.
25. Eker HH, Langeveld HR, Klitsie PJ, van't Riet M, Stassen LP, Weidema WF, Steyerberg EW, et al. Randomized clinical trial of total extraperitoneal mesh hernioplasty vs Lichtenstein repair. Arch Surg. 2012;147(3):256-60.
26. O'Riordain DS, Kelly P, Horgan PG, Keane FBV, Tanner WA. Laparoscopic extraperitoneal inguinal hernia repair in the day care setting. Surg Endoscopc. 1999;13(9):914-7.

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