



TEP versus TAPP Repair for Inguinal Hernia- A Prospective Study in a Tertiary Care Centre (IGMC Shimla)

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Abstract

This study was conducted in Department of Surgery w.e.f. June 2013 to May 2014. The purpose of our study was to compare two laparoscopic procedures for inguinal hernia repair in terms of operative time, postoperative pain, hospital stay and postoperative complications. A total of 40 patients were subjected to surgery allocating to TAPP or TEP group alternatively, thus each group having 20 patients. It was observed that operative time was little more in TEP group as compared with TAPP. Operative time ranged between 50-130 minutes (mean 78.25 minutes) in TEP group and 40-70 minutes (mean 58 minutes) in TAPP group. There was no significant difference in postoperative pain, need for analgesia, hospital stay and return to work. (P value > 0.05) There was no major postoperative complications in either group. Minor complications like, seroma was observed in 2 cases (10%), Pneumosrotum in 3 cases (15%) and UTI in 1 case (5%) in TEP group while in TAPP group haematoma in 3 cases (15%) and scrotal edema in 3 cases (15%) were observed. There were no recurrence in either group over a follow up period of 6-12 months. It was observed in the present study that both procedures are equally effective in hernia repair, but TEP takes more time as space is limited, hence we conclude that TAPP repair of inguinal hernia is easier and equally effective.

Introduction

A hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls. A hernia can occur at various sites of the body, most commonly through the abdominal wall particularly the inguinal region. Surgery for inguinal hernia was first attributed to Erasistratus of Keos in the third century and probably described by Celsus in first century AD^[1] However, Edoardo Bassini of Italy, who described his technique of hernia repair by

reconstruction of the inguinal floor along with high ligation of the hernia sac in 1884, is generally regarded as "The Father of Hernia Surgery. In the middle of the twentieth century Bassini's concept was improved by Shouldice (1945), McVay and Anson (1942), showing the importance of fascia transversalis. The introduction of prosthesis for surgical repair of inguinal hernias was first performed by Usher in 1955. However, it was Lichtenstein who, in 1986, applied the tension-free concept for inguinal

hernia surgery, describing a technique that would reduce the recurrence rate associated with the tension of the herniorrhaphy suture. In subsequent years, various other hernioplasty techniques emerged, but still Lichtenstein hernioplasty remains the method of choice in open anterior approach of inguinal hernias.^[2] The application of minimally invasive surgical techniques to inguinal hernia repair has added to the ongoing debate about the best inguinal hernia repair.

Laparoscopic inguinal hernia repair is another method of tension-free mesh hernia repair, based on a preperitoneal approach. Proponents tout quicker recovery, less pain, better visualization of anatomy, utility in fixing all inguinal hernia defects and decreased surgical site infections. Critics emphasize longer operative times, technical challenges, and increased cost.^[3,4] The most commonly used laparoscopic techniques for inguinal hernia repair are Trans-Abdominal Pre-Peritoneal (TAPP) repair and

Totally Extra-Peritoneal (TEP) repair. TAPP requires access to the space through peritoneal cavity with placement of a mesh through a peritoneal incision covering all potential hernial sites in the inguinal region. The peritoneum is then closed above the mesh, leaving it between the preperitoneal tissues and the abdominal wall where it becomes incorporated by fibrous tissue. TEP repair was first reported in 1993. TEP is different in that the preperitoneal space is entered without opening the peritoneal cavity. Mesh is used to seal all potential hernia sites from outside the peritoneum. This approach is considered to be more difficult than TAPP, but may lessen the risks of damage to the internal organs and of adhesion formation leading to intestinal obstruction, which has been linked to TAPP^[5,6]

Material and Methods

This comparative study was conducted in the Department of Surgery, IGMC, Shimla from 1st July 2013 to 30th June 2014 after approval of ethical committee and included 40 patients with inguinal hernia. After taking an informed consent,

patients were allocated to each group in an alternate fashion i.e. one patient for TEP and next for TAPP. Patients with primary inguinal hernia, recurrent hernia and bilateral hernias were included in the study' while patients who refused to give consent to undergo the study, previously operated patients whose earlier surgery scars/adhesions were likely to interfere with the present procedure, incapable of filling the questionnaire, complicated inguinal hernia, patients with poor cardio-pulmonary reserve and immunocompromised state and paediatric patients were excluded from this study.

TEP was performed using three midline ports one 10 mm just below umbilicus, second at suprapubic region and third in between(both 5mm) while TAPP was performed using three port triangle(10mm just above umbilicus and two 5mm(one in between umbilicus and suprapubic region and another in line of umbilicus in midclavicular-midinguinal line). Both procedures were completed using standard techniques. Polypropylene mesh of size 15x12cm. was used in all cases. Mesh was fixed medially at cooper's ligament and laterally above iliopubic tact. Time taken for surgery was noted in each case. Any peroperative complications like vascular, visceral or nerve injuries were noted. Postoperative parameters like pain, Haematoma, Wound infection, length of hospital stay, etc. were recorded as per performa. Patients were followed up upto 3 months and any delayed complications like persisting numbness, persisting pain, Port-site hernia, Hernia recurrence or obstruction were noted.

Observations

This comparative study was conducted on 40 patients with diagnosis of inguinal hernia. Patients were assigned alternatively to TEP and TAPP, so each group comprised of 20 patients. The age of the patients ranged from 22 to 80 years in both the TEP and TAPP group with a mean of 48.35 years in the TEP group and a mean of 46.75 years in TAPP group.

Duration of surgery was between 50-130 min. in 20 cases of TEP and between 40-70 min. in 20 cases of TAPP group. TEP was performed in an average time of 78.25min. and TAPP was performed in an average time of 58 min. Out of 20 cases of TEP, 16 cases were performed in 60-85 min. with a mean duration of 69.025 min, three cases were performed in 91-120 min. and just one case took more than two hours due to difficult anatomy as depicted in Table 1.

Table 1

Duration of Surgery (in min.)	TEP(n=20)	TAPP(n=20)
30-60	6(30%)	12(60%)
61-90	10(50%)	8(40%)
91-120	3(15%)	NIL
121-150	1(5%)	NIL

There were no intra operative complications in either group.

The post operative pain was recorded at 2 hours., 4 hours, 8 hours,16 hours & 24 hours after operation by using Visual Analogue Scale (VAS) pain scoring system. There was no significant difference in analgesic doses required in either group. At 24 hours p value was 0.0003 and it was significant in TEP group. The mean VAS scores were as shown in Table 2.

Table 2 VAS scores

Duration Post Surgery	TEP	TAPP	P VALUE
2hrs	3.7	3.3	0.2159
4hrs	3.0	2.5	0.0879
8hrs	2.0	1.9	0.154
16hrs	2.0	1.75	0.161
24hrs	1.55	1.05	0.0003

There were 3(15%) cases of pneumoscrotum detected in immediate post operative period, which resolved without intervention, two cases of seroma formation (10%), one case of urinary tract infection (5%) in the TEP group. In the TAPP group there were a total of six post operative complications which included three cases of hematoma formation (15%), and three case of scrotal edema (15%). As shown in table 3. P value>0.05, was insignificant.

Table 3

Complications	TEP (no. of complications)	TAPP (no. of complications)
Seroma	2(10%)	Nil
Hematoma	Nil	
Wound infection	Nil	Nil
Neuralgia	Nil	Nil
Pneumoscrotum	3(15%)	Nil
Urinary tract infection	1(5%)	Nil
Scrotal edema -	Nil	3(15%)

Hospital stay of the patients ranged between one to three days as shown in table. As P value > 0.05, the difference between two groups was statistically insignificant.

Table 4

Day of discharge	TEP (no. of patients)	TAPP (no. of patients)
1	11(55%)	10(50%)
2	8(40%)	8(40%)
3	1(5%)	2(10%)

There were no recurrences or prolonged pain in either group over a follow up period of three 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. The recurrence rate with previous hernia repairs as in Bassini's approach is ranging from 5% to 20% is no longer acceptable.^[7] During the late1980's, Lichtenstien I et al, emphasized the mandatory effective use of mesh reinforcement of the inguinal floor, thus reducing the recurrence rate around 1%. In the 1990's, many new techniques of herniorrhaphy based on the principle of minimally invasive access emerged. The first report of Laparoscopic Totally Extraperitoneal Mesh Hernioplasty came in 1982, performed by Ger. ^[8,9]. Currently though open hernia repair is preferred by most surgeons but laparoscopic procedures have started catching up, with TEP and TAPP being the two main modalities of laparoscopic hernia repair. In both techniques, the groin area is reinforced with mesh that is

implanted in the same anatomical region, only difference is the access to the operating field. In the TEP method the whole procedure is performed in the extra peritoneal space without opening the peritoneum. It is believed that this could decrease the rate of complications resulting from intra-peritoneal approach. However, some surgeons have argued the point of more extensive dissection, which might contribute to a higher local complication rate^[10]. The majority of surgeons have used the trans-abdominal route (TAPP), but many authors have objected to this laparoscopic approach because it requires transgressing the peritoneal cavity, with all of its potential complications. In contrast, TEP approach eliminates this possibility.^[5,6,11,12] In the present study, age of patients was comparable in both groups. (P value being >0.05) Mean operative time of TEP repair 78.25 minutes (range 50-130) minutes, was significantly higher as compared to that of the TAPP which was 58 minutes. (range 45-70). The mean operative time of TEP of 78.25 minutes in our study was comparable to the study by Kald et al (80 minutes)^[13] and was less than the operative time of Ramshaw (89.2 min)^[14], while it was higher in our study as compared to Topal et al (42 min), Halkik et al (60 min) and Liem et al (45 minutes)^[15,16,17]. Post operative pain was recorded using Visual Analogue Scale (VAS) pain scoring system. There was no difference in mean pain score upto 16 hours, but it reached significant levels (P = 0.0003) at 24 hours in TEP group. The results are comparable to the results of Liem et al and Champault et al whereas Schrenk et al did not find any difference^[17,18,19].

There were no intra-operative complications in both groups. The result was better than that of Ramshaw et al 80 (0.6% bladder injury), Liem et al (2.25 %) epigastric artery injury and one case of vas deferens injury) while comparable to the results of Schrenk et al^[14,17,19] There was one case of seroma formation in TEP and none in TAPP patients. The incidence of 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%)^[13,17,20] and less than in the study of Cohen et al (6%)^[21]. There were 3(15%) cases of hematoma formation in TAPP and none in TEP group and is higher as than studies by Halkik et al and by Liem et al (1-5%)^[16,20] No conversion of TEP or TAPP was required ,though some studies show conversion rate in TEP was higher as compared with TAPP, ranging(0 to 7%)^[10,22,23]. There was no incidence of neuralgia in both TEP and TAPP hernia repair group. Results were similar to the study done by Spitz et al^[20].

Pneumoscrotum developed in 3 (15%) cases which got resolved within 3 hours of surgery, and one case of urinary tract infection in the TEP and none in TAPP group which was comparable to the study done by Liem et al (3%)^[17]. There was no short term recurrence in either TEP or TAPP group in the mean follow up period of 3 months. In comparison in TEP, recurrence was reported by Ramshaw et al as (0.5%), by Liem et al as (1%). The median hospital stay was 1.35 and 1.25 days each in TEP and TAPP group respectively which was statistically insignificant and comparative to studies by Liem et al, 1 day in TEP, Topal et al 2 days in TEP^[15,17].

Conclusion

Lichtenstein mesh hernioplasty still remains the most common operation done for inguinal hernia, but in the era of minimally invasive surgeries, it is being competed by various laparoscopic surgeries with laparoscopic TEP being the front runner. Learning curve of surgeon can be reduced by enhancing knowledge of the anatomy of preperitoneal space. TEP repair has proven to be of benefit in terms of post operative pain and post operative analgesia requirement although having significantly lengthier procedure time than TAPP hernioplasty. There was no difference between TEP and TAPP hernioplasty in terms of post operative hospital stay and post operative complications. As the surgeon becomes more experienced in the laparoscopic approach, there occurs a dramatic decrease in the operative time.

Intra and post operative complications remain minimal if surgeon is thoroughly versed with the anatomy of inguinal region. In conclusion both laparoscopic techniques to repair inguinal hernia are feasible. We found that TAPP is much easier technique than TEP and requires shorter operative time. Though in TAPP there are theoretically, slightly more chances of bowel injury, but by following the guidelines it can be reduced. The choice of technique could be according to the surgeon skill and preference. But there is no sufficient evidence to recommend the use of TAPP rather than TEP.

References

1. SSS McClusky DA, Mirilas P, Zoras O, Skandalakis PN, Skandalakis JE. Groin hernia: anatomical and surgical history. *Arch Surg* 2006; 141:1035–42.
2. Heikkinen T, Bringman S, Ohtonen P, et al. Five-year outcome of laparoscopic and Lichtenstein hernioplasties. *Surg Endosc*. 2004;18:518–522.
3. Beet GL, Dirksen CD, Go PMNYH et al. Open or laparoscopic mesh repair for recurrent inguinal hernia a randomized controlled trial. *Surg Endosc*. 1999;13:323–327
4. Ferzli G, Masaad A, Albert P et al. (1993) Endoscopic extraperitoneal herniorrhaphy versus conventional hernia repair. A comparative study. *Curr Surg* 50:291–294
5. [Felix EL, Michas CA, Gonzalez MH. Laparoscopic hernioplasty : TAPP vs TEP. *Surg Endosc* 1995;9:984-9
6. McKernan JB, Laws HL. Laparoscopic repair of inguinal hernias using a totally extraperitoneal prosthetic approach. *Surg Endosc* 1993;7:26-8
7. Rulkow I: The recurrence rate in hernia surgery. *Arch Surg* 130:575-8, 1995.
8. Lichtenstein IL, Shulman AG, Amid PK, Montllor MM: The pathophysiology of recurrent hernia. A new concept introducing the tension-free repair. *Contemp Surg* 35:13-9, 1989
9. Mameren H, Go MNYH: Surgical anatomy of the interior inguinal region. *Surg Endosc* 8:1212-1215, 1994
10. Khoury N: A comparative study of laparoscopic extraperitoneal and transabdominal preperitoneal herniorrhaphy. *J laparoendosc Surg* 5:349-355, 1995.
11. Felix EL, Michas CA, Gonzalez MH. Laparoscopic hernioplasty :TAPP vs TEP . *Surg Endosc* 1995;9:984-9.
12. Schultz L, Cartuill J, Graber JN, et al. Transabdominal preperitoneal procedure. *Semin Laparosc Surg* 1994; 1:98-105.
13. Kald A, Anderberg B, Smedh K and Karlsson M. Trans peritoneal or totally extraperitoneal approach in laparoscopic hernia repair: Results of 491 consecutive herniorrhaphies. *Surg Laparosc Endosc*, 1997; 7:80-89.
14. Ramshaw BJ, Tucker JG, Duncan TD, et al. Technical consideration of the different approaches to laparoscopic herniorrhaphy; an analysis of 500 cases. *An Surg*. 1996; 62; 69-72.
15. Topal B. and Hourlay P. Totally pre peritoneal endoscopic inguinal hernia repair. *Br J Surg*. 1997; 84: 61-3.
16. Halkik 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.
17. Liem MSL, Graaf YD, Steensel CV et al. Comparison of conventional anterior surgery and laparoscopic surgery for inguinal hernia repair *N Eng J Med*. 1997; 336; 1541-47.
18. Champault GG, Rizk N, Catheline JM, et al. Inguinal hernia repair, totally preperitoneal laparoscopic approach vs stoppa operation: Randomized trial of 100 cases. *Surg Laparosc Endosc*. 1997; 7 (6):

19. Schrenk P, Woisetschlager R, Rieger R and Wayand W. Prospective randomized trial comparing postoperative pain and return to physical activity after trans abdominal preperitoneal, total preperitoneal or Shouldice technique for inguinal hernia repair. *Br J Sur.* 1996; 83: 1563-6.
20. Spitz DJ and Arrequi ME. Sutureless laparoscopic Extraperitoneal inguinal herniorrhaphy using reusable instruments. *Surg Laprosc Endosc*,1999;10:24-9
21. Cohen RV, Alvarez G, Roll S, et al. Transabdominal or totally extraperitoneal laparoscopic hernia repair? *Surg Laparosc Endosc*, 1998; 8: 264-8.
22. Van Hee R, Goverde p, Hendrickx L, Van der Schelling G, Totte E. Laparoscopic transperitoneal vs. extraperitoneal inguinal hernia repair: a prospective clinical trial. *Acta Chir Belg* 1998;98:132-135.
23. Gass M1, Banz VM, Rosella L, Adamina M, Candinas D, Güller U. TAPP or TEP? Population-based analysis of prospective data on 4,552 patients undergoing endoscopic inguinal hernia repair. *World J Surg* 2012 Dec;36(12):2782-6.