

Transabdominal Preperitoneal Patch Plasty versus Open Lichtenstein Hernia Repair – A Study

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Abstract

A study to compare the outcomes of laparoscopic transabdominal preperitoneal patch plasty (TAPP) and open Lichtenstein repair in the management of inguinal hernia was carried out at the Department of Surgery, SKIMS Medical College, Bemina, Srinagar, Kashmir, India, from June 2017 to December 2018. Sixty patients with inguinal hernia were enrolled in the study. It was a type of non-randomized prospective cohort study, wherein 30 patients were treated with TAPP and 30 with open Lichtenstein repair. Patients were studied since admission till discharge and followed for 2 years in the outpatient department. Mean operation time in TAPP was higher than the Open Lichtenstein Repair, but the overall complications were higher in the latter. Patients with inguinal hernias who underwent repair by TAPP approach had significantly better post-operative courses than those who undergo open Lichtenstein repair.

Keywords: Inguinal Hernia, Lichtenstein Repair, Recurrence, Seroma, Totally Extraperitoneal Hernioplasty, Transabdominal Preperitoneal Patch Plasty

1. Introduction

Inguinal hernia repairs are one of the most common general surgical operations and globally; about more than 20 million inguinal hernia repairs are conducted every year¹. The condition is multifactorial and affects both genders at all ages^{2,3}. Indirect hernia corresponds to more than 70% of cases among adults. Hernia recurrence is a significant long-term complication of hernia repair, with reported recurrence rates ranging from 1.1% to 33.0% after primary repair and 11.7–30.0% after recurrent hernia repair^{4,5}.

Hernia repair can be accomplished through traditional open techniques or else through the minimally invasive laparoscopic approach. Over the last two decades, the laparoscopic approach has gained greater acceptance and there are two primary techniques: Totally extraperitoneal hernioplasty (TEP) and transabdominal preperitoneal

patch plasty (TAPP). TAPP was introduced in our department in 2017, and this study was undertaken to compare the outcome of inguinal hernia repair using TAPP and open Lichtenstein technique of mesh repair in terms of operating time, post-operative hospital stays, complications (early and late), and cosmesis. The objectives were to analyze the outcomes and thereby formulate the future hernia repair policies for the department.

2. Materials and Methods

The study was carried out at the Department of Surgery, SKIMS Medical College, Bemina, Srinagar, Kashmir, India, from June 2017 to May 2018 after approval by the research committee chaired by the Head of the General Surgery Department (Research/Surg 01/2017). Sixty patients with inguinal hernia participated in the study.

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In June 2017, TAPP was introduced as a new tool for the management of inguinal hernia and a prospective non-randomized study was initiated, wherein 30 patients of inguinal hernia were selected after informed consent for TAPP and 30 with Lichtenstein repair. The two groups were homogeneous regarding the pre-operative characteristics. The exclusion criteria included the patients with inguinal hernia demanding emergent surgery repair and the recurrent hernia.

Open Lichtenstein repair was conducted under spinal anesthesia with a 5–7 cm incision and polypropylene mesh fixation with 2.0 polyglactin 910 (Vicryl) separate sutures and with no supplemental local anesthesia. TAPP was conducted under general anesthesia after gaining peritoneal access with three trocars. The same kind of mesh was positioned and fixed in the preperitoneal space. All patients received equal analgesia at induction of anesthesia and during the immediate post-operative period.

The cases were studied since admission till discharge and then followed in the outpatient department for 2 years. The studied parameters included demographic data, details of the hernia (side, unilateral or bilateral), operating time, post-operative hospital stay, immediate and late post-operative complications, and recurrence. Post-operative pain was recorded with Visual Analog Scale of 1–10 and the surgical site scars were measured in centimeters.

The data were recorded in Microsoft Excel-2016 software and analyzed by Statistical Product and Service Solutions (SPSS Version 27). A $P < 0.05$ was deemed as statistically significant.

3. Results

There were 30 male patients in each study group (TAPP, Lichtenstein) varying in age from 30–60 years (Table 1) with unilateral (on either side) and bilateral hernia (Table 2). All the patients were residents of Kashmir Valley.

Mean operation time between the two approaches had a significant difference ($P < 0.05$); for unilateral hernia repair the operation time by TAPP was 55.2 min and by Lichtenstein method was 40.8 min; similarly, for bilateral hernia the operation times were 58.4 min and 75.7 min, respectively, as shown in Figure 1.

Post-operative pain experienced by the patients in the two groups, as assessed by Visual Analog Scale of 1–10, on

Table 1. Age distribution of enrolled patients (years)

Age distribution (years)	TAPP		Open		P-value
	No.	%age	No.	%age	
30–44	7	23	6	20	0.951
45–59	9	30	11	37	
≥60	14	47	13	43	
Mean±SD	54.4±13.95		54.2±11.24		

TAPP: Transabdominal preperitoneal patch plasty

Table 2. Location of the hernia

Location/Type of Hernia	TAPP		Lichtenstein		P-value
	No.	%age	No.	%age	
Location of the hernia					
Right	14	46.7	15	50.0	0.929
Left	11	36.7	11	36.7	
Bilateral	5	16.7	4	13.3	
Type of hernia					
Direct	20	66.7	18	53.3	0.108
Indirect	10	33.3	12		

TAPP: Transabdominal preperitoneal patch plasty

the day of the operation and on 1st and 7th post-operative day had a significant difference (<0.001) with less pain felt after TAPP for unilateral as well as bilateral hernia, as shown in Table 3.

The patients after TAPP for unilateral and bilateral hernia had a mean post-operative hospital stay of 1.7 days and 1.4 days. This was significantly lower than the respective stay of 2.1 days and 3.3 days after the open Lichtenstein approach, as shown in Table 4.

About 23.3% of patients treated through the Lichtenstein approach had perioperative complications, whereas only 6.7% had complications in the TAPP group, as depicted in Table 5 and Figure 2.

As regards to cosmesis, the TAPP repair was associated with skin scars about 0.5 cm–2 cm at the port sites and no scar in the inguinal region, while the Lichtenstein repair

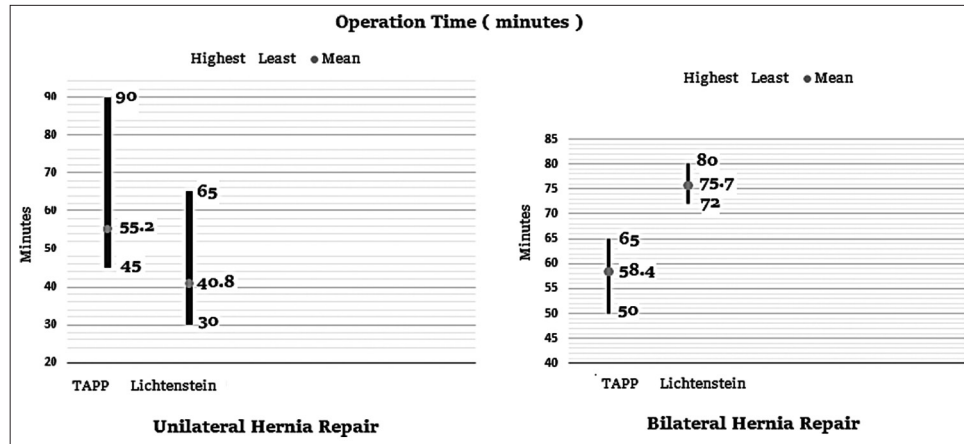


Figure 1. Operation time.

Table 3. Post-operative pain assessed by VAS

Day of Pain Assessment	TAPP		Lichtenstein		P-value
	Mean	SD	Mean	SD	
Post-operative pain assessed by VAS in unilateral cases					
Day 0	3.12	0.605	4.15	0.481	<0.001*
Day 1	2.09	0.811	2.93	0.443	<0.001*
Day 7	0.79	0.458	1.56	0.493	<0.001*
Post-operative pain assessed by VAS in bilateral cases					
Day 0	36.4	3.29	44.3	2.98	0.008*
Day 1	23.6	3.51	35.0	3.16	0.002*
Day 7	10.8	2.95	18.3	2.63	0.006*

TAPP: Transabdominal preperitoneal patch plasty

was associated with a single large scar of around 6–8 cm size in the groin.

4. Discussion

Inguinal hernia repair is one of the most common general surgical operations. It is conducted globally in more than 20 million patients every year¹. The lifetime occurrence of inguinal and femoral hernia is about 27–43% in men and

Table 4. Post-operative hospital stay (days)

Postoperative hospital stay	Mean	SD	Range	P-value
Post-operative stay (days) in unilateral cases				
TAPP	1.7	0.801	1–3	0.046*
Lichtenstein	2.1	0.711	1–4	
Post-operative stay (days) in bilateral cases				
TAPP	1.4	0.89	1–2	0.036*
Lichtenstein	3.3	1.25	2–5	

TAPP: Transabdominal preperitoneal patch plasty

Table 5. Perioperative complications

Perioperative Complications	TAPP		Lichtenstein		P-value
	No.	%age	No.	%age	
Yes	2	6.7	7	23.3	0.048*
No	28	93.3	23	76.7	

TAPP: Transabdominal preperitoneal patch plasty

3–6% in women. The definitive treatment of hernia is surgical repair but these operations have a wide range of complications including infection, recurrence of hernia, and chronic pain.

Hernia recurrence is reported in 1.1–33.0% after primary repair and 11.7–30.0% after repair of recurrent

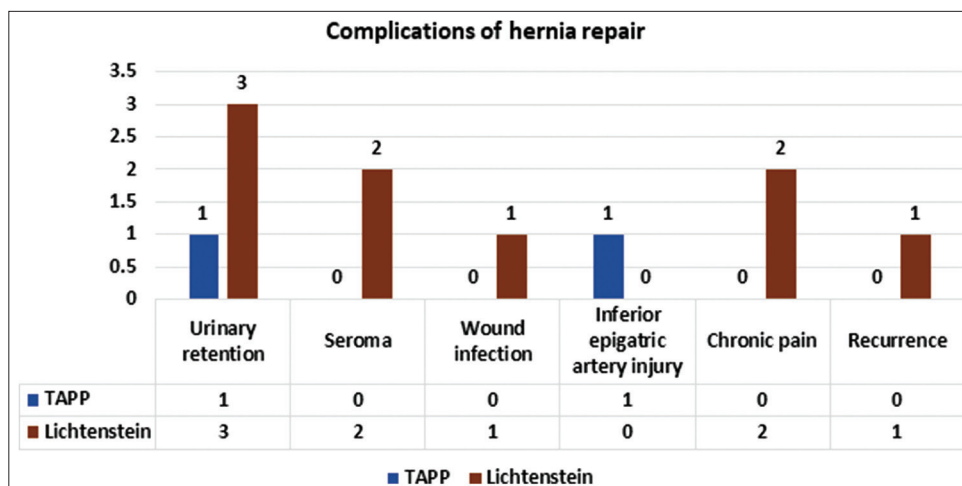


Figure 2. Perioperative complications after transabdominal preperitoneal patch plasty and Lichtenstein repair.

hernia⁴⁵. Of all the reported recurrences, 57% may occur within 10 years of repair and the remaining 43% may appear later, even after more than 50 years⁶. Chronic pain after operation that lasts more than 3 months is reported in about 10–12% and approximately 1–3% of patients have severe chronic pain with long-term disability¹.

There are a total of more than 100 different inguinal hernia repair techniques, which can broadly be categorized as tissue repair, open mesh repair, and laparo-endoscopic mesh repair. However, the current International guidelines of the HerniaSurge Group only recommend the TEP, TAPP, and Lichtenstein techniques. The current study was conducted to audit the results of newly introduced TAPP with traditional Lichtenstein technique in our institution to chalk out the departmental protocols for the future.

The mean operation time for unilateral as well as bilateral hernia repair was significantly higher in TAPP than the Lichtenstein approach ($P < 0.05$) as TAPP requires time in creation of approach through pneumoperitoneum and lacks the usual dexterity of open approach. Post-operative pain as well as post-operative hospital stay were, however, significantly lesser with TAPP. Overall, the incidence of complications was significantly lower with TAPP, with 93.3% having no complications in TAPP in comparison to Lichtenstein where only 76.7% had no complications.

The specific complication seen with TAPP was injury to inferior epigastric artery in one patient during peritoneal reflection and that might be attributed to lesser experience of the surgeons as laparoscopic surgery is known to have a steep learning curve and complications are often reported

in the early phase of the learning curve. The possibility of this complication arises when while raising peritoneal flap, the peritoneum is cut beyond the medial umbilical ligament. Proper knowledge of anatomy, skills, and experience result in prevention of such complications⁷. Wong and Merkur have suggested various methods for prevention and management of intraoperative inferior epigastric artery bleeding that includes bipolar coagulation, tamponade, suturing, conversion to open surgery, embolization, and ultrasound-guided thrombin injection or compression. Bleeding was controlled in our series with suction followed by monopolar cautery on Maryland forceps⁸.

However, there were no symptomatic seromas, chronic pain, and wound infections in TAPP group in our series though these complications were seen in the Lichtenstein group. Seromas are otherwise reported in 3–8% of cases repaired by TAPP^{9,10} and it is the possibility of seroma formation should be explained to the patient before surgery, to prevent anxiety. The main problem with post-operative seroma is that they may be mistaken for recurrences and there are reports where the correct diagnosis being made only after groin exploration⁹. Recently in 2020, safety of laparoscopic inguinal herniorrhaphy approaches (TAPP, TEP) was reviewed in a meta-analysis of randomized clinical trials by Hung *et al.* and it was found that both TEP and TAPP have their own advantages in inguinal hernia repair but TAPP was associated with a lower seroma rate¹¹.

In our study, the patients in the TAPP group felt significantly less pain than the ones in the Lichtenstein

group for equal perioperative analgesia. Moreover, since follow-up is short, hence, it is not feasible to draw conclusions regarding recurrence. These results are in agreement with a meta-analysis by Schmedt *et al.*, in which TAPP was found to offer no advantage over Lichtenstein as far as recurrence rates are concerned. The TAPP group, however, had a lower incidence of chronic pain and wound infection, which resulted in earlier resumption of the normal activities or work¹².

Bittner and Schwarz in 2019 described the ranking of TAPP in comparison to the other techniques, and it was concluded that the TAPP technique has the potential to become the standard operative technique for repair of inguinal hernias in future¹³. There are, however, some studies where there were no statistically significant differences in the inflammatory response, pain scores, or complications between the groups and the it was inferred that TAPP offered no significant advantage over the other techniques^{2,14}. The limitation of our study is the small number of participants and it is hoped that is future, as greater number of patients undergo TAPP, a more comprehensive study would be undertaken to analyze the outcomes of these techniques of hernia repair.

5. Conclusion

The experience of hernia repair with TAPP was satisfactory in our department and since a generally accepted single technique suitable for all inguinal hernias does not exist as yet, hence, the surgeons would use offer Lichtenstein or else the TAPP, after taking into consideration the patient and the hernia-related factors. Although learning curve is steep with TAPP, it is expected that with passage of time, as experience increases, the results would improve further.

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