# **Original Research Article**

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# Comparison of outcomes of open hernioplasty- Lichtenstein versus laparoscopic trans abdominal preperitoneal mesh repair in patients with uncomplicated unilateral inguinal hernias

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#### **ABSTRACT**

**Background:** Inguinal mesh hernioplasty is one of the common procedures performed throughout the world. There are open and laparoscopic techniques of hernia repair. The laparoscopic approach to inguinal hernioplasty is now well established. The purpose of this study was to compare the outcomes of Lichtenstein tension free hernioplasty and laparoscopic TAPP (transabdominal preperitoneal mesh repair) considering these criterias, such as, duration of the surgery, hospital stay, and duration to resume normal activity, cosmesis, degree of postoperative pain, wound infection, recurrence and complications.

**Methods:** A prospective randomized study was conducted by comparing patients (two groups) who underwent laparoscopic (TAPP) and Lichtenstein Tension free open hernioplasty in SVMCH and RC from November 2016 to June 2017.

**Results:** Among the two groups of patients, depending on my criteria's, namely, cosmesis (p-0.074) and postoperative cord edema (p-0.042), patients who underwent TAPP had statistically better outcomes than open hernioplasty.

**Conclusions:** My study concludes that laparoscopic TAPP repair is safe and efficacious and the analysis here states the absolute superiority of laparoscopic TAPP over Lichtenstein tension free hernioplasty.

**Keywords:** Inguinal hernia, Laparoscopic mesh repair, Lichtenstein tension free hernioplasty, Open hernioplasty, TAPP

# INTRODUCTION

A hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity.

The external abdominal hernia is the most common form, the most frequent varieties being the inguinal, femoral and umbilical, accounting for 75% of cases. The rarer forms constitute 1.5%, excluding incisional hernias.<sup>1</sup>

Inguinal mesh hernioplasty is one of the common procedures performed throughout the world.<sup>2</sup> In the early 1980s, Lichtenstein popularized the tension-free repair, supplanting tissue-based repairs with the widespread acceptance of prosthetic materials for inguinal floor reconstruction. This technique was superior to previous tissue-based repairs in which mesh could restore the strength of the transversalis fascia, thereby avoiding tension in the defect closure. Superior results were reproducible regardless of hernia size and type, and they

were achievable among expert and non-expert hernia surgeons alike.<sup>2</sup>

The latest in the armamentarium of the hernia surgeon is the laparoscopic repair of the hernia. Even though laparoscopic hernia repairs were reported as early as 1982, the widespread interest in laparoscopic herniorrhaphy did not occur till the 1990's.<sup>3</sup> Disappointing early recurrence rates (even up to 25%), excessive cost and the steep learning curve were the major stumbling blocks which prevented the routine use of laparoscopy in the management of inguinal hernias.<sup>4,5</sup>

In 1991, Arregui reported TAPP technique for inguinal hernias.<sup>6</sup> With the introduction of TAPP, the previous laparoscopic techniques such as closure of internal ring, plug and patch and intraperitoneal onlay mesh have slowly faded away due to their high complication and recurrence rates.

The laparoscopic approach to inguinal hernioplasty is now well established, the advantage of examining the opposite side for the presence of a small hernia sac.7 In cases of recurrent hernia, following previous open mesh repair, the laparoscopic approach The laparoscopic approach offers advantages in terms of lesser postoperative pain and analgesic requirements as well as a significantly early return to work. The incidence of chronic debilitating pain is also significantly lower than with open mesh repair.

It offers allows access to the hernial site without going through scarred tissues or mesh. The laparoscopic procedure however requires significantly longer operating time at least in unilateral cases.

However, the operating time in bilateral cases is not significantly different. The laparoscopic procedure also has a long learning curve and surgeons with greater experience with the procedure are able to have shorter operating times as well as fewer complications.<sup>8</sup>

With more than a decade of laparoscopic preperitoneal repairs the experiences have consolidated, learning curves stabilized, recurrence rates reduced and the complications diminished.<sup>9</sup>

The objective of the study was to assess the relative benefits of open repair vs TAPP Repair in unilateral inguinal hernias this will include

- Duration of the surgery
- Cosmesis
- Degree of postoperative pain
- Duration of hospital stay
- Duration to resume normal activity of daily living
- Recurrence rates at 1Year following surgery
- Complications- Surgical site infection, inguinodynia, cord oedema.

#### **METHODS**

A prospective randomized study was conducted by comparing 50 patients (two groups) who underwent laparoscopic (TAPP) and Lichtenstein tension free open hernioplasty who accepted for my study at their own will were included in my study from November 2016 to June 2017. Postoperatively both the groups were given VAS score card to express the intensity of pain and the same was 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. Outcomes of open hernioplasty and TAPP were compared by taking parameters such as duration of the surgery, cosmesis, degree of postoperative pain, duration of hospital stay, duration to resume normal activity of daily living, recurrence rates at 1 year following surgery, complications such as surgical site infections, inguinodynia, cord edema and orchitis. Regular follow-up was done post operatively at 4 weeks, 8 weeks, 6 months and 1 year.

#### Inclusion criteria

- Age >18yrs
- Who gives informed and written consent
- Uncomplicated unilateral inguinal hernia- direct and indirect
- Patients fit for general and spinal anaesthesia.

# Exclusion criteria

- Age <18yrs.
- Pregnant women.
- Patients with complicated inguinal hernia- strangulated/ incarcerated.
- Patients with cirrhosis of liver and/or ascites.
- Patients not fit for general & spinal anaesthesia.
- Inguinodynia, orchitis and cord edema.

## Statistical analysis

Following statistical methods were applied in the present study.

- Descriptive and inferencial statistical analysis
- Student 't' test (two tailed, independent)
- Levens test
- Chi square test / Fischer Exact test.

Statistical software: The statistical software namely SPSS 18.0, and R environment ver.3.2.2 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

All the statistical methods were carried out to analyze our data. The contents of each table are explained during discussion. Graphs are made to portrait the relation existing among data wherever necessary.

#### **RESULTS**

In my study, 50 patients were selected out of which 25 patients underwent TAPP and the other 25 patients underwent open hernioplasty. The data collected have been statistically analysed and discussed. The total of 50

patients are arranged and grouped into specific subgroups.

In my study, the duration of surgery was more in patients who underwent laparoscopic hernioplasty (mean- 121 mins) (Table 1).

Table 1: Analysis of duration of surgery between the two groups.

Independent t test						
	Group	N	Mean	Std. Deviation	Std. Error mean	t value
Duration (min)	A	25	89.6000	8.02600	1.60520	11.520**
	В	25	121.4000	11.22868	2.24574	11.520***

<sup>\*\*</sup>p<0.0001 \*p<0.001.

Table 2: The distribution of patients in relation to cosmesis who underwent open hernioplasty and TAPP hernia repair.

			Group		- Total
			A	В	Total
	Cood	Count	22	25	47
Coamosia	Good	% within Group	88.0%	100.0%	94.0%
Cosmesis	Bad	Count	3	0	3
	Dau	% within Group	12.0%	0.0%	6.0%
Total		Count	25	25	50
		% within Group	100.0%	100.0%	100.0%

Pearson Chi-Square= 3.191; p=0.074.

In my study about 88% of patients had good cosmesis and 12% had bad cosmesis who underwent open

hernioplasty. All the patients who underwent TAPP hernia repair had 100% good cosmesis (Table 2).

Table 3: Mean pain score in POD-1 between two groups.

Independent t test							
Group		N	Mean	Std. deviation	Std. error mean	t value	
PAIN_POD-1	Open hernioplasty	25	2.1600	0.62450	0.12490	3.737**	
	Laparoscopic hernioplasty	25	1.5200	0.58595	0.11719	3.131	

<sup>\*\*</sup>p<0.0001 \*p<0.001.

In my study, the development of pain in post op day 1 was more in patients who underwent open hernioplasty (mean-VAS score 2) (Table 3).

In my study, the duration of hospital stay was more in patients who underwent open hernioplasty (mean 4 days) (Table 4).

Table 4: Duration of hospital stay.

Independent t test							
	Group	N	Mean	Std. deviation	Std. error mean	t value	
Duration in	A	25	4.1200	0.33166	0.06633	26 952**	
min	В	25	2.0400	0.20000	0.04000	26.853**	

<sup>\*\*</sup>p<0.0001 \*p<0.001.

In my study, the duration to resume daily activities was more in patients who underwent open hernioplasty (mean- 17 days) (Table 5). In my study about 12% of patients who underwent open hernioplasty had surgical site infection whereas only 4% of patients who underwent TAPP hernia repair had surgical site infection. The other 88% of patients who underwent open hernioplasty and

96% of patients who underwent TAPP hernia repair had good wound healing without any surgical site infection (Table 6). In my study about 24% of patients who underwent open herniaplasty and 8% of patients who underwent TAPP hernia repair developed inguinodynia. The other 76% of patients who underwent open

hernioplasty and 92% of patients who underwent TAPP hernia repair had no incidence of inguinodynia (Table 7).

In my study about 12% of patients who underwent open hernioplasty and 4% of patients who underwent TAPP hernia repair developed orchitis (Table 8).

In my study about 24% of patients who underwent open hernioplasty and 4% of patients who underwent TAPP hernia repair developed cord edema. There is a statistical significance of p=0.042 (Table 9). In my study about 8% of patients had recurrence who underwent open hernioplasty whereas none of the patients had recurrence who underwent TAPP hernia repair (Table 10).

Table 5: Duration to resume daily activities among the two groups.

Independent t test							
	Group	N	Mean	Std. deviation	Std. error mean	t value	
Resume day	A	25	16.6800	2.73435	0.54687	7.335**	
	В	25	11.2400	2.50466	0.50093	1.333***	

<sup>\*\*</sup>p<0.0001 \*p<0.001.

Table 6: The percentage distribution of patients in relation with incidence of surgical site infection who underwent LTFH and TAPP hernia repair.

			Group		Total
			A	В	
	No	Count	22	24	46
SSI	NO	% within group	88.0%	96.0%	92.0%
331	Vac	Count	3	1	4
	Yes	% within group	12.0%	4.0%	8.0%
Total		Count	25	25	50
Total		% within group	100.0%	100.0%	100.0%

Pearson Chi-Square=1.087, p=0.297.

Table 7: The percentage distribution of patients in relation with incidence of inguinodynia who underwent LTFH and TAPP hernia repair.

			Group		Total
			A	В	
	No	Count	19	23	42
To continue descrip	No	% within group	76.0%	92.0%	84.0%
Inguinodynia	Yes	Count	6	2	8
		% within group	24.0%	8.0%	16.0%
TD:4-1		Count	25	25	50
Total		% within group	100.0%	100.0%	100.0%

Pearson Chi-Square=2.381, p=0.123

Table 8: The percentage distribution of patients in relation with incidence of orchitis who underwent LTFH and TAPP hernia repair.

			Group		Total
			A	В	
Orchitis N	No	Count	21	24	45
		% within Group	84.0%	96.0%	90.0%
	Yes	Count	4	1	5
		% within Group	16.0%	4.0%	10.0%
Total		Count	25	25	50
		% within Group	100.0%	100.0%	100.0%

Pearson Chi-Square=2.00, p=0.157.

Table 9: The percentage of cord edema between the two groups.

			Group		Total
			A	В	
	No	Count	19	24	43
Candadama	NO	% within Group	76.0%	96.0%	86.0%
Cord edema	V	Count	6	1	7
	Yes	% within Group	24.0%	4.0%	14.0%
Total		Count	25	25	50
Total		% within Group	100.0%	100.0%	100.0%

Pearson Chi-Square= 4.153\*, p=0.042.

Table 10: The percentage distribution of patients in relation with recurrence of hernia who underwent LTFH and TAPP hernia repair.

			Group		Total
			A	В	
Recurrence	No	Count	23	25	48
		% within group	92.0%	100.0%	96.0%
	Yes	Count	2	0	2
		% within group	8.0%	0.0%	4.0%
Total		Count	25	25	50
		% within group	100.0%	100.0%	100.0%

Pearson Chi-Square= 2.083, p=0.149.

#### **DISCUSSION**

During the last several decades numerous innovative and creative techniques have been introduced in an effort to manage patients with inguinal hernia. Despite the development of many newer technologies including that of the optics, the treatment of inguinal hernia by laparoscopic method has still eluded many of our patients.

The long learning curve of laparoscopic repair of inguinal hernia coupled with lack of proper documentation has and is delaying the proficient application of this procedure to the masses though large published series have reported their experience with laparoscopic mesh repair of inguinal hernia.

Köckerling et al, in 2016 in the present registry study, showed that no significant difference was identified in the recurrence rates between the Laparoscopic repair and Lichtenstein technique. 10 TEP was found to have benefits compared with Lichtenstein repair as regards the postoperative complication rates, pain at rest, and pain on exertion. Scheuermann et al, in 2017 conducted a metaanalysis of randomized controlled trial on transabdominal preperitoneal (TAPP) versus Lichtenstein operation for primary inguinal hernia repair and concluded that outcome measures did not show any significant differences between the two techniques. The results of this analysis indicate that complication rate and outcome of both procedures are comparable. 11 TAPP operation demonstrated only one advantage over Lichtenstein operation with significantly less chronic inguinal pain postoperatively.

Memon et al, in 2013 conducted a meta-analysis of the randomized evidence to determine the relative merits of laparoscopic (LIHR) and open (OIHR) inguinal hernia repair and concluded that LIHR was associated with earlier discharge from hospital, quicker return to normal activity and work, and significantly fewer postoperative complications than OIHR. <sup>12</sup>

The inguinal hernia can be repaired by many techniques, primarily by open or by laparoscopic methods. The following study was undertaken in an effort to identify the better of the two methods namely Lichtenstein tension free hernioplasty and trans abdominal preperitoneal mesh repair. This was also done to identify the subset of patients who would benefit more, from a particular type of repair.

This was a comparative study consisting of 50 patients, with 25 patients in laparoscopic TAPP repair group and 25 patients in Lichtenstein tension free repair group conducted in Sri Venkateshwaraa Medical College Hospital and Research Centre, Pondicherry from November 2016 to June 2017 which includes a follow up of 1 year period. The study was undertaken to compare the outcomes of the procedures. The observations and calculated means were subjected to statistical analysis.

The patients who underwent TAPP had lesser post operative pain (mean pain score of 1.5 (Table 5), lesser post operative stay in hospital, TAPP was associated with faster recovery period (mean= 11 days) marginally quicker return to normal activities than open repair (mean= 16 days). TAPP has clinical significance over open technique in view of cosmesis. There was no

statistical significance (p=0.123) between the two groups for inguinodynia. In my study about 12% of patients who underwent open hernioplasty and 4% of patients who underwent TAPP hernia repair developed orchitis. There was no statistical significance between the two groups here.

There is a statistical significance that, cord edema is comparatively more in patients who underwent open hernioplasty. About 8% (n=2) of patients who underwent open hernioplasty had recurrence. Even though there was a degree of clinical significance, there is no statistical significance in my study.

## **CONCLUSION**

My study shows that TAPP could preferably be the treatment of choice for uncomplicated unilateral as well as bilateral hernias. During laparoscopic repair of inguinal hernia, not only an occult contra lateral inguinal hernia can be identified, but also an occult femoral hernia and obturator can be identified and tackled and corrected. It also supports the fact that laparoscopic TAPP repair is safe and efficacious and the analysis here states the absolute superiority of laparoscopic TAPP over Lichtenstein tension free hernioplasty.

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## REFERENCES

 Bailey & Love's short practice of surgery. In: Williams NS, C. J. K. Bulstrode CJK, O'Connell PR, eds. 25<sup>th</sup> ed. Chapter 57. 2008: 968.

- 2. Shulman AG, Amid PK, Lichtenstein IL. A survey of non-expert surgeons using the open tension-free mesh patch repair for primary inguinal hernias. Int Surg. 1995;80:35-6.
- 3. Goepel R, Uber die verschliessung von bruchpforten durch einheilung geflocuhtener fertiger silberdrahtnetze Verh Deutsch Ges Chir. 1900:9:174-9.
- 4. Bassini E. Ueber de behandlung des listenbruches. Arch Klin Chir. 1890;40:429-76.
- 5. Adler RH. An evaluation of surgical mesh in the repair of hernias and tissue defects. Arch Surg. 1962;85:44.
- 6. Handley WS. A method for the radical cure of inguinal hernia (darn and stay-lace method) Practitioner. 1918;100:466-71.
- 7. Hope WW. Comparing Quality-of-Life outcomes in symptomatic patients undergoing Laparoscopic or Open ventral hernia repair. J Laproendosc Adv Surg Tech A. 2008;18(4):567-71.
- 8. Schwartz's principles of surgery. In: Abdominal wall, omentum, mesentry, and retroperitoneum. 9<sup>th</sup> ed. New York: McGraw Hill publishers; 2010: 1273-1274.
- Bassini E. Sulla cura radicale dell'ernia inguinale. Arch Soc Ital Chir. 1887;4:380.
- 10. Köckerling F. Surg Endosc TEP versus Lichtenstein: Which technique is better for the repair of primary unilateral inguinal hernias in men? 2016;30:3304.
- Scheuermann U, Niebisch S, Lyros O, Jansen-Winkeln B, Gockel I. Transabdominal Preperitoneal (TAPP) versus Lichtenstein operation for primary inguinal hernia repair A systematic review and meta-analysis of randomized controlled trials. BMC Surg. 2017;17(1):55.
- 12. Memon MA. Meta-analysis of randomized clinical trials comparing open and laparoscopic inguinal hernia repair. Br J Surg. 2003;90:1479-92.

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