

Lichtenstein Repair Vs Open Pre-Peritoneal Mesh Repair for Inguinal Hernia: A Prospective Comparative Study

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Abstract

Introduction: Inguinal hernia repairs are one of most commonly performed surgeries. Lichtenstein repair is popular technique and has decreased the hernia recurrence rate to less than 3%. The prosthetic mesh repair causes chronic groin pain in 15-40% of the population. Transinguinal Pre Peritoneal Repair (TIPP) by its nascent posterior approach is theoretically and practically sound alternative. It is a popular technique in the developing countries. It can also be used in lieu of Lichtenstein repair or when laparoscopic facilities are not available or not affordable by patients. **Aims and Objectives:** To evaluate Transinguinal preperitoneal mesh placement for inguinal hernia as an alternative to Lichtenstein repair. The Study compares the two procedures in terms of operative duration; Intraoperative and post-operative complications; postoperative pain at day 1, 7, 14, 30; chronic groin pain at 6 months and recurrence within 6 month. **Design of the Study:** A prospective randomized comparative study. **Materials and Methods:** A prospective randomized study was carried out in Mahatma Gandhi Medical College and Research Institute, Pondicherry, India from January 2015 to January 2016 involving 60 patients. Out of them, 30 patients each were randomly classified under two groups, who underwent Lichtenstein repair and Open Pre-peritoneal repair, and a comparative study was made between the two groups. Patients were evaluated intra-operatively and post-operatively and multiple variables assessed. Post-op pain scores were calculated using Visual Analogue Pain scores (VAS).

Mean duration of procedure, Paired t test and Independent t test were used for statistical analysis. **Results:** In our study of 60 patients; 50% of the patients were above 30 years, 59 (98.3%) patients are males and 42 (70%) had direct hernia. In the open pre-peritoneal group; 5 (16.7%) patients had injury to peritoneum and 2 (6.7%) patients had injury to vessels during surgery. The post-operative pain score on days 1, 7, 30 and 180 (<0.0001 on day 1, 0.0001 on day 7, 0.004 on day 30 and 0.0014 on day 180) were better in patients who underwent open pre-peritoneal repair than in patients who underwent Lichtenstein repair. **Conclusion:** Compared to the patients who had Lichtenstein repair, Patients having Pre-peritoneal repair had no post-operative complications, returned to work earlier and enjoyed good quality of life. The study shows that TIPP repair do hold a considerable promise which needs to be investigated further in a larger population. TIPP by its nascent posterior approach is theoretically and practically sound alternative.

Keywords: Inguinal Hernia; Preperitoneal Repair; Lichtenstein's Repair; Visual Analogue Pain Scores; Blinded manuscript.

Introduction

Inguinal hernia repairs are one of most common surgeries performed world-wide. Inguinal hernias are present in 1.7% of the world population. Males have a high predilection for inguinal hernia and in the age group above 50 years the risk of having a hernia increases by 22.8%. Surgery is the treatment of choice and is the only cure [1].

Hernia repairs have evolved over many decades. The trial and testing period spanned from the ancient

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Egyptian times to the modern laparoscopic day care repairs. From tissue repair to tension free repair, the surgeries have evolved a long way.

Lichtenstein repair has decreased the hernia recurrence rate to less than 3%. Along with it post-operative complications and cost of surgery has also increased. Post-operative complications still tend to hinder the patients in the long run. Each procedure carries a risk of its own. The prosthetic mesh repair causes chronic groin pain in 15-40% of the population [2].

Transinguinal Pre Peritoneal Repair (TIPP) by its nascent posterior approach is theoretically and practically sound alternative. It is also a popular technique in the developing countries. It can also be used in lieu of Lichtenstein repair or when laparoscopic facilities are not available or not affordable by patients. Pre-peritoneal mesh repair also has decreased post-operative complications [3].

Subjects and Methods

This prospective randomised comparative study was conducted between January 2015 and January 2016 in a tertiary care centre after ethical approval from the Human Ethics Committee of the Institute. One group underwent Lichtenstein tension free repair and the second group underwent Open Pre-peritoneal hernia repair. 30 patients were recruited in each group by randomization with a total of 60 patients as sample size.

All patients admitted with inguinal hernia, falling under the inclusion criteria mentioned below, were included in this study after taking informed consent.

Inclusion Criteria

- All patients presenting with unilateral hernia
- All patients aged 18 and above

Exclusion Criteria

- All the patients presenting with complicated hernias, undergoing emergency hernia surgeries.
- Patients who are unfit for surgery.

This was a prospective randomized comparative study involving two groups.

Operative Procedure

Lichtenstein repair was carried out in the universal manner for the control group. In Open or Transinguinal Pre-peritoneal (TIPP) mesh repair, an incision was made 1 cm above the deep ring and deepened to reach the fascia of Camper and Scarpa. It was further deepened

to reach external oblique aponeurosis, which was incised along the line of fibres. Internal oblique muscle was split followed by transversalis fascia, to reach the Pre-peritoneal space. Inferior epigastric artery was medialized and pre-peritoneal pad of fat was pushed up.

In case of direct hernia, the sac along with the contents was reduced. In indirect hernia the cord was identified, vas deferens was anteriorized and the indirect sac was pulled back and pushed up along with the pre-peritoneal fat. Pre-peritoneal dissection was carried out laterally till the anterior superior iliac spine, medially till the lateral border of rectus abdominis, inferiorly till the pecten pubis and superiorly till the arcuate fibres. Inferior epigastric artery was identified medially, femoral artery was identified laterally and internal iliac vessels identified inferiorly.

A 15 x 11 cm polypropylene mesh was placed in the pre-peritoneal space. The mesh was anchored with 2-0 vicryl (polyglactin) along with the internal oblique muscle and transversalis fascia. The external oblique was sutured with 2-0 vicryl and the wound was closed in layers.

Patients were evaluated intra-operatively and post-operatively. Patients in the two groups were given equal dosage of analgesics in post-operative period. Patients who could not tolerate pain were given additional dosage of analgesics. Pain was scored from 0-10 using Visual Analogue Pain Score (VAPS). Patients requiring additional analgesics were graded as having severe pain with pain score of 10 using VAPS. Patients were evaluated for pain on Post-operative days 1, 7, 14, 30, 60, 90 and 180.

The outcomes in this study included multiple variables such as injury to peritoneum, injury to vessels, wound seroma, wound induration, scrotal collection and surgical site infection.

Results

In our study of 60 patients, 59 (98.3%) were males patients and only 1 (1.7%) patient was a female.

Figure 1 : shows out of 60 patients, 44 (73.3%) patients were Manual labourers and 16 (26.6%) were having sedentary life style.

Table 1: compares the operative duration between two groups. Patients who underwent pre-peritoneal repair were found to have mean operative duration of 54.0667 mins compared to 72.5 mins with that of patients in the Lichtenstein repair group with significant p value of 0.001.

Table 2: shows the comparison of complications during surgery between case and control groups. Out of 30 patients in case group 5 (16.7%) patients had

injury to peritoneum and 2 (6.7%) patients had injury to vessels. In control group no patients had injury to peritoneum and vessels. A significance in p value 0.019 was seen in case and control group with reference to injury to peritoneum.

It also shows the comparison of post-operative complications between case and control groups. Out of 30 patients in case group 2 (6.7%) patients presented with wound induration and no patients had wound seroma, SSI and scrotal collection.

In control group 2 (6.7%) patients had seroma and 6 (20%) patients presented with wound induration. There was significance in p value of 0.0468 with respect to

wound induration when case group was compared with control group.

Table-3 and Figure 2: shows comparison of pain scores in post-operative days between case group and control group. Days 1, 7 30 and 180 case group shows significant difference with the control group in terms of post-operative pain (<0.0001 on day 1, 0.0001 on day 7, 0.004 on day 30 and 0.0014 on day 180).

On day 14 mean pain score for case and control groups are 2.3 and 2.8 with 'p' value (0.09) not showing any significance. On day 90 the mean pain score for case and control group are 0.267 and -0.093 respectively with no statistical significance.

Table 1: Comparison of Operative Duration between groups

Operative Duration	Mean	SD	Variance	df	't' Value	'p' Value
Case Group	54.0667	16.752	271.91	29	3.365	0.001(S)
Control Group	72.5	16.489	280.823	29		

Table 2: Comparison of Complications in Case group and Control group

Complications	Case Group		Control Group		X ² Value	'p' Value
	Yes	No	Yes	No		
Injury to Peritoneum	5 (16.7)	25 (83.3%)	0 (0%)	30 (100%)	5.454	0.019(S)
Injury to Vessels	2 (6.7)	28 (93.3%)	0 (0%)	30 (100%)	2.068	0.15(NS)
Wound Seroma	0 (0%)	30 (100%)	2 (6.7)	28 (93.3%)	2.0689	0.15 (NS)
Scrotal Collection	0 (0%)	30 (100%)	0 (0%)	30 (100%)	-	- (NS)
Surgical Site Infection	0 (0%)	30 (100%)	0 (0%)	30 (100%)	-	- (NS)
Wound Induration	2 (6.7%)	28 (93.3%)	6 (20%)	24 (80%)	4.307	0.0468(S)

Table 3: Comparison of Pain scores in post-operative days of Case group and Control group

Post-Operative Days	Mean	Case Group Standard Deviation	Variance	Mean	Control Group Standard Deviation	Variance	Pearson Correlation	't' Value	'p' Value
Day 1	4.967	1.92	3.688	7.1	1.583	2.506	-0.157	4.368	<0.0001(S)
Day 7	3.567	1.5	2.254	5.1	1.213	1.472	-0.145	4.07	0.0001(S)
Day 14	2.3	1.207	1.458	2.8	1.517	2.303	-0.0602	1.372	0.09(NS)
Day 30	1.033	0.889	0.791	1.7	0.702	0.493	-0.314	2.818	0.004(S)
Day 90	0.267	0.583	0.34	0.5	0.629	0.396	-0.093	1.423	0.08(NS)
Day 180	0	0	0	0.267	0.449	0.202	-	3.247	0.0014(S)

Distribution by Occupation

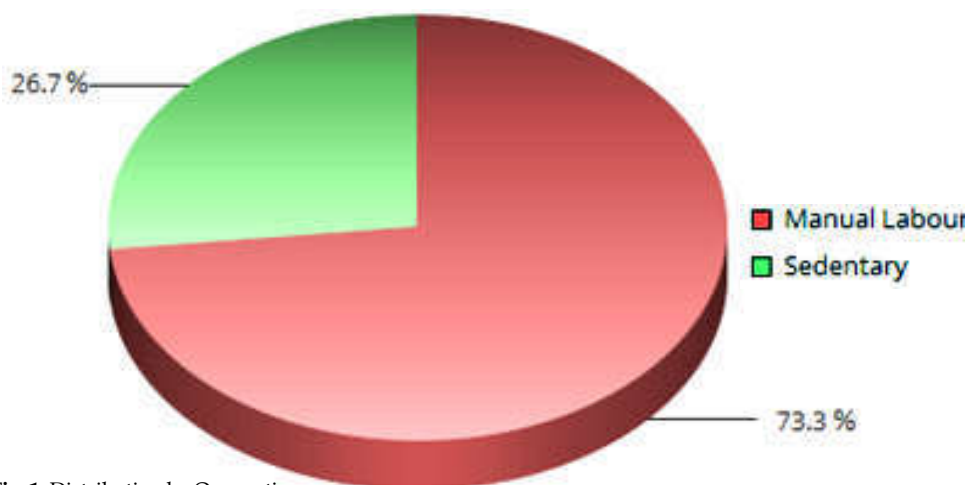


Fig. 1: Distribution by Occupation

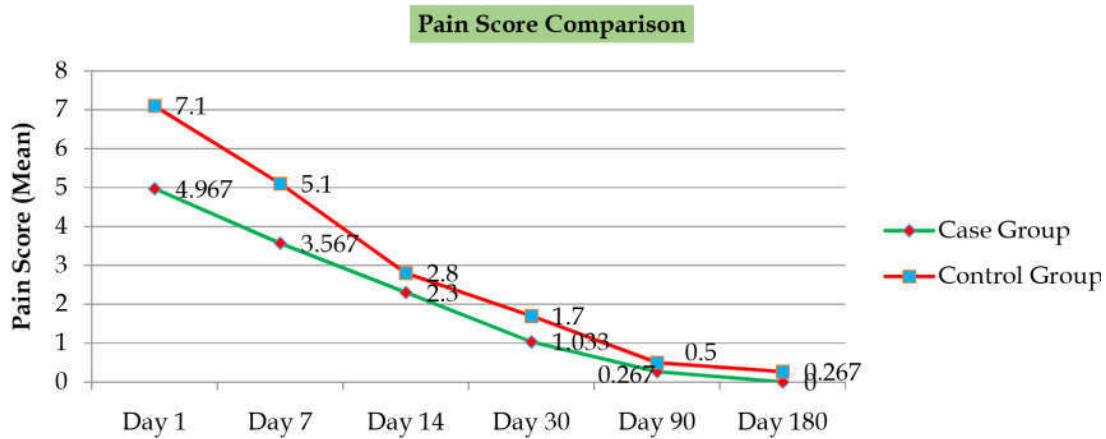


Fig. 2: Mean comparison of pain scores in post-operative days of Case group and Control group

Discussion

Hernia repair surgeries are done all over the world. It is the most common surgery next to appendectomy. Lichtenstein repair has become procedure of choice for repair of inguinal hernia all over the world. It has decreased the recurrence rates to less than 0.3%. Though recurrence rates are less, the post-operative pain has become a world-wide problem.

Inguinodynia has become one of the foremost complications of hernia repair after 6 months of surgery. Causative factors for Inguinodynia are many, most common of which are injury to nerves and mesh placement. Placing the mesh in the parietal compartment causes injury to the nerves which requires neurectomy or neurolysis. Approach to both causes morbidity to the patient as described by D.C. Chen et al. [4].

In the study conducted by Martin F Bjurström et al. [5] in 2014, it was observed that patients who underwent posterior herniorrhaphy, experienced pain usually at 3-6 months due to inflammation and also experienced moderate pain during work. The study also found out that intra-operative identification of nerves and neurectomy decreases chronic post hernioplasty pain (CPIP) [6].

Laparoscopic surgeries reduce the risk of post-operative pain and other complications but many patients are not able to afford the treatment. Open pre-peritoneal mesh repair will be useful for such patients [7,8]

In a retrospective study of 496 patients by G. G Koning et al. [9], concluded that there was no significant difference in chronic groin pain in patients who underwent TIPP when compared with Lichtenstein repair [10,11,12]

Out of 30 patients in case group, 5 (16.7%) patients had injury to peritoneum and 2 (6.7%) patients had injury

to vessels. In control group no patients had injury to peritoneum and vessels. The p value of 0.019 was seen in case and control group with reference to injury to peritoneum is significant [13]. Subjects in case group that had injury to peritoneum did not cause any complications. J.F. Gillion et al. [14] in their study on Quality of life and chronic pain after TIPP surgery found that, out of the 151 patients only 1.9% of the patients had complications intra-operatively.

J.F. Maillart et al. [15] in their studies on Pre-peritoneal mesh repair of inguinal hernia deduced that the surgery is associated with less wound seroma and post-operative complications. Rubik Ray et al. in his study of 71 patients found that 5.7% of the patients developed wound seroma and 17.14% of them developed wound induration when compared with Pre-peritoneal repair. In our study of 60 patients we observed that 6.7% of the patients from the control group developed wound seroma compared to 20% with that of Lichtenstein group. We also found a statistically significant difference in patients with wound seroma between both the groups (p value 0.0468).

After Lichtenstein repair, the quality of life is poor and pain is high as reported by a number of studies. With proper nerve identification and handling, D.C. Chen et al reported excellent outcomes following TIPP on POD 0 and 30. The study also showed that about 25% (128 of 531) of patients suffer with pain and concluded that Quality of Life (QOL) is poor in Lichtenstein group. Out of the 25%, 14.5% (77 of 531) of the patients had moderate to severe pain while 18% (96 of 531) of the patients developed pain several times per week or more. J.F. Gillion et al [14] reported in their TIPP series that the incidences of recurrence (0.2%) and severe chronic pain ($\leq 0.7\%$) were very low and the QOL of the patients were excellent.

In TULIP study conducted by G.G. Koning et al. [16], a double blind randomized control study of 300

patients, it was found that TIPP drastically reduces the immediate post-operative complications and chronic groin pain in patients.

In our study of 60 patients we found that patients who underwent TIPP had less pain compared to Lichtenstein repair. Their scores were statistically significant when compared on POD 1, 7, 30 and 180 (<0.0001 on day 1, 0.0001 on day 7, 0.004 on day 30 and 0.0014 on day 180). On day 14 and 90 the 'p' value (0.09 on day 14 and 0.08 on day 90) though doesn't show any significance but is showing statistical significance with relation to mean when compared with the Lichtenstein group.

We also found the quality of life to be better in patients who underwent TIPP. All the scores were assessed using VAS from post-operative day 1-180. All patients had regular follow up in the study.

The study shows that TIPP repair do hold a considerable promise which needs to be investigated further in a larger population. TIPP by its nascent posterior approach is theoretically and practically sound alternative. It may play role where Laparoscopic facilities or skill are unavailable.

Limitations of the Study

In our study of 60 patients, 70% of the patients presented with direct hernia. This resulted in an unequal assessment.

And the procedure being a novel one, the sample size of 60 patients is small. The study was carried out in only one unit of the Department to avoid any bias and ensure uniformity in data collection and recording.

Suggestion for Further Studies

A continuation of this study can be done with larger number of patients. Further TIPP can be compared with TEP/TAPP to assess the outcomes in terms of post-operative complications, chronic groin pain, quality of life and economic burden.

Summary and Conclusion

From the above study we can draw the following conclusion:

- The operative duration was 52.006 mins for Pre-peritoneal repair, which was shorter when compared with that of 72 mins for Lichtenstein repair.
- Some patients in Pre-peritoneal repair group had injury to peritoneum but it did not cause any complications.

- In Pre-peritoneal group; post-operative complications was less, patients returned to work earlier and had good quality of life.
- The study shows that TIPP repair do hold a considerable promise which needs to be investigated further in a larger population.
- Lichtenstein is a popular technique with world wide acceptance. However, its role is limited in case of recurrence. TIPP by its nascent posterior approach is theoretically and practically sound alternative. It may play role where Laparoscopic facilities or skill are unavailable.
- Laparoscopic hernia repair is a advanced laparoscopic skill with steep learning curve and most of the surgeons are finding themselves in transition phase, TIPP may play a role of suitable bridge between open and laparoscopic repair.

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