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Original Research Article

Delayed complications after open inguinal hernia repair: a comparison of two techniques

Vashisht Dikshit, Digvijay Jadhav*, Iqbal Ali, Pratham Mody, Neha Srivastava

Department of Surgery, Dr. D. Y. Patil Medical College and Hospital, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, India

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***Correspondence:**
Dr. Digvijay Jadhav,
E-mail: digvijay.j@yahoo.com

ABSTRACT

Background: The open preperitoneal repair offers the benefits of placing the mesh in the preferred position while avoiding the disadvantages of laparoscopic repair.
Methods: A total of 60 patients with bilateral inguinal hernias were randomized to undergo either the standard Lichtenstein meshplasty or the modified iliopubic tract repair in a teaching hospital. Outcomes measured were chronic inguinal pain, groin numbness, and recurrence.
Results: Delayed complications like chronic inguinal pain and numbness were not seen in the iliopubic tract group. However, this difference was not statistically significant ($p>0.05$). One patient in the Lichtenstein repair group had recurrence of hernia. There were no recurrences in the iliopubic tract repair group. This difference again, was not statistically significant ($p>0.05$).
Conclusions: The iliopubic tract repair offers an excellent alternative to the Lichtenstein meshplasty, and is associated with lower incidence of delayed neurological complications, recurrence rates on par with the gold standard Lichtenstein meshplasty.

Keywords: Chronic pain, Hernia, Hernioplasty, Mesh, Recurrence

INTRODUCTION

The hernia surgeon of today, has a multitude of surgical techniques at his disposal, ranging from anatomical repairs, to the modern laparoscopic repairs. Amongst these, the Modified Lichtenstein Meshplasty remains the most popular. This popularity can be attributed to its ease of learning, safety and low recurrence rates.[1]

This technique, however, has its drawbacks. Numbness and chronic groin pain continue to remain a major cause of morbidity following meshplasty. This can be attributed to the greater number of nerves encountered during the anterior approach used in the Lichtenstein technique.[2] These complications are magnified in cases of bilateral inguinal hernias. This highlights the need to consider other surgical techniques when faced with bilateral inguinal hernias.

The Open Preperitoneal approach involves placing the mesh in the preferred location, namely, the preperitoneal space, while avoiding the problems associated with laparoscopy.[2] This approach also minimizes dissection in the inguinal canal, resulting in lesser manipulation of inguinal nerves and potential damage to the vital structures.[2]

This study compared a modification of the Iliopubic Tract repair, wherein a single midline incision is used for bilateral repair, to the standard Lichtenstein Meshplasty

with respect to delayed neurological complications (chronic groin pain and numbness), and recurrence.

METHODS

A prospective randomized study of sixty patients was carried out at Dr. D. Y. Patil Hospital, between May 2015 and April 2018. The study protocol followed the guidelines stated by the CONSORT criteria. The sample size was calculated using the formula:

$n = z^2 \times P (100 - P)/d^2$

Where:

P was the anticipated prevalence

d was the desired precision

z was the appropriate value from the normal distribution for the desired confidence, which was 95% in present study (z=1.960).

Demographic details of all patients were recorded. Patients between ages 18 and 80, with bilateral uncomplicated inguinal hernias were randomised into two groups, one undergoing the Lichtenstein Meshplasty, and the other, the modified iliopubic Tract Repair. Patients with unilateral, complicated, congenital, and recurrent hernias were excluded from the study (Table 1).

Table 1: Patient characteristics.

	Lichtenstein	Modified iliopubic
Mean age	61.77	61.7
Type of Hernia		
B/L Direct	12	9
B/L Indirect	11	10
U/L Direct+ U/L Indirect	3	6
Pantoloons	4	5

Informed consent was obtained from all patients after explaining the nature of the study, and the advantages and disadvantages associated with both procedures. All the patients in the study were operated upon by the same team of surgeons comprising of experienced consultants, as well as surgery residents.

Both groups received inj. Cefotaxime 1gm IV at the time of induction of anaesthesia as per present institute protocol.

Patients in Group A underwent the standard Lichtenstein meshplasty repair as described in literature. A 3"x 6" lightweight Prolene mesh was fixed over the posterior wall of the inguinal canal using interrupted Prolene sutures, and the procedure repeated on the opposite side after repair of one side.

Patients in Group B underwent the modified iliopubic tract repair, wherein the preperitoneal space was accessed using a lower midline incision, extending from below the umbilicus to the pubic symphysis. The hernia sac was then identified. In case of indirect inguinal hernia, the sac was ligated and divided at the level of the deep ring, with the distal part of the sac remaining within the canal. In case of a direct hernia, the sac was inverted with a running purse-string suture. Repair was then done by approximating the arching fibres of the Transversalis fascia superiorly to the iliopubic tract (Figure1) inferiorly with interrupted Prolene sutures (Figure 2). A small mesh (3"x 6" lightweight Prolene mesh cut in half) was then sutured placed over the repair, and secured superiorly to the Transversalis arch, and inferiorly to the pectineal ligament, thus eliminating possibility of future femoral hernias as well (Figure 3). The contralateral hernia was similarly repaired through the same incision. The incision was then closed in layers over a suction drain.

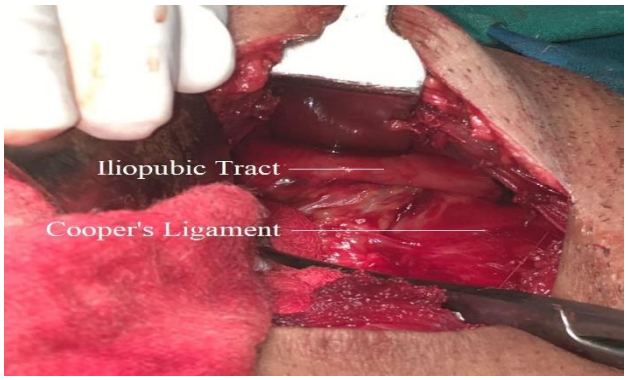

Figure 1: The iliopubic tract.

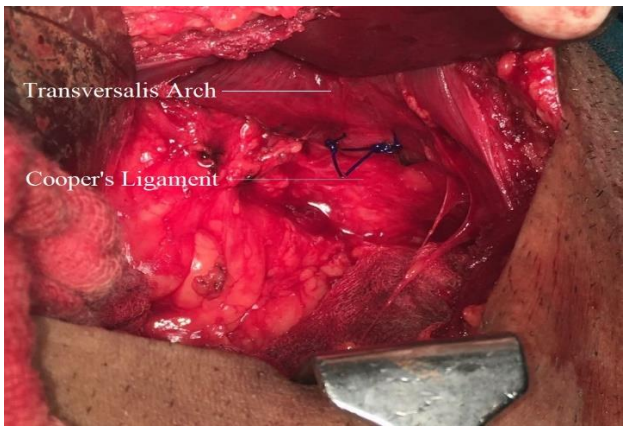

Figure 2: Approximating transversalis arch with iliopubic tract with sutures.

Both groups received inj. Cefotaxime 1gm IV 12 hourly for three days as per institute protocol for antibiotic prophylaxis, and Inj. Paracetamol 1gm IV 8 hourly for analgesia post-operatively. Main outcome assessed was chronic inguinal pain, with groin numbness and recurrence being secondary outcomes assessed.

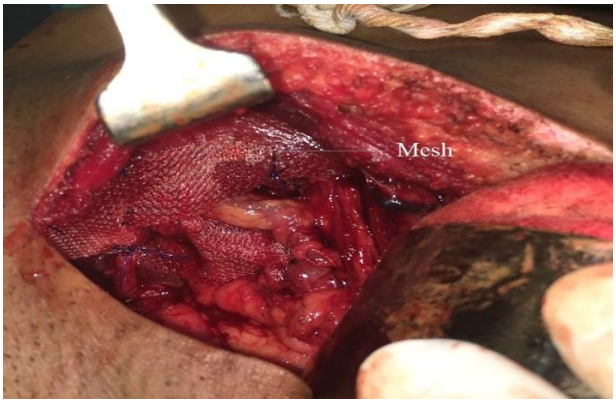

Figure 3: Placement of Prolene mesh over posterior wall in preperitoneal plane.

Patients were followed up 3 monthly, for a period of up to three years. They were asked about inguinal pain, and history of consuming analgesics. Patients' were also subjected to a physical examination to assess numbness and paranesthesia.

Recurrence was defined as a bulge with expansile cough impulse on physical examination, which was confirmed by ultrasonography.

Follow-up examinations were conducted by a member of the team who was not the operating surgeon for the particular case to avoid bias.

Chronic pain, numbness and recurrence were tabulated and compared using the unpaired t-test. A p value less than 0.05 was considered statistically significant.

RESULTS

All sixty (thirty in Lichtenstein group, thirty in Iliopubic tract group) patients completed the study. None were lost to follow-up (Figure 4).

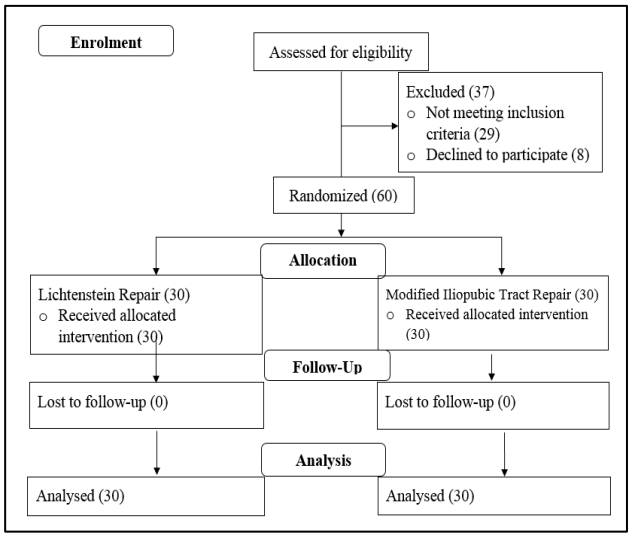

Figure 4: Participant flow diagram.

Majority of the patients were in the 61-70 years (Group A: 36.67%, Group B: 40%). The youngest patient in the study was 24 years old, while the oldest was 80 years old. Both groups were comparable, with no statistical difference in age (p value 0.49). All patients in the study were males.

More patients in the Lichtenstein repair group experienced chronic inguinal pain as compared to the iliopubic tract repair group. However, this difference was statistically insignificant. (P > 0.05) (Table 2).

Groin numbness was seen in five patients in the Lichtenstein repair group, and not seen in the Iliopubic tract repair group. This difference was not statistically significant (P > 0.05) (Table 2).

One recurrence was encountered in the Lichtenstein repair group after 24 months. There was no recurrence in the Iliopubic tract repair group. This difference was again, not statistically significant (P > 0.05) (Table 2).

Table 2: Delayed post-operative complications in both groups.

	Lichtenstein	Modified iliopubic	P value
Chronic inguinal pain	1	0	0.8
Groin numbness	5	0	0.052
Recurrence	1	0	0.8

DISCUSSION

The ideal method of hernia repair would cause minimal discomfort to the patient, both during the surgical procedure and in the post-operative course. It would be technically simple to perform, and easy to learn, would have a low rate of complications and recurrence, and would require only a short period of convalescence.

Most modern studies compare the standard Lichtenstein meshplasty to laparoscopic techniques, and few directly compare it to open preperitoneal methods. This makes it difficult to assess the impact of the posterior approach itself in the surgical outcome, factoring in the minimal trauma caused by laparoscopic methods. The present study design makes it possible to directly study the role of the posterior approach alone in outcome of hernia repair by comparing it to the current gold standard.

The results can vary widely amongst different centres, and the results from specialised centres are often good. For example, very low recurrence rates have been reported from the Shouldice hospital using their eponymous technique, even<1%, with some authors suggesting it be used as a gold standard when evaluating new herniorrhaphy techniques.[3,4] However, there exists a steep learning curve for the technique, which has resulted in other centres failing to reproduce the Shouldice

hospital's stellar recurrence rates.[5,6] Present study was conducted in a general surgical teaching centre, which far better mimics clinical reality.

The Nyhus repair is considered the standard open preperitoneal repair. Present study focussed on present modification of the same, tailored specifically to bilateral inguinal hernias. This choice was also relevant as it considered the cost of the repair, which is sensitive in a developing country like ours.

Post-operative pain following hernia repair has extensively been studied, and most reports show a distinct advantage with the posterior pre-peritoneal approach, as employed by the Iliopubic tract repair. A meta-analysis of over 500 patients showed significantly higher pain following Lichtenstein repair as compared to pre-peritoneal repair.[7] Other studies by Liu Z et al, Koning et al, Nienhuijs et al, Ray et al, and Sajid et al also found significantly lower pain scores in patients following open pre-peritoneal repair as compared to the Lichtenstein meshplasty.[2,8- 10,12]

Late complications are a bane of hernia repair. Present study assessed patients for groin numbness, chronic pain, recurrence and late infection at three monthly intervals for a maximum period of 2 years. Long term pain was measured based on a history of analgesic use, and restriction of daily activities. While other indices are available, authors found their application difficult with present patients, who mostly are illiterate and come from poor backgrounds. Late complications were encountered more in the Lichtenstein group, with five patients reporting numbness, one each reporting chronic groin pain and recurrence. None of the patients who underwent the Iliopubic tract repair suffered any delayed complication. However, this was not statistically significant, and a more extensive study would be required to confirm statistical advantage.

Our findings however, were in contrast to others, who have reported significantly higher rates of groin numbness and chronic inguinal pain amongst patients undergoing the Lichtenstein meshplasty as compared to preperitoneal repairs. It has been postulated that this may be due to the greater chances of nerve damage in the anterior approach employed by the Lichtenstein repair.[6-9,11-13]

The recurrence rates are dependent on the technique and of course, the expertise of the surgeon. For tissue repairs such as the Shouldice repair, recurrence rates are as low as 0.4% seen at the Shouldice clinic. This cannot be replicated in low volume centres, but one unit in the UK achieved a recurrence rate of 0.8% at 6 years if stainless steel wire was used compared with 8.1% within 2 years when they used a polyester suture.[14]

Mesh repairs are popular and generally have the lowest recurrence rates of around 0.8% compared with non-mesh repairs.[15,16] The Lichtenstein tension-free repair is probably the most popular of the methods with recurrence rates of 0% in 1000 cases at 1 to 6 years by Lichtenstein's team.[17] One large Danish database study of young males undergoing hernia repair found recurrence rates of 1.6% with the Lichtenstein repair at 5 years.[16] The Prolene Hernia System has similar results to the Lichtenstein repair with recurrence rates of around 1%.[18] Open pre-peritoneal mesh repairs are less commonly performed but are associated with comparable recurrence rates of 1 to 4%.[7] Present study mirrored these results with no significant difference in recurrences at the end of the study.

The results of laparoscopic inguinal hernia repairs are more variable with the most frequently reported recurrence rates of 2 to 3% but vary between 0.6% and 10% with no discernible difference between TAPP or TEP repairs.[12,19] The large variation probably reflects the steep learning curve required to achieve good outcomes from laparoscopic repair.

CONCLUSION

The modified Iliopubic tract repair has shown several clinically relevant advantages. Patients experienced significantly lower pain after the Iliopubic tract repair, and experienced lower rates of neurological complications. Immediate post-operative complications were on par with the high standards set by the Lichtenstein meshplasty.

For surgeons who prefer an open approach, the modified Iliopubic tract repair is an excellent alternative to the Lichtenstein meshplasty, especially for bilateral and recurrent hernias.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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