



ORIGINAL RESEARCH PAPER

General Surgery

COMPARATIVE STUDY OF INGUINAL HERNIA REPAIR WITH PLACEMENT OF MESH ANTERIOR AND POSTERIOR TO FASCIA TRANSVERSALIS IN CASES OF UNILATERAL INGUINAL HERNIA

KEY WORDS: TIPP, transinguinal preperitoneal, chronic inguinal pain, inguinodynia

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ABSTRACT

Background: Since inception hernia surgery evolved a lot and achieved the gold standard of Lichtenstein hernioplasty. Chronic post-surgical inguinal pain and mesh related wound complications are still issues of concern for surgeons. To minimize these problems different modifications are being evaluated worldwide.

Objective: To compare the incidence of post-surgical chronic inguinal pain duration of surgery between two different techniques of mesh placement, one is placing the mesh anterior to Fascia Transversalis and other is placing the mesh posterior to Fascia Transversalis.

Study Design: Randomized superiority trial done among patients selected from opd and divided in two groups undergone hernioplasty by two different techniques of mesh placement.

Materials And Methods: Each group of patients contained fifty patients of 18 to 65 years of age with unilateral inguinal hernia. Duration of surgery recorded and post-surgical chronic inguinal pain evaluated at 2 weeks 2 months 4 months and 6 months after surgery.

Conclusion: The study showed that placement of mesh posterior to fascia transversalis gave better result than placing it anterior to FT in respect of post operative chronic pain but with a longer operative duration.

BACKGROUND

Lichtenstein tension-free hernioplasty (LH) revolutionized hernia repair surgery in 1984⁽¹⁻³⁾ which is now considered as gold standard by American college of surgeons⁽³⁾. In LH the mesh is placed just deep to the external oblique aponeurosis and tailored to pubic tubercle, inguinal ligament, and conjoint tendon. Placing mesh posterior to Fascia transversalis (FT) in preperitoneal space developed by Rives⁽⁴⁾, Stoppa⁽⁵⁾, Wantz⁽⁶⁾ Kugel⁽⁷⁾. Modern days transinguinal preperitoneal (TIPP) hernia repair was described by Pe'lissier et al⁽⁸⁾, where the preperitoneal space was approached through the inguinal canal. Chronic inguinal pain, wound infection, seroma are still issues of concerns for the surgeons. Inguinodynia, found in almost 4% to 20%⁽⁹⁾ patients, characterized by chronic pain radiating to scrotum or femoral triangle. Recently LH is being challenged by other techniques where the mesh is placed in the preperitoneal space behind the defect of the hernial weakness against the support from front made by the muscles in the groin.⁽¹⁰⁾ Placing the mesh in the preperitoneal space is technically demanding and requires more tissue handling but may minimize the risk of direct nerve injury. Extensive dissection further increases the risk of seroma. Few other techniques have come up with the advantage of minimal preperitoneal dissection.⁽¹¹⁾

OBJECTIVE

To compare statistically the duration of surgery and Post-operative chronic inguinal pain to assess any superiority of either of the operative techniques.

Study Design

A randomized superiority single blind trial was done. Study participants were randomly allocated into two groups each containing fifty patients on the basis of "RANDOMISATION BY PAIR". Group I patient undergone hernioplasty placing mesh anterior to Fascia Transversalis (FT) and Group II patients undergone hernioplasty with placing mesh posterior to Fascia Transversalis.

MATERIALS AND METHODS

Study was done in Department of General Surgery, Bankura Sammilani Medical College & Hospital, Bankura, within a span of 18 months. Patents were selected from OPD. Permission from Institutional Ethics Committee and informed consent from the study subjects obtained. Time required for surgery

was recorded for each patient. Post-operative inguinal pain recorded on a visual analogue scale (VAS) from 0 to 10 at 2 wk, 2 month 4 month and 6 month after the surgery. The statistical analysis done standard statistical software and P value <0.05 taken as significant.

Inclusion Criteria

Patients with unilateral inguinal hernia in the age group of 18-65 years who essentially require a hernioplasty for cure are included in the study.

Exclusion Criteria

Patients with bilateral hernia, complicated inguinal hernia, recurrent hernia and patients with preexisting inguinoscrotal disease (epididimoorchitis, filariasis, hydrocele etc) are excluded from the study.

Operative Techniques

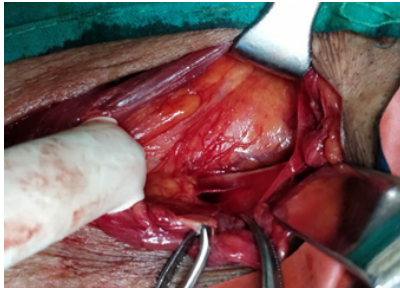
All surgeries in this study were done under spinal anesthesia. For all patients approaching inguinal canal, hernial sac dissection were same with standard LH. Genital branch of genitofemoral nerve Ilioinguinal nerve were secured. In Group I patients then a recess is made anterior to FT for mesh placement.



Picture 1: Space Created For Placement Of Mesh Anterior To FT

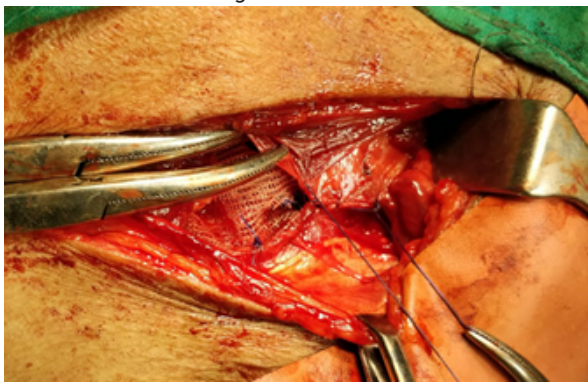
A standard 7x15 cm polypropelene mesh fixed to pubic tubercle, lower margin of inguinal ligament with continuous prolene suture ending beyond deep ring. Cord passed through a longitudinal slit made through the lateral margin of

the mesh. The upper part of the mesh tailored to conjoint tendon loosely. In Group II patients after confirming the position of pulsation of inferior epigastric vessel medial to the deep ring, the preperitoneal space opened through the thinner portion of transversus abdominis aponeurosis on the medial and superior part of inguinal canal at the lower part of conjoint tendon. Dissection done bluntly with index finger from medial to lateral to make a preperitoneal pocket and pushing back the inferior epigastric vessels. The dissection extended beyond deep inguinal ring. Mesh was placed in this newly created preperitoneal pocket.



Picture 2: Preperitoneal Space

The mesh anchored with cooper's ligament and undersurface of the conjoint tendon. Visible iliohypogastric nerve on the surface of the conjoint tendon was left unharmed. FT closed with continuous absorbable suture over the mesh. Picture 3: Fascia Transversalis being closed over the mesh



Picture 3: Fascia Transversalis Being Closed Over The Mesh

RESULTS AND ANALYSIS

Table 1: Duration Of Surgery

Groups	Mean (mn)	SD	Unpaired t, df, p value
Group I (n ₁ =50)	46.64	8.9392	11.7602,98,<0.0001
Group II (n ₂ =50)	67.58	8.8666	
Total (N=100)	57.11	13.75463

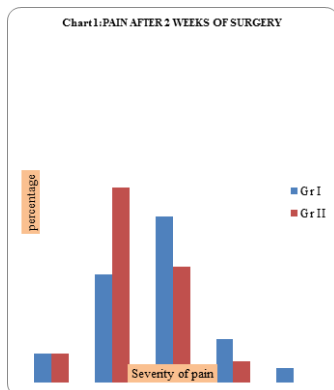


Table 2: Pain After 2 Weeks Of Surgery

Groups	Mean	SD	Unpaired t, df, p value
Group I (n ₁ =50)	4.3	2.4599	2.9901, 98, <0.0035
Group II (n ₂ =50)	2.98	1.9218	
Total (N=100)	3.64	2.2941

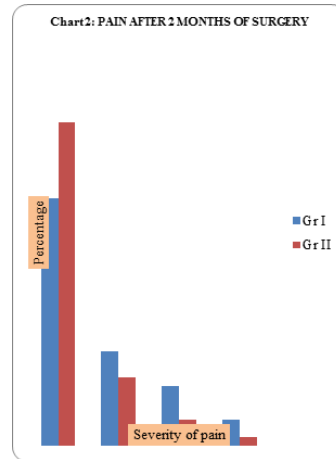


Table 3: Pain After 2 Months Of Surgery

Groups	Mean	SD	Unpaired t, df, p value
Group I (n ₁ =50)	1.80	2.5234	2.219, 98, 0.0288
Group II (n ₂ =50)	0.83	1.7309	
Total (N=100)	1.32	2.2060

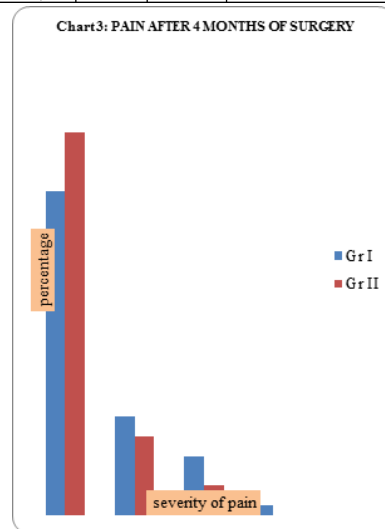


Table 4: Pain After 4 Months Of Surgery

Groups	Mean	SD	Unpaired t, df, p value
Group I (n ₁ =50)	1.32	2.1327	2.048, 98, 0.0433
Group II (n ₂ =50)	0.60	1.2776	
Total (N=100)	0.96	1.7861

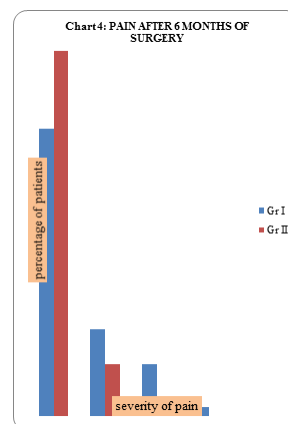


Table 5: Pain After 6 Months Of Surgery

Groups	Mean	SD	Unpaired t, df, p value
Group I (n ₁ =50)	1.18	2.0375	2.121, 98, 0.0365
Group II (n ₂ =50)	0.4694	0.2094	
Total (N=100)	0.8282	1.7086

The estimated mean operative duration in Group I was 46.64 minutes whereas that of Group II was 67.58 minutes, which found to be significant statistically. After 2 week, 2months, 4 months and 6 months the mean pain scores in Group I and Group II were 4.3 and 2.98, 1.80 and 0.83, 1.32 and 0.6, 1.18 and 0.4694, respectively. All findings were statistically significant.

DISCUSSION

In LH contact of mesh with inguinal nerves, makes patient vulnerable for inguinodynia. Therefore surgeons attempted to place the mesh in the preperitoneal space posterior to the fascia transversalis. Different techniques of preperitoneal dissection and mesh placement were described previously by workers like Rutkow and robbins⁽¹²⁾, Gilbert⁽¹³⁾, Ray et al⁽¹⁴⁾. All these procedures are technically difficult and requires blind dissection of preperitonral space. Maiti et al⁽¹¹⁾ proposed a modification of LH and avoids extensive preperitoneal dissection. They claimed that as the mesh was placed below the conjoint tendon the iliohypogastric nerve also didn't come in contact with the mesh, thereby reducing the chance of post operative pain. They didn't place the mesh entirely under the FT, part of it remained out of FT and the margin was fixed to inguinal ligament like it is done in LH. In this study the anterior placement of mesh done as explained by Nurullah Bülbüller⁽¹⁵⁾ et al. The mesh placed anterior to FT was anchored with inguinal ligament and conjoint tendon like LH. Mesh placed posterior to FT was completely under the cover of FT and preperitoneal space created not through a keyhole opening but incising the FT for a little long segment and entirely under vision. Sajid et al.⁽¹⁶⁾, conducted a meta analysis that included 12 RCT and 1437 patients and concluded that the risk of developing chronic groin pain following preperitoneal hernia repair was lower compared to the use of lichtenstein repair. In the same study they also concluded that the duration of surgery was similar in the two procedures, whereas Zhang et al⁽¹⁷⁾ found longer mean operating time for anterior preperitoneal repair as compared to posterior repair (70.1 min vs. 62.6 min, p = 0.1). In this study vascular injury and nerve injury were not encountered. As this procedure allows careful minimal dissection in preperitoneal space with better visibility the risk of injury is minimum. This study found the operative duration to be significantly higher for posterior placement of mesh which expected to be minimized in a high volume centre. Placement of mesh just anterior to FT was not found to be very beneficial in respect of direct nerve contact.

CONCLUSION

The study showed that placement of mesh posterior to fascia transversalis gave better result than placing it anterior to FT in respect of post operative chronic pain but with a longer operative duration. Both the techniques need to be studied on a larger population to be claimed as a better alternative.

REFERENCES

1. Lichtenstein IL, Shulman AG, Amid PK, Montllor MM. The tension-free hernioplasty. *The American Journal of Surgery*. 1989;157(2):188-93.
2. Amid PK. Lichtenstein tension-free hernioplasty: Its inception, evolution, and principles [Internet]. SpringerLink. Springer-Verlag; 2003 [cited 2019May]. Available from: <https://link.springer.com/article/10.1007/s10029-003-0160-y>
3. Fitzgibbons R (2000) Management of an inguinal hernia: Conventional? Tension-free? Laparoscopic? or maybe no treatment at all. General Sessions of the American College of Surgeons. 86th Annual Clinical Congress
4. Rives J, Lardennois B, Flament JB, Convers G. The Dacron mesh sheet, treatment of choice of inguinal hernias in adults. Apropos of 183 cases. *Chirurgie*. 1973;99(8):564-75. French
5. Stoppa RE, Warlaumont CR, Verhaegue PJ (1986) Prosthetic repair in the treatment of groin hernias. *Int Surg* 71: 154-158
6. Wantz GE. The technique of giant prosthetic reinforcement of the visceral sac performed through an anterior groin incision. *Surg Gynecol Obstet*. 1993;176(5):497-500.
7. Kugel RD. The Kugel repair for groin hernias. *Surgical Clinics of North*

- America. 2003;83(5):1119-39.
8. Pélissier EP, Blum D, Ngo P, Monek O. Transinguinal preperitoneal repair with the Polysoft patch: prospective evaluation of recurrence and chronic pain. *Hernia*. 2007Jul;12(1):51-6.
9. Amid PK. Causes, prevention, and surgical treatment of postherniorrhaphy neuropathic inguinodynia: Triple neurectomy with proximal end implantation. *Hernia*. 2004;8(4):343
10. Fisher JE (ed) (2007) *Mastery of surgery*, 5th edn. Wolter Kluwer/ Lippincott Williams & Wilkins, Philadelphia, p 1933
11. Maiti SB, Kushwaha PB, Maiti KB. Modified Lichtenstein Technique for Transinguinal Preperitoneal Prosthesis (Tipp) Repair of Groin Hernia. *Indian Journal of Surgery*. 2018;81(1):96-100.
12. Rutkow IM, Robbins A. The Mesh Plug Repair. *Abdominal Wall Hernias*. 2001;:382-7.
13. Gilbert AI, Young J, Azuaje R. Gilbert Technique of Inguinal Hernia Repair. *Inguinal Hernia Surgery Updates in Surgery*. 2017;:31-6
14. Ray R. Transinguinal Preperitoneal Technique of Inguinal Hernioplasty – A Better Alternative to Lichtenstein Procedure. *Journal Of Clinical And Diagnostic Research*. 2014
15. Bülbüller N, Çetinkaya Z, Kirkil C, Ayten R, Aygen E, Girgin M, et al. Inguinal Hernia Repair via Application of Mesh in Front of and behind the Fascia Transversalis. *Indian Journal of Surgery*. 2012May;76(2):124-6.
16. Sajid MS, Craciunas L, Singh KK, Sains P, Baig MK. Open transinguinal preperitoneal mesh repair of inguinal hernia: a targeted systematic review and meta-analysis of published randomized controlled trials. *Gastroenterology Report*. 2013May;1(2):127-37.
17. Zhang J, Bai J, Li Q, et al. Anterior versus posterior tension-free repair of adult inguinal hernia. *Shaanxi Med J* 2011; 40:331-2. Downloaded from <http://bmjopen.bmj.com/> on September