International Journal of Research in Medical Sciences
Kumar R et al. Int J Res Med Sci. 2021 Feb;9(2):390-394
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20210412

Original Research Article

A prospective comparative study of Lichtenstein procedure with and without mesh-fixation for inguinal hernia repair

Ravinder Kumar[1], Hilal A. Wani[1], Anshuman Mahesh[1], Irfan N. Mir[2]*

[1]Department of Surgery, Government Medical College, Kathua, Jammu and Kashmir, India
[2]Department of Surgery, SKIMS, Soura, Jammu and Kashmir, India

Received: 09 January 2021
Accepted: 20 January 2021

***Correspondence:**
Dr. Irfan N. Mir,
E-mail: irfanazir@gmail.com

ABSTRACT

Background: Repair of inguinal hernia is one of the most common elective operations performed in general surgery worldwide. Mesh-hernioplasty became the gold standard, because of its low recurrence rate in comparison with tissue repairs. The ideal repair must be simple, safe, easy to perform and require minimal dissection which provides enough space, should be cost effective with less hospital stay, less pain and less recurrence. The present study aimed at comparing the effect of mesh fixation and non-fixation in Lichtenstein technique for inguinal hernia repair.
Methods: Hundred (100) patients with primary uncomplicated, unilateral inguinal hernia were treated between April 2019 and September 2020. Patients with inguinal hernia underwent Lichtenstein repair with mesh-fixation (group A) (n=50) and non-fixation (group B) (n=50). The mean operative time, post-operative pain score, average hospital study, post-operative complications and recurrence rates were compared between the two groups.
Results: Mean operative time in non-fixation group- (group B) (32.24 min) was shorter as compared to fixation group- (Group A) (49.36 min) with a p value of 0.002. Post-operative pain score was lower in (group B) at 12 and 24 hours (3.71±1.409 and 2.2±0.8169) as compared to Group A at 12 and 24 hours (4.77±1.196 and 2.98±1.295) with a p value of <0.0001. The analgesia required in (group B) was less as compared to (group A). The post-operative complication and recurrence rates were almost identical in both the groups, with lesser incidence of groin pain and paresthesias in group B.
Conclusions: In Lichtenstein inguinal hernia repair, non-fixation of mesh is safe and preferable option, with less operative time and less postoperative pain.

Keywords: Hernia, Chronic groin pain, Mesh, Hernioplasty

INTRODUCTION

Inguinal hernia repair is one of the most commonly performed procedures in surgical practice. Until the introduction of the tension free techniques, different types of primary tissue repair methods were used. There is now a consensus that tension free repair is the gold standard in inguinal hernia surgery because of higher patient comfort and lower recurrence rates.[1]

Inguinal hernia are seen in 3-8% of population, comprising 80-83% of all hernias. 50% of inguinal hernias are indirect, 25% are direct, and 5% are femoral. 86% of all inguinal hernias are found in men, while 84% of femoral hernias are found in women. Indirect inguinal hernia is the most primary type in both genders.[2]

The vast majority of hernias occur in the inguinal region, and the high incidence of this condition means that inguinal hernia repair is the most frequently performed surgical procedures.[3]

Lichtenstein popularized the tension free open repair by using polypropylene mesh, claiming faster recovery and

return to work with a 99% probability of permanent cure. Lichtenstein hernioplasty first described in 1989, is a widely accepted technique for open repair of inguinal hernia due to its safety, efficacy and low recurrence rates. Despite the success of Lichtenstein hernioplasty in the management of inguinal hernia, the occurrence and handling of chronic groin pain (CGP) has posed a significant challenge to surgeons. The reported incidence of CGP varies from 0.7% to 62.9% in the medical literature.[4] The introduction of the tension-free techniques has led to very low recurrence rates and such techniques seem to produce post-operative pain less frequently. The incidence of chronic pain following hernia repair is not actually known. Different studies report frequencies of up to 40%.[5] Clinical effectiveness of hernia repair is usually concerned with hernia recurrence, chronic groin pain, length of hospitalization, recovery time and complications e.g. surgical site infection, seroma and hematoma. These outcomes are very dependent on surgical techniques, patient factors and type of mesh/mesh fixation techniques.[6]

Prosthetic mesh, which is usually made of polypropylene but may be made of Dacron or marsilene, has traditionally been secured using sutures, staples or tacks. However, a study in which unfixated mesh based repair of inguinal hernia was done, was associated with less post-operative pain than tack-fixated mesh based repair has led to the conclusion that inappropriate placement of fixation devices may be a cause of the chronic post-operative pain that is described by many patients. This might suggest that a technique that involves unfixated placement of mesh is ideal.[3]

Whether the mesh should be fixed or not is still a debate. The development of post-operative CGP in patients undergoing open inguinal hernia repair is a multifactoral phenomenon. Pain can be experienced due to nerve resection, nerve compression from sutures, foreign body reaction caused by mesh or tension on muscle fibers.

The Aim of our study was to compare the results between the two groups of Lichtenstein mesh hernioplasty, group A, with conventional suture fixation of the mesh and group B with no fixation of the mesh, in terms of mean operative time, post-operative pain, hospital stay, postoperative complications and recurrence rates.

METHODS

Following the approval of institutional ethical committee (IEC) of Government Medical College, Kathua and obtaining written consent form, the patients were randomly grouped into 2 groups. In the time interval of 18 months (April 2019 to September 2020), hundred patients between the age of 18 and 78 years were selected from our OPD, with primary, unilateral, uncomplicated inguinal hernias for elective surgeries. These patients were worked up and evaluated properly. Femoral hernias, strangulated or incarcerated hernias, bilateral hernias, recurrent hernias, and patients with immunological disorders, coagulation disorders or psychiatric disorders were excluded from the study. All the patients and atleast one attendant from each patient were informed about the study and informed consent was taken from all the patients before the surgery. Randomization was done using a computer generated list. In consecutive order the patients were allocated to receive one of the two repairs. The patients themselves were blinded to the method used. All the patients were admitted to the hospital one day before surgery. All the patients were given intravenous antibiotic at the time of induction of anesthesia for prophylaxis. Oral intake was allowed after 6 hours post operatively. Uncomplicated cases were discharged from hospital on 1st post-operative day.

Lichtenstein hernia repair was done in all patients under spinal anesthesia. In group-A, 50 patients were operated on with mesh fixation, 2.0 prolene suture was used. Mesh was fixed at pubic tubercle, inguinal ligament and around the cord at the border of internal ring, and conjoint-tendon. In group-B, 50 patients were operated and the mesh was not fixed. The mesh was laid under fascia without any fixation on inguinal ligament or any part of conjoint tendon. The mean operative time, hospital stay (in days), postoperative complications were compared between the two groups.

The post-operative pain was assessed using the visual–analog–scale (VAS). Patients were informed that pain may be represented by straight line that was calibrated from 0-10 cm extremes of which correspond to no pain "0" at one end and worst pain at other end "10". Patients were assessed to rate their pain depending on the severity. Patients with a pain score greater than 3 on VAS were given a dose of analgesia (I/M diclofenac), which was titrated with the requirement of patients. The scores were calculated at 12 and 24 hours post operatively.

All the patients were followed on OPD basis after discharge, initially on 7th post-operative day for seroma formation, hematoma formation, scrotal edema, mesh migration and then later on after one month and then at the end of 3rd month for paresthesia, neuropraxia and recurrence, by our unit.

Statistical analysis

Continuous variables were summarized as mean±standard deviation (SD) and categorical variables were expressed as frequencies and percentages. Chi- square test or Fisher's test, whichever appropriate, was applied for data analysis. A p value of less than 0.05 was considered statistically significant.

RESULTS

A total of 100 patients were treated for uncomplicated, unilateral inguinal hernia by Lichtenstein technique with

and without mesh fixation (50 patients in each group). The main and important parameters compared between the two groups include operative time, post-operative pain, hospital stay, post-operative complications and recurrence rate.

The mean age of patients (n=50) in group-A was found to be 46.24 years and that in group-B (n=50) was 44.82 years. The difference was statistically insignificant.

The sex ratio ratio (male: female) in group A and group B were 48:2 and 49:1 respectively. The difference between the two groups was statistically insignificant.

In group-A 38 (76%) of cases were right sided inguinal hernias and 12 (24%) were left sided, while in group-B 32 (64%) patients and 18 (36%) patients had right and left sided disease respectively.

In group-A 34 (68%) patients had indirect hernia while 11 (22%) had direct hernia while 5 (10%) patients had combined hernia, while in group-B 29 (58%) had indirect hernia, 17 (34%) had direct hernia and 4 (8%) had combined.

Table 1: Comparison of various parameters between the two groups.

Parameter	Group A	Group B
Mean age	46.24	44.82
Male/female ratio	48/2	49/1
Laterality R/L	38/12	32/18
Type (%)		
Indirect	34 (68)	29 (58)
Direct	11 (22)	17 (34)
Combined	5 (10)	4 (8)
Mean operative time (in minutes)	49±13.11	32±7.21
Average hospital stay (in days)	2.28	2.48
VAS score		
At 12 hour	4.77±1.196	3.71±1.409
At 24 hour	2.98±1.295	2.2±0.8169

The mean operative time in group A was 49.36±13.11 minutes and that in group B was 32.24±7.21 minutes, the difference was statistically significant (p=0.0002).

The average hospital stay in days in group A and B was 1.68 and 1.49 days respectively, the difference was statistically insignificant.

The postoperative pain score and therefore the analgesia requirement was found to be significantly lower in group-B patients as compared to that in group-A, with a VAS score at 12 hours in group-A being 4.77±1.126 and that in group-B 3.71±1.407 (p value<0.0001) and at 24 hours as 2.98±1.295 and 2.2±0.8169 (p value<0.0001) in group A and B respectively.

Various postoperative complications were noted in both the groups, like seroma formation, wound infection, scrotal edema, paraesthesia, recurrence rates. All the postoperative complications including recurrence rate were comparable in the two groups. However, it was observed that the incidence of paraesthesia and groin pain were lesser in group B as compared to that in group A (Table 2).

Table 2: Postoperative complications.

Complications	Group A (%)	Group B (%)
Seroma	5 (10)	4 (8)
Hematoma	3 (6)	1 (2)
Scrotal edema	2 (4)	1 (2)
Paraesthesia	4 (8)	1 (2)
Recurrence	0	0

DISCUSSION

In Lichtenstein mesh hernioplasty, the mesh is mostly fixed by sutures. Though considered to be tension free, but still the sutures may strangulate muscle fibres, compress regional nerves, or give rise to a lesion leading to severe chronic pain or dysesthesia.[7-13]

Sutureless hernioplasty is believed to be associated with less tension in the suture line. A better levelling leads to better embodiment of mesh without formation of dead space, chances of nerve entrapment and hence post-operative complications are reduced with better post-operative recovery and a decreased post-operative hospital stay.[14]

Keeping this in mind, we conducted a prospective study, dividing patients randomly into two groups, conventional mesh henioplasty with suture fixation of the mesh was done in group A, while in group B mesh hernioplasty was performed without fixation of the mesh.

In our study, mean age of the patients was 46.24 years and 44.82 years respectively in group A and group B (Table 1). Our results were in concordance with the results obtained by Ghafoor et al, who also reported similar findings in their study. Mean age of the patients in their study was 38.03 years.[15]

The majority of the cases in the present study i.e. 76 percent in group A and 72 percent in group B had right sided inguinal hernia, whereas the remaining patients had left inguinal hernia (Table 1). Our results were in concordance with the results obtained by Nordback et al.[16]

In the present study, majority of the cases (68 percent in group A and 58 percent in group B) were of indirect hernia (Table 1). Our results were in concordance with the results

obtained by Ersoz et al, who reported that 62.8 percent of the patients were of indirect hernia.[2]

Mean duration of operative procedure in group A was 49±13.11 and that in group B was 32.24±7.21 minutes, in the present study was found in sutureless group mean time to be 32.24 (7.21) minutes, with maximum of 48 and minimum of 23 minutes (table 1). Our results were in concordance with the results obtained Ersoz et al, who reported that, mean procedural time for suture less mesh repair of inguinal hernia in their study was 32.4 minutes.[2]

Mean postoperative pain score at 12 hour and 24 hour in group A was 4.77±1.196 and 2.98±1.295, and that in group B was, 3.71±1.409, 2.20±0.8169 respectively (Table 1). Lionetti in his study compared suture less hernioplasty with Lichtenstein hernioplasty. He reported that average VAS scores were significantly lower in suture less hernioplasty than in Lichtenstein hernioplasty.[17]

Mean hospital stay in our study was 1.68 days and 1.49 days in group A and B respectively (Table 1). In most cases, patients were discharged after 24 hours of surgery. However, in 12 cases (8 in group A and 4 in group B) postoperative pain (as assessed by VAS) was significantly higher after 24 hours. So, these patients were discharged after 48 hours postoperatively. Ersoz et al who reported that mean hospital stay was 1.14 days in their patient group.[2]

There were no complications in the immediate post-operative period. At one week postoperatively, seroma formation, wound infection and scrotal swelling were seen in 5 (10%) cases, 3 (6%) cases and 2 (4%) case in group A and 4 (8%) cases, 1 (2%), and 1 (2%) cases in group B respectively (Table 5). At one month postoperatively, mesh had to be removed in 1 case (2%). At 3 months postoperatively paraesthesia was noted in 4 (8%) cases in group A and in 1 (2%) cases in group B respectively (Table 2). Our results were in concordance with the results obtained by Ersoz et al.[2]

In another study conducted by Ghafoor et al, seroma formation, wound infection and scrotal swelling occurred in 5.5%, 3.3% and 2.2% of the cases respectively.[15] In another study, conducted by Al-Tammimi post-operative wound infection was present in 6 percent of the cases. The incidence of post-operative heavy uncomfortable large scrotal swelling was 6.5%.[18]

Seroma formation is common with the use of synthetic mesh in hernia repairs, and is probably a physiological reaction to the foreign body. In our study the wound seroma that developed (Table 2), resolved within 1-2 weeks with conservative management without aspiration. Similarly, wound infections that developed, was managed conservatively, with regular dressings and drainage wherever found necessary. Scrotal edema responded well to conservative treatment employing scrotal support, oral antibiotics and non-steroidal anti-inflammatory drugs.

There was no recurrence in either of the groups over a period of 3 month follow up in any of our cases.

Chronic post hernioplasty groin pain is defined as a persistent postoperative pain that fails to resolve 3 months after surgery. In the studies in which mesh was fixed, entrapment of the ilioinguinal, iliohypogastric or genitofemoral nerve was thought to be responsible for the pain, neuralgia and paresthesia. In our study these complications were found in 4 (8%) cases in group A and 1 (2%) cases in group B. Alfieri et al reported that postoperative chronic pain was present in 9.7% after 6 months and in 4.1% of cases after 1 year.[19]

Limitations

This study has some limitations like small size of the study group and a limited period follow-up of 3 months only. Large multicentric studies with longer period of follow-up are required to validate the results.

CONCLUSION

Tension free mesh repair for the treatment of inguinal hernia cases is an effective technique in terms of decreased time of operative procedure and hospital stay, and decreased postoperative complications.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Anadol AZ, Akin M, Kurukahvecioglu O, Tezel E, Ersoy E. A prospective comparative study of the efficacy of conventional Lichtenstein versus self-adhesive mesh repair for inguinal hernia. Surg Today. 2011;41(11):1498-503.
2. Eryoz F, Culu S, Duzkoylu Y, Bektas H. The comparison of Lichtenstein procedure with and without mesh- fixation for inguinal hernia repair. Surg Res Pract. 2016;8041515.
3. Fortelny RH, Petter-Puchner AH, Glaser KS, Redl H. Use of fibrin sealant (Tisseel/Tissucol) in hernia repair: a systematic review. Surg Endosc. 2012;26(7):1803-12.
4. Ladwa N, Sajid MS, Sains P, Baig MK. Suture mesh fixation versus glue mesh fixation in open inguinal hernia repair: a systematic review and meta-analysis. Int J Surg. 2013;11(2):128-35.
5. Koninger J, Redecke J, Butters M. chronic pain after hernia repair: a randomized trial comparing Shouldice, Lichtenstein and TAPP. Langenbecks Arch Surg. 2004;389:361-5.
6. Techapongsatorn S, Tansawet A, Kasetsermwiriya W. Mesh Fixation techniques for Inguinal hernia repair: protocol for an umbrella review with

integrated and updated network meta-analysis. BMJ Open. 2019;9:e031742.
7. Canonico S, Benevento R, Perna G, Guerniero R, Sciaudone G, Pellino G, et al. Sutureless fixation with fibrin glue of lightweight mesh in open inguinal hernia repair: effect on postoperative pain: a double-blind, randomized trial versus standard heavyweight mesh. Surgery. 2013;153(1):126-30.
8. Hidalgo M, Castillo MJ, Eymar JL, Hidalgo A. Lichtenstein inguinal hernioplasty: sutures versus glue. Hernia. 2005;9(3):242-4.
9. Aasvang E, Kehlet H. Surgical management of chronic pain after inguinal hernia repair. Br J Surgery. 2005;92(7):795-801.
10. Amid PK. Classification of biomaterials and their related complications in abdominal wall hernia surgery. Hernia. 1997;1(1):15-21.
11. Katkhouda N. A new technique for laparoscopic hernia repair using fibrin sealant. Surg Technol Int. 2004;12:120-6.
12. Lau H. Fibrin sealant versus mechanical stapling for mesh fixation during endoscopic extra peritoneal inguinal hernioplasty: a randomized prospective trial. Ann Surg. 2005;242(5):670-5.
13. Mui WL, Ng CS, Fung TM, Cheung FK, Wong CM, Ma TH, et al. Prophylactic ilioinguinal neurectomy in open inguinal hernia repair: a double-blind randomized controlled trial. Ann Surg. 2006; 244(1):27-33.
14. Gondal SH, Anwer T, Bhatti AA. A comparative study between Lichenstein and sutureless inguinal mesh hernioplasty. PJMHS. 2013;7(4):940-4.
15. Ghafoor T, Rehan TM, Amjad S, Waseem M, Anwar MS. Sutureless tension free Lichtenstein repair: a safe option for indirect inguinal hernia. J Sheikh Zayed Med Coll. 2010; 1(3):74-7.
16. Nordback I. Side incidence of inguinal hernias. Ann Chir Gynaecol. 1984;73(2):87-90.
17. Lionetti R, Neola B, Dilillo S, Bruzzese D, Ferulano GP. Sutureless hernioplasty with light-weight mesh and fibrin glue versus Lichtenstein procedure: A comparison of outcomes focusing on chronic postoperative pain. Hernia. 2012;16(2):127-31.
18. Al-Tammimi AS. Sutureless hernioplasty vs Lichtenstein hernioplasty comparative study. Kufa Med J. 2008;11(1):423-9.
19. Alfieri S, Rotondi F, Di Giorgio A, Fumagalli U, Salzano A, Di Miceli D, et al. Influence of preservation versus division of ilioinguinal, iliohypogastric, and genital nerves during open mesh herniorrhaphy: prospective multicentric study of chronic pain. Ann Surg. 2006;243(4):553-8.

Cite this article as: Kumar R, Wani HA, Mahesh A, Mir IN. A prospective comparative study of Lichtenstein procedure with and without mesh-fixation for inguinal hernia repair. Int J Res Med Sci 2021;9:390-4.