Comparative study between suture versus sutureless mesh fixation in open inguinal hernioplasty

Original Article

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ABSTRACT

Background: Inguinal hernia repair is one of the most commonly performed procedures in surgical practice. Our study aims to compare the effect of suture and sutureless mesh fixation open inguinal hernioplasty.

Patients and Methods: Forty patients with inguinal hernias who were hospitalized in the general surgery department of Alzahraa University Hospital between March 2023 and March 2024 were included in this research. A comparison was made between the two groups' mean operational time, intraoperative complications, post-surgical discomfort, length of hospital stay, postoperative complications, and recurrence rates.

Results: Group A received suture mesh fixation, whereas goup B received suture-less mesh fixation. With a *P value* of 0.0005, group B's mean operating time was lower than group A's. At the first, 7th day, and first month after surgery, group B's postoperative pain score was lower than group A's, with a *P value* of less than 0.05. The rates of recurrence, hospital stay, and postoperative complications were nearly the same in both groups.

Conclusion: We conclude that the modification of standard Lichtenstein mesh hernioplasty, which does not need suture mesh fixation, may be used on a routine basis.

Key Words: Chronic groin pain, hernioplasty, inguinal hernia, mesh fixation.

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INTRODUCTION

Total 45% of abdominal wall hernias are caused by inguinal hernias. Inguinal hernia incidence has a bimodal distribution, peaking after age 70 and around age 5. Indirect hernias are the most prevalent type of hernia in both males and females, accounting for two-thirds of these cases. 90% of cases of inguinal hernias are caused by men, and just 10% are caused by women[1].

Surgery is the only effective treatment for inguinal hernias. Morbidity and death rates will rise if hernias are not operated on[2].

Since 1994, Lichtenstein inguinal hernia tension-free mesh repair has been our method of choice for hernia repair since it is easy to use, safe, pleasant, efficient, and successful with minimal early and late morbidity and a low recurrence rate[3].

About 25% of patients have chronic discomfort and long-term postoperative pain following a Lichtenstein hernia repair. The compression or irritation of the nerve caused by the sutures used to fix the mesh is one of the primary causes of these problems[4]. This is the main reason for the interest in alternate, sutureless mesh fixing methods.

Our study compared the sutured and sutureless fixing of polypropylene mesh in open inguinal hernia repair (operative time, complications during and after surgery, pain after surgery, degree of physical activity limitation, length of hospital stay following surgery, and recurrence of hernia).

PATIENTS AND METHODS:

Among patients, 40 patients were enrolled in this prospective randomized controlled study and divided into two groups: group A (20 cases who underwent sutured hernioplasty) and group B (20 cases who underwent sutureless hernioplasty). This study was conducted in the Department of Surgery, Al Zahraa University Hospital, between March 2023 and March 2024, and all patients underwent surgery within the first 6 months.

Faculty and College Ethics Committee approved our study. Informed consent was obtained from the patients. All information collected was for research purposes only.

Inclusion criteria

Adults at or above the age of 18 years old and below the age of 65 years old with unilateral or bilateral inguinal hernias were candidates for elective open mesh repair.

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Exclusion criteria

Recurrent hernias, emergency presentation, long-term steroid therapy, continuous chemotherapy, and mental or medical conditions could affect the ability to perceive and interpret pain.

Methods

All patients underwent complete history taking, physical examination, and routine investigations.

Surgical technique

Spinal anesthesia was applied to all patients.

The incision in the skin: approximately 1.5 cm above and parallel to the inguinal ligament's medial two thirds. Next, the external oblique aponeurosis was opened along the incisional line, beginning at the external ring and extending up to 5 cm. The inguinal canal's underlying contents were carefully released from the superior and inferior flaps of the external oblique aponeurosis. The large area between the two flaps protects the ilioinguinal and iliohypogastric nerves while allowing for the installation and fixing of mesh under eyesight. After that, the cremaster and spermatic cord were raised and separated for a further 2 cm past the pubic tubercle. We have to make sure that the ilioinguinal nerve was included when the cord was lifted, the genitofemoral nerve, and the spermatic vessels along with it.

Hernia sac management: Without ligating the sutures, the small or medium-sized hernia sac was separated and inverted into the preperitoneal region. A massive hernia sac was cut open at the midpoint of the inguinal canal, with the stump retracted deep beneath the internal ring and the proximal portion suture-ligated. The distal sac remained in situ. After being separated, the direct hernia sac was dissected free. The peritoneal sac was inverted and kept in place with a purse-string suture after the contents were decreased.

The floor of the inguinal canal, which ran from the pubic tubercle to behind the spermatic cord above the internal inguinal ring and overlapped both the conjoint tendon and the shelving part of the inguinal ligament, was equipped with a trimmed and fitted polypropylene mesh measuring 6 by 11 cm.

Group A: mesh fixation with sutures

First, a No. 3–0 Proline suture was used to attach the apex to the pubic tubercle. After making an incision in its lower edge to allow for the spermatic cord, the lower border of the mesh was stitched to the free edge of the inguinal ligament. The suture was pulled up behind the cord for 2–3 cm. The mesh was secured to the conjoined tendon using sutures. The upper and lower flaps of the mesh were sewn together lateral to the spermatic cord using a single polypropylene stitch.

Group B: sutureless mesh fixation

In all cases fixation was done by one suture at the pubic tubercle and in some cases, another suture was used to anchor the mesh to the conjoined tendon.

Closure of the wound in layers.

Postoperative follow-up

Six hours following the last analgesic dose administration at rest, on the first postoperative day, a visual analogue score (VAS) was used to assess postoperative pain. Before being released from the hospital, every patient was given the same postoperative instructions, which included a 3-6 month restriction on lifting heavy weights and an encouragement to resume regular activities as soon as feasible. Patients were followed-up serially in an outpatient clinic at the first postoperative week, 1, 3, and 6 months after surgery, and were discharged if their pain was sufficiently controlled and there were no major problems.

RESULTS:

All patients in the study were males and their age ranged between 18 and 65 years with a mean and standard deviation (SD) of 42.98±14.32 years.

There was a highly significant difference between group A and B cases as regard operative time being longer in group A (Table 1).

There was no significant difference between group A and B cases as regard intraoperative complications (Table 2).

There was a significant difference between group A and B cases as regard VAS at 1st, 7th day, and 1st month postoperative (Table 3).

There was no significant difference between group A and B cases as regard postoperative hospital stay (Table 4).

There was no significant difference between group A and B cases as regard postoperative complications (Table 5).

There was no significant difference between group A and B cases as regard the limitation of physical activity.

There was no case of recurrence in either group during the follow-up period of 6 months (Table 6).

Table 1: Operative time of the study

	Study patients (*N*=40)				
Operative time	Group A	Group B	Test value	*P* value	Significance
Mean±SD	64±11	54±5	3.8165	0.0005	HS

Table 2: Description and Comparison between both study groups as regards intraoperative complications

	Study patients (*N*=40)					
Intra operative complication	Group A		Group B		T	*P* value
No	18	90%	20	100%	2.105	0.14
Bleeding	2	10%	0	0		

Table 3: The result of postoperative pain in sutured group compared with sutureless group as regards visual analogue pain score at 1st, 7th day, and 1st month postoperative as expected pain scores were higher at the first day after surgery

	Study patients (*N*=50)				
VAS	Group A Mean±SD	Group B Mean±SD	Test value	*P* value	Significance
VAS at 1st day	3.05±1.47	2.05±1.61	2.055	0.04	S
VAS at 7th day	2.85±2.03	1.6±1.8	2.021	0.05	S
VAS at 1st month	1.1 5±1.35	0.4±0.99	2.001	0.05	S

Table 4: Postoperative hospital stays data distribution in the study

	Study patients (*N*=40)				
Hospital stay	Group A	Group B	Test value	*P* value	Significance
Mean±SD	26.4±4.92	25.8±4.4	0.40	0.68	NS

Table 5: Result of postoperative complications in both groups

Postoperative complications	Group A (*N*=20) [*n* (%)]	Group B (*N*=20) [*n* (%)]	Test value	*P* value	Significance
Wound serama	2 (10)	0	2.105	0.14	NS
Wound infection	0	0	0.000	1	NS
Ing-scrotal edema	1 (5)	1 (5)	0.000	1	NS
Hematoma	1 (5)	0	1.026	0.3	NS
Urine retention	1 (5)	1 (5)	0.000	1	NS
None	15 (75)	18 (90)	1.558	0.21	NS

Table 6: Result of limitation of physical activity between both groups

	Study patients (*N*=50)					
Degree of limitation of physical activity	Group A		Group B		T	*P* value
Unrestricted activity	16	80%	18	90%	0.78	0.37
Some restriction	4	20%	2	10%		
Great difficulty	0	0	0	0		

DISCUSSION

The study conducted by Burcharth *et al*.[5] revealed that the disorder primarily affects males with a male-to-female ratio of 9 : 1. This finding is consistent with the 40 male patients in our sample, which indicates the high sex predominance of this disease.

The suture mesh fixation group in our study had an average operating time of 64+/-11 min. The mean surgical time in the suture-less mesh fixation group was 54±5, and the statistical significance was shown with a *P value* of.0005.

Similar to our findings, Kumar *et al*.'s[6] study demonstrated that suture-less mesh fixation required a much lower operating time than suture use.

With nonsuture fixation, Sanders and Waydia[7] showed a considerable reduction in operational time, ranging from 6 to 17.9 min.

Seroma, hematoma, scrotal edema, urine retention, and infection were seen in five patients in the suture group and two patients in the sutureless group following surgery; however, these results were not statistically significant.

Postoperative hematoma was smaller in the no fixation group in a research by Lionetti *et al*.[8] comparing no fixation of mesh with Lichtenstein hernioplasty, nevertheless, this difference was statistically not significant, which was comparable to our findings.

In our study, patients in group B had a considerably lower postoperative pain score and, consequently, a lower need for analgesia than patients in group A; on the first day, group A's VAS score was 3.05±1.47, while group B's was 2.05±1.61 (*P value=0.04*).

The VAS scores were statistically significant on the 7th day, 2.85±2.03 in group A and 1.6±1.8 in group B (*P value=0.05*); during the first month, they were 1.15±1.35 in group A and 0.4±0.99 (*P value=0.05*).

In his research, Lionetti contrasted Lichtenstein hernioplasty and suture-less hernioplasty. According to his research, the average VAS ratings for suture-less hernioplasty were much lower than those for Lichtenstein hernioplasty (Lionetti *et al*.)[8].

The study's mean hospital stay for groups A and B was 26.4 h and 25.8 h, respectively. This result was not statistically significant.

According to Kumar *et al*.[6], the mean hospital stay for the suture and suture-less groups was 1.68 days and 1.49 days, respectively.

In the current investigation, no patient showed signs of recurrence. This can be the result of a few instances or short-term follow-up.

A 12-month follow-up was conducted on 158 individuals by Redha *et al*.[9]. They did not see any recurrence among their subjects, which is consistent with our findings.

CONCLUSION

Prolene suture mesh fixation in Lichtenstein's hernia repair is linked to several problems, including longer surgical times, more tissue damage, nerve entrapment that results in severe postoperative pain, and a higher risk of persistent groin discomfort. In contrast to mesh fixed with prolene suture, sutureless mesh fixation demonstrated advantages in our study, including shorter mean length of surgery, relief from chronic groin pain, and a reduction in foreign body sensation. This was attributed to a reduction in the trauma to the underlying tissue caused by prolene suture bites and nerve entrapments linked to suture use. Based on the benefits listed above, our study concludes that the modification of classic Lichtenstein mesh hernioplasty by not using suture mesh fixation can be used routinely.

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Hammoud M, Gerken J. Inguinal Hernia. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.

2. North KA, Bennett DH. Hernia, umbilicus and abdominal wall. In: William NS, Bulstrode CJK and O'Connell PR. Bailey and Love's short practice of surgery. 25th ed. London: Edward Arnold Publishers; 2015. 1143–1162.

3. Sakorafas GH, *et al*. 'Open tension free repair of inguinal hernias; the Lichtenstein technique'. BMC Surg 2001; 1:3–3.

4. Kim-Fuchs C, Angst E, Vorburger S, Helbling C, Candinas D, Schlumpf R. Prospective randomized trial comparing sutured with sutureless mesh fixation for Lichtenstein hernia repair: long-term results. Hernia: the journal of hernias and abdominal wall surgery 2012; 16:21–27.

5. Burcharth J, Pommergaard HC, Rosenberg J. The inheritance of groin hernia: a systematic review. Hernia 2013; 17:183–189.

6. Kumar R, Wani HA, Mahesh A, Mir IN. A prospective comparative study of Lichtenstein procedure with andwithout meshfixation for inguinal hernia repair. Int J Res Med Sci 2021; 9:390–394.

7. Sanders DL, Waydia S. A systematic review of randomised control trials assessing mesh fixation in open inguinal hernia repair. Hernia: the journal of hernias and abdominal wall surgery 2014; 18:165–176.

8. 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; 16:127–131.

9. Redha AGM, Jaber AA, Nasser AM, Ghalib A, Redha M. The difference in outcome of patients with open inguinal hernia repair by using delayed absorbable sutures instead of nonabsorbable sutures for mesh fixation. Int Surg J 2021; 8:24–27.