



Fibrin Glue Versus Polypropylene Suture for Mesh Fixation in Lichtenstein Inguinal Hernia Repair

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Abstract

Background: Lichtenstein hernia repair is the most common procedure for hernia repair. An ideal mesh should restore abdominal function, be integrated physiologically into the abdominal wall based on max biocompatibility, be without serious long-term complications like chronic groin pain. The search for the most appropriate method to fix mesh and to reduce complications is still on and this study aims for the same. The current study aimed to analyze the fibrin glue versus polypropylene sutures for inguinal hernia repair. **Methods:** This comparative prospective study was conducted in the Department of General Surgery, Prathima Institute of Medical college, Nagnoor, Karimnagar. Patients were selected based on the inclusion and exclusion criteria and randomly allotted in two groups Fibrin glue group and the proline group of n=40 cases each. Postoperatively the patient was assessed for complications, recovery time, and Data collected was statistically analyzed using an appropriate statistical test, and $p < 0.05$ was taken significantly. **Results:** the side of involvement of hernia in group I 62.5% were with right side involvement and 30% were of left side hernia and 7.5% cases were of bilateral involvement. In group II the right-side involvement was 57.5% cases and the left side in 37.5% and 5.0% bilateral involvement was noted. In group, I direct hernia was present in 50% of cases and indirect hernia in 50% cases whereas in group II direct hernia was found in 45% of cases and indirect hernia in 55% of cases the differences were statistically not significant. This study showed a mean time of 52.3 ± 9.05 mins among the proline group and 45.76 ± 5.35 minutes in the fibrin glue group to complete the surgery. **Conclusion:** it can be concluded that Lichtenstein's hernia repair with mesh fixation with fibrin glue has advantages such as decreased mean duration of surgery, decreased incidence of hematoma, and seroma formation as compared to the conventional proline sutures. The incidence of postoperative pain and chronic groin pain was found to occur less in the case of fibrin mesh fixation which was evident with lesser VAS scores. **Keywords:** Chronic groin pain (CGP), fibrin glue, polypropylene suture, proline mesh, Lichtenstein repair

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Introduction

Abdominal wall hernia is a very common presentation and the prevalence in the general population is approximately 5%.^[1] Although the natural course of the disease is relatively slow, it eventually reaches the size that severely impairs the patient's ability to perform the daily

activity.^[2] About 75% of all abdominal wall hernias are groin hernias making it the most common of hernia among it.^[3] The lifetime rate of inguinal hernia is 27% in males and 3% in females.^[3] Inguinal hernia repair accounts for 15% of operations in general surgery. Lichtenstein hernioplasty, first described in 1989, is now the most used technique for open

repair of inguinal hernia due to its safety, efficacy, and low recurrence rates and it has a short learning curve to obtain highly acceptable results. [3] Despite the success of Lichtenstein hernioplasty, there are some disadvantages with the surgery which are inevitable with the current standard technique of Lichtenstein tension-free hernioplasty. One of such drawbacks is chronic groin pain (CGP) also known as Inguinodynia. CGP is defined as pain persisting for more than 3 months postoperatively. [4] CGP is reported to have incidence varying from 0.7% to 62.9% in the medical literature. [1] It can be mild to severe, can even be disabling, and can adversely affect the quality of life. [6] Approximately 10% of patients will have chronic post herniorrhaphy pain. [7] The occurrence and handling of chronic groin pain have posed a significant challenge to surgeons. The Etiology of CGP is broadly divided into Neuropathic and Non-Neuropathic causes. Neuropathic causes of CGP include direct trauma to the nerves in the inguinal region or nerve entrapment secondary to mesh-related fibrosis, suture fixation of the mesh. Nonneuropathic causes of CGP include the periosteal reaction of suture fixation at the pubic tubercle, the displacement of the mesh, an inflammatory reaction to the mesh, and potentially the use of heavyweight mesh for hernia repair. [8] A variety of techniques have been employed to tackle the issue of CGP. The use of different types of meshes has been studied without clear long-term differences in results (polyester vs. polypropylene, heavyweight vs. lightweight). Different methods of mesh fixation have been recommended with the Uses of fibrin or butyl-2-cyanoacrylate glues and have increased in popularity in recent years as it has been postulated that glue mesh fixation may decrease the operating time and reduce postoperative pain compared to suture or tacker fixation of mesh. [9] Various non-randomized and randomized, controlled trials have been reported with a variable incidence of CGP. With this background, we in the current study tried to determine the efficacy of fibrin glue over polypropylene suture in mesh fixation in Lichtenstein hernia repair in terms of early and late postoperative morbidity and outcome.

Materials and Methods

This prospective study was done in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar. Institutional Ethical committee permission was obtained for the study. Written consent was obtained from all the patients involved in the study after explaining the nature of the study and expected outcomes in the local language.

Inclusion criteria

1. Patients diagnosed with inguinal hernia
2. Aged more than 18 years
3. Voluntarily willing to participate in the study

Exclusion criteria

1. Recurrent hernia
2. Strangulated hernia
3. Collagen connective tissue disorders
4. Patients were not fit to undergo surgery

A detailed relevant clinical history was taken and clinical examination including general, systemic and local examination was done based on standard structured proforma. After routine relevant investigations and patients were prepared for surgery. They were randomly allotted in two groups of an equal number of cases of n=40 each. Group, I was treated with fibrin glue for mesh fixation The mesh was placed in position and fixed with Fibrin glue on the pubic tubercle, along the inguinal ligament and the conjoined area. Glue was avoided on the nerves as much as possible. Only one vial of fibrin glue was used for each patient. All the Nerves were tried to preserve in either group. All operations were performed with subarachnoid block and no postoperative analgesia device was used and group II was treated with polypropylene sutures for mesh fixation. Postoperatively patients were monitored for the duration of operation (minutes), Hematoma/seroma. Wound/mesh infection, Postoperative Recovery time to daily activities (walking, driving, manual work) (days), Persistent numbness: numbness in the groin or testicle persisting beyond three months postoperatively, Chronic Groin pain: pain persisting for or beyond three months postoperatively, etc. The pain was assessed using the Visual Analogue Scale (VAS) with a

score of 0 as no pain and a score of 10 as the worst possible pain. Statistical analysis was done using Microsoft excel and analyzed using SPSS version 19.0 continuous variables were labeled as mean and percentages and categorical variables were measured by appropriate statistical tests and the P<0.05 was taken as significant.

Results

Out of the total n=80 patients equally divided into two groups. The group I (Fibrin Glue) the youngest case was 22 years, the oldest case was 63 years, and the mean age was 40.5 years, and the most common age group of involvement was 31 – 40 years with 30% of the cases. Similarly, for group II (proline) group the youngest case was 19 years and the oldest case was 62 years, and the mean age was 42.5 years and the common age group was 41 – 50 years with 27.5% of all cases depicted in table 1.

Table 1: Age wise distribution of cases included in the study

Age in years	Group I N (%)	Group II N (%)
18 – 20	00 (0.00)	1 (2.5)
21 – 30	06 (15.0)	6 (15.0)
31 – 40	12 (30.0)	10 (25.0)
41 – 50	10 (25.0)	11 (27.5)
51 – 60	08 (20.0)	8 (20.0)
>60	04 (10.0)	4 (10.0)
Total	40 (100.0)	40 (100)
Mean	40.50	42.5
Standard Deviation	9.05	7.56

Out of the total n=80 cases of the study n=64(80%) were male cases and n=16(20%) were females. In group I out of n=40 cases n=33(82.5%) were males and n=7(17.5%) were females. Similarly in group II out of n=40 cases n=31(77.5%) were males and n=9(22.5%) were females. The male to female ratio of the cases in the study was 4:1.

Table 2: Laterality of involvement of hernia

Side of hernia	Group I N (%)	Group II N (%)
Right	25 (62.5)	23 (57.5)
Left	12 (30.0)	15 (37.5)
Bilateral	03 (7.5)	02 (5.0)
Total	40 (100.0)	40 (100.0)

Based on the side of involvement of hernia in group I 62.5% was with right side involvement and 30% were of left side hernia and 7.5% cases were of bilateral involvement. In group II the

right-side involvement was 57.5% cases and left side in 37.5% and 5.0% bilateral involvement was noted depicted in table 2. In group, I direct hernia was present in 50% of cases and indirect hernia in 50% cases whereas in group II direct hernia was found in 45% of cases and indirect hernia in 55% of cases the differences were statistically not significant. This study showed a mean time of 52.3± 9.05 mins among the proline group and 45.76± 5.35 minutes in the fibrin glue group to complete the surgery. This finding was statistically significant with a p-value< 0.05. The mean time for mesh fixation in this study was the meantime of 8.80± 1.50 minutes in the fibrin glue group and 12.2 ± 2.20 mins in the proline group. This finding was statistically significant with a p-value< 0.05. In this study, we found n=2 cases in group I and n=8 in group II had developed seroma in the post-operative period and the findings were statistically significant. It was also found that n=2 cases in group I and n=5 cases in group II had developed a hematoma. Development of post-operative local numbness was recorded and depicted in Table 3

Table 3: Postoperative local numbness in cases of study

Local numbness	Group I N (%)	Group II N (%)	Chi-square value	P-value
Yes	2 (5.0)	3 (7.5)	1.756	0.541 (NS)
No	38 (95.0)	37 (92.5)		
Total	40 (100)	40 (100)		

The incidence of postoperative wound infections was revealed in group I n=3(7.5%) cases developed postoperative wound infections and in group II n=4(10.0%) cases developed postoperative wound infection the difference was not found to be significant. In the postoperative period in the group, I case n=4 cases and in group II n=3 cases developed urinary retention in the early postoperative period.

Table 4: Postoperative Pain Assessment with Visual Analogue Scale

VAS Scores (days)	Group I Mean ± SD	Group II Mean ± SD	p-value
Day 1	4.59 ± 0.75	5.51 ± 0.87	0.012*
Day 2	3.94 ± 0.41	4.50 ± 0.75	0.513
Day 3	2.21 ± 0.37	3.24 ± 0.54	0.223
Day 4	1.50 ± 0.21	2.25 ± 0.64	0.023*
Day 7	0.96 ± 0.12	1.50 ± 0.5	0.011*

* Significant

The visual analog scale was used to assess postoperative pain on day 1, 2, 3, 4, and 7 and subsequent follow-up visits at 1st month, 3rd month, and 6th month. During the initial postoperative period the values in group I was found to be significantly less on the first day, the fourth day, and the seventh day depicted in table 4. The incidence of chronic groin pain at 1st month was found in n=1 cases in group I and n=6 cases of group II. In the second visit in the 6th month, there was no chronic pain found.

Discussion

Lichtenstein's tension-free hernioplasty is the most widely practiced hernia surgery. [10] The conventional approach is to use a prolene suture for mesh fixation which is a time-consuming procedure. This also increases post-operative complications such as chronic groin pain. [11] Pain can be experienced due to nerve resection, nerve compression from sutures, foreign body reaction caused by the mesh, or tension on muscle fibers. [12] Recently fibrin glues are being extensively used in many abdominal surgical procedures. [13] In this study, we have taken fibrin glue for group I and prolene sutures for group II to compare the outcomes of surgery on various parameters postoperatively. In this study the common age group in group I was 31 – 40 and in group II 41 – 50 years. Basu et al., [14] in a similar study on Prevalence of Primary and Recurrent Inguinal Hernia found the commonest age group of involvement with the hernia was 41 – 50 years. Nowobilski et al., [14] in their research on inguinal hernia found the mean age of 52.6 with a range from 20 to 78 years. In our study we found the male to female ratio was 4:1 in concordance with other published results which have shown male dominance in the development of inguinal hernias. [15 - 17] In our study 52.5% of all hernias were found to be indirect hernias. Nadeem S et al., [18] in their study of hernioplasty also found a greater incidence of indirect hernia and Narayankar RP et al., [17] in their study also reported the greater incidence of indirect hernias. The mean time is taken to complete the surgical procedure in group I was slightly lesser 45.76 minutes as compared to the conventional group II cases of 52.3 minutes. Testini et al., [19] in their study have found lesser time with fibrin glue group of 29.7 ± 5 minutes versus 45.3 ± 11 minutes in

conventional prolene group. Although our study has found slightly more time required for the procedures, however, it confirms the aspect that time required is lesser in the fibrin glue method as compared to the conventional method probably due to time saved for suturing as in the conventional group. Odobasic A et al., [16] have found with 30% of the control group with seroma and 3.3% of the study group with a seroma. The development of postoperative complications such as seroma was seen in 5% of cases of group I and 20% of cases in group II. Girish et al., [20] found 68% of the control group (proline group) and 32% of the study group (fibrin glue) showed seroma formation. This study found the incidence of infections in group I to be 7.5% and in group II 10%. M Testini et al., [19] found that 8% of patients in the control group and 2% of patients in the study group developed a hematoma, which was statistically not significant. Narayankar RP et al., [17] in their study found 8% of cases in the control group and 6% in the study group developed postoperative wound infection. Lower incidence of wound infections has been reported by Paajanen et al., [15] where the rate of infection was 1.4% in the control group and 3.4% in the study group developed wound infection.

Conclusion

Within the limitations of the current study, it can be concluded that Lichtenstein's hernia repair with mesh fixation with fibrin glue has advantages such as decreased mean duration of surgery, decreased incidence of hematoma, and seroma formation as compared to the conventional prolene sutures. The incidence of postoperative pain and chronic groin pain was found to occur less in the case of fibrin mesh fixation which was evident with lesser VAS scores.

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