

A comparative study of postoperative chronic pain after tension free inguinal hernia repair using absorbable versus non-absorbable sutures for mesh fixation

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Abstract: Background: Inguinal hernias are very commonly encountered by surgeons throughout the world. Chronic groin pain may be caused by nerve injury either during dissection or retraction, or nerve entrapment due to post-operative fibrosis, or mesh related fibrosis, or lastly sutures used to fix the mesh. The mesh can be secured by non-absorbable sutures or absorbable sutures. **Material and methods:** This is a prospective, descriptive, single centre and randomized study was conducted in the Department of General Surgery, N.C Medical College and Hospital over a period of 1 year. All patients of 21-80 years old, who were admitted for elective inguinal hernia repair, were included for the study. Patients with bilateral, recurrent, irreducible or incarcerated hernia and patients with co morbid conditions that might interfere with pain assessment (e.g. impaired cognitive function, limited mobility, daily use of pain medicine); and patients who had undergone surgery in the groin area were excluded from the study. **Results:** Out of 180 patients 90 were having right inguinal hernia, 56 patients with left inguinal hernia and 34 patients were having bilateral inguinal hernia. we analyzed post-operative pain using VAS score on alternate basis till 10th post-operative day. In Group A, mesh fixation was done by non-absorbable suture material polypropylene (n=90) and Group B, mesh fixation was done by monofilament absorbable suture material poliglecaprone (n=90). On post-operative day 1 the mean VAS score in group A was 6.12±1.03, while that in group B was 5.01±0.93, on day 10, the mean VAS score in group A was 2.41±0.56, while that in group B was 1.62±0.46, with a p value of 0.039 which is statistically significant. Overall, Group B experienced less pain compared to group A. Mean VAS score at 1st month in group A was 1.93±0.62 and in group B was 1.52±0.34 and at 2nd month it was 1.31±0.54 in group A and 1.03±0.26 in group B. **Conclusion:** Patients with absorbable suture for mesh fixation has less groin pain as compared to non-absorbable suture in hernia repair during 6 months follow up period.

Keywords: Inguinal hernia, Mesh, Suture, Chronic groin pain.

INTRODUCTION

Inguinal hernias are very commonly encountered by surgeons throughout the world. Inguinal hernias are usually repaired either by open or laparoscopic approaches. Though laparoscopic hernia repair has gained popularity in recent times, open inguinal hernia repair is still preferred by many surgeon's due to lesser rates of recurrence and technical simplicity.¹ Amongst the open surgical techniques for open inguinal hernia repair, which was introduced in 1989 is very popular and widely accepted.²

Lichtenstein tension-free repair though showed good results had a high incidence of chronic groin pain (CGP) postoperatively. The average incidence as reported in many studies has been between 10-40 %. ³ There are a lot of factors which may be considered for the development of CGP post-herniorrhaphy such as surgeons experience and the surgical technique of fixing the mesh. The various causes proposed for the origin of CGP post-herniorrhaphy are nerve entrapment in sutures or due to mesh fibrosis, injury to nerves of inguinal region, periosteal reaction to sutures taken on pubic tubercle.⁴

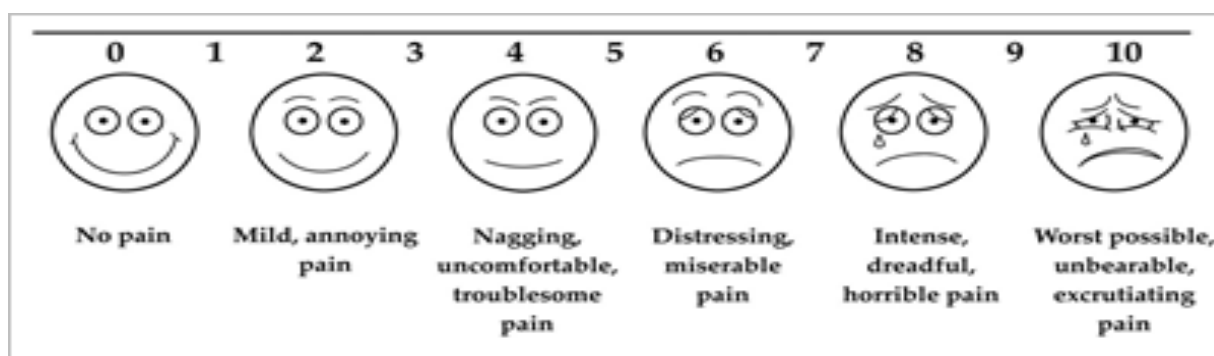


Fig 1: VAS used for assessment of pain.

0: No pain; 1, 2, 3: Mild pain; 4, 5, 6: Moderate pain; 7, 8, 9: Severe pain; 10: Worst imaginable pain

According to International Association for the Study of Pain (IASP), chronic groin pain is defined as “groin pain as any VAS (visual analogue scale) score above zero which lasts for more than 3-months following inguinal hernia repair”.⁵ Cut-off point to differentiate post-operative pain and chronic groin pain is 3 months as per major consensus.⁶ It may be continuous as described by patients as an ongoing awareness of pain or it may be activity related pain occurring only during activity like cycling, running, kneeling, walking upstairs, gardening, lifting at work.⁷ Chronic groin pain may be caused by nerve injury either during dissection or retraction, or nerve entrapment due to post-operative fibrosis, or mesh related fibrosis, or lastly sutures used to fix the mesh. The mesh can be secured by non-absorbable sutures or absorbable sutures.⁸

Many new techniques were developed to tackle the issue of CGP. Studies show that the use of light weight mesh reduces the incidence of CGP. Use of non-traumatic techniques for mesh fixation has become popular in recent years.

Aim of this study was to compare postoperative chronic pain after tension free inguinal hernia repair using absorbable sutures versus non-absorbable sutures for mesh fixation.

MATERIALS AND METHODS:

This is a prospective, descriptive, single centre and randomized study was conducted in the Department of General Surgery, N.C Medical College and Hospital over a period of 1 year. All patients of 21-80 years old, who were admitted for elective inguinal hernia repair, were included for the study. Patients with bilateral, recurrent, irreducible or incarcerated hernia and patients with co morbid conditions that might interfere with pain assessment (e.g. impaired cognitive function, limited mobility, daily use of pain medicine); and patients who had undergone surgery in the groin area were excluded from the study. The sample size was calculated to be 90 subjects for each of two groups at alpha error 0.05 and power 80%. Randomization into two groups (repair

using absorbable sutures and repair using non-absorbable sutures) was done by chit box method. In Group A, mesh fixation was done by non-absorbable suture material polypropylene (n=90) and Group B, mesh fixation was done by monofilament absorbable suture material poliglecaprone (n=90).

During dressing, any swelling, discharge, discoloration at wound site and scrotal swelling if present was documented. If swelling was present than local part ultrasonography was done. Hematoma or seroma was considered in patients having anechoic collection with or without internal echoes respectively in ultrasonography findings.

Statistical Analysis

Data were analysed using SPSS Software version 25th and Microsoft Excel was used to generate tables. Student t test and Chi-square or Fisher exact test has been used to find the significance of study parameters on categorical scale between two or more groups. P value as <0.05 is considered as statistical significant.

RESULT:

Out of 180 patients 90 were having right inguinal hernia, 56 patients with left inguinal hernia and 34 patients were having bilateral inguinal hernia.

Table 1: Distribution of different age groups of patients

Age in years	Group A	Group B
21-40	56 (62.2%)	52 (57.7%)
41-60	33 (36.6%)	36 (40.0%)
>61	1 (1.11)	2 (2.22%)
Total	90 (100%)	90 (100%)

In our study, the most of the patients the age group of 21-40 years i.e., 56 out of 90 (62.2%), followed by 41-60 years, i.e., 33 out of 90 (36.6%) in Group A and in Group B the age group of 21-40 years i.e., 52 out of 90 (57.7%), followed by 41-60 years, i.e., 36 out of 90 (40.0%) Table 1.

Table 2: Post-operative pain (VAS scale)

Days	Group A	Group B	P value
1	6.12±1.03	5.01±0.93	0.032
3	5.03±1.01	4.44±0.81	0.042
5	4.51±0.83	3.61±0.74	0.041
7	3.72±0.81	2.53±0.72	0.050
9	2.83±0.73	2.01±0.63	0.025
10	2.41±0.56	1.62±0.46	0.039

In table 2, we analyzed post-operative pain using VAS score on alternate basis till 10th post-operative day. On post-operative day 1 the mean VAS score in group A was 6.12±1.03, while that in group B was 5.01±0.93, though the difference is small it is still statistically significant with a p value of 0.032. On post-operative day 3 the mean VAS score in group A was 5.03±1.01, while that in group B was 4.44±0.81, which was statistically significant with a p value of 0.042.

On post-operative day 5 the mean VAS in Group A was 4.51±0.83, while that in Group B was 3.61±0.74. This difference is statistically significant with a p value of 0.0413. And on day 10, the mean VAS score in group A was 2.41±0.56, while that in group B was 1.62±0.46, with a p value of 0.039 which is statistically significant. Overall, Group B experienced less pain compared to group A in table 2.

Table 3: Mean post-operative pain at 1 months and 2 months

VAS	Group A	Group B	P value
At 1 st month	1.93±0.62	1.52±0.34	0.043
At 2 nd months	1.31±0.54	1.03±0.26	0.039

In table 3, Mean VAS score at 1st month in group A was 1.93±0.62 and in group B was 1.52±0.34 and at 2nd month it was 1.31±0.54 in group A and 1.03±0.26 in group B. The p value for pain at one and two months post-operative periods between the two groups are statistically significant (p<0.05). No recurrence in either of the groups during this study period. However, long term follow-up is required to judge the late recurrence rate.

Table 4: Late complication: chronic pain

Post-operative time	Pain scale score	Group A	Group B
At 1 st month	No pain	34 (37.7%)	37 (41.1%)
	Mild	45 (50.0%)	49 (54.4%)
	Moderate	11 (12.2%)	4 (4.4%)
At 2 nd months	No pain	23 (25.5%)	53 (58.8%)
	Mild	65 (72.2%)	37 (41.1%)
	Moderate	2 (2.22%)	0 (0%)

Table 5: Early complications in two groups of patients

Complications	Group A (n=90)		Group B (n=90)		Total (n=180)		P value
	N	%	N	%	N	%	
Seroma	7	7.7	11	12.2	18	10	0.73
Scrotal edema	14	15.5	10	11.1	24	13.3	0.69
Wound infection	2	2.2	5	5.5	7	3.8	0.74

Post-operative complication we observed seroma in 7 out of 90 (7.7%) patients in group A and 11 out of 90 (12.2%) patients in group B. For this, p value is 0.73, which is statistically not significant. Scrotal swelling developed in 14 out of 90 (15.5%) patients in group A and 10 out of 90 (11.1%) in up B. For this, p value is 0.74, which is considered statistically not significant. Wound infection was observed in 2 out of 90 (2.2 %) patients in group A and 5 out of 90 (5.5%) in the group B. The p value is 0.74 which is statistically not significant.

DISCUSSION

The Lichtenstein repair has decreased the incidence of recurrence of inguinal hernia by using prosthetic mesh and has become routine practice.^{7,8} Main morbidity after hernia repair is chronic groin pain nowadays that occurs in 16%-62% of patients and 3%-11% patients suffer with severe debilitating pain.⁹ Chronic groin pain may be due to nerve damage during operation, post-operative fibrosis or mesh-related fibrosis.¹⁰ Nerve injury occurs due to inadequate dissection, failure to visualize the nerves and aberrant location of nerves.¹¹

In our study mean age is between 41.32±9.43 years in group A and 42.54±9.57 years in group B with p value=0.83, which is statistically not significant and it is similar in comparison with other studies. Singh AN et al found that mean age group in group A was 48.23±18 years while in group B was 47.82±17.49 years with p value=0.986, which was not statistically significant.¹²

In our study, mean post-operative pain score is 1.31±0.54 in group A and 1.03±0.26 in group B at with p value 0.043, which is statistically significant. Kim-Fuchs C et al study mean post-operative pain score in group A was 1.84±1.7 while in group B was 1.24±1.3 with p value=0.084, which was statistically significant.¹³ We observed that, lower pain score is reported among patients in group B in comparison to group A. Mesh fixation by absorbable suture material causes less irritation of nerves as compared to mesh fixed by non-absorbable suture material. This may contribute to significantly less post-operative pain in the Group B compared to Group A.

In the out study the incidence of seroma formation in group A (n=90) was 7 and in group B (n=50) was 11, $p=0.73$ which was not statistically significant. Kaul A et al found incidence of seroma formation in group A (n=50) was 4 and in group B (n=50) was 5 $p=0.73$ which was not statistically significant.¹⁴ In our study, the incidence of scrotal edema in group A (n=90) is 14 and in group B (n=90) is 10 with p value of 0.69, which is statistically insignificant. Sajid MS, et al observed the incidence of scrotal edema in Group A (n=90) was 8 and in Group B (n=90) 7 with p value of 0.91, which was statistically not significant.¹⁵ The edema is due to the dissection around the sac of hernia and handling of tissues while separating the spermatic cord from sac.

In our study, 2 cases developed wound infection in group A (n=90) and 5 in group B (n=90) with p value of 0.74, which suggests no statistical difference in occurrence of wound infection. In the study of Kumar S, et al, incidence of wound infection in group A (n=92) was 1 and in group B (n=92) was 2 with p value of 0.561, which was statistically not significant.¹⁶ Patients with wound infection were managed by drainage of collection by opening one or two sutures, pus culture was sent. Oral antibiotics were given according to the culture. None of the patient required wound re-exploration or removal of the mesh. No incidence of local swelling (recurrence) found in early post-operative periods in all the study groups.

In our study incidence of moderate pain in group A (n=90) was 2 and 0 in group B (n=90) at 2nd month. In our study, an internationally accepted standard definition of pain (pain beyond 3 months) was used. Shah N, et al found the incidence of chronic pain in Group A (n=155) was 18 and in Group B (n=155) it was 7, with p value 0.04 which was statistically significant.¹⁷

Limitation of our study is short follow up period of 2 months and we also not compared the recurrence rate in both the absorbable suture groups and non-absorbable suture group. Large, multi-centric and long follow up study are needed.

CONCLUSION

We conclude that patients with absorbable suture for mesh fixation has less groin pain as compared to non-absorbable suture in hernioplasty during 2 months follow up period. However, complications like seroma, scrotal swelling, wound infection comparable in both the groups and are not statistically significant. There is no incidence of early recurrence in both the study groups.

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