Research Article

A Study of laparoscopic total extraperitoneal inguinal hernia repair: fixation versus nonfixation of mesh

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Abstract

Background: Fixation of the mesh during laparoscopic totally extra peritoneal (TEP) inguinal hernia repair is thought to be necessary to prevent recurrence. However mesh fixation may increase postoperative pain and lead to an increased risk of complications. We questioned whether elimination of fixation of the mesh during TEP inguinal hernia repair leads to decreased postoperative pain, complications and morbidity without an increased rate of recurrence. **Methods:** A prospective comparison study was carried out in 90 patients who underwent laparoscopic TEP inguinal hernia repair with fixation (group Fx, n= 45) or without fixation (group NFx, n=45) of the mesh. **Results:** Patients in whom the mesh was not fixed had significantly less operative time, shorter length of hospital stay, early return to routine activity, less postoperative duration of analgesia, lesser post operative pain scores and were less likely to develop urinary retention. No herniarecurrences were observed in either group (follow up range 6 to 24 months). **Conclusions:** Elimination of fixation of mesh during laparoscopic TEP inguinal hernia repair significantly reduces duration of postoperative analgesia, hospital stay, return to routine activity and pain scores. Eliminating fixation does not lead to an increased rate of recurrence.
Keywords: Mesh fixation, Tacker, Laparoscopic hernioplasty, TEP.

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INTRODUCTION

Laparoscopic TEP repair has undergone constant modifications in surgeons' quest to achieve perfect results. The evolution has instigated redefinition of acceptable hernia repair with special emphasis on comfort, cost and cosmesis, in addition to traditional outcome measures like groin pain and recurrence. The need or convenience of mesh fixation in TEP repair is still a controversial issue. Some authors recommend systematic fixation of the mesh using stapling devices, suturing or recently, polycynoacrylate adhesives, as a measure to prevent early recurrences. However many of the experts are of opinion that stapling or fixing the mesh not only increase time and expense of the procedure but also can cause specific complications like nerve entrapment syndrome, Inguinodyenia, Osteitis Pubis and osteomyelitis and does not offer any advantage over non fixing of the mesh. This technical detail is therefore of great interest as it may have repercussions on postoperative pain, morbidity, recurrence rates and hospital cost. The present study compares the results of fixation and nonfixation of mesh in laparoscopic total extraperitoneal herniorrhaphy with reference to various intraoperative complications, postoperative complications, chronic groin pain and early recurrence.

METHODS

Patients with incomplete, reducible inguinal hernias and fit for general anaesthesia who consented to participate in the study were included. Fixation was done in every alternate patient. Patients with irreducible hernias and previous lower abdominal surgery, pediatric patients with

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congenital hernia were excluded from the study. The results of our study are based on our observations in 90 patients (45 in each group) who have completed a minimum follow-up of 6 months.

Surgical Technique

All patients underwent laparoscopic TEP inguinal hernia repair. We used reusable cannulas, working ports, and instruments in all cases. A polypropylene mesh 15 x 11cm to 15 x 15 cm, depending on the patient's body habitus, was introduced and unrolled in the preperitoneal space. The mesh was positioned to cover the entire myopectineal orifice from symphysis pubis in the midline to anterior superior iliac spine laterally. Tackers or Endosuturing with proline 2-0 was used for fixation of mesh. Patients found to have bilateral hernias at operation underwent repair of the opposite side simultaneously. Two pieces of mesh, one on each side overlapping in the midline, were used for this purpose. Dissection of the opposite side to search for incipient hernias was not done routinely in all cases.

Postoperative Management and Follow-up

Patients were observed in the hospital for 1 day to 2 days initially, and subsequently in the later part of the study, on outpatient basis. Nonnarcotic injectable analgesia (Diclofenac sodium, 50 mg every 8 hours) was given routinely to all patients in the immediate postoperative period and converted to oral as per demand dosage on the next morning. Patients were reassessed on postoperative day 7, at 1 month, and at 6 monthly intervals thereafter. The following parameters were evaluated:

- The patients were observed for following intraoperative paramerters/ complications
- Operating time -from insertion of ports to completion of port closure in both fixation and non fixation group.
- Bleeding - the bleeding included injury to the inferior epigastric vessel and/ or any major blood vessel. The minor subcutaneous bleeding was excluded.
- Transaction of vas - The cutting of the vas deferens was noted.
- Bowel and bladder injury - injury to bowel or bladder in which definitive surgical procedure was required.
- The patients-were observed in immediate postoperative period for complications like subcutaneous emphysema, cord oedema, hematoma, seroma, local pain, testicular pain, local swelling, Parasthesia, mesh migration.
- The total hospital stay of the patient in the postoperative period was noted from the day of surgery to the day of discharge.
- The patients were also asked for the time to return to routine activities postoperatively based on fulfilment of parameters like ability to walk without support, passing of urine, able to squat, passing of stools, ability to climb up and down of stairs without support.
- The patient was then again followed after 1week. The complications such a mesh infection, subcutaneous emphysema, prolonged pain, Parasthesia, swelling, seroma, wound gape, port site hernia, recurrence were observed. Thepatient is then called up at 1 month for follow up and following complication like pain, swelling, seroma, port site hernia, Parasthesia and presence of early recurrence were checked.
- The patients were then followed up at every 6 months.
- Pain was evaluated with the visual analog score at day 1, 1 week and 1 month.

Statistical Analysis

Data was analysed with unpaired t test, Chi square test, Fisher's exact test and Mann Whitney test. P value less than 0.05 was considered as statistically significant.

RESULTS

Patient's demographic characteristics of both the groups are shown in Table1. Ninety Patients with 45 in each group were operated. Mean age was 50.2±13.81 in fixation group and 49.6±14.94 in nonfixation group. All (100%) patients in fixation group were male whereas there were 97.78% male and 2.22% female in nonfixation group. Right side involvement was found to be maximum, with 28 (62.22%) patients in each group. Bilateral hernia was found in 15 patients,8 in the fixation group, and7 in the nonfixation group.Mean duration of complaints was 11.11±4.95 months in fixation group and 11.67±5.43 months in nonfixation group (p= 0.9164).

Table 1: Socio-demographic characteristics of patients (n=90)

Character	Fixation (n=45)	Nonfixation (n=45)
Age (mean±SD)	50.2 ± 13.81	49.6 ± 14.94
Gender		
Male	45(100)	44(97.78)
Female	0(0)	1(2.22)
Occupation		
Sedentary	8(17.78)	6(13.33)
Moderate	12(26.67)	18(40.00)
Heavy	25(55.55)	21(46.67)
Side involvement		
Right	28(62.22)	28(62.22)
Left	9(20.00)	10(22.22)
Bilateral	8(17.78)	7(15.56)
Type of hernia		
Unilateral indirect	34(75.55)	35(77.77)

Unilateral direct	3(6.67)	3(6.67)
Bilateral direct	8(17.78)	7(15.56)
Duration of complaints (months)	11.11±4.95	11.67±5.43

Figure in brackets represents percentages

The operation was completed successfully in all patients with no conversions. Out of 45 patients in fixation group, tackers were used in 29 and Endosuturing was done in 16 patients. No procedure-relatedmortality occurred in either group. We did not have any major intra operative complications like significant bleeding, transaction of cord and bladder/ bowel injury. We found statistically significant difference between operating time, duration of analgesics required, time taken to return to activity, hospital stay and postoperative pain scores in both the groups. Table 2 shows Mean operating time in fixation group was 68.66±17.81 minutes and in nonfixation group 59.11±14.51 minutes ($p < 0.0001$). Mean duration of analgesia required was 4.67±1.30 days in fixation group and 3.45±0.89 days in nonfixation group ($p < 0.0001$). Mean time taken to return to the routine activity was 2.87±1.52 days in fixation group and 1.87±1.10 days in nonfixation group (p= 0.0007) whereas mean post operative hospital stay was 4.69±1.33 days in fixation group and 3.47±0.89 days in nonfixation group ($p < 0.0001$).

Table 2: Outcome measures and follow up (Mean±SD)

Character	Fixation(n=45)	Nonfixation(n=45)	P value
Operating Time (Minutes)	68.66 ± 17.81	59.11 ± 14.51	< 0.0001
Duration of analgesia (days)	4.67 ± 1.30	3.45 ± 0.89	< 0.0001
Time taken to return to routine activity (days)	2.87 ± 1.52	1.87 ± 1.10	0.0007
Duration of post op. hospital stay (days)	4.69 ± 1.33	3.47 ± 0.89	< 0.0001
	Pain scores		
Day 1	2.57 ± 0.89	2.22 ± 0.97	0.0453
1 week	1.67 ± 0.74	1.31 ± 0.73	0.0109
1 month	0.87 ± 0.63	0.51 ± 0.66	0.0065

Postoperative complications like urinary retention, cord edema, subcutaneous emphysema, were higher in fixation group which resolved spontaneously after a few hours. This difference was statistically non significant. Table 3 shows distribution of post operative complications in immediate postoperative period, at 1 week follow up and at 1 month follow up visit. Postoperative urinary retention was seen in 8(17.78%) patients in fixation group and 5(11.11%) patients in nonfixation group (p= 0.2751). Cord edema was seen in 10(22.22%) and 7(15.56%) patients in fixation and nonfixation groups respectively (p= 0.2096). Subcutaneous emphysema was present in 16(35.56%) in fixation group and 12(26.67%) in nonfixation group (p= 0.1812). Fever was seen in 2(4.44%) in fixation group and in 1(2.22%) in nonfixation group (p= 0.500). Seroma was seen in 8(17.78%) in fixation group and in 3(6.67%) in nonfixation group (p= 0.0983). Testicular pain in 2(4.44%) in fixation group and in 1(2.22%) in nonfixation group (p= 0.500). Pain score at day1 was 2.57±0.89 days in fixation group and 2.22±0.97 days in nonfixation group (p= 0.0453). At 1 week it was 1.67±0.74 days in fixation group and 1.31±0.73 in nonfixation group (p= 0.0109). At 1 month it was 0.87±0.63 days in fixation group and 0.51±0.66 days in nonfixation group (p= 0.0065).

Table 3: Distribution of post operative complications (n = 90)

Complication	Fixation (n=45)	Nonfixation (n=45)	P value
Immediate post operative period			
Urinary retention	8(17.78)	5(11.11)	0.2751
Cord edema	10(22.22)	7(15.56)	0.2096
Subcutaneous emphysema	16(35.56)	12(26.67)	0.1812
Fever	2(4.44)	1(2.22)	0.500
Seroma	8(17.78)	3(6.67)	0.0983
Testicular pain	2(4.44)	1(2.22)	0.500
Follow up at 1 week			
Pain	18(40.00)	11(24.44)	0.0572
Swelling	7(15.56)	2(4.44)	0.0786
Seroma	3(6.67)	1(2.22)	0.2736
Parasthesia	12(26.67)	8(17.78)	0.1552
Follow up at 1 month			
Prolonged pain	10(22.22)	4(8.89)	0.0721
Swelling	4(8.89)	2(4.44)	0.3363

Figure in brackets represents percentages

At 1 week of follow up pain was seen in 18(40.00%) in fixation group and in 11(24.44%) in nonfixation group (p= 0.0572). Swelling was seen in 7(15.56%) in fixation group and in 2(4.44%) in nonfixation group (p= 0.0786).Seroma was seen in 3(6.67%) in fixation group and in 1(2.22%) in nonfixation group (p= 0.2736). Parasthesia was present in 12(26.67%) in fixation group and in 8(17.78%) in nonfixation group (p= 0.1552). At 1 month of follow up prolonged pain was seen in 10(22.22%) in fixation group and in 4(8.89%) in nonfixation group (p= 0.0721). Swelling was seen in 4(8.89%) in fixation group and in 2(4.44%) in nonfixation group (p= 0.3363). No complications were seen in either group at 6 months of follow up.

DISCUSSION

The present comparative study was done to prospectively compare the early and late outcomes of fixation and nonfixation of the mesh in laparoscopic total extra

peritoneal inguinal hernia repair and intraoperative as well as postoperative factors. The mean age of the study subjects was 50.2 ± 13.81 years in fixation group while it was 49.6 ± 14.94 years in the nonfixation group. Both the study groups were comparable in age incidence. This was comparable to the age incidences in various other studies as in a studies 60.3 ± 15.0 years and 60.3 ± 15.0 years in fixation group and nonfixation group respectively[16]and 53.8 ± 15.6 years in fixation group and 56.9 ± 16.3 years in nonfixation group[13] In the present study, all i.e.100% patients were male with no female participant in fixation group and 97.78% males and only 2.22% females in nonfixation group. This was similar to the findings in other studies[13,16,23]. Incidence of inguinal hernia was found to be maximum in heavy manual workers i.e. 51.11%. It other studies 46% heavy workers and 44% were heavy manual workers[24,25]. In the present study, 68% patients presented with the duration of complaints between 1-12 months with mean duration of complaints 11.39 ± 5.18 months in both the groups as a whole. Mean duration of complaints was 11.11 ± 4.95 months in fixation group and 11.67 ± 5.43 months in nonfixation group. These findings were comparable with other studies[15,25] Findings of the present study supports the universal acceptance of high incidence of inguinal hernia on right side i.e. in (62.22%) patients. 24.45% patients presented with left side involvement and 13.33% patients were having bilateral involvement.[12,13,25] There were 23.34% direct hernia, 76.66% were indirect hernia and no patient had mixed hernia. So that 105 inguinal hernias were operated in 90 patients. 30% and indirect were 60% in other study[13]. Statistically significant difference between operating time, duration of analgesics required, time taken to return to activity, hospital stay and postoperative pain scores in both the groups. In other studies this difference was statistically significant[13,16] and in some other studies it was statistically nonsignificant[15]. In the present study pain score was recorded on day1, at 1 week and at 1 month. It was statistically significant on all the three occasions in two study groups. It was statistically nonsignificant in some studies[13,15,22]. No patients in either group presented with any complication or recurrence at 6 months of follow up. In other study it was found in 0.2% patients in fixation group whereas no recurrence in nonfixation group after 6 months[9] whereas no recurrence was seen in study at Pakistan in either group after 1 year of follow up[23].

CONCLUSION

We conclude that in the statistically comparable groups of fixation and nonfixation of mesh in laparoscopic total extraperitoneal inguinal hernia repair, operating time, post operative recovery, time taken to return to the routine activity, post operative morbidity and hospital stay was significantly less in nonfixation group. With no recurrence at 6 months follow up and statistically significant favorable difference found between outcomes of the two procedures, non fixation of mesh can be considered as routine procedure in total extra peritoneal inguinal hernia repair. With larger sample size and adequate control of bias and confounders, further evaluation and comparison is recommended.

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