

Original Research

A Comparative Study of the Advantage of Non-Fixation versus Fixation of Mesh in Laparoscopic Totally Extraperitoneal (TEP) Repair of Inguinal Hernias at a Tertiary centre

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Abstract

Background: Laparoscopic inguinal hernia surgery (LIHS) is the recommended procedure for bilateral and recurrent inguinal hernias (IH) while it is one of the options dealing with unilateral inguinal hernias.

Aims and objectives: To evaluate the outcome of fixation versus non-fixation of mesh in Totally Extra Peritoneal (TEP).

Materials and Methods: All patients admitted in General surgical Ward/unit either through OPD or emergency, presenting with uncomplicated unilateral inguinal hernias were included. A total of 120 patients were included in the study, 60 patients underwent TEP repair without fixation of mesh and in remaining 60 patients mesh was fixed using metallic tacks.

Results: The mean age of the patient was 45.05 ± 16.50 years and 44.98 ± 15.85 years in the fixation and non-fixation group, respectively. 41.66% of the cases among the fixation and 35% in non-fixation of mesh in laparoscopic TEP repair of inguinal hernia were above 50 years of age respectively.

Conclusion: We observed that postoperative chronic pain is less likely to develop in patients who undergo Totally Extra Peritoneal (TEP) repair without mesh fixation; moreover, even when chronic pain does develop in such patients, their pain will be mild and unlikely to necessitate re-exploration.

Keywords: Inguinal Hernia, Laparoscopic repair; Totally extraperitoneal repair.

Introduction

Laparoscopic inguinal hernia surgery (LIHS) is the recommended procedure for bilateral and recurrent inguinal hernias (IH) while it is one of the options dealing with a unilateral inguinal hernias [1]. With the advent of laparoscopic surgery, it has revolutionized the treatment of hernia. Laparoscopic hernia repair can be done by two methods – Trans Abdominal Pre Peritoneal (TAPP) and Totally Extra Peritoneal (TEP) [2]. Both these methods have their advantages and disadvantages. In TEP mesh is placed in the extra peritoneal space which is fixed by various fixation devices, so that it does not get displaced leading to recurrence of post-operative complications [3]. Of these two, TEP has emerged as the favoured technique [4]. Despite the fact that recent trials [5] have confirmed that laparoscopic inguinal hernia repair is comparable with open surgery in terms of outcome and recovery, yet this needs to be widely accepted worldwide. Whether non fixation of mesh is superior to fixation of mesh still remain controversial. The major issue with hernia surgery has been recurrence. However, now that low recurrence rates are being reported consistently, attention is being drawn to other issues like chronic groin pain (CGP) and quality of life (QOL) [6, 7]. Three meta-analyses have now been published that have shown that non-fixation of mesh does not lead to increased recurrences [8, 9].

Aims and Objective: The aim of the present study was to evaluate the outcome of fixation versus non-fixation of mesh in TEP with a primary objective to evaluate post-operative groin pain, time of surgical procedure, incidence of urinary retention, intra and post-operative complications, duration of hospital stay after surgery and recurrence rates, days taken to return to activity.

Material and Methods: The present prospective study was carried out in the Department of Surgery, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India. All patients admitted in General surgical Ward/unit either through OPD or emergency, presenting with uncomplicated unilateral inguinal hernias were included. All patients were informed regarding the study, and their written consent was obtained.

The institutional ethical committee granted ethical approval. The duration of study was from June 2022 to May 2023. All patients completed a minimum of 1-year follow-up and the follow-up data was collected and finally evaluated. A total of 120 patients were included in the study, 60 patients underwent TEP repair without fixation of mesh and in remaining 60 patients mesh was fixed using metallic tacks. Age of all cases was between 20 years to 60 years old. Parameters used for comparison between non-fixation and fixation of Mesh were pain, duration of operation, intra and post-operative complication, duration of hospital stay and long term groin pain and recurrence.

Inclusion Criteria

- a. All adult patients with uncomplicated inguinal hernias
- b. willing for laparoscopic operation and
- c. Medical fitness for TEP.

Exclusion Criteria

- a. Patients with complicated inguinal hernias
- b. acute or obstructed inguino-scrotal hernia
- c. recurrent and bilateral hernia
- d. previous history of midline scars, a complicated hernia or
- e. Medically unfit for general anaesthesia.

Operative Procedure: It was started with Injection amoxicillin 1000 mg and clavulanic acid 200 mg was given intravenously as prophylaxis at the time of induction along with two additional post-operative doses. The procedure was done under general anaesthesia. During TEP Procedure, A 10-mm paraumbilical port was made on the side of the hernia. In bilateral hernias, the port was made on the side of the larger sac. The rectus muscle was retracted laterally after incising the anterior rectus sheath, and a preperitoneal access was obtained to place a 10-mm trocar for a 10-mm 30° telescope. Pneumo-preperitoneum was created and blunt dissection with the telescope was used to create the preperitoneal space. Two 5-mm ports were placed in the midline, one just above the symphysis pubis and the other in between the 10- mm port and 5-mm supra-pubic port, and the entire posterior floor was dissected. Reduction of sac was attempted in all cases but in case of adhesions, sac was divided at the deep ring. Genitofemoral and lateral cutaneous nerves were identified. Fascia over these nerves was kept intact. Peritoneum was teased down, proximal to the point where vas deferens turns medially. The triangle of doom and Hasselbach's triangle were defined. After the dissection, a rolled 12 × 15 cm polypropylene mesh was introduced via the 10-mm port. The mesh was spread to cover the entire myopectineal area on the affected side. In bilateral hernia, both meshes were placed so as to overlap each other in the midline. The mesh was fixed with absorbable tackers, medially on Cooper's ligament and laterally near anterior superior iliac spine above the iliopubic tract. This step was omitted during the mesh non-fixation period. For bilateral inguinal hernia, the same procedure was repeated on the contralateral side, ensuring a 1–2-cm overlap of the mesh medially. The port sites were closed with skin staplers. Injection paracetamol 1 g 8 hourly was given to all patients on the day of surgery for analgesia as Post-operative Management. Oral fluids were allowed 6 hourly post-operatives and progressed to normal diet the next day. Visual analog scale was used to assess pain in the post-op period. The patients were regularly followed up. Follow-up was done at 1 week, 3 months, 6 months, and 1 year. All patients completed a minimum of 1 year follow-up either visiting at centre or through by the means of telephonic interview.

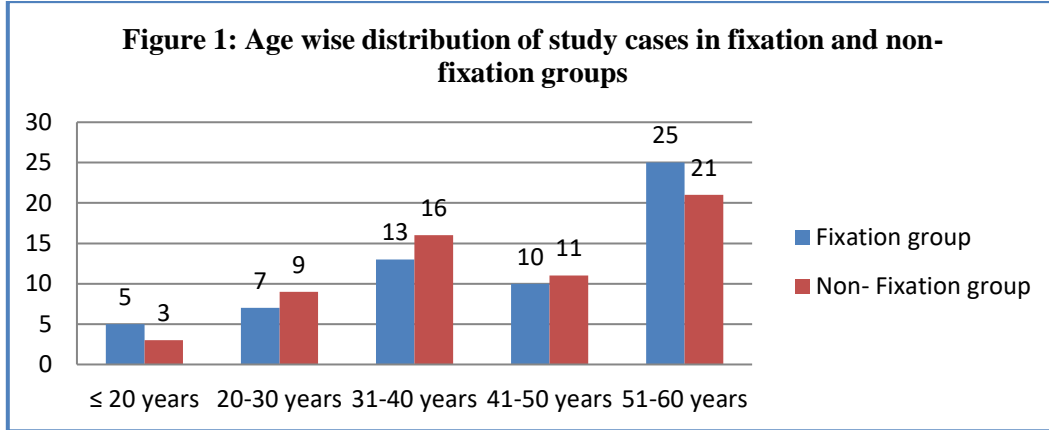
Statistical analysis: In present study, data was analysed by two statistical software-Statistical package for the social sciences (SPSS) version 22.0 and Microsoft 16. The categorical data namely; Intra operative and Post-operative complication was analysed by Chi-square test. The Independent sample 't' test was used to compared ordinal data namely age, operating time, post-operative pain and duration of stay in hospital. A p value of < 0.05 was considered as statistically significant.

Result

The present study was to compare the advantages of non-fixation and fixation of mesh in laparoscopic TEP repair of inguinal hernias. Of the 60 cases in the fixation group, 40 were right-sided hernias and 20 were left-sided. Of these, 34 cases were direct and 26 were indirect hernias. Among the non-fixation group, of the 60 cases, 32 were right-sided and 28 were left-sided hernias. Of these, 42 cases were direct, and 18 cases were indirect hernias. In both groups, 100% of the patients were men.

Table1: Age wise distribution of present cases		
Age (years)	Fixation group (n=60)	Non- Fixation group (n=60)

≤ 20	05 (8.33%)	03 (5%)
21-30	07 (11.66%)	09 (15%)
31-40	13 (21.67%)	16 (26.67%)
41-50	10 (16.67%)	11 (18.33%)
51-70	25 (41.66%)	21 (35%)
Total	60 (100%)	60 (100%)



We observed that, 41.66% of the cases among the fixation and 35% in non-fixation of mesh in laparoscopic TEP repair of inguinal hernia were above 50 years of age respectively. Therefore, inguinal hernia is more common in old age (table 1, figure 1).

Table 2: Comparison of mean age of study cases between groups of fixation and non-fixation of mesh

Operative Procedure	Mean Age (years) [Mean ± SD]	Paired 't' test	P value
Fixation	45.05+16.50	0.158	0.65
Non fixation	44.98+15.85		

The mean age of the patient was 45.05 ± 16.50 years and 44.98 ± 15.85 years in the fixation and non-fixation group, respectively. Whereas pair t test = 0.158 and p= 0.65. This shows difference in mean age between two groups was not statistically significant (p= 0.65). So both groups were comparable. Majority of the patients were males.

Table 3: Comparison of average pain scores (by VAS Score) in different phases after operation between groups of fixation and non-fixation of mesh

Different phases	Fixation	Non-fixation	Paired 't' test	P value
	Mean ± SD			
12 hours	36.76+16.98	31.00+14.79	1.531	0.08
24 hours	25.01+15.21	13.50+12.71	3.061	0.01
72 hours	14.62+14.74	4.76+5.97	3.045	0.02
1 Month	7.33+10.807	00	3.671	0.001
6 Months	4.33+6.789	00	3.589	0.005

When analysed for post-operative pain among the two groups, it was observed that the VAS score was statistically significant at 24 hours and beyond up to six months as shown in table 3.

Table 4: Distribution of intra-operative and post-operative complication in study group

Operative Procedure	Intra-operative		Post-operative		P value
	complication	No complication	complication	No complication	
Fixation (n=60)	15 (25%)	45 (75%)	13 (21.67%)	47 (78.33%)	0.60
Non-fixation (n=60)	7 (11.67%)	53 (88.33%)	6 (10%)	54 (90%)	

When the intraoperative complications were compared between non-fixation versus fixation it was observed that in addition to complications like bleeding from inferior epigastric vessels, gonadal vessels and pneumoperitoneum, fixation group had additive complication namely bleeding from tacker site. In present study, it was noted that there was 25% complications among fixation group whereas only 11.67% of complications was observed in non-fixation group respectively. Though the complications were higher in fixation group, statistical analysis revealed no significant ($p=0.60$).

When analysed for post-operative complications, there was 21.67% complications among fixation group whereas only 10% of complications was observed in non-fixation group respectively. Though the complications were higher in fixation group, statistical analysis revealed no significant ($p=0.60$).

Operative Procedure	Mean operative time	Mean duration hospital stay	't' test	P value
	(Mean \pm SD)			
Fixation (n=60)	92.38 \pm 16.02minutes	3.52 \pm 0.50 days	3.627	<0.002
Non-fixation (n=60)	54.51 \pm 18.79 minutes	2.80 \pm 0.93 days		

The mean operative time in fixation group was 92.38 \pm 16.02minutes whereas in case of non-fixation group it was 54.51 \pm 18.79 minutes respectively, which was statistically significant ($p<0.002$).

When we analysed the mean duration of post-operative hospital stay, the patients in the fixation group had to stay an mean of 3.52 days when compared to non-80 days, and the difference between the hospital stay was statistically significant ($p<0.002$) (Table 5).

Discussion

The main focus of present study was on cost-effectiveness, score of pain, operating time, intra or post-operative complications, recurrence, days of hospital stay after surgical procedure, and above all the quality of life of the patients after surgery.

The present study' didn't shows any significant difference in pain score at 12 hours of post-operative period, but there was a significant difference in VAS score at 24 hours, 72 hours, 1 month, and 6 months of follow-up. Taylor C. et al. [10] conducted a study on 929 patients to evaluate the incidence of chronic pain after laparoscopic TEP repair with and without mesh fixation. There was no significant difference in pain scores in both groups up to 1 week, but they observed a significant difference in pain scores at 1 month. In the present study, we observed that the mean operative time in the fixation group was 92.38 \pm 16.02 minutes, whereas in the non-fixation group it was 54.51 \pm 18.79 minutes, respectively, which was statistically significant ($p<0.002$). Moreno Egea A et al. [11], study on 170 patients, observed mean operative time of unilateral non-fixation was 39.1 \pm 15.3 minutes whereas in unilateral fixation was 45.7 \pm 17.9 minutes, and the difference between time was significant ($p=0.01$), which was similar to the present study.

In present study the mean duration of post-operative hospital stay among the patients in the fixation group was 3.52 days when compared to non-fixation group which was 2.80 days, and the study observed statistically significant difference between the two groups. In another study conducted in Turkey with an aim to analysis the outcomes of laparoscopic total extra peritoneal (TEP) inguinal hernia repair without using mesh fixation among 60 patients between 2012 and 2015, all patients were discharged within post-operative 24 hours [12].

In a Randomized Prospective Study of Totally Extra peritoneal Inguinal Hernia Repair: Fixation Versus No Fixation of Mesh at Minnesota, USA among 274 patients, the study observed the mean duration of stay in hospital among non-fixation group was 8.3 hours and 16 hours in case of fixation group and the difference among the duration was significant ($p=0.01$) [13].

In present study, it was noted that there was 25% complications among fixation group whereas only 11.67% of complications was observed in non-fixation group respectively during intraoperative. Though the complications were higher in fixation group, statistical analysis revealed no significant ($p=0.60$).

Similarly, in the case of post-operative complications, there were 21.67% of complications among the fixation group, whereas only 10% of complications were observed in the non-fixation group, respectively. Though the complications were higher in the fixation group, the results were still significant ($p=0.60$). In another interventional prospective study, urinary retention was one of the post-operative complications in five patients (15.6%) with fixation compared to four patients (12.9%) with similar complications in the non-fixation group [14]. In another study, only four patients developed a post-surgical complication [12]. In another randomised prospective cohort study of 274 patients, only 19 inguinal seromas (6.1%) were identified at 2 weeks, only 7 (1.9%) remained at 1 month, and none at 1 year among the fixation group, though the findings were insignificant [15].

Limitations of the Study

The present study was a single centric study with no female patients and Small sample size.

Conclusion

The present study reveals that Mesh fixation appears to be unnecessary in TEP repair of inguinal hernias is as safe as mesh fixation with certain advantages. It is associated with higher operative time, higher postoperative complication and an increased likelihood of developing chronic groin pain and offers no clinical advantages and increases the cost of the process. We observed that postoperative chronic pain is less likely to develop in patients who undergo TEP repair without mesh fixation; moreover, even when chronic pain does develop in such patients, their pain will be mild and unlikely to necessitate re-exploration.

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Reference

1. NICE Guidelines (2007) Laparoscopic surgery for inguinal hernia repair. Technology appraisal guidance 83 www.nice.org.uk
2. Bhandarkar DS, Shankar M and Udawadia TE. Laparoscopic surgery for inguinal hernia: Current status and controversies. *J Minim Access Surg* 2006; 2(3): 178-186.
3. Bittner R, Arregui ME, Bisgaard T, Dudai M, Ferzli GS, Fitzgibbons RJ, et al. Guidelines for laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal Hernia [International Endo hernia Society (IEHS)]. *Surg Endosc* 2011; 25(9): 2773-2843.
4. Kockerling F, Schug-Pass C, Jacob DA, Keller T (2013) The intra and postoperative complication rate of TEP in patients undergoing unilateral endoscopic inguinal hernia repair is not higher compared with TAPP. *World J Surg* 37(4):933–934. <https://doi.org/10.1007/s00268-012-1858-8>.
5. Heikkinen T, Bringman S, Ohtonen P, Kunelius P, Haukipuro K and Hulkko A. Five-year outcome of laparoscopic and Lichtenstein hernioplasties. *Surg Endosc* 2004; 18:518-522.
6. Singh AN, Bansal VK, Misra MC, Kumar S, Rajeshwari S, Kumar A et al (2012) Testicular functions, chronic groin pain and quality of life after laparoscopic and open mesh repair of inguinal hernia: a prospective randomized controlled trial. *Surg Endosc* 6(5):1304–1317
7. Jakhmola CK, Kumar A (2015) Laparoscopic inguinal hernia repair in the armed forces: a 5 year single centre study. *MJAFI* 71(4):317–323
8. Teng YJ, Pan SM, Liu YL, Yang KH, Zhang YC, Tian JH et al (2011) A meta-analysis of randomized controlled trials of fixation versus non-fixation of mesh in laparoscopic total extraperitoneal inguinal hernia repair. *Surg Endosc* 25:2849e58
9. Sajid MS, Ladwa N, Kalra L, Hutson K, Sains P, Baig MK (2012) A meta-analysis examining the use of tacker fixation versus nofixation of mesh in laparoscopic inguinal hernia repair. *Int J Surg* 10(5):224–231. <https://doi.org/10.1016/j.ijssu.2012.03.001>
10. Taylor C, LayaniL, Liew V, Ghusn M, Crampton Nand White S. Laparoscopic inguinal hernia repair without mesh fixation, early results of a large randomized clinical trial. *Surg Endosc*2008; 22: 757-762.
11. Moreno-Egea A, Torralba Martínez JA, Cuenca GM and Aguayo Albasini J L. Randomized Clinical Trial of Fixation vs Non fixation of Mesh in Total Extraperitoneal Inguinal Hernioplasty. *Arch Surg*2004; 139: 1376-1379.
12. Sağıroğlu J, Özdemir T, Atak T, Gök MA, Erdoğan KO, ErenT, etal. Laparoscopic Total Extraperitoneal Inguinal Hernia Repair Without Mesh Fixation: Report of Early Outcomes. *SouthClinIstEuras*2016; 27(3):215-219.
13. Koch CA, Greenlee SM, Larson DR, Harrington JR and Farley DR. Randomized Prospective Study of Totally Extraperitoneal Inguinal Hernia Repair: Fixation Versus No Fixation of Mesh. *Journal of the Society of Laparoendoscopic Surgeons* 2006; 10:457-460.
14. Ayyaz M, Farooka MW, ToorAA, Malik A A, Khokhar HA, Khan A, et al. Mesh fixation vs. non-fixationin total extraperitoneal mesh hernioplasty. *J Pak MedAssoc*2015; 65(3):270-272.
15. Messaris E, Nicastrì G and Dudrick SJ. Total Extraperitoneal Laparoscopic Inguinal Hernia Repair without Mesh Fixation. Prospective Study With 1-Year Follow-up Results. *Arch Surg* 2010; 145(4):334-338.