

Research Article

**Comparison of satisfactory outcome after laparoscopic total
extraperitoneal mesh repair of indirect inguinal hernia
with tacker and without tacker fixation**

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ABSTRACT

Objectives: To compare the satisfactory outcome after laparoscopic total extraperitoneal mesh repair of indirect inguinal hernia with tacker and without tacker fixation.

Materials & Methods:

This comparative study was conducted at Department of Surgery, DHQ Hospital Sahiwal from January 2017 to June 2017. Total 200 patients of indirect inguinal hernia were selected. Laparoscopic total extraperitoneal mesh repair of inguinal hernia without tacker fixation was done in group A while without tracker in group B. Post operative pain was assessed at 1 month follow up.

Results: Mean age of the patients in present study was 41.78 ± 11.33 years. Total 200 patients were selected 100 patients in each group. Satisfactory outcome was noted in 90 (90%) patients of group A while in 70 (70%) patients of group B. Statistically significant ($P = 0.001$) difference of satisfactory outcome between the both groups was noted. In age group 20-40 years, satisfactory outcome was noted in 40 (93.02%) patients of group A while in 38 (95%) patients of group B. But the difference was statistically insignificant with p value 1.00. In age group 41-60 years, satisfactory outcome was noted in 50 (87.72%) patients of study group A and in 32 (53.33%) patients of study group B and the difference was statistically significant with p value 0.001.

Conclusion: This study showing that post-operative pain is less after laparoscopic total extraperitoneal mesh repair of indirect inguinal hernia without tacker fixation compared to with tacker fixation.

Keywords: Inguinal hernia, laparoscopic, mesh, tacker fixation.

INTRODUCTION

An inguinal hernia is a protrusion of abdominal-cavity contents through the inguinal canal. They are very common in men

(lifetime risk 27% for men, 3% for women).¹ There are two types of inguinal hernia, direct and indirect, which are defined by their

relationship to the inferior epigastric vessels. Direct inguinal hernias occur medial to the inferior epigastric vessels while Indirect inguinal hernias occur when abdominal contents protrude through the deep inguinal ring, lateral to the inferior epigastric vessels.² About 27% of males and 3% of females develop a groin hernia at some time in their life.³ Groin hernias occur most often before the age of one and after the age of fifty.⁴ Inguinal, femoral and abdominal hernias resulted in 51,000 deaths in 2013 and 55,000 in 1990.⁵

Inguinal hernia repair is one of the most common procedures in the field of general surgery. Various methods for inguinal hernia repair have been described. Tension-free repair is the procedure type of choice because of its low recurrence rate.⁶ Tension-free repair procedures can be roughly categorized into 2 groups based on the approach: laparoscopic and open anterior.⁷ The use of prosthetic mesh, to create tension-free repair, is preferable over non mesh techniques because of reduced recurrence.⁸ Laparoscopic hernia repair can be performed by either a total extraperitoneal (TEP) approach or trans-abdominal preperitoneal approach. TEP repair is gaining popularity because many surgeons have become wary of the potential complications when entering the peritoneal cavity using the trans-abdominal approach.^{9,10} Decreased post operative pain and lesser morbidity are the main advantages of Total Extra Peritoneal Repair (TEP) over open hernia repair. Laparoscopic hernia repair is now recommended as the method of choice for bilateral and recurrent inguinal hernias.¹¹ The disadvantages of TEP are requirement of general anesthesia (GA), need to fix the mesh, seroma formation and difficult learning curve.¹² Fixation of mesh with metal staples, apart from increasing the cost, may lead to

new post operative groin pain which even becomes chronic in small percentage of patients.¹³ This had led to various studies showing 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, inguinodynia, osteitis pubis and osteomyelitis and does not offer any advantage over non fixing of the mesh.¹¹⁻¹⁴ In a study by Wakodkar A et al¹⁴ has found post-operative pain at 1 month in 22.22% patients after laparoscopic total extraperitoneal mesh repair of inguinal hernia with tacker compared to only 8.89% in patients without tacker.

As post-operative pain following laparoscopic total extraperitoneal mesh repair of inguinal hernia with tacker is the most common patients' complaint which not only affects patients physically but also associated with high morbidity and also no local randomized trial has been done previously, so the purpose of this study was to compare the outcome in terms of post-operative pain after laparoscopic total extraperitoneal mesh repair of inguinal hernia with tacker fixation and without tacker fixation in local population. Then on the basis of these results, some practical recommendations could be made in our routine practice guidelines for these particular patients to be provided with better technique which is associated with less post-operative pain in order to reduce their morbidity.

OPERATIONAL DEFINITIONS:

- 1. Indirect Inguinal hernia:** bulge in the groin area that become more prominent on coughing, straining, or standing up and disappear on lying down was deemed as positive.
- 2. Post-operative Perineal Pain:** It was assessed by using visual analogue scale.

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No Pain = 0, Mild Pain = 1-3, Moderate Pain = 4-6, Severe Pain = 7-10

3. Outcome: was measured in terms of post-operative pain after one month.

- If patients had no or mild pain (VAS = 0-3), outcome was considered as satisfactory.

If patients had moderate or severe pain (VAS = 4-10), outcome was considered as unsatisfactory.

MATERIAL AND METHODS

This comparative study was conducted at Department of Surgery, DHQ Hospital Sahiwal from January 2017 to June 2017. Total 200 patients of indirect inguinal hernia were selected.

Inclusion Criteria:

- a. All patients with indirect inguinal hernia (as per-operational definition).
- b. Age 20-60 years.
- c. Both genders.

b. Exclusion Criteria:

- a. Patients with irreducible hernia.
- b. Obstructed and strangulated hernias (not reducible on examination).
- c. Patients with h/o previous lower abdominal surgery.
- d. H/o previous mesh placement in the preperitoneal space.
- e. Patients unfit for anesthesia.

Data collection procedure:

After approval from local ethical review committee, total 200 patients of inguinal hernias (as per-operational definition) who were admitted Department of Surgery, DHQ Hospital, Sahiwal fulfilling the inclusion/exclusion criteria were selected. After taking informed written consent and explaining all the risks and benefits of the procedure, all selected cases were offered to

pick up a slip from total mixed up slips (half-slips contained letter 'A' and other half slips contained letter 'B') and he/she was placed in that respective group.

In group A patients, laparoscopic total extraperitoneal mesh repair of inguinal hernia without tacker fixation was done while in group B patients, laparoscopic total extraperitoneal mesh repair of inguinal hernia with tacker fixation was done. All the patients were assessed after 1 month for post-operative pain assessment and outcome (as per operational definitions) was measured for both groups at one month post-operatively. Findings were noted on pre-designed proforma.

Statistical analysis:

All the data was entered and analyzed by using SPSS version 20.0. The quantitative variables like age, duration of disease and post-operative pain were presented as mean and standard deviation. The qualitative variables like genders and outcome (satisfactory/unsatisfactory) of both groups were presented as frequency and percentage. Chi square was used to compare the outcome of both groups and p-value ≤ 0.05 was considered as significant.

RESULTS

Mean age of the patients in present study was 41.78 ± 11.33 years. Total 200 patients were selected 100 patients in each group. Satisfactory outcome was noted in 90 (90%) patients of group A while in 70 (70%) patients of group B. Statistically significant ($P = 0.001$) difference of satisfactory outcome between the both groups was noted. (Table 1) Patients were divided into two age groups, age group 20-40 years and age group 41-60 years. In age group 20-40 years, satisfactory outcome was noted in 40 (93.02%) patients of group A while in 38 (95%) patients of group

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B. But the difference was statistically insignificant with p value 1.00. In age group 41-60 years, satisfactory outcome was noted in 50 (87.72%) patients of study group A and in 32 (53.33%) patients of study group B and the difference was statistically significant with p value 0.001. (Table 2)

Total 81 (89.01%) patients of group A and 68 (74.73%) patients of group B found with satisfactory outcome with p value 0.020. All female patients of group A while 2 (22.22%) female patients of group B found with

satisfactory outcome with p value 0.002. (Table 3)

≤6 month's duration of disease group, outcome was satisfactory in 50 (90.91%) patients of group A and in 40 (72.73%) patients of group B. Difference of satisfactory outcome between both groups was significant with p value 0.024. In >6 months duration of disease group, satisfactory outcome was noted in 40 (88.89%) patients of group A while in 30 (66.67%) patients of group B and difference was significant with p value 0.021. (Table 4)

Table 1: Comparison of satisfactory outcome between both groups

Group	Satisfactory outcome		Total	P value
	Yes (%)	No (%)		
A	90 (90%)	10 (10%)	100	0.001
B	70 (70%)	30 (30%)	100	

Table 2: Stratification of outcome with respect to age groups.

Age of patients (years)	Group A		Group B		p-value
	Satisfactory outcome		Satisfactory outcome		
	Yes (%)	No (%)	Yes (%)	No (%)	
20-40	40 (93.02%)	3 (6.98%)	38 (95%)	2 (5%)	1.00
41-60	50 (87.72%)	7 (12.28%)	32 (53.33%)	28 (46.67%)	0.001
Total	90 (90%)	10 (10%)	70 (70%)	30 (30%)	

Table 3: Stratification of outcome with respect to gender.

Gender	Group A		Group B		p-value
	Satisfactory outcome		Satisfactory outcome		
	Yes (%)	No (%)	Yes (%)	No (%)	
Male	81 (89.01%)	10 (10.99%)	68 (74.73%)	23 (25.27%)	0.020
Female	9 (100%)	0	2 (22.22%)	7 (77.78%)	0.002

Table 4: Stratification of outcome with respect to duration of disease.

Duration of disease	Group A		Group B		p-value
	Satisfactory outcome		Satisfactory outcome		
	Yes (%)	No (%)	Yes (%)	No (%)	
≤6	50	5	40	15	0.024

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months	(90.91%)	(9.09%)	(72.73%)	(27.27%)	
>6 months	40 (88.89%)	5 (11.11%)	30 (66.67%)	15 (33.33%)	0.021
	90	10	70	30	

DISCUSSION

Laparoscopic hernia repair can be performed by either a total extraperitoneal (TEP) approach or transabdominalpreperitoneal approach. TEP repair is gaining popularity because many surgeons have become wary of the potential complications when entering the peritoneal cavity using the transabdominal approach. TEP repair has shown favorable short-term results with regard to reduced postoperative stay, decreased postoperative pain, and earlier return to physical activity in comparison with open mesh repairs.¹²⁵ Postoperative groin pain is still a concern in approximately one fifth of patients after TEP repair.¹⁵ Though generally mild and non-limiting, it can be severe in a small percentage of patients who may seek help from chronic pain specialists and have significant occupational difficulties.¹⁶ The common practice of using staples or tacks to fixate mesh to the groin has been implicated as a possible cause of postoperative pain based on numerous reports of new groin pain that is well localized, corresponds with the location of fixation tacks, and is ameliorated by their removal.¹⁷ On the other hand, there is an entrenched belief within the surgical community that mesh fixation is a vital step in the repair to reduce the risk of mesh folding or migration that could lead to early hernia recurrence. This randomized controlled study has compared the outcome in terms of post-operative pain after laparoscopic total extraperitoneal mesh repair of indirect inguinal hernia with tacker and without tacker fixation.

Mean age of the patients in present study was

41.78 ± 11.33 years. Statistically significant (P = 0.001) difference of satisfactory outcome between the both groups was noted. In age group 20-40 years, satisfactory outcome was noted in 40 (93.02%) patients of group A while in 38 (95%) patients of group B. But the difference was statistically insignificant with p value 1.00. In age group 41-60 years, satisfactory outcome was noted in 50 (87.72%) patients of study group A and in 32 (53.33%) patients of study group B and the difference was statistically significant with p value 0.001. Total 81 (89.01%) patients of group A and 68 (74.73%) patients of group B found with satisfactory outcome with p value 0.020. All female patients of group A while 2 (22.22%) female patients of group B found with satisfactory outcome with p value 0.002. Inguinal hernias are the most common type in both males and females; approximately 25% of males and 2% of females have an inguinal hernia over the course of their lifetime. The female-to-male ratio for indirect inguinal hernia is 7:1.¹⁸ 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.¹⁴ In our study, mean post-operative pain in Group A (laparoscopic total extraperitoneal mesh repair of inguinal hernia without tacker fixation) was 1.46 ± 1.50 while in Group B (laparoscopic total extraperitoneal mesh repair of inguinal hernia with tacker fixation) was 1.77 ± 2.08 (p-value=0.2505). Outcome was satisfactory in 84 (92.31%) patients in group A while in group B, it was found in 67 (73.63%) patients with a p value of 0.001 which is statistically significant. In a study by Wakodkar A et al¹⁴ has found post-operative

pain at 1 month in 22.22% patients after laparoscopic total extraperitoneal mesh repair of inguinal hernia with tacker compared to only 8.89% in patients without tacker. The author reported 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 ($p = 0.0065$).¹⁴

The incidence of chronic pain in the literature ranges from 9% to 22% in patients after laparoscopic TEP repair with mesh fixation.¹⁹⁻

²⁰Several RCTs were conducted to evaluate the incidence of chronic pain after laparoscopic TEP repair with and without mesh fixation.²¹ However, data from those studies are conflicting. An RCT by Taylor et al¹⁹ not only found that mesh fixation was associated with a higher incidence of chronic pain but also found an association between the number of fixation tacks used and the incidence of pain. In contrast, Koch et al²² in their RCT reported that elimination of mesh fixation during laparoscopic TEP repair significantly reduced the use of postoperative narcotic analgesia but did not reduce postoperative pain. In another RCT Ferzliet al²³ reported no difference in the incidence of postoperative pain between the two groups.

The dilemma of chronic pain after laparoscopic inguinal hernia repair using metallic tacks to fixate mesh has encouraged the development and use of alternative methods of fixation that avoid the use of such tacks, including fibrin glues, acrylate adhesives, and absorbable tacks. Patients appear to report less pain than with permanent fixation in some studies.²⁴⁻²⁵ However, these alternate forms of fixation have their own

disadvantages including high cost and/or difficulty of use. Although those studies were limited by the short duration of follow-up, they were not able to show any statistically significant difference in the risk of hernia recurrence between the two methods of fixation.

Nonfixation of mesh is also cost-effective. Although we did not perform a cost analysis, previous studies have shown a significant reduction in cost when the mesh is not fixed.¹⁹ Ferzliet al²³ showed that nonfixation of mesh resulted in savings of \$120 per operation. The two groups in their study were similar in terms of sex ratio, operative times, conversion rates, recurrent hernias, and bilateral hernias repaired. In a study, mean pain score on VAS after fixation was 4.7 ± 0.683 compared to non-fixation 4.1 ± 0.86 .²⁶ A randomised control trial published in 2012 showed that there was no statistically significant difference in pain.²⁷ On comparing TransabdominalPreperitoneal (TAPP) versus TEP early postoperative pain is lesser in TEP hernia repair.²⁸ A trial spanning over 10 years advocated use of tackers only in selective patients.²⁹ One study showed that early postoperative groin pain was more common in young patients.³⁰ Use of absorbable or non-absorbable tackers has no difference on pain after TEP repair. An alternative to tackers is fibrin glue which reduces postoperative pain probably due to decreased irritation and inflammation.³¹

There is a great variation in the rate of postoperative chronic pain, ranging from 0.1% to 0.4% and 22.5% in laparoscopic repairs for which staples are used to attach the mesh.³² For laparoscopic hernia repair, the possibility of nerve injury (pain or paresthesia) caused by entrapment from incorrect placement of staples (above all lateral cutaneous femoral nerve, but ilioinguinal, and genitofemoral are

also at risk) and epigastric vessels injury by clips application may be avoided if tacker not used either in the TAPP technique or in the TEP. It seems that not only entrapment but also postoperative fibrous scar around the staples can lead to nerve injury. In conventional TAPP, the prosthesis is anchored using metal clips. This is a critical step that requires the utmost attention to avoid damaging the surrounding nerves and blood vessels. Lesions arising due to such intraoperative damage can lead to complications, including hemorrhage, or painful neuralgia during follow-up.³³

CONCLUSION

This study concluded that the post-operative pain is less after laparoscopic total extraperitoneal mesh repair of indirect inguinal hernia without tacker fixation compared to with tacker fixation. So, we recommend that total laparoscopic extraperitoneal mesh repair of indirect inguinal hernia without tacker fixation should be used routinely for reducing the post-operative pain which will in turn improve their quality of life by reducing post-operative morbidity.

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