International Surgery Journal
*Reddy RRS et al. Int Surg J. 2017 Jan;4(1):166-169*
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20164380

**Original Research Article**

# A prospective comparative study of total extraperitoneal inguinal hernia repair: fixation versus without fixation of the mesh

**Raghu Rami Reddy S.*, Girish T. U., Sharath Chandra B. J.**

Department of Surgery, JSS Medical College and Hospital, Mysore, India

**Received:** 14 November 2016
**Revised:** 16 November 2016
**Accepted:** 19 November 2016

***Correspondence:**
Dr. Raghu Rami Reddy S.,
E-mail: raghuram6887@gmail.com



## ABSTRACT

**Background:** Mesh fixation during laparoscopic total extra-peritoneal (TEP) inguinal hernia repair is still controversial. Although many surgeons considered it necessary to fix the mesh, some published studies supported elimination of mesh fixation. Therefore, a randomized prospective comparative study was conducted in JSS Hospital to compare the postoperative pain, cost effectiveness and recurrence of fixation versus without fixation of mesh.
**Methods:** A randomized prospective comparative study was carried out in 30 patients who underwent laparoscopic TEP inguinal hernia repair with (Group A) or without (Group B) fixation of the mesh. The postoperative pain scores are analyzed and compared by visual analogue scale at 24hrs, 1 week, and 1 month in both groups. The recurrence rate is analyzed and compared by follow up of patients after 6months in both groups. The cost effectiveness is compared in both groups in monetary terms.
**Results:** Patients in whom the mesh was not fixed had less postoperative pain (median of VAS is 4 in group A and 2 in group B, $p \leq 0.0001$), mean lesser cost of surgery (Rs. 13135 in group A and Rs. 9245 in group B, $p \leq 0.0001$). No hernia recurrences were observed in either group (follow up period of 6months).
**Conclusions:** Elimination of fixation of mesh during TEP inguinal hernia repair significantly reduces the postoperative pain and cost of surgery and it does not lead to increased rate of recurrence.

**Keywords:** Comparison, TEP repair, With fixation of mesh, Without fixation of mesh

## INTRODUCTION

Inguinal hernias are the most common type of hernia. The incidence is about 25% in males and 2% in females. Inguinal hernia repair contributes significantly to general surgeon's workload.

Since the evolution of laparoscopic inguinal hernia repair, total extra-peritoneal repair (TEP) is the technique most commonly employed by laparoscopic surgeons. This technique involves placement of polypropylene mesh in the pre-peritoneal space. The issue of fixation of the mesh remains unresolved in TEP inguinal hernia repair. Surgeons have previously fixed the mesh using laparoscopic stapling devices, tacks, suturing techniques and recently adhesives. Fixation of mesh is done to prevent migration of mesh resulting in recurrence but many studies showed without fixation of mesh is not associated with any increased risk of hernia recurrence and however fixing the mesh not only increases the cost and duration of procedure but also can cause complications like post-operative pain.[1]

Taylor C et al conducted a study of laparoscopic inguinal hernia repair without mesh fixation, early results of a large randomized clinical trial and concluded that mesh

fixation in TEP is associated with increased operative cost and chronic pain but no difference in the risk of hernia recurrence at the end of 6 months.[2]

Koch CA, Greenlee SM, Larson DR, et al conducted a randomized prospective study of TEP inguinal hernia repair: fixation versus no fixation of mesh and concluded that elimination of tack fixation of mesh during TEP hernia repair significantly reduces the use of postoperative narcotic analgesia, hospital length of stay and development of post-operative urinary retention. Elimination of tacks does not lead to increased rate of recurrence.[3]

Tam KW, Liang HH, Chai CY, et al conducted a meta-analysis of RCTs; outcomes of staple fixation versus non-fixation in TEP inguinal repair and concluded that elimination of tack fixation of mesh in TEP repair is associated with decreased operative cost and significantly reduce operative time and in-hospital stay, but no difference in risk of hernia recurrence, complications, and postoperative pain.[4]

The objective of this study was analyze and compare the occurrence of postoperative pain, recurrence rate, cost of TEP inguinal hernia repair performed with and without fixation of the mesh.

## METHODS

Patients admitted in JSS Hospital, Mysore during October 2014 to March 2016 who will undergo TEP inguinal hernia repair were taken for the study.

### *Sample size*

30 patients divided into 2 groups, Group A: 15 with mesh fixation and Group B: 15 without mesh fixation. Duration of this study was October 2014 to March 2016. The design of this study was prospective comparative study. And purposive sampling.

### *Inclusion criteria*

Patients with all inguinal hernias who are willing for TEP.

### *Exclusion criteria*

- Patients who are not willing for TEP procedure
- Patients in whom general anaesthesia can't be given
- Patients who come with hernia recurrence after laparoscopic inguinal hernia repair.

### *Randomization*

The qualifying patients are informed of the risks and benefits of each operation and are asked to sign a detailed informed consent.

### *Selection of cases*

Following evaluation, patients were grouped into Group A (with mesh fixation) and Group B (without mesh fixation) accordingly as per the surgery chosen by the patient.

### *Procedure*

All the 30 patients were admitted and a detailed history and clinical examination was carried out as per written proforma. Preoperatively the patients were offered options of TEP inguinal hernia repair either without fixation of mesh or with fixation of mesh and were educated about the advantages, disadvantages, type of anaesthesia, and also the approximate cost of each of the procedure.

After taking consent for the procedure, the patient is investigated thoroughly. Following evaluation, once the patient is deemed fit for surgery, patients were grouped accordingly as per the surgery chosen by the patient.

A total of 30 patients were enrolled in this 18-month observational study and were divide into 2 groups of 15 patients each, in which one group had procedure done with mesh fixation (group A) and the other group had procedure done without mesh fixation (group B).

A dose of prophylactic antibiotic was given 30 minutes before surgery. Post operatively the patients were kept nil by mouth and advised complete bed rest till the effect of anesthesia is completely worn out, till then they are given supportive maintenance intravenous fluids. Patients were advised and encouraged to ambulate and start their activities of daily life as early as possible. Prophylactic oral antibiotics are given for duration of 5 to 8 days, of which parenteral antibiotics are given for at first 48 hours. Analgesics were given at 12 hour interval for a period of 3 to 5 days, shifted on to oral tablets as early as possible. The postoperative pain scores are analysed and compared by visual analogue scale at 24 hours, 1 week, and 1 month in both groups.

Pain intensity had been assessed by a visual analogue scale - VAS (0 (no pain) to 10 (worst pain)).

The visual analogue scale (VAS) is a subjective measure of pain. It consists of a 10cm line with two end- points representing 'no pain' and 'worst pain imaginable'. Patients are asked to rate their pain by placing a mark on the line corresponding to their current level of pain.

The distance along the line from the 'no pain' marker is then measured with a ruler giving a pain score out of 10. The score can be used as a baseline assessment of pain with follow-up measures providing an indication of whether pain is reducing or not. The recurrence rate is analyzed and compared by follow up of patients after 6

months in both groups. The cost of surgery is compared in both groups in monetary terms.

***Statistical methods***

At the end of the study the data was tabulated and analyses using rates, ratios and percentages. T - test was used for comparison.

## RESULTS

30 patients were randomized to each group

Group A: With fixation of mesh in TEP repair

Group B: Without fixation of mesh in TEP repair.

This Table 1 shows the median VAS score at postoperative day 1 in without fixation of mesh group was 2 compared to 4 in mesh fixation group. It infers that post-operative pain was significantly less in without fixation of mesh group compared to with mesh fixation group. Pain at duration of 1 week and 1 month is 0 in both groups.

**Table 1: Comparison of post-operative pain in two groups at different point of time.**

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | Without mesh fixation | | | With mesh fixation | | |
| | Mean | SD | Median | Mean | SD | Median |
| Pain 24 hours | 1.6 | 0.6 | 2.0 | 3.9 | 0.6 | 4.0 |

This Table 2 the mean cost of surgery in rupees in without fixation of mesh (Group B) group is less compared to with fixation of mesh (Group A). It infers that cost of surgery is significantly less in without fixation of mesh group compared to with mesh fixation group.

***Recurrence in both groups***

Group A: 15 Patients had no recurrence after 6 months of follow up.

Group B: 15 Patients had no recurrence after 6 months of follow up.

**Table 2: Comparison of cost of surgery in both groups.**

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | Without mesh fixation | | | With mesh fixation | | |
| | Mean | SD | Median | Mean | SD | Median |
| Cost of surgery Rs. | 9245.0 | 221.0 | 9125.0 | 13135.0 | 479.3 | 12875.0 |

P<0.0001.

## DISCUSSION

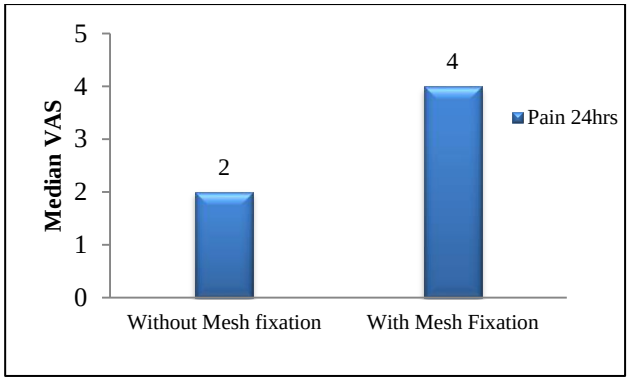
This is a prospective comparative study, comparing 30 patients who had undergone TEP repair for inguinal hernia, of which 15 had undergone mesh fixation with tackers and the other 15 without fixation of mesh.

In the present study post-operative pain, the median VAS score at postoperative day 1 in without fixation of mesh group B was 2 compared to 4, mesh fixation group A. This difference was statistically significant ( 4 versus 2, p value <0.0001) which is similar to the study conducted by Taylor C et al.[2] Pain at 1week and 1month is 0 in both groups.

P value is <0.0001

In the present study, the mean cost of surgery in rupees in without fixation of mesh (Group B) group is less compared to with fixation of mesh (Group A). Group B (Rs 9245) versus Group A (Rs 13125), p value < 0.0001. The cost of surgery in Group B was significantly less compared to Group A which is similar to the study done by Taylor C et al and Tam KW et al.[2,4]

In the present study none of the study groups had recurrence similar to the study conducted by Taylor C et al in which without fixation of mesh in TEP repair was not associated with an increased risk of hernia recurrence and also in the study done by Koch CA et al and Tam KW et al where there is no recurrence in any of the groups.[3,4]




p value is < 0.0001.

**Figure 1: Comparison of post-operative pain in two groups at different point of time.**

## CONCLUSION

The aim of laparoscopic inguinal hernia repair procedures is to decrease the post-operative complications and morbidity of the patient without any increased risk of hernia recurrence. This study compares the postoperative pain, cost of surgery and recurrence of hernia, after mesh fixation with tackers versus without mesh fixation in TEP inguinal hernia repair. TEP repair without mesh fixation shows advantages over mesh fixation, including lower incidence of complications such as post-operative pain, less cost of surgery and no increase in rate of hernia recurrence.

Hence our study favours the TEP inguinal hernia repair without mesh fixation which is better in postoperative pain and cost of surgery, and is not associated with an increased risk of hernia recurrence.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the institutional ethics committee*

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**Cite this article as:** Reddy RRS, Girish TU, Chandra BJS. A prospective comparative study of total extraperitoneal inguinal hernia repair: fixation versus without fixation of the mesh. Int Surg J 2017;4:166-9.