

# Comparison of Transabdominal Preperitoneal and Total Extra Peritoneal: A Prospective Study

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## Abstract

**Background:** Groin hernia surgeries have come a long way since knowledge of modern surgery. Among them, laparoscopic hernia repair is the advanced and better method in terms of cosmesis, bilateral repair, recurrent hernias.

**Aims and Objectives:** To compare operative time and post-operative pain in transabdominal preperitoneal (TAPP) and total extra peritoneal (TEP).

**Materials and Methods:** A total of 40 cases of groin hernia admitted in Sri Siddhartha Medical College, Tumkur, Karnataka, India, between 2013 and 2015 randomly picked for TAPP and TEP surgeries, assigning 20 for each, prospective analysis made results compared and evaluated using FISCHERS test and Chi-square test.

**Results:** Comparatively TEP repair took more time and TAPP repair had more pain.

**Conclusion:** No major complications in both procedures, laparoscopy repair has long learning curve which demands skills, TEP takes more time, and TAPP has more pain.

**Key words:** Duration, Pain, Total extraperitoneal, Transabdominal preperitoneal

## INTRODUCTION

No disease of human body, belonging to the province of the surgeon, requires in its treatment a better combination of accurate, anatomical knowledge with surgical skill than hernia in all its varieties.<sup>1</sup>

Sir Astley Paston Cooper's statement in 1804 still reverberates in the minds of surgeons. Groin hernias are the most common conditions referred to surgeons all over the world and over five lakh hernia repairs are performed annually.<sup>2</sup> The lifetime risk for men is 27% and for women is 3%.<sup>3</sup>

Since Bassini published his landmark paper on the technique of tissue repair<sup>4</sup> in 1887, numerous modifications have been proposed. There has been a revolution in surgical procedures for groin hernia repairs after the introduction of prosthetic material by Usher<sup>5</sup> in 1958.

Ger reported the first laparoscopic hernia repair in 1982 by approximating the internal ring with stainless steel clips.<sup>6</sup> The laparoscopic transabdominal preperitoneal (TAPP) repair was a revolutionary concept in the hernia surgery and was introduced by Arregui *et al.*,<sup>7</sup> and Dion and Morin<sup>8</sup> in the early 1990s. Laparoscopic groin hernia repair can be done by TAPP approach and also by total extra peritoneal (TEP) approach.<sup>9</sup>

The learning curve of laparoscopic repair of inguinal hernia has been made all the more steep because of lack of documentation of results with regard to patient satisfaction, post-operative pain, duration of stay in the hospital, complications and recurrence of hernia, hence making stratification of patients for either TEP or TAPP repair difficult.

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Our purpose in this study is to compare the results of laparoscopic hernioplasty by TEP technique and laparoscopic TAPP technique, and determine if the relative advantages achieved could be put in practice in large scale and also identify criteria which may help stratify the patient to a particular type of repair to obtain encouraging results for that particular patient. The aim of our study is to compare and assess the outcome between laparoscopic TAPP repair and TEP repair of inguinal hernia in terms of duration taken for procedures and post-operative pain.

## MATERIALS AND METHODS

This was a prospective study. This study consisted of 40 patients of inguinal hernia treated with laparoscopic hernia repair, 20 of whom were treated by laparoscopic TAPP mesh repair and the remaining 20 cases treated by TEP mesh repair of inguinal hernia in Sri Siddhartha Medical College and Hospital from October 2013 to March 2015 which included a minimum of 1 year of follow-up.

### Inclusion Criteria

1. Male Patients above 18 years of age
2. Unilateral inguinal hernia (proven by clinical examination and abdominal ultrasound)
3. Patients fit for laparoscopic hernia repair under general anesthesia.

### Exclusion Criteria

Patients with the following conditions are excluded from this study:

1. Female patients
2. Patients with recurrent hernia
3. Patients with bilateral hernia
4. Patients unfit for general anesthesia
5. Hernia with complications (irreducible hernia and strangulated hernia).

All the patients were admitted, and a detailed history and clinical examination was carried out as per written Performa. Preoperatively the patients were be offered options of either laparoscopic TEP or laparoscopic TAPP repair for inguinal hernia, and will be educated about the advantages, disadvantages, type of anesthesia, and also the approximate cost of each of the procedure.

After taking consent for the procedure, the patient is investigated thoroughly. Once the patient is deemed fit for surgery. A dose of prophylactic antibiotic was given 30 min before surgery. A Foleys catheter was inserted. Postoperatively the patients were kept nil by mouth and advised complete bed rest until the effect of anesthesia is completely worn out, until then they are given supportive

maintenance intravenous fluids. Foley's catheter is removed once the patient becomes ambulatory, usually on the first post-operative day. Patients were advised and encouraged to ambulate and start their activities of daily life as early as possible.

Analgesics were given at 12 h interval for a period of 3-5 days, shifted on to oral tablets as early as possible. Patients were observed for any complications such as subcutaneous emphysema, mediastinitis, CO<sub>2</sub> narcosis in the immediate post-operative period and hematoma, seroma, wound sepsis during their stay in the hospital and also assessed for post-operative pain and its severity.

Patients were discharged once free of complications and once they resumed their activities of daily normal life. Patients were discharged within the next day or within 48 h. At discharge, they were advised to come for stitch removal after 7-8 days (1<sup>st</sup> follow-up), and then after 1 week (2<sup>nd</sup> follow-up), and then after 1 month of surgery (3<sup>rd</sup> follow-up). Later on after 3 months of surgery (4<sup>th</sup> follow-up) and after 6 months after surgery (5<sup>th</sup> follow-up) and at 1 year (6<sup>th</sup> follow-up).

### Statistical Methods

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on mean  $\pm$  standard deviation (min-max) and results on categorical measurements are presented in number (%). A significance is assessed at 5% level of significance. Student's *t*-test (two-tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups Chi-square/Fisher Exact test has been used to find the significance of study parameters on a categorical scale between two or more groups.

## RESULTS

### Study Design

This prospective study consisted of 40 patients with diagnosis of inguinal hernia who were admitted to the surgical inpatient ward in Sri Siddhartha Hospital and Medical College, Tumkur and underwent laparoscopic hernioplasty during October 2013 to March 2015.

Total number of cases - 40

Number of laparoscopic (TEP) hernioplasty - 20

Number of laparoscopic (TAPP) hernioplasty - 20.

All cases underwent detailed pre-operative assessment and their pre-operative findings and post-operative complications were meticulously recorded as per protocol. The findings were tabulated and the following observations were made.

This comparative study with 20 patients undergoing laparoscopic TEP procedure and 20 patients undergoing laparoscopic TAPP procedure is undertaken to study the efficacy based on the duration of operation, and post-operative pain. Descriptive statistical analysis has been carried out in the present study.

Table 1 shows patients were aged between 20 and 60 years in laparoscopic TEP group with the mean age being  $41.6 \pm 10.2$  years.

Patients were aged between 20 and 60 years (in laparoscopic TAPP group, with the mean age being  $41.13 \pm 9.6$  years.

In TEP mesh repair group, as shown in Table 2:

- 10 (50%) right sided hernias
- 10 (50%) left side hernias.

And in laparoscopic TAPP mesh repair group there were as follows:

- 9 (45%) right sided hernias
- 11 (55%) left sided hernias.

Table 3 shows the mean operative time was 110 min for laparoscopic TAPP hernia repair and 125 min for laparoscopic TEP hernia repair.

Hence, the overall mean operative time was significantly less in laparoscopic TAPP repair than in laparoscopic TEP repair.

Table 4 shows a comparison of post-operative pain between laparoscopic TEP and laparoscopic TAPP hernia repair.

Post-operative pain was assessed using visual analog scale (score 1-10).

**Table 1: Age distribution of patients studied**

Age group	TAPP	TEP	Total
20-30	5	2	7
30-40	6	6	12
40-50	4	9	13
50-60	5	3	8
Total	20	20	40

Chi-square: 3.71,  $P=0.29$ , Interpretation: Not significant, TAPP: Transabdominal preperitoneal, TEP: Total extra peritoneal

**Table 2: Diagnosis**

Diagnosis	TAPP	TEP	Total
Right direct hernia	0	5	5
Left direct hernia	0	3	3
Right indirect hernia	9	5	14
Left indirect hernia	11	7	18
Total	20	20	40

TAPP: Transabdominal preperitoneal, TEP: Total extra peritoneal

Pain score in laparoscopic TAPP group:

- 6 patients (30%) with a score of <3 (mild pain)
- 10 patients (50%) with a score of 3-6 (discomforting) and
- 4 Patients (20%) with a score of >6 (distressing).

Pain score in laparoscopic TEP group:

- 12 patients (60%) with a score of <3 (mild pain)
- 8 patients (40%) with a score of 3-6 (discomforting)
- No distressing pain seen in TEP group.

The difference between the two groups was statistically significant. TEP group has less pain compared to TAPP group.

There were no major complications, but we had 12 patients with MINOR complications in our study.

There were 5 patients with minor complications in laparoscopic TEP group (25%).

There were 7 patients with minor complications in laparoscopic TAPP group (35%).

The complications observed in our study were as follows:

1. Hematoma - 4 cases
2. Seroma - 7cases.

Patients in laparoscopic TEP group has post-operative stay 4.4 days, when compared to laparoscopic TAPP group who took 4.65 days, with  $P = 0.7$  which is statistically insignificant.

## DISCUSSION

All the patients in our study were males. 55% of the population in the TEP group and 65% in the TAPP group,

**Table 3: Operative time**

Duration of surgery (min)	TAPP	TEP	Total
80-100	5	0	5
100-120	10	6	16
120-140	5	14	19
Total	20	20	40
Mean±SD	110.90±12.02	125.50±7.46	$P<0.0001$

SD: Standard deviation, TAPP: Transabdominal preperitoneal, TEP: Total extra peritoneal

**Table 4: Post-operative pain**

Post-operative pain (visual analog score)	TAPP	TEP	Total
<3	6	12	18
3-6	10	8	18
>6	4	0	4
Total	20	20	40
Mean±SD	4.45±1.7	3.3±0.98	$P=0.01$

SD: Standard deviation, TAPP: Transabdominal preperitoneal, TEP: Total extra peritoneal

which shows skilled people preferred laparoscopic repair of inguinal hernia than open with an average of 60% of total study population.

In our study, the mean operative time was 110 min for laparoscopic TAPP hernia repair and 125 min for laparoscopic TEP hernia repair.

Hence, the overall mean operative time was significantly less in laparoscopic TAPP repair than in laparoscopic TEP repair (Figure 1).

The operative time in various studies for laparoscopic TEP and laparoscopic TAPP repair is shown in Table 5.

The study by Hamaza *et al.*, has similar results to our study as long duration in TEP group when compared to TAPP group.

Pain score in laparoscopic TAPP group, 6 patients (30%) with a score of <3 (mild pain), 10 patients (50%) with a score of 3-6 (discomforting) and 4 patients (20%) with a score of >6 (distressing).

Pain score in laparoscopic TEP group, 12 patients (60%) with a score of <3 (mild pain), 8 patients (40%) with a score of 3-6 (discomforting) and no distressing pain in TEP group.

The difference between the two groups was statistically significant. TEP group has less pain compared to TAPP group (Figure 2).

The study conducted by Bansal *et al.*,<sup>13</sup> shows similar results.

There were NO MAJOR complications, but we had 12 patients with MINOR complications in our study. 5 patients in TEP (25%) and 7 patients in TAPP (35%).

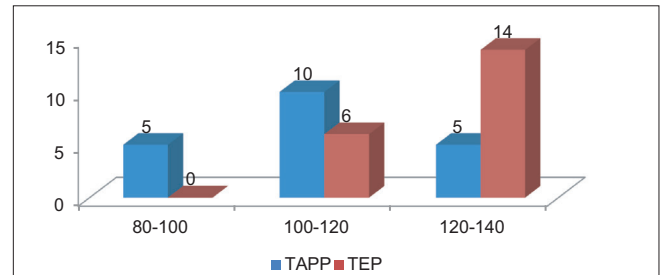
**CONCLUSION**

This study supports the view that laparoscopic TEP and TAPP mesh repair for inguinal hernia are safe and efficacious, as we did not encounter any major complications, which demanded conversion. However, comparatively TEP group showed superiority with respect to post-operative pain and early return to normal work. Although the duration of surgery (TEP) lasted little longer, still a long-term randomized control trials with enhanced sample size and reduced confounding factors are required to establish the absolute superiority of one technique over the other.

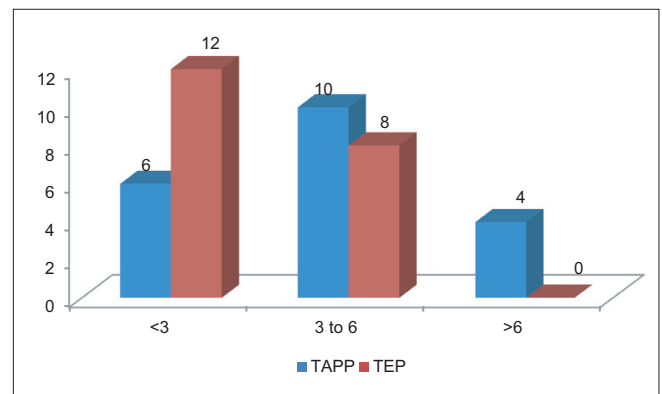
**Table 5: Operative time of different studies**

Study	Laparoscopic TEP hernia repair (in min)	Laparoscopic TAPP hernia repair (in min)
Leibl <i>et al.</i> <sup>10</sup>	56	66
Swanstorm, <i>et al.</i> <sup>11</sup> (n=158)	57	92
Hamaza, <i>et al.</i> <sup>12</sup> (n=25)	96.12	77.4

TAPP: Transabdominal preperitoneal, TEP: Total extra peritoneal



**Figure 1: Duration for performing procedures**



**Figure 2: Post-operative pain**

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