



A COMPARATIVE STUDY BETWEEN TOTALLY EXTRAPERITONEAL (TEP) AND TRANS ABDOMINAL PREPERITONEAL (TAPP) LAPAROSCOPIC INGUINAL HERNIA REPAIR TECHNIQUES

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Abstract

Objective: The study was undertaken to compare the efficacy, safety and patient satisfaction between the two techniques of laparoscopic inguinal hernia repair. **Methodology:** This was a comparative study carried out at a tertiary care hospital from August 2017 to July 2019. Diagnosis of inguinal hernia was made based on history and clinical examination and ultrasound scan of the abdomen. 50 patients enrolled in the study for laparoscopic hernia repair were equally divided into 2 groups, Group A - TEP group and Group B - TAPP group. Results: The outcomes were compared between both groups. The mean operative time required for TEP was 68 minutes and that for TAPP was 81 minutes. No major complications were noted in either TEP group or TAPP group. Minor complication rate was 28 % for Laparoscopic TEP group and 24 % for Laparoscopic TAPP group. The hospital stay in TEP was (2.36 ± 1.43) & that of TAPP was (2.32 ± 1.47) , so it was statistically not significant. **Conclusion:** Laparoscopic repair of inguinal hernia has a prolonged learning curve but once mastered it can be done with decreased operative time, early post operative recovery and faster return to work. TEP and TAPP both are methods of choice for Laparoscopic inguinal hernia repair and it is difficult to establish the superiority of one over the other. Choice between TEP and TAPP depends on the preference and proficiency of the individual surgeon.

Keywords: mesh repair, minimal access surgery, post operative pain, patient satisfaction.

INTRODUCTION

There are two types of laparoscopic repair of inguinal hernia namely laparoscopic Totally Extra-Peritoneal (TEP) repair and laparoscopic Trans Abdominal Pre-Peritoneal (TAPP) repair, both of which have evolved over a period of just two decades. Transabdominal preperitoneal (TAPP) repair requires access through the peritoneal cavity with placement of mesh through a peritoneal incision. In totally extraperitoneal (TEP) repair, the peritoneal cavity is not entered and mesh is used to seal the hernia from outside the peritoneum [1]. Numerous studies have been conducted but the conflicting results have further added to the lack of clarity on which method is superior [2-5]. The following study was done to compare the two methods of laparoscopic inguinal hernia repair based on various parameters such as intraoperative time, intraoperative complications, conversion rates, postoperative complications and recovery time and patient satisfaction in a local tertiary care hospital setting.

AIMS AND OBJECTIVES

The two groups were compared based on following parameters:

- 1) Complications of each procedure.
- 2) Post-operative pain. (VAS Score)
- 3) Conversion rates to open method.



- 4) Duration of operation.
- 5) Duration of stay in hospital.
- 6) Early Recovery to routine work.
- 7) Patient satisfaction.
- 8) Safety and efficacy of the procedure.

MATERIALS AND METHODS

The present study is a prospective study carried out with 50 patients at the Department of Surgery at GCS Medical College, Hospital and Research Centre, Ahmedabad between August 2017 and July 2019.

Inclusion Criteria:

- 1) Patient aged 18 years and above giving written valid consent.
- 2) Patients diagnosed as having unilateral or bilateral incomplete inguinal hernia.
- 3) Patients medically fit to undergo the procedure.

Exclusion Criteria:

- (1) Single or multiple previous lower abdominal surgeries;
- (2) Complicated inguinal hernia, i.e., irreducible, obstructed, or strangulated;
- (3) Recurrent hernias;
- (4) Uncorrected coagulopathies;
- (5) Patients unfit for general anesthesia.

The selected patients were divided into two groups-

Group A (25) - TOTAL EXTRAPERITONEAL (TEP),

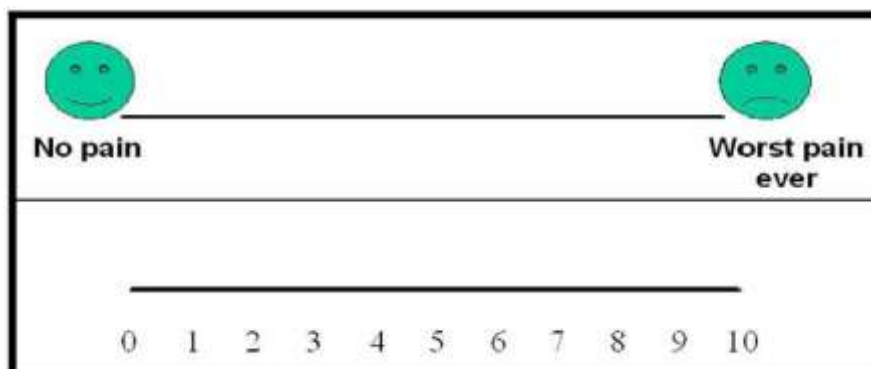
Group B(25) - TRANS ABDOMINAL PREPERITONEAL (TAPP).

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 anaesthesia 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 7 days, of which parenteral antibiotics are given for at first 24 hours. Analgesics were given at 12 hour interval for a period of 3 to 5 days, on first POD intravenous analgesics was given then shifted on to oral tablets. Patients were observed for any complications like subcutaneous emphysema, mediastinitis, CO2 narcosis in the immediate post-operative period and scrotal hematoma, seroma, wound sepsis during their stay in hospital and also assessed for postoperative 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 hours. At discharge they were advised to come for stitch removal after 1 week, (1st follow up), and then after 1 month (2nd follow up), and then after 6 month of surgery, (3rd follow up) and last 1 year (4th follow up).

Pain Assessment

On basis of mayo clinic pain assessment, the patients were asked direct and indirect question to assess the severity of pain at that particular instance at 6 hours, 24 hours, 1 weeks, 2 weeks, 4 weeks, 3 months, 6 months and 1 year. At initial level up to 24 hours the pain assessment was with the use of analgesia. The scale used was VisualAnalog Scale





Pain Score	Severity of pain
0-1	No pain
2-3	Mild Pain
4-5	Discomforting – Moderate Pain
6-7	Distressing – Severe Pain
8-9	Intense – Very Severe Pain
10	Unbearable Pain

To assess patient satisfaction, LIKERT SCALE was utilized. The patients were asked to grade their experience on a scale of 5 as follows:

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
(1)	(2)	(3)	(4)	(5)

All cases underwent detailed preoperative assessment; their preoperative findings and postoperative complications were meticulously recorded as per protocol in a pre structured proforma. The findings were tabulated and appropriate statistical tests were applied to arrive at the conclusion.

Statistical Methods

Mean, standard deviation were used as descriptive statistics. For Inferential statistics Chi-square test, Fisher's exact test, student t test were used.

OBSERVATIONS AND RESULTS

The mean age of patients in Group A: TEP group was 44.72 ± 13.19 years (Range from 18-70 years) and Group B: TAPP group was 43.04 ± 13.34 years (Range from 18-70 years).

Majority of the patients in both groups did not have any comorbidities. In Group A (TEP), hypertension was observed in 2 patients (8%). In Group B (TAPP), 20% had associated conditions; hypertension in 2, diabetes in 2 and BHP in 1 patient. There was no patient with COPD in either group.

In Group A, 48% had direct incomplete hernia and 52% had indirect incomplete hernia. In Group B, direct incomplete hernia was observed in 56% and indirect incomplete hernia was seen in 44%. (Table 1) Table 1: Types of Hernia

Type of Hernia	Group A		Group B	
	N	%	N	%
Direct Incomplete	12	48	14	56
Indirect Incomplete	13	52	11	44
Total	25	100%	25	100%

In Group A, 10 patients (40%) right sided Hernia, 12 (48%) had left side hernia and 3 (12%) had bilateral hernia. In Group B, 9 (36%) had right sided hernia, 12 (48%) had left sided Hernias and 4 (16%) had bilateral hernia.

There were no major complications, but 13 patients had minor complications in our study. (Table 2) There were 7 patients with minor complications in laparoscopic TEP group (28%). There were 6 patients with minor complications in laparoscopic TAPP group (24%). Incidence of minor complications were more in TEP, with $p=0.7470$.

Table 2: Minor complications

The minor complications observed in our study were as follows:		
	TEP	TAPP
• Surgical emphysema	1 case	1 case



• Port site infection	1 case	1 case
• Early transient groin pain	2 cases	1 case
• Haematoma	1 case	2 cases
• Seroma	2 cases	1 case

Table 3: Post-operative PAIN

Pain score according to VAS	Group A			Group B		
	Day 1	Day 2	DOD	Day 1	Day 2	DOD
No Pain	0	0	7	0	0	9
Mild Pain	0	17	18	0	18	16
Moderate Pain	18	8	0	20	7	0
Severe Pain	7	0	0	5	0	0

There was no statistically significant difference between two groups of patients on day 2, ($p=0.8415$) and on DOD ($p=0.6440$). (Table 3)

Table 4: Comparison of Operative Time (Minutes) Between the Group A and Group B

Duration of Time (Min)	Group A		Group B	
	N	%	N	%
51-60	7	28	2	8
61-70	5	20	3	12
71-80	8	32	5	20
81-90	2	8	7	28
91-100	2	8	7	28
101-110	1	4	0	0
111-120	0	0	1	4
Total	25	100%	25	100%

Mean operative time in our study is as follows (it was calculated from time of incision till the time of wound closure). (Table 4)

Mean operative time is significantly higher in TAPP (group-B) compared to TEP (group- A).

Operative Time	Group A	Group B
Average Duration	68.48 ± 13.65	81.52 ± 13.52
	Operative time is significantly less in TEP with $p<0.0001$	

Table 5 - Comparison of Post operative Hospital Stay

Hospital Stay	Group A		Group B	
	N	%	N	%
1-2	17	68	18	72
3-4	5	20	4	16
5-6	3	12	3	12
Mean	2.36 ± 1.43		2.32 ± 1.47	
Interference	Post operative hospital stay is same in both group which are statistical not significant $p=0.9227$			

In our study, the mean length of post operative hospital stay in TEP group was 2.36 ± 1.43 and in laparoscopic TAPP group it was 2.32 ± 1.47 with $p=0.9227$. (statistically non-significant). (Table 5)

The recurrence in both laparoscopic TEP repair group and in laparoscopic TAPP repair group was zero when followed up for a minimum of 6 months and with maximum follow up duration being 12 months.



Table 6 – Patients Satisfaction

Satisfaction	TEP (n=25)	T APP (n=25)
Strongly disagree	0	0
Disagree	0	0
Undecided	2	1
Agree	9	11
Strongly agree	14	13

14 patients (56%) in Group A and 13 patients (52%) were completely satisfied while overall 3 subjects were undecided. (Table 6)

Conversion of TEP to open was done in 2 subjects and in 1 subject in TAPP repair.

DISCUSSION

During the last several decades numerous innovative and creative techniques have been introduced in an effort to manage patients with inguinal hernia. Despite the development of many newer technologies including that of optics, the treatment of inguinal hernia by laparoscopic method has still eluded many of our patients.

The long learning curve of laparoscopic repair of inguinal hernia coupled with lack of proper documentation has and is delaying the proficient application of this procedure to the masses though several large published series have reported their experience with laparoscopic mesh repair of inguinal hernia.

In our study, the mean operative time was 81 minutes for laparoscopic TAPP hernia repair and 68 minutes for laparoscopic TEP hernia repair which is comparable to B. J. Leibl et Al [6] and Lee L Swanstorm et al [7]. The time difference is there as in TAPP repair peritoneal incision is required to enter the pre-peritoneal space so as to place the mesh followed by suturing the peritoneum for closure.

In group A on day one, 18 patients had moderate and 7 had severe pain. On day two, 17 patients with mild pain were discharged and remaining 8 patients were discharged between 3rd to 6th post-operative days. Whereas in group B on day one, 18 patients had moderate and 7 had severe pain. On day two, 18 patients with mild pain were discharged and the remaining 7 patients were discharged between 3rd to 6th post-operative days. Post op pain is statistically similar between the two groups of patients on day 2, ($p=0.8415$) and on DOD ($p=0.6440$) i.e. difference being statistically non significant.

There were 7 patients with minor complications in TEP group (28%) and 6 in TAPP group (24%). Incidence of minor complications were more in TEP, with p value=0.7470 not significant. We observed surgical emphysema and port site infection both in one patient in each group, early transient groin pain and seroma both in 2 cases in group A and 1 case in group B while haematoma in 1 case in group A and 2 cases in group B. All the complications resolved satisfactorily.

The conversion rate to open surgery in our study was 3 (two in Group A and one in Group B). Yassar Hamaza et Al [8] ($n=50$) and Lee L Swanstorm [7] ($n=158$) have both reported conversion of one case each of TEP and TAPP to open. Though conversion rate is higher in TEP group but the study population being small, no conclusive inference can be drawn from the observed conversion rates.

The mean post-operative hospital stay was 2.36 ± 1.43 for laparoscopic TEP repair hernia repair and 2.32 ± 1.47 for laparoscopic TAPP repair. The post-operative hospital stay is statistically similar between two groups with $p=0.9227$. However Yassar Hamaza et Al [8] and Palanivelu [9] have mean post operative hospital stay of only 1 day. Though the post-operative stay in our study was more, most of our patients were fit to be discharged on post-operative DAY 1. But because of the lack of adequate hospital facility available near the patient's residential area and coupled with the fact that our hospital is a tertiary centre that caters to many districts, most patients opted to stay in the hospital.

In our study, there was no recurrence in either TEP Repair or TAPP Repair. Recurrence in literature is almost always attributed to less experience and occurs early in the learning curve [10].

In our study, patient satisfaction in both groups is similar.



CONCLUSION

The significant difference between the two procedures is that the average operative time in patients undergoing TEP repair was less compared to TAPP group.

Hospital stay and recovery are similar in both groups. Though TAPP was associated with reduced postoperative pain score and less minor complications, the difference was statistically insignificant. There was no major complication in our study. Conversion to open surgery was observed more in TEP group. There was no recurrence in either the TEP group or TAPP group.

There are some limitations to this study. The sample size is not extensive enough to draw definitive conclusions. Also all the patients enrolled in the study were not operated upon by the same surgeon therefore operative outcome varied depending on the skill and experience of the operating surgeon. Lastly, as majority of the hospital supplies were subsidized, cost factor could not be evaluated in the study.

Our study shows that TEP and TAPP both are methods of choice for Laparoscopic inguinal hernia repair. TAPP forms an integral part of initial learning curve of laparoscopic inguinal hernia repair making it imperative to master it. As such both laparoscopic TEP and TAPP mesh repair of inguinal hernia are safe and efficacious, but long-term Randomised Control Trials with enhanced sample size and reduced confounding factors are required to establish the absolute superiority of one technique over the other.

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