

A Comparative Study of Totally Extraperitoneal (TEP) and Transabdominal Preperitoneal (TAPP) Inguinal Hernia Repair

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Abstract

Objective- To compare Totally Extra Peritoneal (TEP) repair with Trans Abdominal Pre Peritoneal (TAPP) repair of inguinal hernia. To compare the operative time, technique, intraoperative and postoperative complications of TEP and TAPP repair of uncomplicated inguinal hernia.

Material And Methods: The study is prospective & randomized clinical trial in nature. A sample of size 60 was studied in the DEPARTMENT OF SURGERY, at the SUBHARTI MEDICAL COLLEGE, MEERUT. The sample size was calculated by using the formula $n=4\sigma^2/L^2$. where σ^2 =variance of sample observations and L^2 = least permissible error. In our study, the variance was maintained 1.36 & least permissible error was fixed at .02 (2%) The Patients, who underwent LAPAROSCOPIC REPAIR OF GROIN HERNIA between 1st May, 2016 and 31st March, 2018 were randomized to either TEP or TAPP repairs. The two types of surgical methods were analyzed by making the frequency tables of 60 patients. The significant difference b/w TEP & TAPP surgeries was observed by **un-paired/student's "t" test** at .01 level of significance. The p- value less than .01 was considered as significant .i.e. $P < .01$. Further, all the statistical analysis was done by using S.P.S.S. software 23.0 version.

Result- In this study out of 60 patients, 37 patients were treated by TAPP surgery and 23 patients were treated by TEP. Out of which all patients are male and all are unilateral hernia. Out of 60 patients study shown, 23 patients was of TEP. study showed the duration of stay of hospital in both TEP and TAPP is 3 to 4 days. In our study the cost of TEP and TAPP was 10200 and 11050 respectively. There was significantly mild pain following TAPP repair; however, the pain was comparable in both TEP and TAPP. Preoperative pain and immediate postoperative pain had significant correlation with pain. Significant improvement from preoperative to postoperative quality of life was seen in both TEP and TAPP repairs, but there was no difference between TEP and TAPP in postoperative period. Time to return to normal activity also was similar between the two group. In our study there is no vas deferens injury, no bladder injury, no bleeding and no bowel injury.

Conclusion— The both type of surgeries are safe. However in TEP and TAPP surgeries, cost factor is less for TAPP and operative time increases for TEP surgery. The TEP and TAPP techniques of laparoscopic repair of inguinal hernia have comparable long-term outcomes in terms of incidence of chronic groin pain, quality of life, and resumption of normal activities. However, in many study TEP surgery was associated with significantly higher incidence of early post-operative pain having longer operative time and cord edema, whereas TAPP was associated with a significant higher incidence of SEROMA formation. But in this study no SEROMA formation and pain was not significant. The cost was comparable between the two types of surgeries.

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I. Introduction

Groin hernia repair is one of the most common elective general surgical operations. Yet there has been no universal consensus on the ideal repair which would overcome the potential problems of wound infection, recurrence and chronic groin pain. The last two centuries has seen number of procedures being described for the repair of inguinal hernias beginning with the Marcy's repair, the milestone Bassine's repair to the present era of laparoscopic inguinal hernia repair. However minimal access approaches to inguinal hernia repair have added to

the ongoing debate over the ‘best groin hernia repair’ 2,3.

The advantages of minimal access technique include less pain in the early postoperative period, lower narcotic and non narcotic analgesic requirement, better cosmetics, early return to normal activity and total absence of wound related problems. 2,3

There are two standardized techniques of laparoscopic inguinal hernia repair, Trans Abdominal Pre Peritoneal repair (TAPP) described by Arregui⁵ in 1992 and Total Extra Peritoneal repair (TEP) described by Mckeman and Laws⁶ in 1993 TAPP is relatively easy to learn, bur with the disadvantage that peritoneal cavity is breached^{7,8}.

Vascular injuries and deep/mesh infections were and there was no obvious difference between the two groups. However there was only one RCT¹ comparing TAPP and TEP which reported no statistically significant difference between the two when considering duration of operation, hematoma, length of stay, time to return to usual activities, and recurrences. There have been no literature on the learning effects and cost difference between the two techniques. Thus there is a scarcity of data comparing the

The present prospective randomized controlled trial was designed to compare the TEP and TAPP techniques of laparoscopic inguinal hernia repair in terms of operative complications and follow up.

Aims & objectives

1. To compare Totally Extra Peritoneal (TEP) repair with Trans Abdominal Pre Peritoneal (TAPP) repair of inguinal hernia
2. To compare the operative time, technique, intraoperative and postoperative complications of TEP and TAPP repair of uncomplicated inguinal hernia.

Methods

This prospective randomized study was conducted in the Department of Surgery at the Subharti medical college ,Meerut. Patients who underwent laparoscopic repair of groin hernia between 1st May, 2016 and 31st March, 2018 were randomized to either TEP or TAPP repair.

Method of randomization

Random numbers were obtained from the web site www.randomization.com. The patients were randomized into two groups, Group I as TEP and Group II as TAPP.

Inclusion Criteria

1. Patients with uncomplicated primary inguinal hernia (Photograph 1)

Exclusion Criteria

1. Single or multiple previous lower abdominal surgeries.
2. Complicated inguinal hernia – irreducible, obstructed or strangulated hernias.
3. Recurrent hernias.
4. Uncorrected coagulopathies.
5. Patients unfit for general anesthesia.
6. Patients with diabetes, hypertension, COAD, CAD

Patient data collected regarding:

Age, gender, complaints, past-surgical history, history of alcoholism,diabetes. Blood investigations and Xrays& and other radiological modalities performed were added. Complications if developed were assessed in detail and management of the same and the further complications were followed up.

II. Result

1-Gender Wise Distribution

S.NO.	TYPE OF SURGERY	MALES
1	TAPP(37)	37 (61.67%)
2	TEP (23)	23 (38.33%)
	P- VALUE (Z-SCORES DOUBLE SAMPLE TEST)	.0013* P<.01 (SIG.)

2-Site of Swelling

S.NO.	TYPE OF SURGERY	SITE OF SWELLING	
		LEFT GROIN	RIGHT GROIN
1	TAPP(37)	17(45.95%)	20(54.05%)
2	TEP (23)	18(78.26%)	5(21.74%)
	P- VALUE (Z-SCORES DOUBLE SAMPLE TEST)	.0908 P>.01 (N.S.)	.0002 P<.01 (SIG.)

5-Intra--Operative Complications

S.NO.	TYPE OF SURGERY	INTRA OPERATIVE COMPLICATIONS							
		BLEEDING		BLADER INJURY		INJURY TO VAS DEFRENS		BOWEL INJURY	
		A	P	A	P	A	P	A	P
1	TAPP(37)	37 (100%)	0	37 (100%)	0	37 (100%)	0	37 (100%)	0
2	TEP (23)	23 (100%)	0	23 (100%)	0	23 (100%)	0	23 (100%)	0
	P- VALUE (Z-SCORES DOUBLE SAMPLE TEST)	----	----	----	---	---	---	--	--

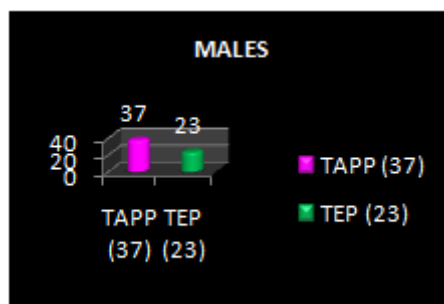
WHERE A= ABSENT, P= PRESENT

6-Pain Scores

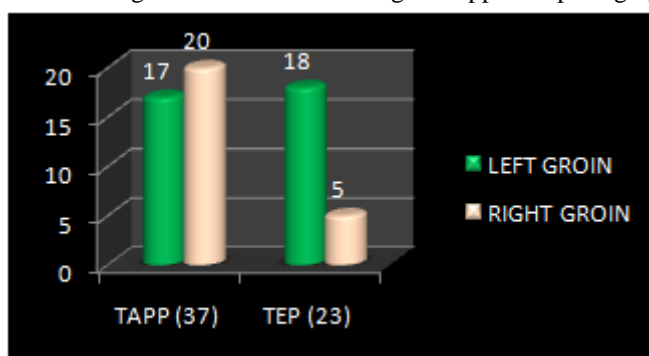
S.NO.	TYPE OF SURGERY	PAIN	
		MILD	MODERATE
1	TAPP(37)	37(100%)	0(0%)
2	TEP (23)	20(86.96%)	3(13.04%)
	P- VALUE (Z-SCORES DOUBLE SAMPLE TEST)	.0001 P<.01 (SIG.)	.0002 P<.01(SIG.)

Graphs

The Bar Diagram Of Gender Wise Distribution In Tapp & Tep Surgery

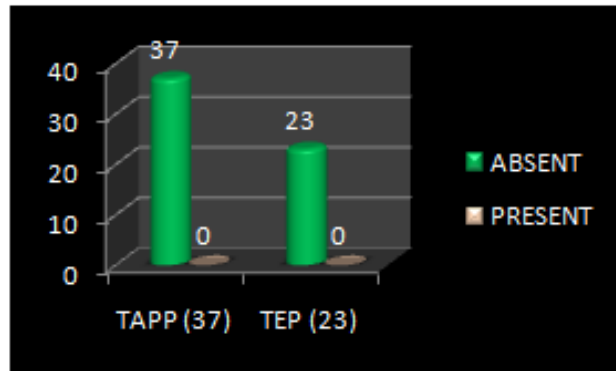


The Bar Diagram Of Site Of Swelling In Tapp & Tep Surgery

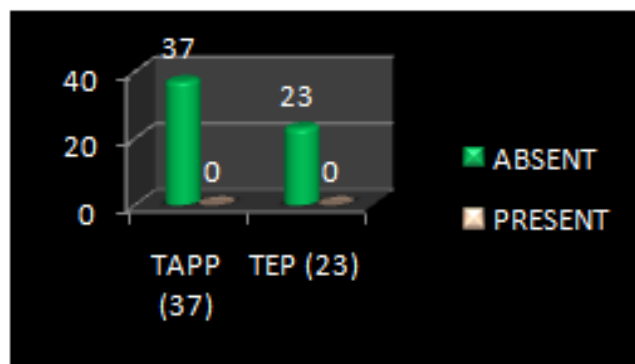


The Bar Diagram Of Different Intraoperative Complications In Tapp & Tep Surgery

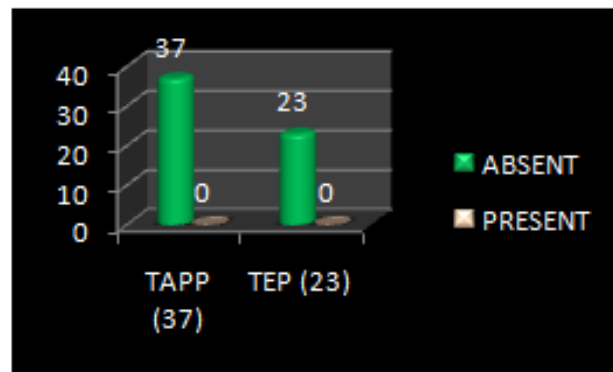
1--Bleeding



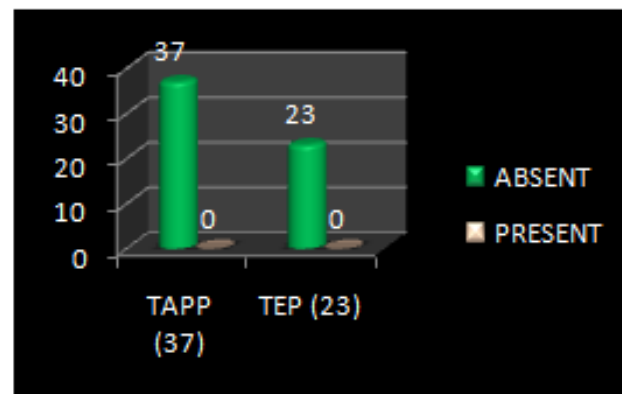
2-- Bladder Injury



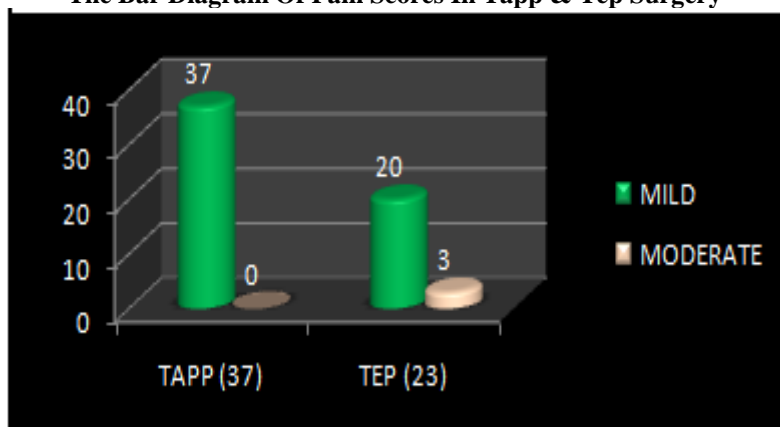
3--INJURY TO VAS DEFERENS



4--Bowel Injury



The Bar Diagram Of Pain Scores In Tapp & Tep Surgery



III. Discussion

Inguinal hernias are common, with a lifetime risk of 27% in men and 3% in women.⁷² Today, inguinal hernia repair is one of the most common operations performed by general surgeons..³

Laparoscopic repair is technically more difficult than open repair and there is evidence of a 'learning curve' in its performance. It is likely that some of the higher rates of potentially serious complications reported for laparoscopic repair are associated with learning curve effects, particularly for the more complex TEP repair. The present prospective randomized study compared TEP and TAPP repair of inguinal hernia.

Bowel Injury

Studies have reported intra-operative bowel injury up to 0% - 0.06% in laparoscopic hernia repair. In the Cochrane database (1) review seven studies reported visceral injuries. In the comparative studies, two reported no visceral injuries whilst two reported a higher rate in TAPP than in TEP. In the three case series, the two TAPP series reported similar rates (0.64% and 0.6%) of visceral injuries whilst the one TEP series reported a lower access phase of laparoscopy. Small bowel is the most frequently injured segment (56%). The injury can be repaired intraoperative if the operator is experienced.

In our study there is no bowel injury.

Bleeding

For TAPP, secondary bleeding was less common [OR = 0.734 (0.539; 1.000), $p = 0.05$]. For a total secondary bleeding rate of 0.94 %, that complication would thus occur in eight out of every 1000 TAPP patients and in 11 out of every 1000 TEP patient.⁵

usually bleeding present in intraoperative period. At the high end of the dissection always a vessels veins is coagulated with bipolar ,diathermy to prevent bleeding. In our study no significant bleeding present.

Injury to vas deferens

- The injury to vas deferens is around 0.3% in adults and 0.8% -2% in children.
- In our study there is no injury to vas deferens reported.⁽¹⁰⁾

Seroma

Seroma is one of the common postoperative occurrences after laparoscopy inguinal hernia repair. Because it mimics a postoperative recurrence of hernia, seroma has been a concern to patients. The reported range of seroma formation in the literature after TEP repair is between 0.5 and 12.2% and for TAPP between 3.0 and 8.0%.⁶

In our study no seroma formation seen. 11.

Scrotal Edema

Scrotal edema following laparoscopic hernia surgery is a common complication. The incidence of scrotal edema was significantly higher in TAPP group (34%) as compared to the TEP group (9.4%) in our study , the difference being statistically highly significant ($P < 0.001$) The incidence of scrotal edema has been reported to be around 17.8 % in TEP repair. In our study no scrotal edema seen.

In that study shows Postoperative complications [OR = 2.323 (1.882; 2.866); $p < 0.0001$] were noted more often after TAPP. For a postoperative complication rate of 3.1 %, this would amount to around 43 out of

every 1000 patients operated on with TAPP and to 19 out of every 1000 patients operated on with the TEP technique.⁵

Pain ---

Pain is the most common complaint after hernia surgery. In there was no difference in pain score at six hours and one week on VAS between the present study the two study groups. However the pain score on VAS was higher in TAPP group one hour after surgery (1.98 versus 2.79) ($p=0.0001$), at 24 hours (1.09 vs 1.83) ($p=0.007$), at 6 weeks (1.09 vs 1.450 $p=0.001$) and at 3 month (0.96 vs 1.280($p=0.0001$)). Thus TAPP was associated with significantly more pain in the post operative period and in the follow up. However the overall pain scores for laparoscopy was < 2 on VAS in the entire study which was not significantly high. At 6, 12 and 18 months follow up patients in both the group had negligible pain and the difference was statistically not significant. There has been no study in literature comparing the pain scores between TEP and TAPP. Lau et al. studied acute pain after TEP. Analysis was done to identify the significant independent factors affecting pain.

Operative Time

The important issues regarding operative time centers on surgeons' experience and cost of the procedure. It is possible that operative time may be longer for TEP compared with TAPP because of the difficult anatomical orientation required and longer learning curve. However there have been no randomized trials in literature longer comparing the operative time between the two groups.

We compared the operative time between TEP and TAPP and found longer mean operative time for TAPP (71.13 in Group I versus 85.32 minutes in Group II) however the difference was statistically not significant. The reason for longer operative time for TAPP in our study could be due to the time taken for suturing to the peritoneum to cover the mesh and this, on an average, took about 8-9 minutes.

Costs And Cost-Effectiveness

No study in literature re laparoscopic inguinal hernia repair nor has there been any study to compare the cost difference between TAPP and TEP.

In our study cost analysis was done by integration of all operative, hidden and indirect costs. The cost incurred was calculated by the sum total of the cost of consumables, the cost of mesh and OT time cost. The cost of consumables and OT time was taken from a previous study done to calculate the cost of laparoscopic surgery (by Department of Hospital Administration in our institute in July 2016).

There was no significant difference in the average cost incurred between the both the groups.

Cost of tap 10200 and tep 11050 her p value is p 0.0022

Patient Satisfaction

Patient satisfaction is comparable in both groups.

Both (TEP and TAPP) groups of patients post operative periods are an eventful

Patient are satisfied in both groups.

IV. Conclusion

In the present study TEP and TAPP had similar learning curve as borne out from the performance of the procedure, operative time, postoperative complications and follow - up outcome. In the hands of both experienced surgeon as well as surgeons during the learning curve, the result of both the repairs seemed equally effective. both are safe and equally beneficial in experience hand.

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