Original article

Comparison of Totally Extraperitoneal versus Transabdominal Preperitoneal repair of inguinal hernias

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Abstract

Introduction: Laparoscopic inguinal hernia repair is a tension-free mesh repair that is based on pre-peritoneal approach of repair. It provides mechanical advantage to the surgeon, by being able to place a large piece of mesh and by using the natural force of the abdominal wall to disperse the intra-abdominal pressure over a large area to support the mesh. This retrospective study is aimed to study the demography of inguinal hernia and to compare operating time, complications and post-operative pain between patients undergoing Total Extrapritoneal (TEP) or Transabdominal Preperitoneal (TAPP) repair.

Methods: A retrospective comparative study was conducted in patients with inguinal hernia who underwent laparoscopic repair by either TEP or TAPP, between April 2019 to July 2020 at Nobel Medical Collage Teaching Hospital, Biratnagar, Morang. Age, sex, type of hernia, duration of operation, post-operative complications, severity of pain and duration hospital stay were analyzed between two groups of patients undergoing surgery by either TEP or TAPP.

Results: One hundred and five patients underwent either TEP or TAPP during study period. There were 96 males and 9 females. There were 50 patients with right, 40 with left and 6 patients with bilateral inguinal hernia. Four patients had left sided irreducible inguinal hernia, 2 patients had bilateral recurrent inguinal hernia, 2 patients had right sided recurrent inguinal hernia and 1 patient had left sided recurrent inguinal hernia.
There was significant difference in duration of operation (TEP 64.43min) / (TAPP 84.46min), p<0. 001. Total duration of hospital stay and post-operative pain were not significant between patients operated with TEP or TAPP. Accidental pneumoperitoneum was noticed in 8 cases, 10 case of subcutaneous emphysema, 5 cases of seroma and 1 case of scrotal hematoma in TEP group. In TAPP group scrotal hematoma occurred in 4 cases and seroma in 5 cases which was not significantly different from TEP group.

Conclusion: TAPP had significantly longer operating time as compared to TEP. However, there was no significant difference in post-operative pain and hospital stay in both group.

Keywords: Inguinal hernia; Laparoscopic hernia repair; TAPP; TEP

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Introduction

Inguinal hernia repair is one of the most commonly performed surgical procedures. Over a hundred years the various methods for inguinal hernia repair had very few changes till the introduction of synthetic mesh. Three decade ago, the first study was published comparing the two minimally invasive surgical techniques TEP (Total Extra-peritoneal) versus TAPP (Trans Abdominal Pre-peritoneal) for surgical repair of inguinal hernia. Since then, many other studies have been published but the findings are contradictory. The operation related results for TEP and TAPP were similar in systematic reviews/meta-analyses and the superiority of one method over another could not be demonstrated.[1]

The purpose of this study is to compare these two procedures in terms of various parameters duration of operation, post-operative complications, severity of pain and duration hospital stay.

Methods

This retrospective comparative study (April 2019 to July 2020) was conducted in all patients above the age of 18 years who underwent laparoscopic/endoscopic inguinal hernia repair at Nobel Medical Collage Teaching Hospital, Nepal. The study protocol was approved by the Institutional Review Board. The inclusion criteria for the study were as follows: (1) Patients who underwent surgery for inguinal hernia via TEP or TAPP. (2) All patients above the age of 18 years (3) ASA grade 1 or 2. Patients with complicated inguinal hernia, those undergoing simultaneous other abdominal procedure and those whose surgical procedure was converted into open repair were excluded.

In the study the following parameters were assessed: age, sex, type of hernia, type of operation, duration of surgery, complication rate, postoperative pain and total duration of hospital stay. The pain was measured qualitatively by using a visual analog scale. The intra-operative and post-operative complications were noted in a proforma during the hospital stay and in the follow up visits.

Both TAPP and TEP were done by standard procedural guidelines, under general anesthesia. Three trocar techniques were used. In TEP all 3 trocars were introduced in midline and initial space creation was done with 0-degree Telescope and later changed to 30-degree telescope. In TAPP, supraumbilical optical port and two 5mm working ports were introduced, at the level of optical port on side of hernia and slightly lower on the contralateral side. Non-absorbable prolene mesh of size 15 X 10 cm was used in all cases and fixation done with non-absorbable tackers. One to two tackers were used in TEP and 3 to 4 Tackers in TAPP method. Mesh was secured in place by fixing it to pubic tubercle and anterior abdomen wall muscles. In TAPP the peritoneum was closed by continuous vicryl 2-0 suture.

The collected data was verified and entered in Microsoft excel 2007. The statistical analysis was performed using Statistical Package for the Social Sciences (SPSS version 25) for statistical analysis. Data were expressed as number (percentage) or the mean (standard deviation). For inferential statistics chi square and independent T-test was applied on variables at 95% confidence interval where the level of significance is equal to 0.05 (P value <0.05).

Results

A total of 105 cases were studied out of which, 96 (91.4%) were male, nine (8.6%) were female and of age group 18 to 84 year (**Table1, Figure 1**). The mean age of the patients in the study was 51years for TEP and 47 years for TAPP. There were 50 patients with right, 40 with left and six patients with bilateral inguinal hernia. Four patients had left sided irreducible inguinal hernia, two patients had bilateral recurrent inguinal hernia, two patients had right sided recurrent inguinal hernia and one patient had left sided recurrent inguinal hernia. (**Table 1, Figure 1**)

Table 1. Demographic and surgery-related parameters

Demographic parameters	TEP	TAPP	P values
Age			
Years ± SD	51.02 ± 17.35	47.96 ± 19.29	0.395
Range	18 – 79	18 – 84	
Sex			
Male	50 (94.3%)	46 (88.5%)	0.282
Female	03 (5.7%)	06 (11.5%)	

Out of 105 patients operated, TEP was done in 50 male and three female patients and TAPP was done in 46 male and six females.

A total of 53 patients underwent TEP, 52 had undergone TAPP, and among them in three patients bilateral TAPP, in five bilateral TEP were performed. two patients who underwent TEP had recurrent hernia. (**Table 2**)

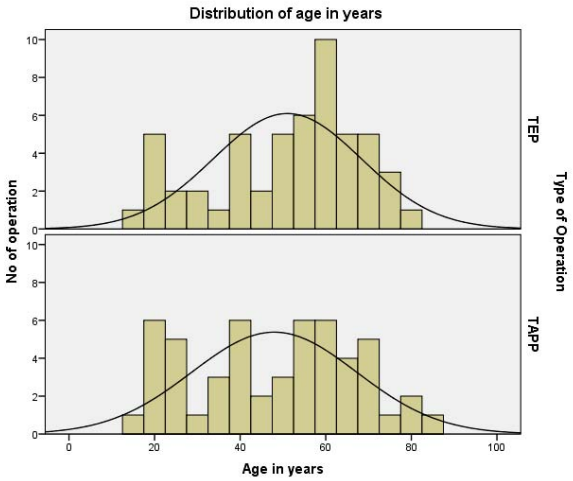

Figure 1. Age in years between TAPP and TEP

Table 2. Types of Hernia

Diagnosis	TEP	TAPP	Total
B/L Inguinal hernia	3	3	6
B/L Inguinal hernia (Recurrent)	2	0	2
Lt. sided Inguinal hernia	27	13	40
Lt. sided irreducible Inguinal hernia	2	2	4
Lt. sided recurrent Inguinal hernia	0	1	1
Rt. sided Inguinal hernia	19	31	50
Rt. sided recurrent Inguinal hernia	0	2	2
Total	53	52	105

Mean Duration of operation for TAPP 84.46 min and TEP was 64.43 min, (p<0.001). Mean duration of hospital stay 3.15 days for TAPP and 3.00 days for TEP (p=0.151). (**Table 3**)

Table 3. Length of hospital stay and duration of operation in TAPP and TEP

Variables	Mean	SD	Min	Max	Median	*p*
Length of stay (days)						
TAPP	3.15	0.78	3	7	3.00	0.151
TEP	3.00	0.00	3	3	3.00	
Duration of operation (Min)						
TAPP	84.46	21.93	50	150	86.00	<0.001
TEP	64.43	13.42	51	100	60.00	

Post operative pain scoring was done using visual analogue scale, in 6 hrs, 12 hrs and 24 hrs. (**Table 4)**

Table 4. Visual analogue scale in TAPP and TEP

VAS	Median (IQR) (Min – Max)		
	6HR	12HR	24HR
TAPP	7 (6 – 8) (5 – 8)	4 (4 – 5) (3 – 6)	2 (2– 3) (2– 4)
TEP	7 (6 – 8) (5 – 9)	5 (4 – 5) (3 – 6)	2 (2– 3) (2– 3)
P Value	0.283	0.627	0.791

Accidental pneumoperitoneum was seen in eight cases of TEP and 0 in TAPP (p=0.006). Subcutaneous emphysema in TEP was 10 and TAPP 0 (p<0.001). In both TEP and TAPP five cases of seroma were seen. Scrotal hematoma was seen four in TAPP and one in TEP. (**Table 5**)

Table 5. Complications in TAPP and TEP

Complication	TEP	TAPP	P values
Accidental pneumoperitoneum	8 (15.1%)	0 (0.0%)	0.006
Scrotal hematoma	1 (1.9%)	4 (7.7%)	0.163
Subcutaneous emphysema	10 (18.9%)	0 (0.0%)	<0.001
Seroma	5 (9.4%)	5 (9.6%)	0.975

Discussion

Laparoscopic approach for inguinal hernia repair has less chronic postoperative pain and numbness, faster return to normal activities, and decreased incidence of wound infection and hematoma, so it should be considered an appropriate approach for inguinal hernia surgery.[2, 3] But between the two types of laparoscopic hernia repairs i.e., TEP and TAPP repair, there has been always debate as to which procedure is more effective than the other.

The European Hernia Society has recommended that laparoscopic approach is the preferred method for female hernias, because the chances of finding a femoral hernia is better and repair of the defect with the pre-peritoneal mesh placement is better.[4] The incidence of bilateral inguinal hernia has been variably reported in literature. Reports from cross sectional and cohort studies of adult patients report an incidence of bilateral hernia up to 6% when clinical examination alone was used for diagnosis.[5] TAPP has led to an increase in the detection of incipient contralateral hernias.[6] A 20% increase in detection rates has been reported with use of laparoscopy over and above routine clinical examination.[7]

Most of the cases in our study, who underwent either TEP or TAPP were male and few (nine) were female. In our study routine clinical contralateral examination was done and only eight cases of bilateral inguinal hernia were found. Intra-operative exploration was also done in TAPP and total case of bilateral inguinal hernia remains same. In our study 32 were direct and 73 were indirect hernias.

In our study there was significant difference in duration of operation (TEP 64.43 min) / (TAPP 84.46 min), p<0.001 that was similar to results of the study done by F. Köckerling et al.[1] In their study, the mean duration of operation for the TAPP technique was 52.62 ± 23.58 min and for TEP technique at 48.58 ± 21.52 mins, was significantly lower. In contrast, in the single center-based study done by Tulin A et al the mean surgery time for TAPP was 52 min and for TEP it was 62 min.[8]

In our study, total length of hospital stay and post-operative pain were not significant between patients operated with TEP or TAPP, and the findings were similar compared to the study done by F. Köckerling et al.[1] In the prospective study done by M Gass et al., duration of operation was longer for

Figure 2. Three ports with veress needle (black arrow)

patients undergoing TEP (TEP 80.3 vs. TAPP 73.0 min, p < 0.0023) while postoperative length of hospital stay was longer for patients undergoing TAPP (TEP 2.6 vs. TAPP 3.1 day, p = 0.0145).[9]

In our study, accidental pneumoperitoneum was noticed in eight cases, which was managed by inserting veress needle in TEP group. (**Figure 2**). There were 10 cases of subcutaneous emphysema, five cases of seroma and one case of scrotal hematoma in TEP. Similarly in TAPP group we had scrotal hematoma in four cases and seroma in five cases.

All the post operative complications were managed conservatively except one case of TEP in which pig tail catheter was inserted to drain seroma. Two cases of large inguinal hernia which were converted to open surgery were excluded from our study. No significant difference between TAPP and TEP procedure was present regarding seroma formation.

F. Köckerling et al., in their study noted more complications within the first 30 post surgical days in the TAPP group (3.97 %; p < 0.0001). These were mainly due to the significant difference in the postoperative seroma rate (TEP 0.51 % vs TAPP 3.06 %; p < 0.001.[1]

Lau et al found that significant clinical factor associated with seroma formation included old age, large hernia defects, an extension of the hernia into the scrotum and the presence of a residual distal indirect sac.[10]

In both group there was no major vascular and bowel injuries which may be due to better experience in laparoscopic surgery. There was no significant difference in the post-operative pain scoring between TEP and TAPP group. One of the major advantages of laparoscopic repair of inguinal hernia is a substantial reduction in postoperative pain. Most of the previous studies are in favor of similar pain sources in the immediate postoperative period in both TEP and TAPP procedures.[11, 12]

There are certain limitations of this study. Being a retrospective study selection and information bias cannot be ruled out. This study is a single institute study and has relatively small sample size, hence the findings cannot be generalized.

Conclusion

TAPP had significantly longer operating time as compared to TEP. However, there was no significant difference in post-operative pain and hospital stay in both group.

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