

To Evaluate the Safety and Efficacy of the ETEP Technique in Treating Inguinal Hernias

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Abstract

Background: Inguinal hernia (IH) refers to the abdominal void protrusion via the inguinal canal. Tension-free hernioplasty (OTFH) is the standard procedure for effective treatment. Laparoscopic totally extraperitoneal prosthesis (TEP) is a novel procedure obviates the need for the opening of the patient's abdominal cavity and allows for a direct operation on the patient's anterior peritoneal space with benefits less pain, faster recovery, and a lower risk of complications. **Methods:** Prospective study conducted at Department of General Surgery, Government Medical College, to evaluate the safety and efficacy of the ETEP technique in treating inguinal hernias from 1stAugust 2023-31stJuly2024 with sample size of 50 subjects. **Results:** Primary and incisional hernia was revealed in 56% and 44% of the subjects respectively. Most of the subjects had unilateral hernia (92%). Mean operative time was 121.48±18.97minutes. Mean VAS was 4.8 after 12 hrs of surgery. Mean hospital stay after surgery was 1.2±0.4days. Mean duration to return back to work after surgery was 9.5days. No complication was reported among the study subjects. **Conclusion:** e-TEP technique is striking among all surgical approaches for laparoscopic hernia repair. eTEP approach gives a wide area to negotiate around and conclude the procedure, thus taking out the shortcomings of TEP/TAPP in inguinal hernias.

Keywords: Inguinal hernia, Trans abdominal pre-peritoneal (TAPP), Total extra peritoneal (TEP), Hernioplasty.

Introduction

A hernia is a protrusion of viscus or a portion of a viscus through an abnormal opening in the walls of its containing cavities. Inguinal hernia (IH) refers to the abdominal void protrusion via the inguinal canal. The inguinal, femoral, and umbilical hernias, which account for 75% of instances, are the most frequent types of external abdominal hernia [1]. According to estimates, the incidence of abdominal wall hernias is 1.7% for people of all ages and 4% for people over 45 [2,3]. Despite the unclear etiology, the associated epidemiology suggests that an inguinal hernia is primarily associated with abdominal wall weakness and increased intra-abdominal pressure. There are various causes for the disease onset, such as dysplasia of the groin, aging, poor growth, malnutrition, abdominal metabolism, or previous lower abdominal surgery [4]. The mainstay of diagnosis of IH is a clinical examination, and symptoms are typically suggestive. but recent Tension-free hernioplasty (OTFH) is the standard procedure for effective treatment, clinical data show that it has many postoperative complications and a high recurrence rate [5,6]. Laparoscopic totally extraperitoneal prosthesis (TEP) is a novel procedure first proposed by McKernan et al. in 1992 [7,8]. Compared to tension-free hernia repair, this procedure obviates the need for the opening of the patient's abdominal cavity and allows for a direct operation on the patient's anterior peritoneal space to complete the treatment, with benefits such as less pain, faster recovery, and a lower risk of complication [9]. A study of the experience with ETEP repair for inguinal hernias can provide valuable insights into the safety, efficacy, and outcomes of this

surgical technique. The study can help identify risk factors for complications, such as recurrence or chronic pain, and develop strategies to improve patient outcomes. It is an important step towards improving patient outcomes and advancing our understanding of this surgical technique.

Aim

To evaluate the safety and efficacy of the E-TEP technique in treating inguinal hernias.

Objectives

1. To evaluate the safety and efficacy of this procedure in terms of postoperative pain, morbidity and recurrence rates.
2. To assess patient satisfaction and quality of life after E-TEP.
3. To identify factors that may predict outcomes after E-TEP.

Material and Methods

Study Design: Prospective study

This study was conducted at Department of General Surgery, Government Medical College, Jammu to evaluate the safety and efficacy of the ETEP technique in treating inguinal hernias from 1stAugust 2023-31stJuly2024. Simple random sampling was done. Patient who had underwent extended view totally extra peritoneal

repair of inguinal hernias and fulfilling the eligibility criteria was included. The total sample size came out to be of 50 subjects.

Inclusion Criteria

1. Patients over the age of 18 years of both sexes who are diagnosed with an inguinal hernia that requires surgical repair.
2. Patients who are able to undergo E-TEP Repair, as determined by the surgeon.

Exclusion Criteria

1. Patients who have had previous inguinal surgery.
2. Patients who have a history of chronic pain or neuropathy in the inguinal region.
3. Patients who have a bleeding disorder or have any medical conditions that would increase the risk of complications during the procedure.
4. Patients who are unwilling to provide informed consent.

The data was collected on factors such as patient age, sex, and medical history, as well as the surgical technique used, the length of hospital stay, and the rate of complications following the procedure.

Statistical analysis

Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). For each assessment point, data were statistically analyzed using one way ANOVA. Difference between two groups was determined using t test and the level of significance was set at $p < 0.05$.

Results

A total of 50 patients who had underwent extended view totally extra peritoneal repair of inguinal hernias were recruited. Male and female comprised of 62% and 38% of the study subjects respectively. Hence males were comparatively more as compared to females. In this study; maximum subjects were from age group of 41-50 years (48%) followed by 51-60 years (30%). Mean age among the study subjects was 49.26 ± 7.91 years (Table 1). Co-morbidities viz. diabetes and hypertension was reported among 22% (11) and 36% (18) of the subjects respectively. Primary and incisional hernia was revealed in 56% and 44% of the subjects respectively. Most of the subjects had unilateral hernia (92%). Hernia on right was reported among 78% of the subjects while 22% had hernia on left side (Table 2, graph 1).

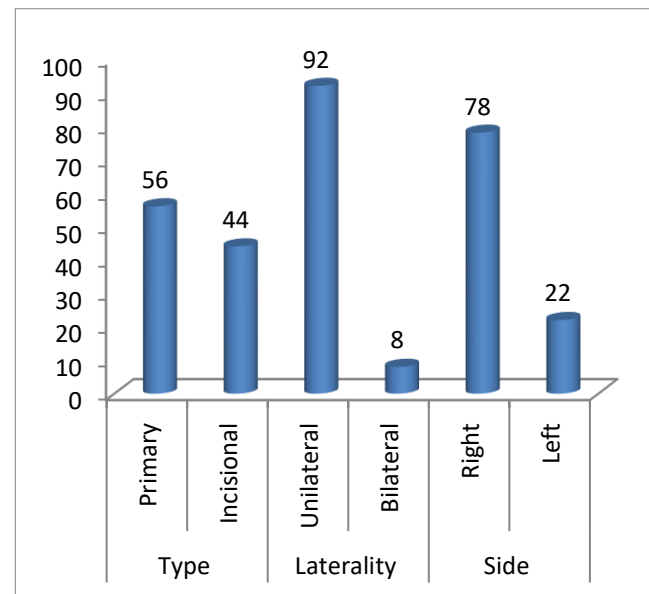
Table 1: Age distribution among the study subjects

Age Group (in years)	N	%
18-30	3	6
31-40	8	16
41-50	24	48
51-60	15	30
Total	50	100
Mean $\pm$ SD	49.26 ± 7.91	

Table 2: Features of hernia

Variables	N=50	Percentage (%)
Type		
Primary	28	56
Incisional	22	44
Laterality		

Unilateral	46	92
Bilateral	4	8
Side		
Right	39	78
Left	11	22



GRAPH 1: Features of hernia

Table 3: Intra-operative and Post-operative Parameters.

S. No	Parameters	Variables	Value
1.	Operative Time	Mean	121.48 minutes
		SD	18.97minutes
2.	Blood loss	>50 ml	0patients
		<50 ml	50patients
3.	Tackers used	4	34patients
		5	12patients
		6	4patients
4.	Postoperative parenteral analgesia	Mean	11.75mg
		SD	2.41mg
5.	Postoperative pain VAS Score (Mean $\pm$ SD) P value <0.01*	12hours	4.8 $\pm$ 0.7
		POD1	2.3 $\pm$ 0.4
		POD2	0.4 $\pm$ 0.1
6.	Hospital Stay	Mean	1.2days
		SD	0.4days
7.	Return to work	Mean	9.5days
		SD	2.1days

*: statistically significant.

Mean operative time among the study subjects was 121.48 minutes with standard deviation of 18.97 minutes. During surgery; all the subjects had blood loss <50 ml. Number of tackers viz, 4, 5 and 6 was used among 68%, 24% and 8% of the subjects respectively. VAS was used to assess pain among the study subjects. Mean VAS was 4.8 after 12 hrs of surgery which decreased to 2.3 and 0.4 at POD 1 and 2 respectively. Mean post-operative parenteral analgesia required (mg) among the study subjects was 11.75 mg. Mean hospital stay after surgery (days) among the study subjects was 1.2 ± 0.4 days. Most of the subjects were discharged with in less than 2 days. Most of the subjects return back to work after surgery(days) within 10 days after surgery. Mean duration to return back to work after surgery(days) among the study subjects was 9.5 days.(Table 3) No complication was reported among the study subjects (Table 4).

Table 4: Complications

Complications	N=50	%
SSI	0	0
Seroma	0	0
Hematoma	0	0
Conversion to TAPP	0	0
Proceed surgery without veress needle decompression	13	26
Recurrence	0	0

Discussion

Inguinal hernial repair is one of the most frequently performed operations in general surgery. The standard method for inguinal hernial repair had changed little over 100 years until the introduction of synthetic mesh. This mesh can be placed by either using an open approach or using a minimal access laparoscopic technique. The concept of hernial repair underwent evolution from Bassini's repair to Lichtenstein tension-free repair with the introduction of polyethylene mesh. After many years of improvement, hernioplasty is now broadly performed. The techniques which are practiced widely presently are mainly: Trans abdominal pre-peritoneal (TAPP), Total extra peritoneal (TEP), Intraperitoneal only meshplasty and Extended view TEP (e-TEP). Each technique has its own applications and pitfalls and has a very gradual learning curve; hence, they have remained confined to the expert hands only. The Newer modification of TEP is e-TEP [10]. Male and female comprised of 62% and 38% of the study subjects respectively. Hence males were comparatively more as compared to females. In this study; maximum subjects were from age group of 41-50 years (48%) followed by 51-60 years (30%). Minimum subjects were from age group of 18-30 years (6%) followed by 31-40 years (16%). Mean age among the study subjects was 49.26 ± 7.91 years which is similar to previous studies [11,12]. In a study by Singh S et al., mean age among the study subjects was 44.2 ± 7.4 years. In Group eTEP there were 22 males and 3 were females. Baig and Priya., reported mean age as 54.67 years and female dominance in contrast our study [13]. Co-morbidities viz. diabetes and hypertension was reported among 22% and 36% of the subjects respectively. According to Singh S et al., 6 patients had diabetes as well as hypertension in Group eTEP [10]. Primary and incisional hernia was revealed in 56% and 44% of the subjects respectively. Most of the subjects had unilateral hernia (92%). Hernia on right was reported among 78% of the subjects while 22% had hernia on left side. In a study by Singh S et al., primary hernia, incisional hernia, unilateral hernia and right-side hernia was reported among 60%, 40%, 88% and 80% of the subjects respectively. These findings are similar to the present study [10]. Number of tackers viz, 4, 5 and 6 was used among 68%, 24% and 8% of the subjects respectively, similar findings were revealed by previous studies [10]. Mean operative time among the study subjects was 121.48 minutes. Mean post-operative parenteral analgesia required (mg) among the study subjects was 11.75 mg. During surgery; all the subjects had blood loss <50 ml. Mean hospital stay after surgery (days) among the study subjects was 1.2 days. Most of the subjects were discharged with in less than 2 days. Most of the subjects return back to work after surgery (days) within 10 days after surgery. Mean duration to return back to work after surgery (days) among the study subjects was 9.5 days. VAS was used to assess pain among the study subjects. Mean VAS was 4.8 after 12 hrs of surgery which decreased to 2.3 and 0.4 at POD 1 and 3 respectively. Hence there was significant decrease in pain after surgery with time. In general, the posterior component separation technique in the form of transversus abdominis release (TAR) as described by Novitsky et al.,

is preferred with the eTEP technique since the plane of dissection is the same [14]. This is called eTEP TAR. It is believed that mesh placement in retromuscular space translates into vascularization of the mesh from both sides, less recurrence, fewer issues of fixation, less pain and fewer chances of bowel adhesions in addition to being economical due to the deployment of a cheaper mesh as composite mesh with anti-adhesion barrier is not needed [15]. In a study by Singh S et al., the mean operative time of Group TEP (167.6 ± 32.4) was higher as compared with Group eTEP (127.5 ± 23.4) [10]. Mean operative time, mean post-operative parenteral analgesia required and mean hospital stay after surgery among the groups (Group TEP, Group eTEP) showed significant correlation. Mean VAS score at 12 Hour after surgery was high in Group TEP (5.6 ± 0.7) than in Group eTEP (4.5 ± 0.6). Mean VAS score at POD1 in TEP Group was 3.9 ± 0.9 and in eTEP Group it was 2.8 ± 0.6 . Mean VAS score at POD3 in TEP Group was 1.1 ± 0.5 and in eTEP Group it was 0.3 ± 0.1 . Mean VAS score among the groups (Group TEP and eTEP) showed significant correlation. Karim et al., reported mean operative time for TAPP was 64.27 min, Kumar et al., reported operative time was significantly higher for e-TEP [16,17]. Hospital stay after surgery in Group TEP (1.7 ± 0.7) was higher as compared with Group eTEP (1.1 ± 0.3) and difference among group was significant, which was in contrast to Rekhi et al reported hospital stay and time to return to usual activity no statistical difference present between TEP and TAPP while pain score was in TEP more than TAPP [18]. Joshi et al., reported post-operative hospital stay was shorter in e-TEP group. VAS score among the groups (Group TEP and eTEP) showed significant correlation. VAS score at 12 h after surgery was high in Group TEP than in eTEP [19]. Penchev et al., reported pain score from the intra-operative (the day of surgery) to the seventh post-operative day is lower in the eTEP group [12]. Vinay and Balasubrahmanya., reported low pain scores, similar scores were documented by Sharma et al., pain scores were less in Group TAPP [20,21]. Hallen et al., reported pain was higher in the TEP, recurrences were found in the TEP group. In this study; no complication was reported among the study subjects [22]. No complication was reported by Singh S et al., too with respect to eTEP technique. Rekhi et al., concluded that higher incidence of post-operative complications is associated with TAPP in comparison to TEP [18]. Reza et al., reported eTEP procedure is cost effective, has minimum complication with easier learning [23]. Vinay and Balasubrahmanya., concluded TEP mesh repair and TAPP mesh repair of inguinal hernia are both safe and efficacious. The e-TEP technique ensures that the extra peritoneal space can be reached from almost anywhere in the anterior abdominal wall. The e-TEP approach can quickly and easily create an extra peritoneal space, enlarge the surgical field, provide a flexible port setup adaptable to many situations, allow unencumbered parietalization of the cord structures (proximal dissection of the sac and peritoneum), ease the management of the distal sac, and improve tolerance of pneumoperitoneum, which is a common complication.

Limitations

1. The patients taken up for the study were predominantly from northern India, in and around single district. Therefore, the results of the present study may not be representative of the whole of the country or the world at large.
2. The number of patients included in the present study was less in comparison to other studies.
3. Because the trial was short, it was difficult to remark on recurrences.

Conclusion

Our initial experience with the e-TEP technique in 50 patients has been convincing. This is a small group observation & there is scope for larger group observation. eTEP technique is striking among all surgical approaches for laparoscopic hernia repair. There are many scopes to improve on technical steps with leverage to incorporate hybrid steps and enough opportunity to overcome hurdles. eTEP approach gives a wide area to negotiate around and conclude the procedure, thus taking out the shortcomings of TEP/TAPP in inguinal hernias.

Declarations

Ethical Considerations

Ethical permission for conducting the research was taken from institutional ethical committee of the college and hospital before starting the research. Subjects who were willing to participate were asked to sign a consent form before study commencement.

Conflict of interest

None

Funding

None

Acknowledgements

None

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