

Early Outcomes of “Extended View Total Extraperitoneal (eTEP)” Procedure for Inguinal Hernia

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Abstract :

Laparoscopic inguinal hernia repair has become popular as an alternative to open surgery. The classical TEP technique is the laparoscopic technique of hernia repair which is considered closest to ideal for inguinal hernia repair, but this technique has several drawbacks such as limited space for dissection and mesh placement, restricted port placement, a low tolerance of accidental pneumoperitoneum, and difficulty in teaching and learning the technique. Extended-view modification, the eTEP technique, which overcomes several of these drawbacks. The eTEP approach can quickly and easily create an extraperitoneal space, enlarge the surgical field, provide a flexible port setup adaptable to many situations, allow unencumbered parietalization of the cord structures, ease the management of the distal sac in cases of large inguinoscrotal hernias, and improve tolerance of pneumoperitoneum, which is a common complication. The purpose of this study was to evaluate the safety and effectiveness of eTEP procedure with placement of polypropylene mesh and fixation by tackers.

Method : It was a observational study of 25 cases. The study was conducted in Shaheed Suhrawardy Medical College Hospital, Dhaka from July 2018 to June 2019. Sociodemographic status, operation time, peroperative blood loss, unwanted events like peritoneal tear, vessel injury, nerve injury, duration of hospital stay, postoperative pain and urinary retention were recorded. All the patients were followed up for at least 3 times at the end of 1st week, 1st month and 3rd month. Any surgical site infection, mesh infection, seroma, scrotal swelling, severity of pain according to visual analogue scale, haematoma and recurrence within this time was recorded. All the data were analyzed on SPSS.

Result : Among the 25 patients average time of operation was 1 hour and 35 minutes, peroperative blood loss was below 20 ml in all patients, peritoneal tear occurred in 2 patients, 1 vessel injury but no nerve injury was observed during the procedure. One patient had mild chronic pain even after the end of 3rd month. One patient developed scrotal swelling which subsided by the end of 1st week. No SSI, mesh infection, seroma, wound hematoma, and recurrence found within this period.

Conclusion : This study showed that, eTEP procedure is cost effective, has minimum complication with easier learning. In the hands of an experienced surgeon, eTEP repair can be safe and effective. New study can be done to find out it's effectiveness in incisional hernia in lower abdomen and bilateral inguinal hernia.

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Introduction :

Inguinal hernia repair is one of the most common surgical procedures in the world, with an estimated 800,000 cases per year in the United States alone, and 20 million procedures across the globe annually^{1,2}. Originally, the technique for inguinal hernia repair was an open, tissue-based suture repair, which eventually evolved to commonly used prosthetics (with various fixation devices of sutures, staples, tacks, and glue) for a tension-free repair with a significantly lower recurrence rate^{2,3} and lower chronic pain after surgery⁴. Laparoscopic repair of the inguinal hernia is becoming a popular method of herniorrhaphy, with 16.8 – 41.0% of such operations in the United States (varying with the region and the characteristics of the hernias)^{5,6}.

Literature has shown the benefits of laparoscopy (when compared to open repair) to be mostly related to the more minimally invasive nature of the surgery, having lower wound infection rates, faster recovery times, and low postoperative pain^{4,7-8}. TAPP and TEP are two most commonly practiced laparoscopic hernia repair technique. RCTs failed to identify which one is superior among this two techniques but in TEP we can avoid complications related to pneumoperitonium. Though TEP has negative aspects, like small operative field that leads to a sizable learning curve of this technique.

The extended view modification (eTEP) has overcome this negative aspect of TEP by providing better ergonomics and a large operative field. Other advantages of laparoscopic surgery like low SSI, less pain, faster recovery and less hospital stay are still present their. The time needed to be master in this technique is yet to be discovered.

In this study, we tried to identify the short term outcome of eTEP technique of inguinal hernia repair performed by a single surgeon.

Method :

This descriptive type study was conducted in Department of surgery of Shaheed Suhrawardy Medical College Hospital from July 2018 to June 2019. The sampling technique was purposive and samples were selected for conducting this study with some inclusion and exclusion criteria. Data was collected from the patients/ guardians by direct interview in a structured questionnaire. Data on per-operative events was taken from surgeon. Informed written consent was taken from patient/guardians by explaining the purpose of this study. Sociodemographic data of the patients like age, sex, occupation, socioeconomic status, BMI, co-morbidity was recorded. Duration of operation, per-operative blood loss, any peritoneal tear, vessel injury, nerve injury, duration of hospital stay, post-operative pain according to visual analogue scale, and any urinary retention was recorded. Three (03) post-operative follow up was taken at the end of 1st week, at the end of 1st month and 3rd month. During each follow up search for any surgical site infection, mesh infection, seroma, haematoma, severity of pain was searched and recorded if any. Calculated data were arranged in systematic manner, presented in tables, diagrams, charts and figures. Statistical analysis was performed using Statistical Package for Social Science (SPSS), version 12.

Inclusion Criteria :

Patients selected for eTEP for inguinal hernia

Exclusion Criteria :

1. Patients with recurrent inguinal hernia
2. Bilateral inguinal henia
3. Complicated hernia (obstructed, strangulated etc.)
4. Very large hernia.

Surgical Technique :

All the operations were performed under general anaesthesia, in supine position with a Foley catheter placed in urinary bladder. All the patients received 1 dose of preoperative antibiotic (Inj. Ceftriaxon 1 gm). After proper antiseptic wash and sterile draping an incision was made 4 cm supero-lateral to the umbilicus in the affected side of the abdomen. Anterior rectus sheath was incised and rectus muscle was split to reach the retromuscular space above posterior rectus sheath. A space is then created by blunt dissection by finger and 10 mm trochar is then inserted to establish pneumoperitonium. Blunt dissection is done to separate the rectus muscle from posterior rectus sheath above the level of arcuate line and from parietal peritoneum below the level of arcuate line. Two working ports are then created one umbilical and one in the iliac fossa just lateral to the rectus muscle. Hernial sac, inferior epigastric artery coopers ligament, vas deference, gonadal vessels and nerves are then identified by careful dissection by scissor or harmonic scalpel. Hernial sac is then reduced and proline mesh of appropriate size is placed. Single tacker is used to fix the mesh with coopers ligament. The space is then deflated by taking out all the gases with specific care to the scrotum. Ports are closed in layers. A gentle pressure bandage was given over the hernia defect in an attempt to prevent seroma or haematoma.

Results :

During the study period a total 25 patients who were undergone eTEP operation fulfilling the inclusion criteria were selected for this study. In 15(60%) cases age group was 35 to <45 years, 7 (28%) patients were in 25 to <35 years and 3 (12%) patients were in 45-55 years age group. All of the patients were male.

Table-I

Age distribution of the patients.

Age Group	No. of patients
25 to<35 years	7
35 to<45 years	15
45- 55 years	3

We have categorized the patients into lower class, middle class and upper class based on their monthly family income of <10,000 taka, 10,000 – 30,000 taka and >30,000 taka respectively. Most of the patients were from poor socioeconomic status (19 patients, 76%), 6 patients (24%) were from middle class.

Table-II

<i>Socioeconomic status</i>	
Socioeconomic Status	No. of patients
Lower class	19
Middle class	6

Thirteen patients (52%) in this study were having normal weight (BMI- 18.5-24.9), 7 patients (28%) were over weight (BMI- 25-29.9), 3 patients (12%) were obese (BMI- 30->30) and 2 patients (8%) were under weight (BMI- <18.5).

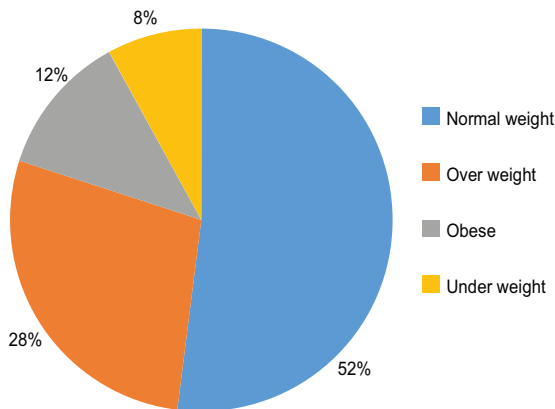


Fig.-1: Pie diagram showing BMI of the patients.

Patient’s were having different occupation. Among them, 11 patients (44%) were day labor, 9 patients (36%) were in service, 3 patients (12%) were businessmen and 2 patients (8%) had other occupations.

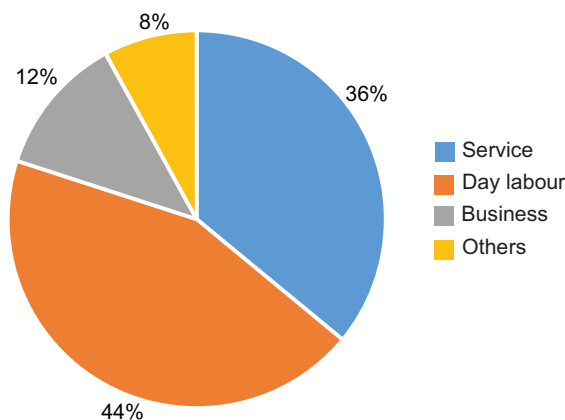


Fig.-2: Pie diagram showing occupation of patients.

Peritoneal tear was occurred in 2 patients, blood vessel injury in 1 patient, no nerve injury occurred. One operation was converted to open procedure.

Table-III

<i>Distribution of peroperative unwanted events.</i>		
Unwanted events	No. of occurrence	Percentage
Peritoneal tear	2	8%
Blood vessel injury	1	4%
Conversion to Open surgery	1	4%

To fix the proline mesh tacker was used. Fifteen patients (60%) required 2 staples, 1 staple used in 7 patients (28%) and 3 staple used in 3 patients (12%).

No. of Staples used to fix mesh

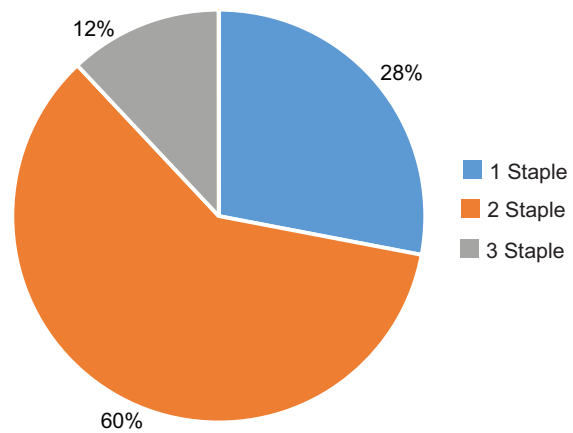


Fig.-3: Number of staples used for mesh fixation.

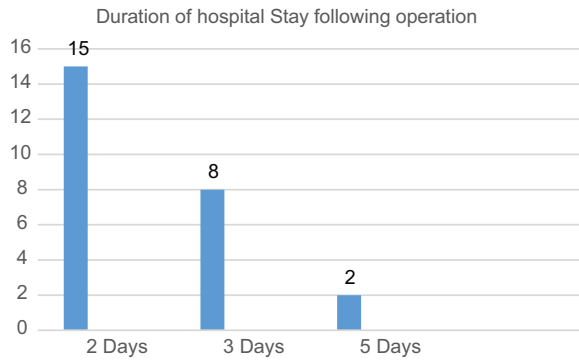
Operation time required was ranging from 1hour and 15 minutes to 2 hours and 10 min. Most of the operations were completed between 1hour 30 minutes - < 2 hours (14 operations, 56%).

Table-IV
Operation time.

Time range	No. of operations	Percentage
1 hour - <1.5 hour	8	32%
1.5 hour - <2 hour	14	56%
2 hour - <2.5 hour	3	12%

Peroperative blood loss in all the operations was < 20 ml except one case, where the amount of blood loss was about 50 ml due to blood vessel injury and that was managed laparoscopically.

Duration of hospital stay was < 2 days for 15 (60%) patients, 3 days for 8 (32%) patients and 5 days for 2 (8%) patients. Average hospital stay was 2.56 days.



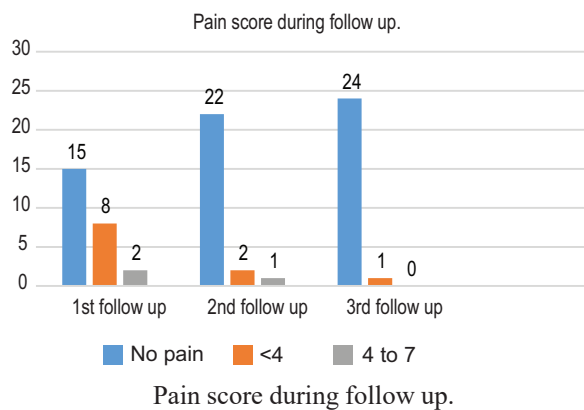
Duration of hospital Stay following operation

During the post operative follow up, by the end of 1st week only one patient had surgical site infection in the port site (4%), 1 patient developed seroma and one patient developed scrotal swelling (4%). All of this complications were resolved by the conservative treatment. There was no haematoma or mesh infection in any of the patients. No complication was observed during 2nd and 3rd follow up.

Table-V

<i>Distribution of postoperative complications during follow up.</i>			
Postoperative complications	1 st week	1 st month	3 rd month
SSI	1	0	0
Seroma	1	0	0
Haematoma	0	0	0
Scrotal swelling	1	0	0
Mesh infection	0	0	0

Post operative pain was measured by visual analogue scale. During the 1st follow up 15 patient (60%) had no pain, 8 patients (32%) had mildpain (pain score <4) and rest of



the 2 patients (8%) had moderate pain(pain score 4-7). During the 2nd follow up 22 patients (88%) were free from any pain, 3 patients (12%) had mild pain and 1 patient (4%) had moderate pain. During 3rd follow up 24 patients (96%) had no pain and only 1 patient (4%) had mild pain.

Discussion :

The result of this study supports that the eTEP technique is safe and effective in the surgical treatment of inguinal hernia. Postoperative complication rates are within the accepted range of other institutions and other techniques of inguinal hernia repair. Direct comparisons are difficult, due to variable selection of complications in different studies. However, available case series and recent controlled trials shows similar rates of seroma(0.52-37.8%), persistent pain (0.3-25%) for this series^{2,8,9,10-15}.In 1 patient conversion to open technique was needed. No peroperative and immediate postoperative serious complications were seen suggesting the safety of eTEP. The average hospital stay were shorter than most results that are available in literature.^{7,16,17,18} As most of the patients were day labour low postoperative pain and short hospital stay resulted in early return to normal physical activity.

The routine use of Foley catheter may be criticized in light of recommendations against routine use of catheterization.¹⁹ But it was done in an attempt to minimize bladder injury or perforation and if such injury occurred, it could be detected early.²⁰ However cauterization did not caused any postoperative urinary complication.

In this series, 60% patients required 2 tackers to fix the mesh. This reduces the risk of early postoperative and chronic pain and hypersensitivity.²¹⁻²³ The authors believe that, adequate dissection to identify the anatomy and avoidance of “triangle of pain” with respect of tackers use is very crucial to prevent inguinodynia. This leads to early recovery and return to full physical activity.

One of the limitations of this study was short follow-up period which may call claim about low incidence of chronic pain. But chronic pain can be predicted by early postoperative pain.²⁴

In this study there was 1 seroma but no haematoma in any patient. Whether literature shows that, for TEP incidence of seroma is between 0.5-12.2% and for TAPP it is between 3.0-8.0%. Incidence of haematoma after laparoscopic hernia surgery is 5-25%.

Another limitation of this study was, the types of analgesic used was not recorded which may have influenced the difference in pain perception.

Despite these weaknesses, the overall result of this study shows relatively low complication, short hospital stay, low number of staple use and low postoperative pain. Reason may be surgeons experience and the technique that allows a better view of the operative field for excellent dissection.

Conclusion :

eTEP technique for inguinal hernia repair is a safe, cost effective and excellent technique with better ergonomics in experienced hand. Learning curve is not that steep. So, it can be adopted as a procedure of choice for inguinal hernia repair. Due to its low complications it may be an alternative to older laparoscopic hernia repair technique. Use of this technique in incisional hernia in lower abdomen and bilateral inguinal hernia may be a subject for new study.

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