

# Outcome Of Totally Extra-Peritoneal (TEP) Mesh Repair Among Patients With Unilateral Primary Inguinal Hernia: A Single Center Experience

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## Abstract

**Introduction:** Inguinal hernias were conventionally treated with open methods like hernioplasty and herniorrhaphy. However, with the development in minimal access surgery, the trends have changed and surgeons are also performing the TEP and TAPP laparoscopic hernia repair routinely. Hence, a retrospective study was performed to assess the safety, feasibility, and associated complications of the TEP laparoscopic hernia repair.

**Methods:** A single institution, single unit retrospective study of all TEP hernia repair was performed at the department of surgery from May 2020 to April 2021. Data of all patients undergoing TEP were obtained from a proforma attached to the case file during patients' admission and was analyzed.

**Results:** A total number of 30 patients underwent the TEP laparoscopic hernia repair during the study period. Age group ranged from 25 years to 80 years and a male preponderance was noted with all patients being male. Per operative findings of indirect hernia was noted in 27, and direct hernia in 3 patients. The mean operating time was  $76.23 \pm 13.53$  minutes. Complications encountered in the post-operative period were seroma in one patient, and wound erythema in two patients. The mean hospital stay was  $1.6 \pm 0.72$  days.

**Conclusion:** Totally Extra-peritoneal (TEP) laparoscopic repair can be performed and has all the established benefits of minimal access surgery among patients with primary unilateral inguinal hernia.

**Keywords:** Inguinal hernia; TAPP; TEP; Unilateral.

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## Introduction

Repair of groin hernia is a routine elective procedure performed in surgical practice and constitutes more than 20 million surgeries around the world annually.<sup>1</sup> Although Lichtenstein's tension free mesh repair has established itself as the gold standard<sup>2</sup>, laparoscopic surgery offers an equally safe and cost-effective option for groin hernia repair.<sup>3</sup> Laparoscopic hernia surgery in the form of Trans-abdominal pre peritoneal repair (TAPP) or Totally Extra Peritoneal repair (TEP) has challenged the gold standard and is an attractive alternative procedure for unilateral groin hernias.<sup>4</sup> Laparoscopic surgery is recommended for bilateral/recurrent groin hernias at present. TEP completely avoids entry to the abdomen and combines the advantages of minimal invasive surgery and those of tension free mesh repair. At the department of surgery of Shree Birendra Hospital, regular laparoscopic surgery for groin hernias was introduced six years back after the acquisition of advanced laparoscopic set up. Most surgeons prefer the TAPP approach because of the shorter learning curve. However, with time few dedicated laparoscopic surgeons have started performing the TEP procedure more frequently.

This study thus aims to assess the safety, feasibility and associated complications among patients who have undergone TEP for primary inguinal hernia in the study hospital.

## Methods

This is a single institution, retrospective review of prospectively maintained database of all patients undergone TEP hernia repair for unilateral inguinal hernia. The study period was from May 2020 to April 2021. All the patients undergoing TEP repair for unilateral inguinal hernia were included in the study. Similarly congenital hernias, bilateral, recurrent, obstructed and incarcerated hernias were also excluded. At the time of admission, preoperative data of patients were recorded on a structured proforma including demographic data, site of hernia, and type of hernia. The ethical approval of this study was obtained from Institutional Review Committee (IRC) of Nepalese Army Institute of Health Sciences (Reg. no. 671). Intraoperative data recorded were duration of surgery, intra-operative complication, and conversion to either Open or TAPP repair. All the cases were performed by trained laparoscopic surgeons of the study hospital.

All cases were operated under General Anesthesia (GA). A 16 Fr Foleys catheter was inserted after induction, and removed post procedure except in those above 60 years of age, in whom it was kept for 24 hours after surgery. All patients received inj. Ceftriaxone 1gm at induction and it was repeated at 12 and 24 hours post operatively. The procedure included three trocars that were inserted in the lower midline which included one Hasson's cannula in the infraumbilical region and two 5 mm trocars. A 10 mm 30-degree laparoscope was then inserted through Hasson's cannula and used to further develop the pre-peritoneal

space down to the pubic symphysis. The retropubic space of Retzius and the space of Bogros were easily expanded by the telescopic approach. Thereafter, the pre-peritoneal space was widened by sharp and blunt dissection under direct view and a second working trocar was placed two finger breadths medially to the superior anterior iliac spine on the side of the hernia. The lower border of the pubic bone and Cooper's ligament were exposed identifying the iliac vein and structures of the obturator foramen. This is the first anatomical landmark and appears as a white glistening structure. Moving toward the anterior superior iliac spine in a surgical plane that is below the inferior epigastric vessels and above the peritoneum, the lateral dissection was started by pushing down the peritoneum until the psoas muscle was seen. The space of Bogros was delineated and cleaned all the way up to the anterior superior iliac spine. Once the medial and lateral dissection was completed, the surgeon was able to identify the entire hernia defect, followed by a proper hernia sac reduction, repair and placement of mesh in the Myopectineal orifice (MPO) of Fauchard. Oral fluids were allowed after 6 hours and gradually progressed to normal diet the next day. The patients were followed up at one week and three months following discharge for recurrence of hernia at the repair site. In the postoperative period, complications, need of re-interventions and hospital stay were recorded. Data obtained were entered in SPSS table and statistical analysis performed using SPSS version 21.0. Results were presented in tables and graphs.

## Results

A total of thirty patients underwent TEP procedure in the study hospital. Patient characteristics and their clinical profile are given in **Table 1**. The mean age of the patients was  $46.7 \pm 16.7$  years. All our patients were male.

**Table 1. Demographic Profile of patient who underwent TEP**

Patient Characteristics	Total
Age (years)	
Mean	46.7 ± 16.7
Median	56
Range	25-80
Sex (%)	
Male	30 (100%)
Presenting Complaints	
Something protruding in the groin	30 (100%)
Pain	17 (56.6%)

The majority of patients had right inguinal hernia 17 (56.6%) followed 13 (43.4%) left inguinal hernia **Table 2**.

**Table 2. Characteristics of hernia as per the location**

Characteristics	Total
Unilateral	30
Right	17 (56.6%)
Left	13 (43.4%)

Majority of the patients had an indirect inguinal hernia 27 (90%) and direct inguinal hernia was seen in 3 (10%) patients. The mean operating time for the procedure was  $76.23 \pm 13.53$  min. No major complication was encountered during the procedure. Two patients had hemorrhage during surgery which was managed intraoperatively. There was no recorded case of injury to viscera, major vessels and bowel **Table 3**.

**Table 3. Intra-operative and postoperative characteristics among the patient**

Characteristics	Total
Type of Hernia	
Indirect	27 (90%)
Direct	3 (10%)
Mean operating time (min)	$76.23 \pm 13.53$ min
Complications (intra-operative)	
Hemorrhage	2
Injury to viscera	Nil
Injury to major vessels	Nil
Conversion to open	2

Post-operative morbidity was detected in three patients. One patient developed a seroma, which was managed conservatively with pressure dressing. Two patients developed wound erythema which was managed with oral antibiotics. There were no cases of surgical site infection (SSI) during one month of follow up of the patient. However, no major postoperative complications were encountered among the patients **Table 4**. There were no cases of recurrence of hernia at the repair site during three months of follow up of the patient.

**Table 4. Post-operative complications, and Hospital stay among the patients**

Post-operative complications	Total
Seroma	1 (3.33%)
Wound Erythema	2 (6.67%)
Mean hospital stay (in days)	$1.6 \pm 0.72$

## Discussion

Laparoscopic approach to inguinal hernia repair has added to the ongoing discussion over the best groin hernia repair.<sup>5,6</sup> Laparoscopic inguinal hernia repair was introduced in 1990 by Ger and associates<sup>7</sup> and is based on Stoppa's<sup>8</sup> concept of using a large piece of mesh to reinforce the fascia transversalis over the myopectineal orifice. Subsequently, laparoscopic repairs of groin hernia have evolved into two main approaches: TAPP pioneered by Arregui et al.<sup>9</sup> in the early 1990s and TEP described by Mckernon and Laws in 1993.<sup>10</sup> Early studies revealed higher risks of serious complication rate<sup>11</sup> and higher recurrence rates.<sup>6</sup> However, with increasing experience, laparoscopic surgery has shown several advantages over open repair in terms of reduced

postoperative pain and morbidity and early return to work with comparable recurrence rate. Few dedicated surgeons at our unit are now performing the TEP repair with results comparable to other studies. TEP repair requires expertise and has a steeper learning curve compared to TAPP.<sup>12,13</sup>

The median age of the patients in the current study was 56 with a range between 25-80 years and this is consistent with a randomized multicenter trial (SCUR Hernia Repair Study) which showed that most hernia occurred in patients above 45 years of age.<sup>14</sup> A similar finding was noted by Ira M. Rutkow.<sup>15</sup> There were no female patients in this study and this male preponderance has been amplified as the study was performed in an army hospital. A similar study conducted by Malla et al on TAPP in Shree Birendra Hospital (Army Hospital) also showed a male preponderance.<sup>16</sup> A study conducted in the Army College of Medical Sciences, Base Hospital Delhi in 434 patients reported only 7 female patients (1.7%).<sup>17</sup> A 10-year study of abdominal hernia in the US Armed Forces reported a six times higher incidence rate of inguinal hernias among males than females.<sup>18</sup>

Out of the 30 patients included in our study, 27 patients (97%) had indirect inguinal hernia whereas only 3 patients (10%) had direct inguinal hernia. These findings were not however consistent with other studies.<sup>17-19</sup> A study conducted by Winslow et al<sup>19</sup> found indirect hernia in 62% of cases and direct in 38%. The ratio of indirect to direct hernia was found to be 2:1 in a study conducted by Fitzgibbons et al.<sup>20</sup> However, a study performed at a tertiary centre from eastern Nepal reported similar findings with 88% of cases being indirect hernias while the remaining 12% were unilateral direct inguinal hernias.<sup>21</sup>

The operative time reported by large series show a large variation, with significant decrease in operating time after the first 30-50 cases. In this study, the mean operating time was  $76.23 \pm 13.53$  min. The overall mean operating time in studies conducted by Leibl et al<sup>12</sup> and Swanstorm et al<sup>22</sup> is significantly less. Our operating time is understandably longer, as we are still in the learning curve of the procedure. Outcomes in our study compares quite favorably with other studies. There were 2 intra-operative complications in the form of bleeding during dissection which was controlled with diathermy. There were two conversions to Open Hernioplasty. Peritoneal defects are known to occur in 10% and 47% of extra peritoneal repairs, making it imperative to master TAPP repair to avoid conversion to open surgery.<sup>23</sup> Swadia, in 2011 reported a conversion of 1.2% in their series of 1539 surgeries.<sup>24</sup> Similarly, Dulucq et al, in 2009 also had reported a conversion of 1.2% in their series of 3100 repairs.<sup>25</sup> In our study, minor post-op complications was seen in 10% of cases as 2 patients (6.67%) developed wound erythema and 1 patient (3.33%) developed seroma. The patients with wound erythema and seroma were discharged with prolonged course of antibiotics and on follow up on after one month, the complications had resolved. There were no cases of recurrence of hernia at the repair site during three months of follow up of the patient

in our study. A similar study from Eastern Nepal, reported seroma in 4%, conversion in 4% and recurrence in 2% of the cases.<sup>21</sup> A large prospective multi-center randomized controlled trial (RCT) in 2004 among 2164 patients reported the intraoperative, postoperative and long-term complications to be 4.8%, 24.6% and 18%.<sup>6</sup> Another RCT conducted in 2008 in 365 patients reported similar complications in 2%, 16% and 18% respectively.<sup>26</sup> A study conducted in Nepal comparing TAPP with Lichtenstein repair, showed that seroma formation, postoperative pain and length of hospital stay were less in the laparoscopic hernia repair compared to open.<sup>27</sup>

The limitation of this study is that this is a single institution-based retrospective study with limited sample size. In order to validate the findings, a long term follow of these cases is required to assess chronic groin pain and recurrence rate.

## Conclusion

Totally Extra peritoneal (TEP) repair of unilateral primary inguinal hernia appears to be suitable and it can safely be carried out with minimum complications with all the established advantages of a minimal access surgery. A long term follow up is needed to assess recurrence and chronic groin pain.

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