

LAPAROSCOPIC TOTAL EXTRAPERITONEAL INGUINAL HERNIA REPAIR: A STUDY AT RAWALPINDI MEDICAL COLLEGE AND ALLIED TEACHING HOSPITALS

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ABSTRACT

Objective: To describe local experience of laparoscopic total extraperitoneal hernia repair in Rawalpindi Medical College (RMC) allied teaching hospitals.

Methodology: A descriptive case series was conducted between 2007 and 2012 at Rawalpindi Medical College and Allied Teaching Hospitals including Benazir Bhutto Hospital, Holy Family Hospital and District Headquarter Hospital, Rawalpindi. Eighty seven patients of inguinal hernia were included through non-probability consecutive sampling. They underwent total extraperitoneal hernia repair. Sixty eight patients had unilateral hernia and 19 patients had bilateral hernias.

Results: The mean age of the study population was 42.9±15.3 years (range: 13-75 years). The mean operation duration was 62±13 minutes (range: 35-90 min). For bilateral hernias the duration was longer; mean 103.66±23.4 minutes with a range of 75-180 minutes. Up to 4.6% had conversion to open surgery and 9.1% had complications. Overall, there were 3.4% hernia recurrences in one year follow up. The mean inpatient hospital stay was 1.85±0.65 days.

Conclusion: TEP carries an acceptable complication rate, combining the advantages of minimal access surgery and mesh reinforcement of the groin. This approach is associated with short hospital stay and a low recurrence rate.

Key Words: Extraperitoneal inguinal hernia repair, Inguinal hernia, Laparoscopic surgery.

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INTRODUCTION

Correction of inguinal hernias is one of the most common surgical procedures¹. The optimal method for repair remains a matter of debate. The use of prosthetic mesh, to create tension-free repair, is preferable over non mesh techniques because of reduced recurrence². The mesh can be placed with either open or endoscopic surgery. The hernia repair according to Lichtenstein is the most commonly used mesh technique in open surgery³. In the early 1990s, a variety of trans-abdominal laparoscopic approaches were reported, with the trans-abdominal preperitoneal (TAPP) approach being the most common. Because of reports of high recurrence rates, the intraperitoneal onlay mesh (IPOM) technique quickly fell out of favor. With TAPP technique the peritoneal cavity is entered, which is avoided in total extra peritoneal (TEP) repair. Several studies and a Cochrane review⁴ suggested that TAPP is associated with higher incidence of port-site hernias and life-threatening

visceral injuries compared with TEP, and some studies found higher recurrence rates after TAPP. Therefore, TEP is generally preferred to TAPP and Lichtenstein in experienced hands⁵.

In 1993 the laparoscopic total extra peritoneal (TEP) approach was reported by McKernan⁶. The TEP approach allows for mesh placement within the preperitoneal space, without entering the abdominal cavity. Recently LEVEL trial⁷ compared the Lichtenstein method with TEP and found TEP to be associated with more adverse events during surgery but less postoperative pain, faster recovery of daily activities and less impairment of sensibility after 1 year. However recurrence rates and chronic pain were comparable.

TEP is the current preferred endoscopic mesh technique in most centers around the world⁸. However, our local experience with TEP is limited and most of us are in the initial phase of learning curve with this technique. We have compiled a data of TEP inguinal hernia repairs

carried out at Rawalpindi medical college and allied teaching hospitals over the last 5 years.

METHODOLOGY

This descriptive case series was carried out at Rawalpindi Medical College and Allied Teaching Hospitals including Benazir Bhutto Hospital, Holy Family Hospital and District Headquarter Hospital, Rawalpindi; from July 2007 till June 2012 after taking permission from the hospital ethical committee. A total of 87 patients of inguinal hernia repair were included after taking informed consent. This included unilateral or bilateral and primary or recurrent inguinal hernias in adults over 12 years. Prepubertal children, those unable to tolerate general anesthesia, those with large scrotal hernias, previous lower midline abdominal surgery, and previous mesh placement in the preperitoneal space were excluded from the study. The surgeries were carried out by surgical specialists of more than 5 years experience in laparoscopic surgery.

Prophylactic antibiotic i.e. cephalosporins were administered one dose one hour before and two doses after the surgery. All cases were performed under general anesthesia. Through a sub-umbilical incision the preperitoneal space was created using balloon dissection. Carbon dioxide was insufflated through a blunt tip trocar (pressure, 12–15 mm Hg). A second trocar was placed halfway the umbilicus and pubic bone. The Space of Bogros was created with isolation of the spermatic cord. The third trocar was placed 2-3 fingers above the symphysis pubis. A 12-15 cm polypropylene (Prolene or Marlex) mesh was placed over the myopectineal orifice of Fruchaud. Mesh fixation was performed to Cooper's ligament with tackers. Instructions were given to all patients, to resume normal daily activities and return to work as soon as possible.

The outcome measured were postoperative pain, length of hospital stay, duration of the procedure and complications. Pain was measured on the visual analog scale from 0 to 10. Length of hospital stay was calculated from the time of surgery till discharge. Duration of procedure was calculated from the time of first skin incision till the last port site was stitched. Details were entered into the pro forma.

Sample size was calculated such that the power of the test was 95% and the absolute precision required was 0.05. The overall rate for complications was reported by Langeveld et al⁸ to be 5.9% for TEP hernia repair. Keeping the anticipated population proportion at 0.059 the required sample size was 87 cases. The data was analyzed using SPSS 16. Numerical data was present-

ed as mean \pm SD and categorical data was presented as proportions (%).

RESULTS

The study included 87 patients undergoing inguinal hernia repair. The age of the patients ranged from 13 to 75 years with a mean age of 42.9 ± 15.3 years. The study included 82 (94.3%) males and 5 (5.7%) females. Majority of hernias i.e. 48 (55.2%) were on the right side, 20 (23%) on the left and remaining 19 (21.8%) were bilateral. 74 (85%) were primary inguinal hernia repairs and 13 (15%) were on recurrent cases (Table 1).

The operative time ranged from 35 to 180 minutes. Mean operating time for unilateral hernias in TEP procedure was 62 ± 13 minutes (range: 35–90 min). For bilateral hernias the duration was longer; mean 103.66 ± 23.4 minutes with a range of 75-180 minutes). For unilateral primary hernia repairs the duration was shorter; mean 73.85 ± 27.6 minutes with a range of 35-180 minutes. For recurrent unilateral hernias the operative time was slightly longer; mean 75.03 ± 25 minutes.

The length of postoperative hospital stay ranged from 1 to 4 days with a mean stay of 1.85 ± 0.65 days. Twenty three (26.4%) were discharged within 24 hours of surgery and 57 (65.5%) were discharged within 48 hours. Seven (8%) were discharged on third day or later.

The pain score for TEP on the visual-analogue scale (VAS) on day 1 ranged from 1 to 7 and the mean score was 3.2 ± 1.7 . Sixty patients (68.9%) experienced mild pain ($VAS \leq 3$).

There were 4 conversions (4.6%). All were converted to Lichtenstein. Reasons for conversion were: problems with adhesions and local anatomy in 2 (2.3%) cases, peritoneal tear in 1 (1.15%) and bleeding from epigastric vessels in 1 (1.15%); however bleeding did not exceed 100 ml and no blood transfusion was required.

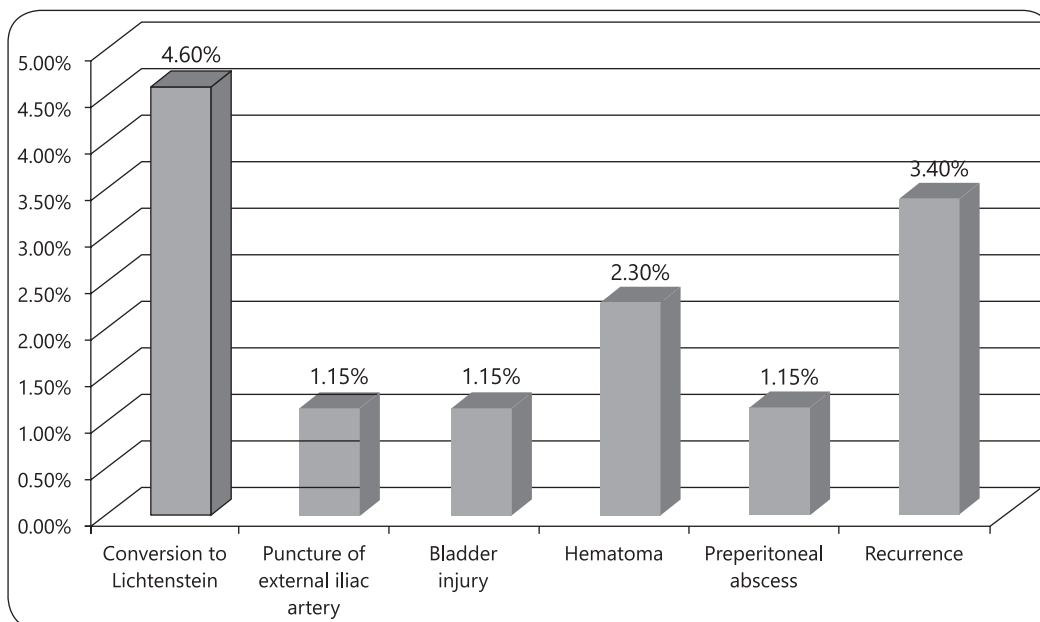
All patients recovered well. The overall rate for complications and adverse events during surgery was 9.1%. Important complications in the TEP repair were; puncture of external iliac artery in 1 (1.15%), bladder injury in 1 (1.15%), hematoma in 2 (2.35%), pre peritoneal abscess in 1 (1.15%) and 3 (3.4%) recurrences were seen after one year follow up (Figure 1).

DISCUSSION

The results of our study were similar to the results of previously published studies on the subject. The mean operating time in our study was 62 minutes. This compares favorably with 55-95 minutes in NICE guidelines⁹, 58 minutes for the Medical Research Council (MRC)¹⁰ and 50 minutes reported by an earlier study¹¹. These

Table 1: Descriptive statistics; TEP inguinal hernia repair

Variable	Results
Age; years	42.9±15.3 years
Gender; n (%)	82 (94.3%) males; 5 (5.7%) females
Hernia position	48 (55.2%) right side, 20 (23%) left side; 19 (21.8%) bilateral
Recurrent cases; n (%)	13 (15%)
Operative time, unilateral hernias; minutes	62±13 minutes (range: 35–90 min)
Operative time, bilateral hernias	103.66±23.4 minutes (range: 75–180 minutes)
Operative time, unilateral primary hernia repairs; minutes	73.85±27.6 minutes
Operative time, unilateral recurrent hernia repairs; minutes	75.03±25 minutes
Length of hospital stay; days	1.85±0.65 days
Pain score (VAS); (1-10)	3.2±1.7
Conversion rate; n (%)	4 (4.6%)
Complication rate; n (%)	8 (9.1%)

Figure 1: Complications of TEP inguinal hernia repair

three pieces of data also showed an average operating time of 45 minutes for the conventional Lichtenstein operation. Meta-analysis, however, does indicate that laparoscopic hernia repair takes longer than open surgery¹². Cheah et al¹³ reported the mean operation duration of 70 minutes for unilateral repairs and said that bilateral repairs took 24 percent longer.

The recurrence rate in our study was 3.4% which is higher than the 2.3% quoted by NICE. This resulted from 2 recurrences in our initial 30 TEP repairs. Other comparable studies identify conversion rates of 1.2% and 2.8% to open or TAPP repair respectively^{14,15}. The recent Cochrane review, favored TEP over TAPP due to fewer operative complications¹⁶. They identified a serious injury rate of 0.3% for visceral and 0.3% for vascular injuries though they did not differentiate between TAPP and TEP repairs. The eight non-randomized studies suggest that TAPP is associated with higher rates of port-site hernias and visceral injuries whilst there appear to be more conversions with TEP. Serious complications occurred in our study and included puncture of external iliac artery in 1 (1.15%), bladder injury in 1 (1.15%). These were encountered in the first few TEP repairs and perhaps indicate the early phase of learning curve of the surgeons. In our study the complication rate was 9.1% which was somewhat higher than that reported by Langeveld et al⁸ in the LEVEL trial (5.9%). This is because we are new with this technique and majority of the complications occurred in the first 40 cases (6 out of 8 complications). Subwongcharoen et al¹⁷ reported an even higher complication rate 12.7%. As the experience with the technique will increase the results are likely to improve. Very limited data were available on learning curves but these data suggest that operators become experienced at between 30 and 100 procedures. Short term operative complications were more frequent after TEP (6%) as compared to open repairs in the study by Hasan et al¹⁸. Conversion to open was reported in 2.8% by Cheah et al as opposed to 4.6% in our series. Mean hospital stay ranged from 1.4 in study by Cheah et al to 2.71 days in study by Subwongcharoen et al¹⁷. In comparison our study reported a duration of 1.85 days.

Over last decade very few local studies have reported results of TEP hernia repair. Shirazi et al¹⁹ documented the outcomes of the first 100 consecutive total extra-peritoneal hernia repair cases. In this study the maximum operating time was 75 minutes, while the minimum was 30 minutes. The conversion rate was 3% (n=3) and the recurrence rate was 4% (n=4). Complications experienced included a chronic groin pain and one umbilical port-site haematoma. Moeen et al²⁰ found that the post-op morbidity scores were significantly lower in the TEP group as compared with the

open mesh repair group. The recurrence rates were nil in either case. Afzal et al²¹ reported that the commonest intraoperative complication was peritoneal tear leading to loss of space.

During the surgery we learned that the inferior epigastric vessels may be dislodged by the dissecting balloon causing significant bleeding. It can be clipped and divided without consequence. Secondly, small holes in the peritoneum can lead to encroachment of the peritoneum into the working space. Thirdly, all holes in the peritoneum should be repaired. Large holes can lead to postoperative complications. Exposed mesh can lead to adhesions to the small bowel and, in rare cases, bowel injury and fistulization²².

The lack of expertise in endoscopic hernia repair is one reason why most general surgeons still favor open hernia surgery. This may be because: (1) the anatomy of the inguinal region has to be re-learned from a laparoscopic viewpoint, i.e. from an interior view rather than the exterior approach as is taught in medical school and surgical training; (2) it is more difficult to operate in a confined extraperitoneal space than it is in the abdomen or thorax; and (3) regular practice is needed for endoscopic techniques of mesh placement and fixation.

CONCLUSION

TEP carries an acceptably low complication rate, combining the advantages of minimal access surgery and mesh reinforcement of the groin. This approach is associated with short hospital stay and a low recurrence rate.

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CONTRIBUTORS

MH planned the study, collected data and performed surgeries. AA compiled and analyzed the data and wrote the manuscript. MMK performed surgeries and helped in collection of data. All authors contributed significantly to the final manuscript.