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Evaluation of the Outcomes of Laparoscopic Total Extra Peritoneal Inguinal Hernia Repair without Mesh Fixation

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Abstract

Background: Inguinal hernias are a significant cause of patient morbidity. It is the most common type of hernia, accounting for 75% of all the abdominal wall hernias. Several methods of inguinal hernia repair have been described and have been evolved over time. The Laparoscopic approach for inguinal hernia repair was first reported by Ger, who performed a high ligation of the sac without mesh placement. Total extraperitoneal repair was developed because of concern for possible complications associated with intra-abdominal access, which was required for the transabdominal preperitoneal approach. Laparoscopic total extra peritoneal repair (TEP) of inguinal hernia is associated with less postoperative pain and morbidity than open hernia repair. The TEP method allows access to the preperitoneal space and avoids the need for a peritoneal incision. The study is aimed to evaluate the role of laparoscopic total extra peritoneal hernia repair without mesh fixation in early ambulation, recurrence rate and post-operative chronic groin pain. Methods: This is prospective study, was conducted on 30 patients suffering from inguinal hernia attending General Surgery Department at Benha University Hospital. Results: The mean age of the studied patients was 31 years, with a standard deviation of 6 years. Regarding gender, there was a male predominance; most of the studied patient was males (93.3%). Regarding complaint, about half of the studied patients (53.3%) complained of left inguinal hernia and the other half (46.7%) complained of right inguinal hernia. Less than one-quarter of the patients had DM or hypertension; 20.0% for each. Only 16.7% had a history of a previous operation. Less than one-quarter had a history of cough or constipation; 20.0% and 23.3%, respectively. Prostatic problem was reported by only 6.7% of the studied patients. The mean surgical time was 60 minutes, with a standard deviation of 14 minutes. No conversion to open surgery was reported in the studied patients. Regarding early outcome, less than one-quarter of the patients reported hematoma, groin pain, or seroma; 20.0%, 16.7%, and 6,7%, respectively. No urine retention was reported. Regarding wound state, most of the patients (93.3%) reported clean wound, and only 6.7% reported infected wound. Regarding late outcome, recurrence occurred in only two patients (6.7%). Only 16.7% reported chronic groin pain. Conclusion: TEP inguinal hernia repair performed without mesh fixation is safe, effective procedure with low morbidity and feasible with minimal recurrence rates. Not fixing the mesh avoids possible complications.

Key words: Laparoscopic Total Extra, Peritoneal, Inguinal Hernia Repair, Mesh Fixation**.**

1. Introduction

One of the most frequently performed operations in the practice of general surgery is inguinal hernia repair. Multiple surgical techniques have been described, and for years, tension repair techniques such as the Bassini and Shouldice methods have been used. Since the end of 1980s, the Lichtenstein method, which uses prosthetic material, was accepted as optimal method of inguinal hernia repair. In recent years, however, minimally invasive methods such as transabdominal pre peritoneal (TAPP) and total extra peritoneal (TEP) approaches have been used for inguinal hernia repair [1]. Although both of these methods are effective, TEP is becoming more popular among surgeons. Giant scrotal hernia and presence of an incision in the lower abdominal quadrant are contraindications [1].

Placement of the mesh is the most frequently debated issue of TEP operation. A wide spectrum of methods has been described in the literature, ranging from nonfixation methods of placement to fixation with metal tacks [2, 3, 4, 5].

Much of the debate concerns chronic postoperative pain and recurrence. Lichtenstein method and TEP have been compared in various studies, and while a relatively lower incidence of recurrence and chronic pain has been recorded for TEP, both complications can still occur. Though chronic pain has many etiologies, the method of fixation can be a cause. Use of absorbable tacks and tissue adhesives such as fibrin glue or cyanoacrylate have been described in numerous literature studies [6, 7].

In some investigations, less chronic pain has been reported for hernia repairs that did not use tacks; however, in general, there is not much difference between the two methods. Therefore, this decision should be left to the discretion of the surgeon [8].

The present study is an analysis of the outcomes of laparoscopic TEP hernioplasty without mesh fixation [3].

The aim of this study is to evaluate the role of laparoscopic total extra peritoneal hernia repair without mesh fixation in early ambulation, recurrence rate and post-operative chronic groin pain.

2. Patients and Methods

In order to fulfill the objectives of this study, the following techniques were followed:

A. Technical design:

1-Study design:

Prospective study

2- Study setting:

The study had been carried out in General Surgery Department at Benha University Hospital after an approval from the Research Ethics Committee in Benha Faculty of Medicine and all patients signed informed consents that they were involved in this study.

3-Target population and criteria for inclusion:

Patients:

Thirty patients suffering from inguinal hernia attending General Surgery Department at Benha University Hospital.

Inclusion criteria:

- Patients older than 16 years old.
- Healthy patients fit for surgery.

Exclusion criteria:

- Patient younger than 16 years old.
- Cannot tolerate general anesthesia.
- History of complicated hernia ; strangulated and/or obstructed inguinal hernia.
- Have bleeding disorders.
- Are taking a medicine (called a blood thinner) that prevents blood clots.
- Have had many abdominal surgeries. Scar tissue may make the surgery harder to do through the laparoscope; previous preperitoneal surgery.
- Have severe lung diseases such as emphysema. The carbon dioxide used to inflate the abdomen may interfere with their breathing.
- Pregnancy.
- Huge inguinoscrotal hernia.

Methods:

All patients included in the study were subjected to the following:

1- Detailed history taking including

- Personal data: Name, age, sex, occupation, address.
- Complaint.
- History of present illness.
- History of previous operations.
- History of chronic systemic disease.
- Past history.
- Family history.

2- Careful clinical examination

General examination

- Vital signs
- Signs of (Pallor, Cyanosis, Jaundice, and Lymph node enlargement).
- Bony deformity.
- Body built.
- Chest examination.
- Heart examination
  - ✓General Inspiction
  - ✓Taking the pulse
  - ✓Palpation
  - ✓Auscultation
  - ✓Examination of blood pressure

Local Examination:

- Scars of prior operations.
- Incisional hernia.
- Abdominal or flank swelling.
- Ascites.
- Organomegally.
- Size and reducibility of the hernia.
- Presence or absence of a contralateral or umbilical hernia.
- Presence or absence of nerve involvement by looking for anesthesia, hyperesthesia or contact dysesthesia.
- Examination of the testicles and cord structures should be performed in men.
- Skin is also examined looking for rashes or the presence of fungal or bacterial infections.

3- Investigations:

A-Laboratory investigations:

- Complete blood picture (CBC).
- Renal function test.
- Liver Test Profile.
- Fasting blood glucose.
- Virology (HCV, HBV, HIV).
- Bleeding and Coagulation profile (INR, APTT, platelets and fibrinogen)

B-Radiological investigations:

- Pelvi-abdominal ultrasound and ultrasound for both inguinal regions

Surgical technique:

Parameters of the study included:

Preoperative:

- Informed consent.
- Marking hernia site.

Operative technique:

1. General anesthesia.
2. Supine position.
3. Disinfection and towelling.
4. Placement of 3 trocars in lower midline.

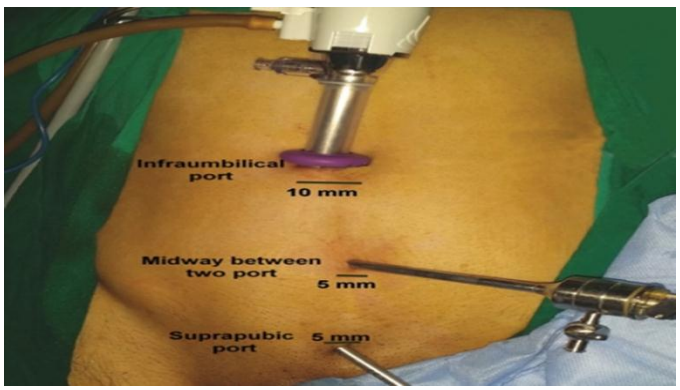

Fig. (1) Placement of trocars in laparoscopic TEP repair

5. Blunty dissect Cooper's ligament bilaterally.

This will open up the space of Retzius.

6. Identify Hesselbuch's triangle and the three potential sites of herniation related to it (direct, femoral, obturator).
7. Identify and protect the epigastric vessels.
8. Blunty develop the space of Borgros to the level of ASIS.
9. Reduction of cord lipoma.
10. Reduction of hernia sac by dissection of cord structures

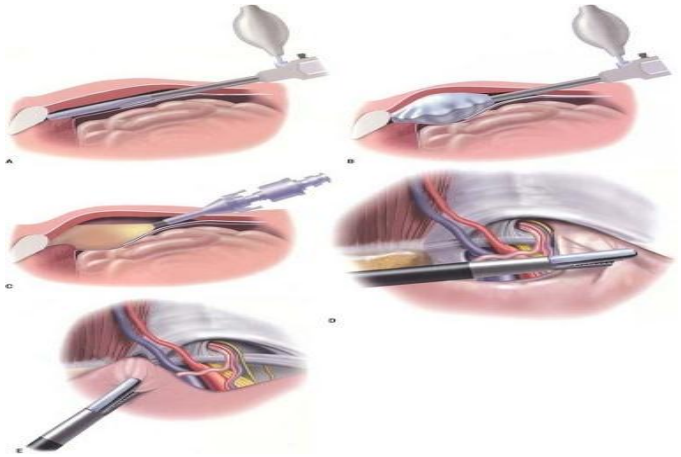

Fig. (2) Creation of workspace and dissection of hernia sac

11. Placement of giant mesh without fixation.

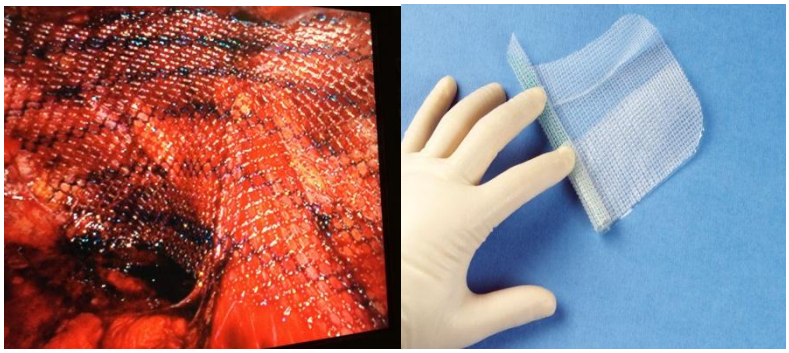

Fig. (3) Introduction of mesh covering MPO without fixation

The giant 15 × 10 cm Polypropylene mesh was rolled in cigar shape manner and fixed by two stay sutures then introduced through the port to the defect as the center of the mesh is at the center of the defect.

The mesh was unrolled by removing the stay sutures and appropriately expanded to cover the dissected space without fixation.

Mesh was fixed with sandwich effect with tissue incorporation by making a space between the pubic-ramus and the peritoneum so a 2-3 cm of the mesh is embedded between the two structures. The same effect was used along the lateral and medial line of the mesh.

c.Post-operative care

Post-operatively, patients were discharged to home after 24 - 48 hours and followed up after one week, one month, ٣ months, ٦months. During each visit symptoms and signs of postoperative complications were detected and recorded. The preoperative data collected for each group included age, sex, BMI, hernia type and operative time. Post-operative data included hospital stay, post-operative pain score, postoperative wound complications.

Early: (within the first week)

- Antibiotic
- Analgesic
- Antispasmotic
- Scrotal elevator
- Then notice:
  - ✓ Hematoma formation
  - ✓ Seroma formation.
  - ✓ Urin output.
  - ✓ Groin pain.
  - ✓ Wound state.

Fig. (4) Complication of laparoscopic TEP repair (hematoma, seroma and chronic groin pain)

Late:(after 6 months)

- Recurrent hernia.
- Chronic groin pain.

Administrative considerations:

- An Official permission was obtained from the ethical committee of General Surgery Department, Benha University Hospital.
- An official permission was obtained from the Institutional Research.
- Approval from ethical committee in the faculty of medicine (Institutional Research Board IRB).

3.Results

The mean age of the studied patients was 31 years, with a standard deviation of 6 years. Regarding gender, there was a male predominance; most of the studied patient was males (93.3%). Regarding complaint, about half of the studied patients (53.3%) complained of left inguinal hernia and the other half (46.7%) complained of right inguinal hernia. ***Table (1)***

Table (1) General characteristics of the studied patients.

General characteristics			
Age (years)	Mean ±SD		31 ±6
Gender	Males	n (%)	28 (93.3)
	Females	n (%)	2 (6.7)
Complaint	LIH	n (%)	16 (53.3)
	RIH	n (%)	14 (46.7)

LIH ; Left inguinal hernia
RIH ; Right inguinal hernia

Surgical details

The mean surgical time was 60 minutes, with a standard deviation of 14 minutes. No conversion to open surgery was reported in the studied patients; as in case of conversion to open surgery patient was excluded from the study. ***Table (2)***

Table (2) Surgical details of the studied patients.

Surgical details		
Surgical time (min)	Mean ±SD	60 ±14
Conversion to open	n (%)	0 (0.0)

Early outcome

Regarding early outcome, less than one-quarter of the patients reported hematoma, groin pain, or seroma; 20.0%, 16.7%, and 6,7%, respectively. No urine retention was reported. Regarding wound state, most of the patients (93.3%) reported clean wound, and only 6.7% reported infected wound. ***Table (3)& figure (1)***

Table (3) Early outcome in the studied patients**.**

Early outcome			
Hematoma	n (%)		6 (20.0)
Seroma	n (%)		2 (6.7)
Urine retention	n (%)		0 (0.0)
Groin pain	n (%)		5 (16.7)
Wound state	Clean	n (%)	28 (93.3)
	Infected	n (%)	2 (6.7)

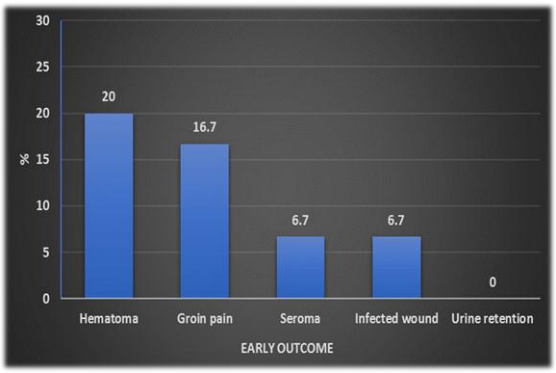

Fig. (5) Early outcome of the studied patients

Late outcome

Regarding late outcome, recurrence occurred in only two patients (6.7%). Only 16.7% reported chronic groin pain. ***Table (4)***

Table (4) Late outcome in the studied patients

Late outcome	**n (%)**
Recurrence	2 (6.7)
Chronic groin pain	5 (16.7)

4. Discussion

The mean age of the studied patients was 31 years, with a standard deviation of 6 years. Regarding gender, there was a male predominance; most of the studied patient was males (93.3%). Regarding complaint, about half of the studied patients (53.3%) complained of left inguinal hernia and the other half (46.7%) complained of right inguinal hernia.

In agreement with previous study found that inguinal hernias occurred more frequently in males, aged 55 to 65 years, and were right sided and oblique (indirect). Specifically, in women indirect (lateral) hernias prevailed, whereas in men pantaloon hernias predominated followed by indirect and then direct (medial). Direct hernias appeared only in few females, because of the very narrow posterior wall of the inguinal canal[9].

Similar to Sağıroğluet al. study in which three female (5%) and 57 (95%) male patients with an overall mean age of 48 years (range: 27–66 years) were included. Recurrent hernia (n=5; 8.3%), unilateral (n=50; 83.4%), and bilateral hernias (n=5; 8.3%) were detected[8].

The mean surgical time in the present study was 60 minutes, with a standard deviation of 14 minutes. No conversion to open surgery was reported in the studied patients.

Our results were better than Sağıroğluet al. study in which in 4 (6.6%) patients, change to open surgery was required because of technical problems. Unilateral hernias were left sided in 32 cases and right-sided in 18. Laparoscopic procedures were completed in an average of 62 minutes (range: 35–118 minutes) [8].

In the current study, less than one-quarter of the patients reported hematoma, groin pain, or seroma; 20.0%, 16.7%, and 6.7%, respectively. No urine retention was reported. Regarding wound state, most of the patients (93.3%) reported clean wound, and only 6.7% reported infected wound.

A retrospective review and analysis examined 1240 cases involving hernia repair via laparoscopy (specifically TEP), performed by a single surgeon, between January 1995 and December 2014 at a major metropolitan academic medical center. Of the 1240 hernia repairs considered, 117 (9.4%) presented as recurrent, with the remaining 1123 (90.6%) being primary. Most patients were operated on for bilateral hernias (58.4%). There were 106 patients who experienced a total of 114 postoperative complications (13.5% of patients, 9.2% of procedures) across the 8 categories evaluated: seroma (n=37), urinary retention (n=32), testicular/hemiscrotal swelling (n=23), neurological symptoms (12 transient, 2 persistent), hydrocele (n=7), wound/mesh infection (n=1), and testicular atrophy (n=0) [10].

In Sağıroğluet al. [8] study, at first postoperative week, level 2 pain was noted in 4 patients. Seroma, was seen at first postoperative week in 4 patients. No patient experienced hematoma, urinary retention, infection, or recurrence.

In the study of Bansal et al, [11]seroma formation was noted in a significantly larger percentage of patients, that is, 32.5%, followed by edema (12.6%) and wound infection (1.8%).

In Georgiou et al. [12] study, the most important short-term postoperative symptoms was pain on the day of discharge. Patients were asked to rate their pain on a VAS from 1 to 9 (1–3: mild, 4–6: moderate, 7–9: severe). The most frequently reported short-term postoperative complications were annoyance and

discomfort (15.9%), swelling (8.9%), seroma (4.5%), hematoma (3.5%), and numbness (2.5%).

In the current study, recurrence occurred in only two patients (6.7%). Only 16.7% reported chronic groin pain.

In Sağıroğluet al. [8] study, there were fewer recurrent hernias than primary hernias, yet chronic pain did not develop in any of our patients.

In Georgiou et al. [12] study, the most common late complication was a feeling of annoyance or discomfort in 14.8% of patients approximately, while around 4.7% developed edema, 1.7% hypoesthesia, and 0.3% seroma in the inguinal region. Overall, 10.9% of the patients reported experiencing pain, especially during physical activity. The total recurrence rate for laparoscopic TEP hernia repair was 1.7%.

In the present study, mesh fixation was not performed during laparoscopic TEP procedure to avoid potential nerve damage and related chronic pain.

This is in agreement with Sağıroğluet al. [8] study which reported that groups who underwent mesh fixation and nonfixation were compared at the end of 12-months follow-up, no significant difference was detected between groups regarding recurrence or return to normal activities.

The superiority of nonfixation method in terms of avoiding potential nerve damage as well as limiting surgical expenses has been acknowledged [13].

Klobusicky and Feyerherd, used fixation method for hernias with a diameter larger than 4 cm where mesh failed to cover hernial defect completely, and found no significant difference when compared to nonfixation method in terms of length of hospital stay, return to normal daily activities, or postoperative morbidity [14].

In their laparoscopic TEP hernia repair study of 172 cases, Khajanchee et al. evaluated outcomes of use of fixation in 67 cases and no fixation in 105. They concluded development of complications of neuralgia and paresthesia was greater in patients who had undergone mesh fixation procedure, which they attributed to inflammatory effect of tacks [15].

In another TEP study of 89 cases, Beattie et al., who advocated nonfixation method, did not apply mesh fixation in any of their patients, but spread the mesh only on spermatic cord in 1 group. In the other group, they divided mesh in half vertically, wrapped each half around spermatic cord structures, and recorded outcomes of a median postoperative follow-up period of 33 months [16].

They did not observe any intergroup difference in postoperative morbidity, and they didn't encounter any instance of recurrence. Claus et al. investigated mesh migration in laparoscopic TEP hernia repair and compared results of radiological examinations performed immediately, and 30 days after surgery in groups that underwent hernia repair with or without mesh fixation, and also reported lack of any difference between groups [17].

In their meta-analysis, Tam et al. [18] reported that hernia repair using TEP laparoscopic method without mesh fixation could significantly decrease operative time, surgical costs, and length of hospital stay, and they found no difference between mesh fixation and nonfixation methods in terms of hernia recurrence, complications, or postoperative pain.

In another meta-analysis performed by Sajid et al., [19]authors indicated that laparoscopic nonfixation TEP method did not increase recurrence risk, and indicated that operative time, postoperative pain, complications, length of hospital stay, and chronic inguinal pain were similar to that detected in cases of mesh fixation method.

5. Conclusion

TEP inguinal hernia repair performed without mesh fixation is safe, effective procedure with low morbidity and feasible with minimal recurrence rates. Not fixing the mesh avoids possible complications.

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