

## Advanced Laparoendoscopic Surgery as a Recent Modalities in Recurrent Inguinal Hernia Repair Using Transabdominal Preperitoneal Approach

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### ABSTRACT

**Background:** Recurrent inguinal hernia accounts for 10 % of the recurrence rate in all recurrent hernia cases.

**Aim:** This study aimed to operate recurrent hernia by laparoscopic transabdominal preperitoneal technique (TAPP) then evaluate its outcomes.

**Patients and methods:** This a prospective clinical study included 30 patients complaining of recurrent inguinal hernia. All of them were treated by laparoscopic transabdominal preperitoneal stapling of prolene mesh 10 X 15 cm by the endo-tacker in the preperitoneal (Bogros) space. The patients were assessed preoperatively. Then, we assessed the results of the operative finding, difficulties and complication.

**Results:** The TAPP approach was easier in operating bilateral recurrent inguinal hernia but with high cost. The laparoscopic approach has several advantages over the open approach like: Less postoperative pain, operative time was less as we operated the unilateral recurrent inguinal hernia in 40 minutes and bilateral hernia in 60 minutes. The disadvantages of the TAPP approach were: It cannot be performed under local anesthesia, higher patient expectation, increased cost and difficult approach in huge hernias. Postoperatively, no significant serious complications were recorded, only one patient developed mild seroma in the early postoperative period, which resolved within 5 days and another one patient developed mild hydrocele late postoperatively, which resolved within 5 weeks.

**Conclusion:** The transabdominal preperitoneal approach is the best technique for the treatment of recurrent inguinal hernia and the most important pre-step of the TAPP was the familiarity with the intra-abdominal laparoscopic anatomy.

**Keywords:** TAPP, Laparoendoscopic, Hernia.

### INTRODUCTION

Recurrent inguinal hernia account for about 10% of the recurrence rate in all recurrent hernia cases and recently there is no more debate about the approach of repair for the recurrent inguinal hernia by the laparoscopic technique, which is widely practiced as the gold standard technique for the treatment of recurrent inguinal hernia cases <sup>(1)</sup>.

Laparoendoscopic repair of recurrent inguinal hernia has revolutionized the technique of hernia repair by approaching the groin hernia orifices intraperitoneally and applying the mesh in the preperitoneal space (Bogros space) <sup>(2)</sup>. The most popular and the best approach for the repair of recurrent inguinal hernia is the Trans-abdominal preperitoneal approach and the key-step of repair by TAPP technique is the well-known laparoscopic anatomy, the space is larger than that are available in totally extra peritoneal approach and away from adhesion in a virgin area which can be dissected easily <sup>(3)</sup>.

A large most recent EU meta-analysis analyzed the results of laparoscopic hernia repair with open repair with mesh in a retrospective study. This analysis has compared the results of 41 published trials. The end result has been that the risks of wound infection and hematoma formation have been less in the laparoscopic group <sup>(4)</sup>.

The total of hospital stay has been less and quicker return to work after laparoscopic surgery. Numbness, hernia recurrence and chronic pain have been also less after laparoscopic technique. There was less incidence of hematoma formation after laparoscopic technique, but higher seroma formation incidence <sup>(5)</sup>. The choice of

the technique will depend on surgeon preference and surgical expertise for the hernia repair <sup>(6)</sup>.

The aim of this study was operating patients with recurrent inguinal hernia by laparoscopic transabdominal preperitoneal technique, assess its safety and evaluate its outcome.

### PATIENTS AND METHODS

This was a prospective clinical study on 30 patients with recurrent inguinal hernia. All patients were treated by laparoscopic transabdominal preperitoneal stapling of prolene mesh. All patients were subjected to: Detailed history, full general examination, regional examination of the hernia sac to detect the type and size of the hernia and to exclude any complications. Routine laboratory investigations were done.

**Exclusion criteria:** Patients with systemic diseases who had contraindication to general anesthesia and to operation.

**Operative steps:** Before induction of general anesthesia, the patient was placed in the supine position, A routine sterile preparation was performed, after the entry and insufflation, the medial and lateral umbilical folds were identified, the defect was seen, visualization of the internal ring was done and adhesion were lysed if present, then the sac was dissected and reduced into the peritoneal cavity. The median and lateral umbilical ligaments were identified. The peritoneal flaps were dissected creating upper and lower flaps with sharp and blunt dissection. The cord was dissected. A 15 cm x 10 cm prolene mesh was inserted and placed in a proper

place to overlap all the hernial orifices by at least 4 cm and cover Doom triangle. The endo-tacker was introduced through the 5 mm port, fixation was carried out by the protack that fire circular staples, which had the advantage of reposition. After completion of mesh fixation, the peritoneal flap was closed over the mesh, avoiding defects within the peritoneum that might allow adhesions or herniation of bowel, this was done by stapling and sutures.

**Postoperative care:** All patients were given cefradin in a dose of 50-100 mg/kg body weight/day for 2 days long. Early ambulation advised few hours postoperative, the majority of patients were discharged from the hospital on the day one and returned to work after a week of surgery and progress notes were documented for all the patients during hospital stay.

**Statistical analysis**

The investigation was conducted with a power of 80% and a significance level of 95%. Software developed by SPSS Inc. of Chicago, Illinois, USA, was used to code, process, and analyze the data that were collected. The software is version 22 for Windows®. Quantitative data were shown as percentages and numbers (frequency). The patients in the same groups were compared at different time points using a paired samples t-test. A statistically significant result was defined as  $P \leq 0.05$ .

**Ethical consideration:** The research obtained approval from the Research Ethics committee of the General Organization for Teaching Hospital and Institutes (GOTH) (REC., HS000127). All cases felt free to withdraw from the research at any period point, in accordance with their demands. The study was conducted in accordance with Helsinki Standards. Informed written consents had been signed by all patients following a full explanation of the advantages, benefits, and potential complications of each intervention.

**RESULTS**

The ages of the patients ranged from 25 to 51 years. All patients were males. During preoperative assessment, examination and preparation: 15 patients (50%) were smokers and 15 patients had chronic cough. 9 patients suffered from constipation (30%), 3 patients suffered from chest infection and necessitated medical treatment for two weeks. No patients suffered from urinary troubles, 15 patients (50%) gave history of lifting heavy objects and 9 patients suffered from associated medical illness. 3 patient suffered from hyperlipidemia on medical treatment and were assessed by the internal medicine doctors and no special instruction given. Only to resume the medical treatment once the patient start to eat and follow up in outpatient clinic every 6 months for the measurement of lipid profile. The other 6 patients were diabetic and their blood sugar level was adjusted

by the internal medicine as the patient received insulin infusion 8 hours preoperatively and postoperatively they continued on the insulin infusion then received insulin according to a sliding scale adjusted by the internal medicine when they started to eat. When the 6 patients were discharged, they continued their oral hypoglycemic drugs (Table 1).

**Table (1):** Age, precipitating factors and associated medical illness in our patients with recurrent inguinal hernias

Age	No. of patient	Percentage
25y male	3	10%
25-29y male	9	30%
30-35y male	12	40%
≥35 male	6	20%
Precipitating factor	No. of patients	percentage
Smokers	15	50%
Chronic cough	15	50%
Difficult micturition	0	0%
History of associated medical illness	9	30%
Lifting heavy objects	15	50%
Constipation	9	30%
Chest infection	3	10%

In 10% of cases in our study, the hernia was small and we had 3 patient (10%) had huge right sided recurrent inguinal hernia. We had complete (scrotal) hernia in 80% of cases. In our laparoscopic approach the hernia was bilateral in 6 cases (20%) and 24 cases (80%) had a unilateral hernia, 18 patients of them had left side hernia and the other 6 patients had right side hernia. Most of our cases (27 patients) had oblique type and only 3 patients (10%) had direct hernia (Table 2).

**Table (2):** The characters of the hernial sac in our study

Type and size	No. of patients	percentage
Bubonocele (small hernia)	3	10%
Complete or scrotal hernia.	24	80%
Huge hernia	3	10%
Unilateral	24	80%
-Left	18	60%
-Right	6	20%
Bilateral	6	20%
Oblique	27	90%
Direct	3	10%

During our laparoscopic approach we found 6 patients (20%) with a medially displaced cord and vessels, 3 patients with markedly superficial and prominent inferior epigastric artery, 3 patients with an endocyst discovered accidentally in the Bogros space, which excised with easiness and we found marked adhesions in 3 patients, which made lateral dissection difficult. In our laparoscopic approach the operative time ranged from 35-45 minutes with mean time of 40 minute for the unilateral recurrent inguinal hernia and ranged from 55-65 minutes with mean time of 60 minute for the bilateral hernias in the last sex patients (Table 3).

**Table (3):** Operative finding, operative time and difficulties

Finding and technical difficulties	No. of patients	Percentage
-Markedly displaced Vas, Spermatic vessels and inferior epigastric artery.	6	20%
-Lymphatic cyst discovered in the Bogros space.	3	10%
-Markedly superficial and prominent inferior epigastric artery.	3	10%
-Marked adhesions.	3	10%
-No abnormal finding or any difficulties.	15	50%
Site of hernia	Mean time	Range
Unilateral	40 minutes	35-45 minutes
Bilateral	60 minutes	55-65 minutes

No major intraoperative complication was recorded in our technique apart from 3 patients (10%) developed minimal to mild bleeding in the Bogros space from a small preperitoneal vessels, while doing medial dissection, the bleeding was controlled by suction, diathermy and clipping (Table 4).

**Table (4):** The intraoperative complication.

Complication	No. of patients	Percentage
1-Technical failure	0	0%
2-Laparoscopic complication	0	0%
3-Vascular injury in the Bogros space	3	10%
4-Bladder injury	0	0%
5-Nerve injury	0	0%
6-No complication	27	90%

In the early postoperative complication after one week: 3 patients (10%) developed complication in the form of

seroma, which resolved within five days with dressing. In the late postoperative period after one month: 3 patients (10%) developed a minimal to mild hydrocele, which resolved spontaneously within 5 weeks (Table 5).

**Table (5):** Postoperative complication in our study

Complication	No. of patients	Percentage
Urinary complication	0	0%
Seroma	3	10%
Hydrocele	3	10%
Groin neuralgia	0	0%
No complications	24	80%

## DISCUSSION

No surgical technique in recent memory has generated as much excitement and enthusiasm among general surgeons as has interventional laparoscopy and although hernias have been treated for over 3.500 years, descriptive anatomy and refinements of techniques continue to flourish. Furthermore, the swings in techniques tend to undergo radical changes over relatively short periods <sup>(1)</sup>.

We performed a prospective clinical study on 30 patients with recurrent inguinal hernia operated by the transabdominal preperitoneal approach.

In our study, 3 patients (10%) had chest infection, which necessitated medical treatment for two weeks preoperatively, 15 patients suffered from chronic cough, 15 patients were smokers (50%) but chest was clear and 9 patients of them stopped smoking 5 days preoperatively. 9 patients suffered from associated medical illness, 3 patients were suffering from hyperlipidemia, the other 6 patients were diabetic.

In a retrospective study, it was reported that 16 patients from 33 patients about (50%) were smokers, 19 patients lifting heavy objects, 4 patients (10%) suffered from respiratory tract infection, which necessitated medical treatment for two weeks preoperatively and 2 patients were diabetic <sup>(7)</sup>.

In our study, the operative time ranged from 35 to 45 minutes for the unilateral recurrent inguinal hernia with a mean of 40 minutes and ranged from 55 to 65 minutes for the bilateral hernia with a mean of 60 minutes. Our results are comparable with those who reported a mean operative time of 46 minutes for a unilateral recurrent inguinal hernia <sup>(8)</sup>. **Others** reported a mean operative time of 50 minutes for the unilateral recurrent inguinal hernia and 80 minutes for the bilateral hernias <sup>(9)</sup>.

No major intraoperative complications were reported in our patients apart from mild bleeding from the preperitoneal vessels, which controlled by diathermy and clipping. A study recorded that mild bleeding while dissection in the Bogros space and this was controlled with endoclips <sup>(10)</sup>. Also, another study didn't record any major intraoperative complication <sup>(11)</sup>

No cases of urinary bladder or other abdominal or pelvic organ injury were reported in our study. None of our patients required intraoperative conversion to open surgery. In other study, authors made laparoscopic repair for recurrent inguinal hernia for 67 hernias and reported that 6 cases required intraoperative conversion to open repair. They reported that three of these cases were due to inability to reduce large indirect sac, in two cases the peritoneal cavity was entered and a previous pfannensteil's incision limited access to the hernia and in one case conversion was due to technical failure<sup>(12)</sup>. Another study performed totally extraperitoneal repair of recurrent inguinal hernia and reported intraoperative conversion to open surgery due to a large hernial sac and the study used a balloon dissector to create the preperitoneal space and hence the previous incisions in the lower abdomen and adhesions that follow these incisions limited the creation of the preperitoneal space<sup>(13)</sup>. Anyhow, we have to mention that the high percentage of intraoperative complications in their study may be due to the fact that their study included much more cases than ours. Also, they used the totally extraperitoneal approach for the repair, which now is relatively contraindicated for the treatment of recurrent inguinal hernia due to very difficult dissection and difficult space making.

## CONCLUSION

The transabdominal preperitoneal technique is the best technique for the treatment of recurrent inguinal hernia and the most important pre-step of the TAPP is the familiarity with the intra-abdominal laparoscopic anatomy.

## DECLARATIONS

- **Funding:** No fund
- **Availability of data and material:** Available
- **Conflicts of interest:** No conflicts of interest.
- **Competing interests:** None.

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