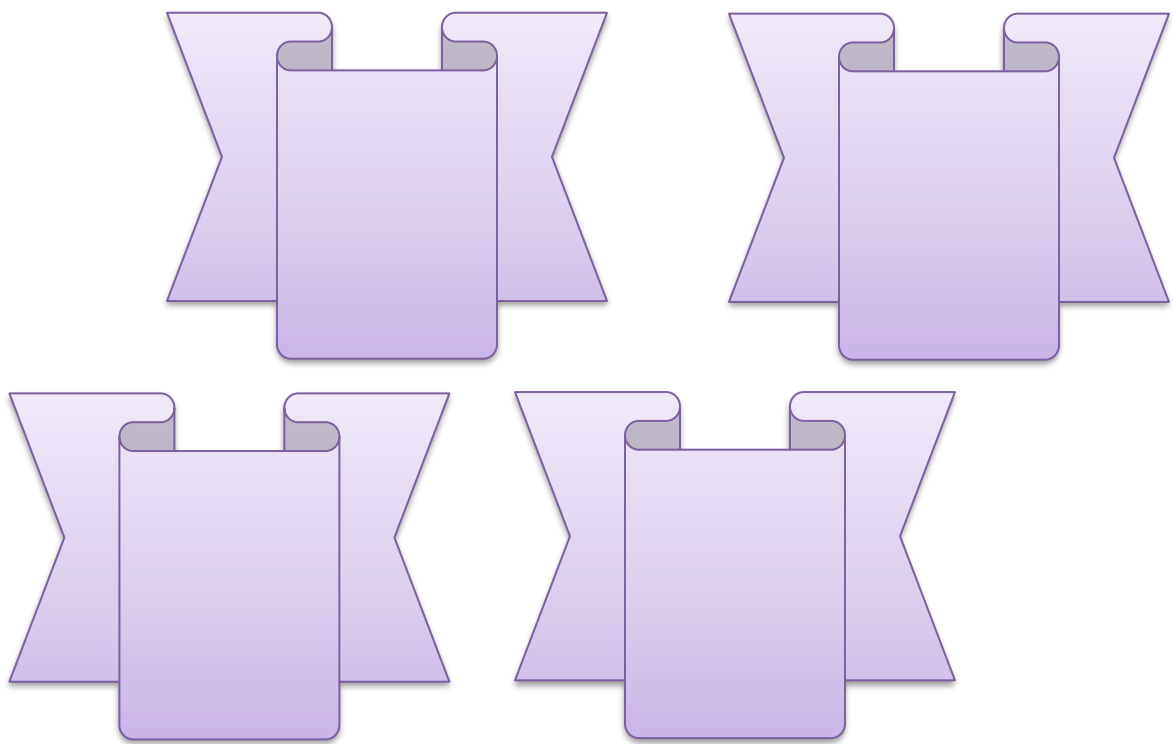


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Original Article

Laparoscopic Transabdominal Preperitoneal versus Open Preperitoneal Hernioplasty for Unilateral Primary Inguinal Hernia

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ABSTRACT

Article information

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Background: According to the greatest reviews of inguinal hernia repairs, there is no discernible difference between laparoscopic and open mesh hernia repair techniques in terms of recurrence.

Aim of the work: This study compares open and laparoscopic hernia repair procedures performed in hospitals.

Patients and Methods: In this retrospective cohort study, the open and laparoscopic approaches to inguinal hernia repair were compared and evaluated for their effects on post-operative pain, hospital stay, operating room time, seroma, urinary retention, paresthesia, numbness, wound infection, and recurrence. From June 2020 to June 2022, 30 patients underwent hernioplasty surgery for a unilateral primary inguinal hernia. A laparoscopic hernioplasty [TAPP] was performed on Group A, while an open hernioplasty was performed on Group B.

Results: There was a statistically significant difference between the two groups regarding the surgical time [p-value = 0.0001] and hospital stay [p-value = 0.0001]. While 20% of group B reported paresthesia and numbness, group A had no complications in terms of paresthesia and numbness [P=0.22]. There was no statistically significant difference between the two groups in terms of seroma and infection results [P-Values =0.329 and 1, respectively]. 13.3% of group A patients experienced recurrence of their hernias compared to group B's 6.7% [p-value =1].

Conclusion: The laparoscopic technique of tension-free repair is preferable to the open technique in terms of immediate postoperative problems as well as delayed pain and paresthesia, as well as in terms of safety.

Keywords: Hernioplasty; Laparoscope; Preperitoneal; Inguinal Hernia.



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INTRODUCTION

A hernia is when intra-abdominal content abnormally exits through a gap in the wall of the cavity where it normally resides, such as the bowel [1]. The final treatment for all hernias, regardless of their origin or nature, is surgical repair, with over 20 million repairs performed annually throughout the world. Repair of the inguinal hernia is one of the common surgical procedures performed worldwide. Men face a 27% lifetime risk, while women face a 3% risk [2].

The widespread use of mesh in groyne hernia surgery has grown in popularity and has all but supplanted suture procedures like the Shouldice repair. The relative merits of placing mesh laparoscopically through two to three tiny abdominal incisions versus using an open technique through a conventional groyne incision are hotly contested [3]. Compared to total extra peritoneal mesh repair [TEP], trans abdominal preperitoneal inguinal hernia mesh repair [TAPP] is a practical and secure method [4].

Even though studies have shown that laparoscopic hernia repair has additional advantages like fewer pain and discomfort, a shorter hospital stay, and an earlier return to normal daily activities, it is still uncommonly done since it requires general anesthesia and has a steep learning curve [3].

The management of surgical patients has undergone many changes as a result of laparoscopic surgery, and the frequency of complications related to open surgical procedures has decreased dramatically [5]. For more than 2 decades, individuals with bilateral or recurring hernias are more likely to benefit from laparoscopic hernia repair [6]. As a result of Lichtenstein's invention of tension-free hernia repair in 1989, which significantly decreased recurrence rates and made open anterior tension-free mesh repairs the most popular repairs globally, there has been a significant revolution in inguinal hernia repair surgery over the past 20 years [7].

Surgeons who adopted the open preperitoneal repair approximated the transversalis fascia to Cooper's ligament and used a preperitoneal slit Prolene mesh. Using a wide chevron-shaped Dacron mesh and a midline incision, Stoppa's GPRVS completely and

bilaterally restored the transversalis fascia over the myopectineal orifice of Fruchaud without mending the damaged wall. Wantz attached the upper border of his Mersaline mesh to the incision using Stoppa's technique applied to one side [8].

TAPP inguinal hernia repair entails laparoscopic investigation of both inguinal areas as well as a second incision to the surrounding peritoneum to examine the myopectineal orifices. The hernia's contents are then reduced, and a mesh is subsequently positioned against the inguinal wall [9]. In situations where there are concurrent intra-abdominal procedures and diagnostic uncertainty, TAPP may be preferable. Additionally, it makes it simpler to identify contralateral hernia and is thought to be a much simpler surgery with a steeper learning curve [10].

THE AIM OF THE WORK

This study compares open and laparoscopic hernia repair procedures performed in hospitals. The goal of the current study is to compare the efficacy of open hernioplasty and laparoscopic hernia repair, as well as to evaluate intraoperative and postoperative problems, operation time, hospital stay, postoperative morbidity, recurrence, and patient satisfaction.

PATIENTS AND METHODS

Study design: Between June 2020 and June 2022, we included 30 patients with inguinal hernias who were admitted to the General Surgery department of the Al-Azhar University Hospital in Damietta.

Study population: Patients who underwent hernioplasty surgery for a unilateral primary inguinal hernia were split into two groups: Group A: All patients who underwent laparoscopic hernia repair surgery [TAPP]. Group B includes all patients who underwent open hernioplasty surgery.

Inclusion Criteria: Age above 18 years, primary, unilateral, and simple inguinal hernias that can be operated on, and no previous history of lower abdominal surgery.

Exclusion Criteria: people with difficult hernias, patients with a history of lower abdominal surgeries and those for whom general anesthesia is contraindicated.

Ethical Considerations: The study procedure was approved by the research ethics committee of the faculty of medicine at Al-Azhar University prior to fieldwork. Each patient signed a written informed consent form.

Study procedures: All participants underwent the following procedures:

Preoperative assessment: Prior to surgery, all patients were instructed to fast for six hours. Prior to either treatment, a urinary catheter was not customarily placed. There was general anesthesia used in every patient. At the time of induction of anesthesia, 1.2 gm of Amoxicillin Clavulanate injection served as a prophylactic antibiotic.

Surgical techniques

A. Open preperitoneal repair with mesh

An anterior rectus sheath was exposed by making a transverse skin incision 8–10 cm long that was made one inch above the internal ring level and one inch from the midline. After making a transverse fascial incision over the midrectus of the afflicted side, the external, internal, and transversus abdominis muscles' muscle fibers were cut to widen the incision laterally. The peritoneum was unharmed since the transversalis fascia was visible and severed in the depth of the wound. Thus, the correct plane of dissection was attained and the preperitoneal space of Bogros was penetrated. As the lower flap of the abdominal wall incision was withdrawn, blunt dissection was initiated using a finger and sponge on a stick just sticking to the peritoneum. Both the spermatic cord and its isolation were mobilized. If there was a direct sac, it was decreased by blunt dissection, moderate traction, and sweeping. After being separated from the cord structures, the indirect sac was located, decreased or ligated, and transected, leaving the distal end open. Frequently, tilting the patient's head down 20 degrees helped in the dissection. Standard "Prolene" polypropylene [Ethicon Ltd, Edinburgh, UK] 15 x 15 cm mesh was shaped and slit laterally, then folded and placed down the space of Bogros.

The mesh was carefully unfolded so that its lower border was well below the ring at the peritoneal reflection, its slit lateral edges hugged the cord structures, and its medial edge just barely crossed the midline. The cord was

restored after hemostasis, and the peritoneum was then allowed to return to its original position. Continuous PDS loop 0 sutures were used to sew the muscle layers together. Finally, prolene 3/0 continuous subcuticular sutures were used to seal the skin.

B. laparoscopic TAPP hernia repair

Under general anesthesia, a laparoscopic TAPP hernia repair was carried out; it was advised to insert a nasogastric tube and a Foley's catheter prior to surgery.

In a direct hernia, the flap was elevated lateral to the internal ring up to the anterior superior iliac spine following medial dissection. Dissection of the hernial sac, which is located anterior and lateral to the cord structures, was done. For the repair, a polypropylene mesh measuring 15 cm [transverse] by 12 cm [vertically] was employed. By withdrawing the telescope and then reinserting it, the mesh was delivered into the operating field via the 10 mm umbilical connection. To secure the mesh to the underlying muscles, staples or trans-fascial sutures were placed over the medial and upper border of the mesh. Three staples were typically enough—one on the upper border and two on the medial border. Following mesh placement, the Peritoneal flap was closed over the mesh to prevent bowel and omental adhesions; this can be done either with staplers or with sutures.

Postoperative follow up of Surgical outcome parameters: Diclofenac sodium 75 mg IM / 12 hours for one day served as postoperative analgesia. Later, 50 mg Diclofenac sodium tablets were administered as needed. Six hours after the final analgesic dose was administered at rest, on the first postoperative day, a postoperative pain assessment was performed. Patients were asked to rate their pain on a scale of 0 to 4 [where 0 is no pain, 1 is mild discomfort, 2 is moderate pain, 3 is severe pain, and 4 is intolerable agony], with 4 being the most painful. If pain was well controlled and there were no serious consequences, patients were released. At 1, 3, and 12 months after surgery, patients were reevaluated with a focus on chronic pain and recurrence. The term "chronic groyne pain" refers to groyne pain of any kind or intensity [including testicular or feeling of a foreign body at the groyne] that lasts longer than three months following the procedure. Recurrence is defined as a palpable hernia or an obvious

abdominal wall defect during the first year following surgery. In cases of uncertainty, recurrence was verified by radiologic analysis to distinguish it from hematoma or seroma.

Statistical Analysis: To explore the association between two qualitative variables, the Chi-Square test was utilized; When the predicted count is less than 5 in more than 20% of cells, Fisher's exact test was performed to investigate the association between two qualitative variables. Significant at P 0.05. Data was processed using Statistical package for Social Science [SPSS 15.0.1 for windows; SPSS Inc, Chicago, IL, 2001].

RESULTS

There were no significant differences between studied groups regarding the age, side of hernia and associated co-morbidities [table 1].

Group B's surgery lasted between 30 and 45 minutes on average, while group A's surgery consumed at least more than 46 minutes, with the majority of cases lasted between 61 and 75 minutes [table 2].

Regarding complications, in the first 24 hours following their operations, 33.3% of group A patients who had laparoscopic hernioplasties reported mild pain, compared to 13.3% of group B patients who had open hernioplasties. 66.7% of group A members reported moderate discomfort, compared to 60% of group B members. Patients who had open hernioplasty, however, reported significant discomfort in a rate of 26.7% [P = 0.004]. One patient experienced wound infection in group B versus None in group A. One patient [6.7%] in group B and two [13.3%] patients in group A experienced hernia recurrence [P=1] as shown in table [3].

Table [1]: General characteristics of studied cases

| | | Group A [n=15] | Group B [n=15] | P value |
|--------------------------|--------------|----------------|----------------|---------|
| Age groups | 15 - 25 | 1 [6.7%] | 2 [13.3%] | 0.824 |
| | 26 – 35 | 6 [40%] | 5 [33.3%] | |
| | 36 – 45 | 6 [40%] | 4 [26.7%] | |
| | More than 45 | 2 [13.3%] | 4 [26.7%] | |
| Hernia side | Right | 8 [53.3%] | 7 [46.7%] | 0.196 |
| | Left | 7 [46.7%] | 8 [53.3%] | |
| Bronchial asthma | | 7 [46.7%] | 2 [13.3%] | 0.108 |
| Diabetes mellitus | | 4 [26.7%] | 5 [33.3%] | 1 |
| Hypertension | | 7 [46.7%] | 10 [66.7%] | 0.462 |

Table [2]: Comparison of the studied cases regarding operative details

| | | Group A [n=15] | Group B [n=15] | P value |
|------------------------------|--------------|----------------|----------------|----------|
| operative time [mins] | 30-45 | 0 [0%] | 15 [100%] | < 0.001* |
| | 46 – 60 | 3 [20%] | 0 [0%] | |
| | 61 – 75 | 7 [46.7%] | 0 [0%] | |
| | more than 75 | 5 [33.3%] | 0 [0%] | |
| Hospital Stay | One day | 15 | 4 [26.7%] | 0.001* |
| | Two days | 0 [0%] | 8 [53.3%] | |
| | Three days | 0 [0%] | 3 [20%] | |

Table [3]: Comparison of the studied cases regarding complications

| | | Group A [n=15] | Group B [n=15] | P value |
|---------------------------------|----------|----------------|----------------|---------|
| 24-hours pain score | Mild | 5 [33.3%] | 2 [13.3%] | 0.004 |
| | Moderate | 10 [66.7%] | 9 [60%] | |
| | Severe | 0 [0%] | 4 [26.7%] | |
| Seroma | Yes | 4 [26.7%] | 1 [6.7%] | 0.329 |
| | No | 11 [73.3%] | 14 [93.3%] | |
| Paresthesia and numbness | Yes | 0 [0%] | 3 [20%] | 0.22 |
| | No | 15 [100%] | 12 [80%] | |
| Wound infection | Yes | 0 [0%] | 1 [6.7%] | 1 |
| | No | 15 [100%] | 14 [93.3%] | |
| Recurrence | Yes | 2 [13.3%] | 1 [6.7%] | 1 |
| | No | 13 [86.7%] | 14 [93.3%] | |

DISCUSSION

In this retrospective cohort study, the open and laparoscopic approaches to inguinal hernia repair were compared and evaluated for their effects on post-operative discomfort, hospital stay, operating room time, seroma, paresthesia, numbness, wound infection, and recurrence.

Inguinal hernia repair techniques have not altered significantly in a little over a century prior to the invention of synthetic mesh. Both an open procedure and a minimally invasive endoscopic technique can be used to implant this mesh. TAPP endoscopic method is the most popular [11].

Lichtenstein et al. [12] supported the widespread use of mesh for hernia repair and created the term "Tension-Free Hernioplasty". The 1990s saw the introduction of laparoscopic tension-free repair, which was touted as a less painful method with a quicker recovery time.

In the TAPP group, operations took longer than in the open group, which agreed with **Bittner et al.** [13] [65 vs. 40 minutes; $P = 0.0001$]. However, the overall length of hospitalization was shorter [1 to 1.5 vs. 2 to 3 days]. Despite the improvements made to the TAPP procedure, the length of the operation is still prolonged.

Our study showed that there is a significant decrease in hospital stay related to laparoscopic hernioplasty. According to **Stephenson** [14], up to 20% of open repairs resulted in long-term inguinal neuralgia from nerve entrapment, and laparoscopic repairs also put many nerves at risk of entrapment.

The majority of studies that have looked at the impact of chronic pain on patients' daily lives and activities as their primary result have done so. In a study of 560 individuals who underwent laparoscopic or open surgery, 7.1% vs. 13.6% had reduced function as a result of persistent discomfort when walking, and 15% vs. 21% did so during strenuous activities [15].

In our study, we discovered that 0% of patients who received laparoscopic repair experienced persistent pain, compared to 20% of patients who underwent open repair, and there was no statistically significant difference between the two. With more experienced surgeons, recurrence rates decreased, according

to **Neumayer et al.** [16], demonstrating the importance of the learning curve.

Additionally, a meta-analysis that included over 6,000 hernia repairs from 33 trials, including quasi-randomized, small studies, and compared all laparoscopic versus all open repairs with a short follow-up for recurrences showed a similar point estimate with only marginally more precision than their trial and tended to favor laparoscopic repair [17]. Their analysis of recurrences revealed that the surgeon was accountable for over 50% of those following laparoscopic surgery, which was consistent with their analysis of recurrences after two years. Given that this particular surgeon only produced one further recurrence over the course of their extensive follow-up, there is evidence that the learning curve may have been overestimated during the first year but has now been overcome. However, with the right instruction from skilled surgeons, many of these early recurrences would have been avoided, showing an even better prognosis for laparoscopic hernia repair [17].

In another Cochrane Database Systematic Review, there were 109 recurrences among the 3504 patients who underwent open repair as opposed to 86 among the 3138 patients who underwent laparoscopic surgery [$p = 0.16$]. Similar findings were observed by a different meta-analysis, which found that overall recurrences did not differ between the laparoscopic and open groups [18].

Our sample was small, consisting of just 30 patients, and the learning curve played a significant impact in the recurrence rate after laparoscopic hernia repair. As a result, the laparoscopic approach would have a lower recurrence rate with a larger sample and improved learning curve.

Limitations of the study: This research has certain restrictions: A bigger sample size from a multicentric investigation is necessary for a more conclusive management choice because of the study's small sample size, single-center design, and absence of randomization.

Conclusion: We came to the conclusion that the laparoscopic technique of tension-free repair is preferable to the open technique in terms of immediate post-operative problems as well as delayed pain and paresthesia, as well as in terms of safety.

Conflict of Interest and Financial Disclosure: None.

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