

Assisted totally extraperitoneal laparoscopic hernioplasty: a new technique innovated for large inguinal hernias

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Background

The most difficult and tedious step in total extraperitoneal (TEP) laparoscopic hernia repair is the dissection of the sac from the cord structures, especially in large inguinal hernias reaching the bottom of the scrotum. The possibilities of bleeding, vas injury, and missing part of the sac lie mostly in this step. We introduced this modification to the procedure to accomplish this step through a small incision at the neck of the scrotum with sparing the second operator port.

Aim

The aim of this study is to evaluate this new technique of assisted totally extraperitoneal (ATEP) laparoscopic hernioplasty in the management of patients with large inguinal hernias.

Patients and methods

This study was conducted on 192 male patients with large inguinal hernias who were randomly arranged into two equal groups: group I included 96 patients who underwent the classical TEP laparoscopic hernioplasty, and group II included 96 patients who underwent the new modification ATEP laparoscopic hernioplasty. The two groups were compared regarding the operative time, intraoperative and postoperative complications, and the hospital stay.

Results

There were statistically significant reductions in the operative time; the incidence of intraoperative bleeding, vas injury, and incomplete sac excision; and postoperative massive scrotal edema in group II compared with group I, with more or less similar cosmetic results.

Conclusion

ATEP laparoscopic hernioplasty is a safe and effective procedure to manage patients with large inguinal hernias and achieved better control with lower morbidity than the classic TEP laparoscopic hernioplasty.

Keywords:

assisted laparoscopy, hernia repair, total extraperitoneal

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Introduction

Inguinal hernias account for more than 75% of all abdominal wall hernias, with a lifetime risk of 27% in men and 3% in women, and repair of these hernias is one of the most commonly performed surgical procedures in the world [1,2]. Laparoscopic inguinal hernia repair originated in the early 1990s as laparoscopy gained a foothold in general surgery [3–5].

Laparoscopic hernia repair is now widely performed and has been demonstrated to be safe and cost-effective. The laparoscopic approach can be performed through transabdominal preperitoneal (TAPP) approach or totally extraperitoneal (TEP) approach. Choosing one or the other will depend on each group's laparoscopic skills and preferences [6]. Both techniques shortened recovery and eliminated most early failures, but the TEP approach reduced the potential for intraperitoneal complications

and may be the procedure of choice in most situations [7].

The most difficult and tedious step in the TEP laparoscopic hernia repair is the dissection of the sac from the cord structures, especially in large inguinal hernias reaching the bottom of the scrotum. The possibilities of bleeding, vas injury, and missing part of the sac lie mostly in this step. Our new idea, assisted total extraperitoneal (ATEP), aims at dealing with scrotal part of the sac through a small incision at the neck of the scrotum then dealing with the proximal part of the sac and application of the mesh through the traditional TEP laparoscopic approach.

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Aim

The aim of this study is to evaluate the feasibility, safety, and effectiveness of a new technique, ATEP laparoscopic hernioplasty, in the management of patients with large inguinal hernias.

Patients and methods

This research started in September 2013 and continued till January 2019 in the General Surgery Department of Zagazig University Hospitals. It was performed on 192 male patients with large oblique inguinal hernias reaching the bottom of the scrotum (Fig. 1).

This study was approved by the IRB of Faculty of Medicine, Zagazig University.

Inclusion criteria

The following were the inclusion criteria:

- (1) Patients between 18 and 70 years old.
- (2) Patients having large oblique inguinal hernia descending into scrotum.
- (3) Patients fit for and willing to have surgery.
- (4) Patients consented to join this study.

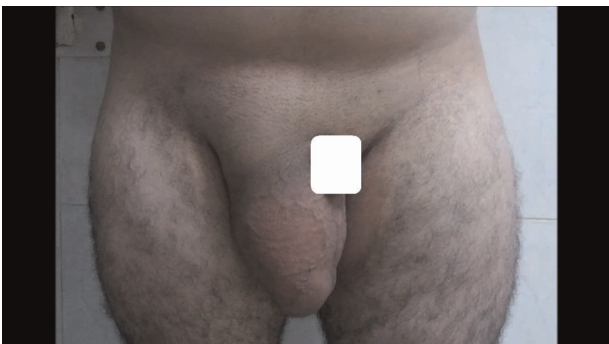
Exclusion criteria

The following were the exclusion criteria:

- (1) Patients who had open lower abdominal surgery.
- (2) Patients with contraindications to laparoscopy.
- (3) Patients in whom the procedure was completed as TAPP.
- (4) Patients with failed spinal anesthesia and switched to general anesthesia.
- (5) Recurrent and bilateral cases.

The patients were numbered and randomly divided into group I and group II.

Figure 1



Large right hernia reaching the bottom of the scrotum.

Group I included 96 patients with odd numbers, and they were planned to undergo the classic TEP repair of their inguinal hernias.

- (1) Group II included 96 patients with even numbers, and they were planned to undergo the new technique of ATEP repair of their inguinal hernias.
- (2) The new technique entails two stages:

Stage I (the open stage)

A small (2 cm) incision is made through the neck of the scrotum (Fig. 2) through which the spermatic cord is mobilized and delivered through the wound (Fig. 3), and then dissection is done to isolate the sac from other cord structures (Fig. 4), which by mild traction and finger insinuation, we can ligate it far proximally at the level of internal ring (Fig. 5). The sac is cut and removed (Fig. 6), but the whole suture thread is not cut and left attached to the neck of the sac (Fig. 7) to identify it at the laparoscopic stage of the operation. Then the cord is repositioned into the scrotum (Fig. 8).

Stages II (the laparoscopic stage)

It is similar to the classic TEP repair, but we can use only one 5-mm operator port to accomplish the procedure. A small (1 cm) incision is made through the umbilicus and deepened to cut the anterior rectus sheath on the ipsilateral side (Fig. 9). The space maker is smoothly insinuated into the preperitoneal space and inflated to make the operative field (Fig. 10). Only one 5-mm operator port is added. In a few cases, we experienced gas leakage through the inguinal incision, and this was easily managed through light manual compression by the assistant over the incision to occlude it. After identification of the spermatic cord, the assistant grasps the thread attached to the neck of the sac to identify it (Fig. 11) and ensure that it was cut high at the proper site, then the thread is cut and withdrawn from the scrotal incision, and then the mesh

Figure 2



A small incision at the neck of the scrotum.

Figure 3



Delivery of the cord through the incision.

Figure 4



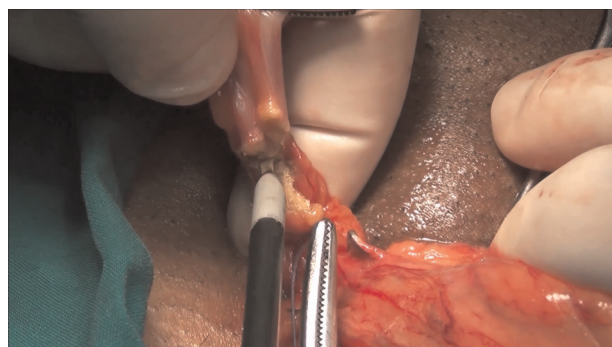
Dissection of the sac from cord structures.

Figure 5



The sac is transfixed at the neck.

Figure 6



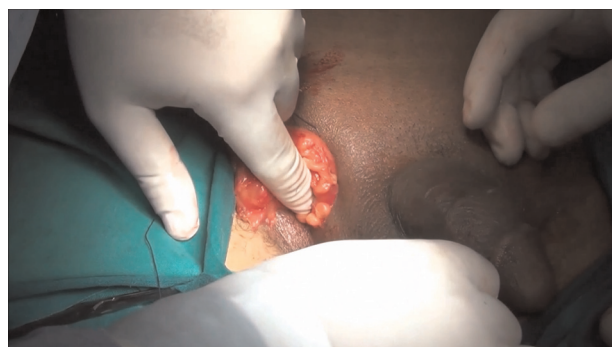
The sac is cut and removed.

Figure 7



The thread is left attached to the ligated neck.

Figure 8



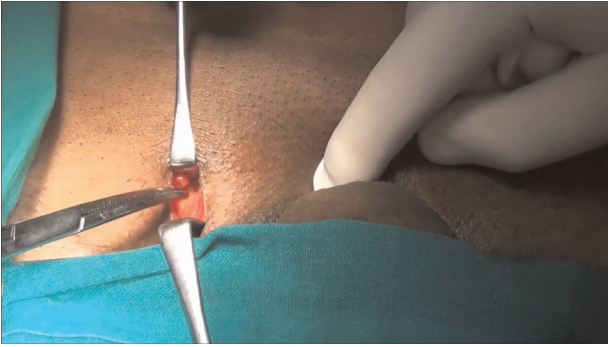
The cord is repositioned into the scrotum.

is put in place and fixed with tacks to the pubic ramus medially (Fig. 12) and the back of the abdominal wall laterally (Fig. 13). No tacks were applied below the iliopubic tract. No drains are left, and the scrotal wound is closed with subcuticular sutures, whereas the abdominal stabs are stapled (Fig. 14).

The operative time was recorded for each case. Moreover, any intraoperative accident or complications such as bleeding, vas injury, or incomplete excision of the sac were reported.

In case of bleeding, control of intraoperative bleeding using Ligasure grasper was done with suction of blood collection. In case of postoperative scrotal hematomas, surgical evacuation and drainage were performed under local or spinal anesthesia. In cases of vas injury, immediate consultation with our colleagues of microsurgery was done, who performed immediate repair of the vas. In cases of incomplete excision of the sac, only three cases of the 14 cases whose sacs were incompletely excised developed scrotal cysts with accumulation of fluid inside. These cases were

Figure 9



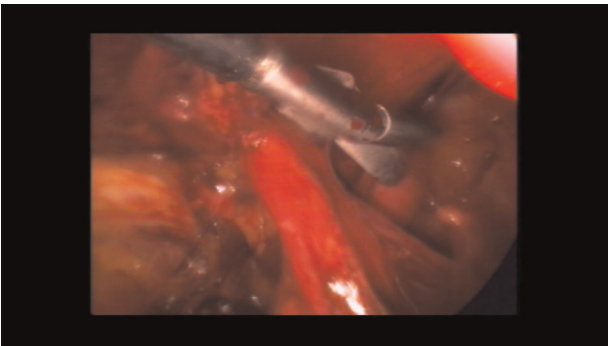
A small incision is made through the umbilicus and deepened to cut the ipsilateral anterior rectus sheath.

Figure 10



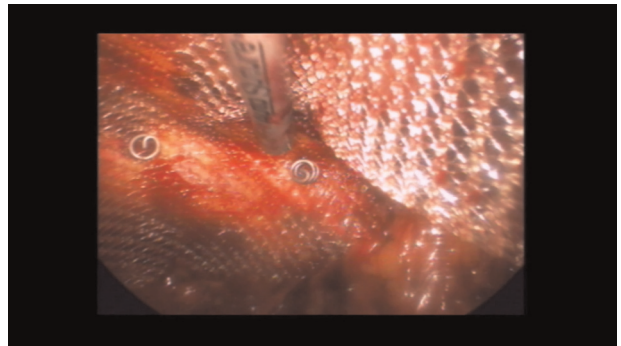
The space maker is smoothly insinuated into the properitoneal space and inflated to make the space.

Figure 11



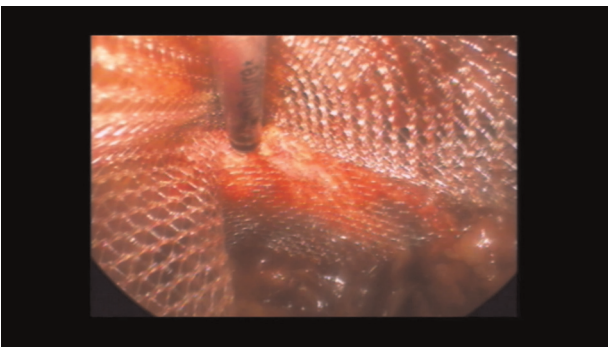
The thread attached to the ligated sac is pulled up to ensure that it was cut at the proper site then it is cut.

Figure 12



Fixation of the mesh to the pubic ramus.

Figure 13



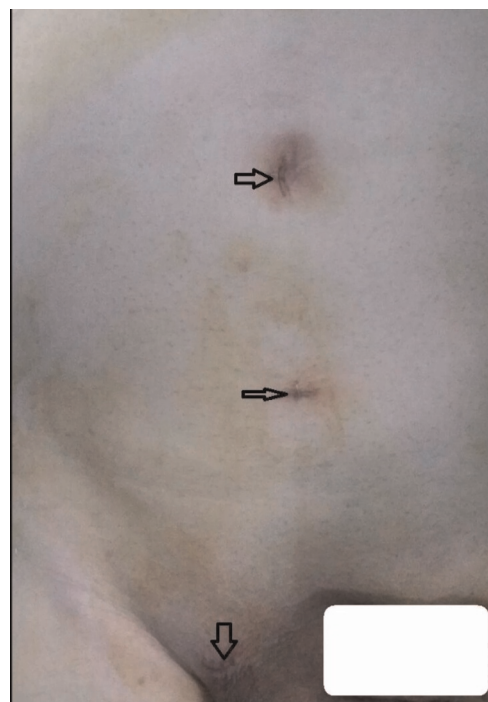
Fixation of the mesh to the back of the conjoint tendon with tacks.

managed conservatively for 3 months, but at the end, all of them needed surgical excision under spinal anesthesia.

Postoperative care

Patients were cared in the usual surgical wards. Postoperative pain was observed and recorded in a digital manner (from 0 to 10) using visual analog pain scale [8]. All postoperative complications such as surgical emphysema, wound infection, and massive

Figure 14



The final appearance of the abdomen at the end of operation.

scrotal edema were reported. The total hospital stay and time to return to work were recorded. Then, all data in the two groups were plotted against each other and were statistically studied to compare them in the two groups.

Results

The demographic and clinical criteria, including the age of patient, the BMI, the duration of the complaint, and the length of the sac all showed no statistically significant difference between the two groups (Table 1).

The operative time is statistically significantly shorter in group II compared with group I. Moreover, all intraoperative complications or unpleasant events such as bleeding, vas injury, or incomplete sac excision are statistically much less likely to occur in group II than group I (Table 2).

The postoperative pain measured by visual analog pain scale was significantly lower in group II than group I.

There was no statistically significant difference between the two groups regarding surgical emphysema or wound infection; however, the incidence of massive scrotal edema was significantly lower in the group II (Table 3).

Discussion

Both laparoscopic and open Lichtenstein hernioplasties have a low risk for hernia recurrence if proper mesh size

is used. The patients who undergo hernioplasty with open mesh hernioplasty seem to experience chronic symptoms and pain more often than those managed with the laparoscopic procedure [9].

The TEP repair of inguinal hernias is increasingly becoming more popular and is gaining acceptance among laparoscopic surgeons. Lack of pneumoperitoneum, no risk of intestinal injury, the absence of risk of adhesions, less likely postoperative shoulder pain, and the more feasibility to use spinal anesthesia all are advantages of TEP over TAPP [10]. The simple logic of our idea is that large inguinal hernia is a compound pathology consisting of an abdominal component and an extraabdominal (scrotal) component, so why should we dissect the scrotal sac through the abdomen. It seems easier, faster, and less injurious to the surrounding structures to attack each component at its location.

The absence of any statistically significant difference between the demographic and clinical criteria in the two groups indicates good matching and absence of bias.

The main task of the second operative port is to help dissect the sac in coordination with the first one, and as this job is already accomplished in the first stage, so we can omit the second port.

The new technique, ATEP repair of inguinal hernia, showed shorter operative time, lower risk of intraoperative complications such as bleeding, vas injury, and incomplete removal of the sac, and also lower incidence of massive scrotal edema than the traditional TEP technique.

Conclusion

ATEP laparoscopic hernioplasty is much easier, safer, and with more acceptable results than the classic TEP repair in the management of large inguinal hernias.

Table 1 The demographic and clinical data

| | Group I (N=96) (mean±SD) | Group II (N=96) (mean±SD) | P value |
|---|-----------------------------|------------------------------|---------|
| Age of the patient (years) | 40.5±8.5 | 42.0±6.6 | 0.171 |
| BMI of the patient (kg/m ²) | 35.1±4.1 | 34.4±5.1 | 0.296 |
| Duration of the complaint (months) | 17.5±6.3 | 18.3±4.1 | 0.298 |
| Length of the sac (cm) | 18.3±2.1 | 18.6±2.3 | 0.346 |

Table 2 The operative data

| | Group I (n=96) [n (%)] | Group II (N=96) [n (%)] | P value |
|--------------------------------|---------------------------|----------------------------|---------|
| Operative time (min) (mean±SD) | 120±30.0 | 45±15.0 | <0.001* |
| Bleeding | 12 (12.5) | 2 (2) | <0.001* |
| Vas injury | 6 (6.2) | 0 | 0.03* |
| Incomplete excision of the sac | 14 (14.5) | 0 | <0.001* |

*Highly significant difference.

Table 3 The postoperative data

| | Group I (N=96) [n (%)] | Group II (N=96) [n (%)] | P value |
|--------------------------------|---------------------------|----------------------------|---------|
| Postoperative pain (mean±SD) | 5.3±3.1 | 3.1±1.5 | <0.001* |
| Marked scrotal edema | 39 (40.6) | 5 (5.2) | <0.001* |
| Surgical emphysema | 21 (21.8) | 25 (26) | 0.49 |
| Wound infection | 2 (2) | 2 (2) | 1.0 |
| Hospital stay (days) (mean±SD) | 1.5±0.5 | 1.2±0.6 | <0.001* |

*Highly significant difference.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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