

Transabdominal preperitoneal laparoscopic method for treatment of emergency groin hernias in adult patients

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ABSTRACT

Background. Emergency groin hernia is an understudied research field despite its severity requiring emergency surgery associated with high postoperative morbidity and mortality rates. Therefore, the purpose of this study was to investigate the efficacy, critical technical elements, and management of problems associated with the transabdominal preperitoneal (TAPP) laparoscopic technique for adult patients in need of an emergency groin hernia repair.

Methods. We analyzed adult patients who were treated between January 2021 and March 2023 for emergency groin hernia repair. These patients' preoperative data were examined.

Results. The surgery was successfully performed on all 21 patients. The duration of the surgery was 71.6±19.7 minutes (range, 45–120 minutes). The hospitalization time was 3.2±2.2 days (range, 2–5 days).

Conclusions. The TAPP approach is a secure and efficient method for performing emergency groin hernia repair in adults due to its ability to evaluate hernia content and reduce the incidence of incisional infection.

Keywords: laparoscopic, TAPP, groin hernia repair, inguinal hernia, femoral hernia, obturator hernia

INTRODUCTION

Since its introduction in 1990, laparoscopic repair of groin hernias, encompassing inguinal, femoral, and obturator hernias, has been universally acknowledged as a very successful procedure for treating elective groin hernias [1]. For almost thirty years, there have been two main approaches to laparoscopic surgery of groin hernias: the preperitoneal transabdominal (TAPP) technique [2] and the totally extraperitoneal (TEP) [3] method. These two surgical methods have proven to be enduring, with a high percentage of success and a low recurrence rate [4-7].

As surgical techniques advance and our understanding of preperitoneal anatomy deepens, surgeons naturally expand these techniques to increas-

ingly difficult settings. This is further facilitated by increased training in structural surgery. It has now broadened its scope from elective, uncomplicated groin hernias to complex and emergency groin hernia cases [8,9], much like how laparoscopic cholecystectomy is performed for acute cholecystitis.

Laparoscopic procedures have been used successfully to treat acute emergency groin hernias in a number of specialist centers. The reason for the discrepancy in outcomes between laparoscopic and open surgery is believed to be the modification in the sequence of surgical procedures used to treat patients with emergency groin hernias. Any indicators of bowel recovery are monitored during the open approach, which involves isolating the strangulated colon. A laparotomy or bowel resection will be per-

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formed if the degree of strangulation is unclear or if there are doubts over the survival of the harmed tissue. During the laparoscopic procedure, after the diagnosis is confirmed and the strangulated bowel is reduced, surgeons would prioritize repairing the groin hernia before waiting for the bowel to regain its normal function. This repair can be done using laparoscopy or an open surgical technique. After the completion of the hernia surgery, the surgeon subsequently returns to reassess the viability of the bowel. This allows sufficient time for the constricted colon to heal, decreasing the need for bowel resection. The distinct benefits of laparoscopy in accessing the constricted contents and the prolonged duration that allows the constricted bowel to recuperate in a heated intra-abdominal setting are crucial factors in diminishing the incidence of unnecessary laparotomy and bowel resection in emergency laparoscopic procedures for groin hernias [8-10]. The decision to do laparotomy is widely recognized as the primary factor contributing to later morbidity and mortality.

This study primarily focuses on the technical aspects of using a laparoscopic method to handle acute emergency groin hernia cases.

METHODS

Study population

This retrospective analysis comprised 21 patients with severely strangulated obturator, femoral, and inguinal hernias. These patients had emergency transabdominal preperitoneal (TAPP) repair at Hue Central Hospital between January 2021 and March 2023. An analysis was conducted on the patients' attributes, surgical specifics, length of hospitalization, occurrence of complications, death rate, and recurrence rate.

The laparoscopic technique was evaluated based on several factors, including the average duration of the operation, its effectiveness in reducing the hernia, the frequency of having to switch to open surgery, and the accuracy in diagnosing contralateral inguinal hernias. The laparoscopic procedure was assessed based on several parameters, including the average duration of hospitalization, mortality rate, morbidity rate of complications, and rate of hernia recurrence.

Adult patients with strangulated groin hernias, no history of major abdominal surgery, no infection of the abdominal wall, no significant cardiovascular diseases, and in a physically fit state for general anesthesia were recruited for the study. The exclusion criteria included patients who were not eligible for general anesthesia, had symptoms of peritonitis, had an intestinal perforation diagnosed prior to surgery, and had severe dyspepsia that would have made a laparoscopic procedure difficult.

Surgical technique

Every treatment was performed by a single surgeon, and TAPP repair was carried out each and every time. After general anesthesia was administered, the abdominal cavity was punctured just below the umbilicus to allow the insertion of a 10-mm trocar. After then, a pneumoperitoneum was formed, and the pressure increased to 12 mmHg. A 10-mm trocar was used to introduce a 30° video camera into the abdominal cavity. Two 5-mm trocars were introduced using laparoscopic visualization at each mid-clavicular line, about 1 or 2 cm below the umbilicus (Figure 1). First, we located the inguinal region and evaluated the hernia's contents. The hernia reduction treatment was then carried out, despite some technical difficulties. Hernia reduction may be made easier with general anesthesia. In the event that direct traction is unsuccessful, an assistance may physically press the inguinal area from the outside. It became required to use an electronic hook to enlarge the hernia ring if the previously indicated treatments failed. The hernia ring was cut on the front and side for indirect hernias and the front and middle for direct hernias. Following a good decrease, the liveliness of the hernia content became readily apparent. Subsequently, the TAPP repair procedure was carried out according to the standard protocol. A recurrence of severely incarcerated bowel was identified in the latest stage, prompting the performance of endoscopic colon resection if deemed required. We opted for open surgery in patients who experienced intestinal perforation. The TAPP technique was used to repair any further contralateral inguinal hernias simultaneously.

The manifestation of imprisoned or strangulated inguinal hernia involves the presence of a fundamental mass in the inguinal area or scrotum, regardless of whether the person is standing or lying down. Patients may report experiencing localized soreness or pain during examination. Certain individuals ex-

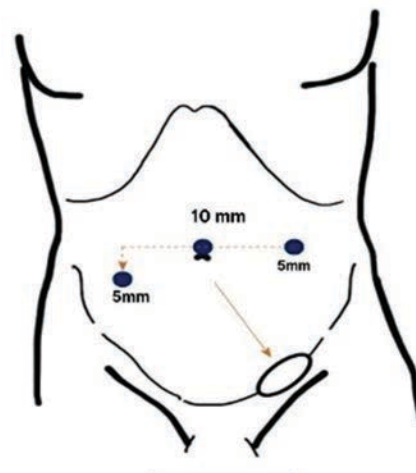


FIGURE 1. Trocar placement

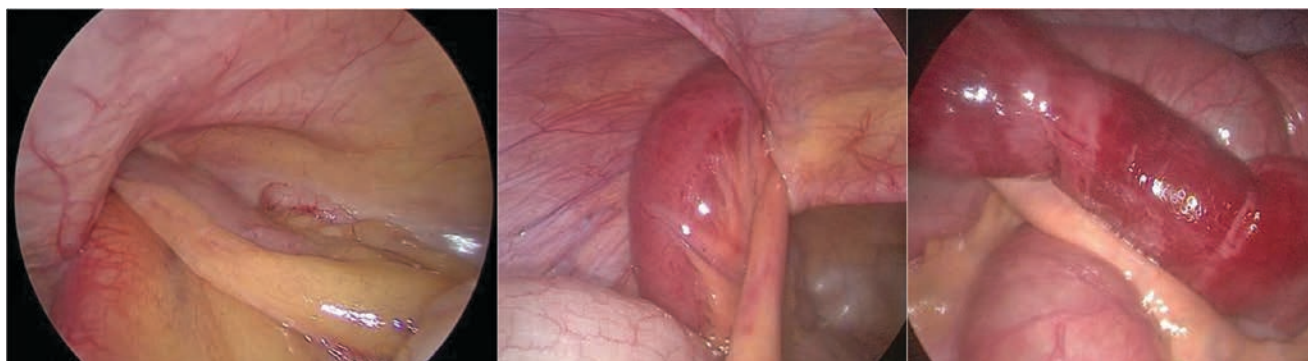


FIGURE 2. Strangulated inguinal hernia

hibit gastrointestinal manifestations. Signs such as persistent or intense discomfort, skin redness, sickness, or throwing up that are linked to the bulge indicate that the hernia may be strangulated. Figure 2 illustrates an instance of strangulated inguinal hernia in our investigation. Before surgery, patients underwent preoperative evaluations, including laboratory testing, ultrasonography (US), and computed tomography (CT) scans. The US and CT scans are excellent diagnostic tools for accurately determining a hernia sac's location, size, and contents. The protack adhesive was used to repair all the meshes. The peritoneum was sutured using either an absorbable suture or protack.

Every patient received a preoperative prophylactic antibiotic.

RESULTS

There were 21 patients who underwent TAPP approach for emergency groin hernia repair in adults. All characteristics of the patients and details about surgical procedures are listed in Table 1. Nineteen male and two female patients were included with a mean age of 57.3±13.6 years (range, 29-92 years). Their mean BMI was 21.1±2.4 kg/m² (range, 18–27 kg/m²). The mean duration of symptoms was 8.7±7.5 hours (range, 3–18 hours). The types of groin hernias were 76.2%, 9.5%, 14.3% and 9.5% for indirect inguinal, direct inguinal, femoral and obturator hernias, respectively. The mean operation time was 71.6±19.7 minutes (range, 45–120 minutes), and the length of hospital stay was 3.2±2.2 days (range, 2–5 days). The approaches of hernia reduction are presented in Table 2. The postoperative complications after TAPP are shown in Table 3.

DISCUSSION

Compared to open surgery, the TAPP approach's laparoscopic method provides a quicker recovery after surgery. It is applied to the evaluation of hernia content and concurrent treatment of bilateral hernias.

As a result of the growing need for ongoing improvement of surgical skills, we have just begun to

TABLE 1. Characteristics of the patients and details about surgical procedures

Items		Results
Age (years)	Mean±SD (range)	57.3±13.6 (29–92)
Sex	Male (%)	19 (89.5)
	Female (%)	2 (10.5)
BMI (kg/m ²)	Mean±SD (range)	21.1±2.4 (18–27)
Duration of symptoms (hours)	Mean±SD (range)	8.7±7.5 (3–18)
Types of hernia	Inguinal Indirect (%)	14 (76.2)
	Inguinal Direct (%)	2 (9.5)
	Femoral (%)	3 (14.3)
	Obturator (%)	2 (9.5)
Content of hernia content	Omentum (%)	7 (33.3)
	Bowel (%)	14 (66.7)
Operating times (minutes)	Mean±SD (range)	71.6±19.7 (45–120)
Hospitalization (days)	Mean±SD (range)	3.2±2.2 (2–5)

TABLE 2. Approaches of hernia reduction

Type	n (%)
Reduction during anesthesia	5 (23.8)
Direct traction with manual compression	16 (76.2)
Incision of hernia ring	0 (0)

TABLE 3. Major complications

Complications	n (%)
Seroma/hematoma	3 (14.3)
Urine retention	2 (9.5)

use the TAPP technique for the treatment of incarcerated hernias because it is preferable in terms of assessing intestinal viability. During open surgery, the use of muscle relaxants and narcotic medications may allow the trapped hernia content to return to the abdominal cavity. As a result, surgeons are always faced with the dilemma of whether or not to do an exploratory laparotomy due to trapped material.

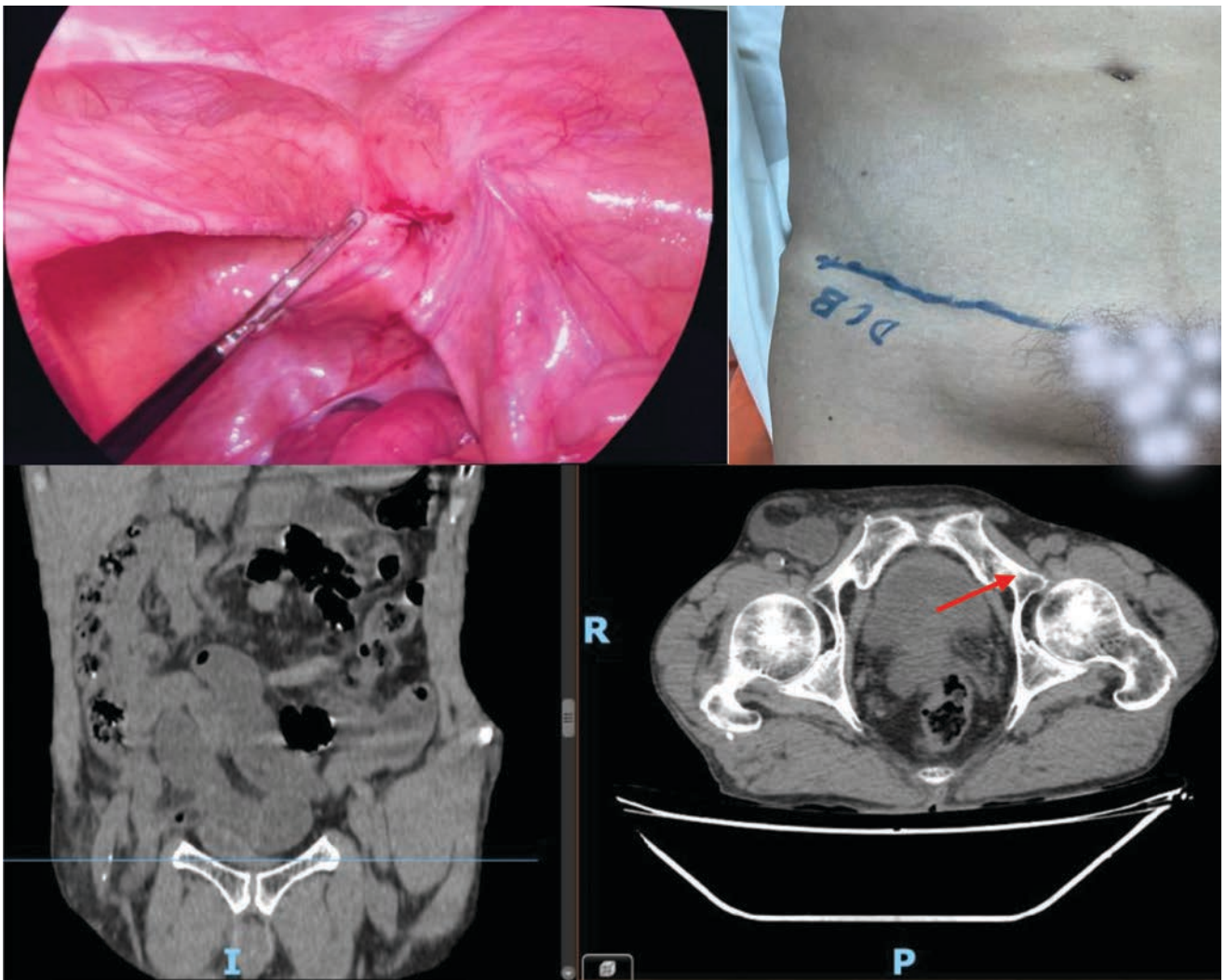


FIGURE 3. Femoral hernia

Among 21 patients undergoing emergency surgery by TAPP technique, we have 19 men and 2 women; the female cases are obturator hernia patients with low BMI. This is entirely in line with the literature on documenting the phenotype of an obturator hernia patient, which is typically slender, elderly women; hence, the condition is known as “the hernia of old ladies” [11]. Though it accounts for only 0.2-1.6% of all occurrences of mechanical obstruction of the small bowel, it is an uncommon cause of bowel obstruction that frequently shows up without any particular symptoms. The Howship-Romberg sign, the Hannington-Kiff sign, and obturator neuralgia are a few of the traditionally recognized symptoms, albeit they are not always present. Compared to other abdominal hernias, its incidence ranges from 0.05 to 1.4%, and 90% of cases appear clinically as intestinal blockage.

The lower area of the abdomen in the groin area is a common place for hernias to occur. Inguinal, femoral and obturator hernias all happen in the groin, causing pain and other symptoms. Both men and women can suffer from groin hernias, but certain types do affect one gender more than the other.

16 cases of inguinal hernias (Figure 2), 3 femoral hernia cases (Figure 3), and 2 obturator hernia cases (Figure 4) were included in our study. Regardless of gender, inguinal hernias remain the most common type of injury. On the right side, femoral and inguinal hernias are more common [12]. This is probably because the right testis normally descends more slowly during fetal development, which causes a developmental delay in the closure of the processus vaginalis. Most people agree that the sigmoid colon's location reduces the chance of a left-sided malformation by tamponading the left femoral canal.

In this report, we recorded herniated organs such as intestines (66.7%) and greater omentums (33.3%). All patients whose herniated organs are the intestines use laparoscopic surgery to release the organs without having to resection the intestines. For the greater omentum, if it is inflamed, sticky, and difficult to pull back into the abdominal cavity, we will remove a part to release it easily.

Most of the trapped contents might have returned to the abdominal cavity on their own during the TAPP procedure due to the force of gravity, narcotic drugs, or muscle relaxants. In order to stop any bleeding or

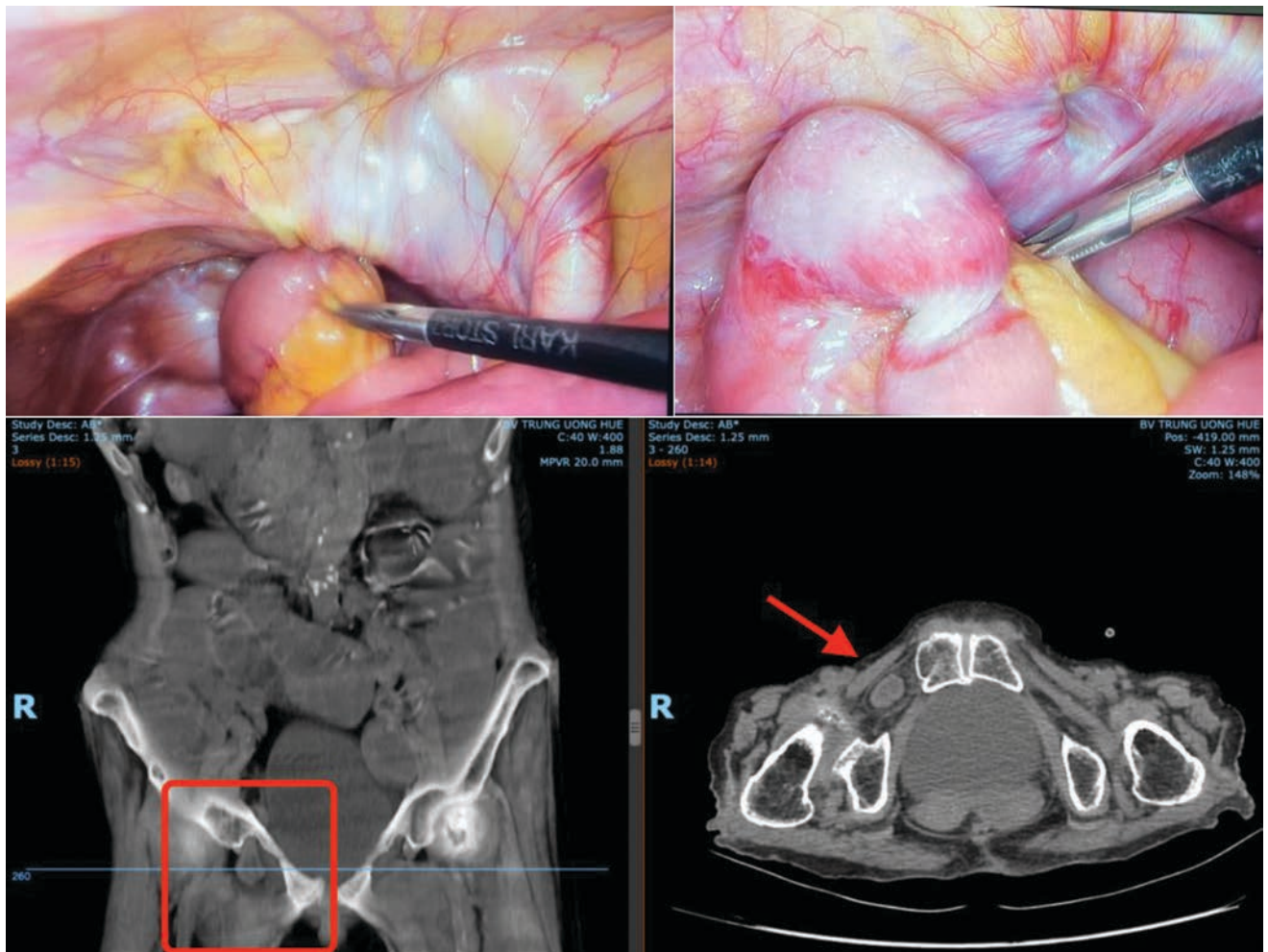


FIGURE 4. Obturator hernia

damage to the bowel, those who require surgical intervention during a procedure should carefully retract the trapped contents while holding the non-swollen tissue around the intestines securely using soft forceps. Hernia sac incision is required immediately if manual traction is not effective in reducing the imprisoned content. Surgically opening the conjoint tendon or the exterior border of the abdominal rectus muscle is the preferred course of action in situations of direct hernia. For indirect hernia, we advise dissecting from the upper lateral region since it is safely separated from the triangle of doom and the inferior epigastric arteries. It is simpler to release the inguinal ligament in the upper middle region when a femoral hernia is present. It should be noted that in some cases, especially those in which abdominal wall adhesives have been used in the past or in which hernias have been present for a long time, there may be substantial adhesions in the surrounding area that are difficult to separate by simply opening the hernia sac. Owing to the situation, open surgery should be considered. After the hernia's contents have been retracted into the abdominal cavity, it is crucial to confirm the bowel's viability.

Hematoma or seroma

Seroma is the most common complication in laparoscopic groin hernia surgery, especially in cases of strangulation with large hernia sacs, where multiple dissections increase the risk. We recorded 3 cases (14.3%) of patients with seroma detected by clinical and ultrasound at the first follow-up visit.

A hematoma or seroma is a lump that is often entirely absorbable and is located around the groin area. It can be identified by ultrasound and may or may not spread to the scrotum. It was difficult to fully dissect the indirect hernia's distal sac. It may leave tiny cavities, which could account for the high likelihood of seroma or hematoma following repair of an indirect hernia in this particular instance. It should be mentioned that in certain situations, appropriate antibiotic therapy and close observation of dynamic changes in the groin area are required.

A scrotal seroma was the most common postoperative complication seen in this investigation. Every seroma formed beneath the external ring and beneath the scrotum or groin's superficial soft tissue, which is where the hernia sac was found [13]. The reported incidence of seroma formation varies from 0.5 to 12.2% [5]. Studies have shown that seroma for-

mation is significantly higher after laparoscopic hernia repair [14,15]. In this study, the incidence was marginally higher at 15.9%. But this wasn't a serious issue—within eight weeks, it resolved on its own. Only symptomatic seromas ought to be treated, in our opinion.

Infection

Although rare, mesh infection is a significant complication that frequently necessitates an explanation of the infected prosthesis and can be challenging to treat. An estimated 2% to 4% of surgical site infections occur with elective inguinal or femoral hernia surgeries [16,17]. The outcome varies based on the extent of intestinal ischemia and the level of contamination in the surgical area. Avoid using the mesh in cases when there is severe intestinal ischemia leading to perforation.

Without removing the mesh, mesh infection is a serious complication that is difficult to treat. The size of the pores and the type of filament used are the main factors that increase the chance of infection [18]. Monofilament meshes have a lower susceptibility to infection compared to multifilament meshes. [19,20]. Lightweight meshes possess significant pore size. Their superiority stems from enhanced elasticity, heightened flexibility, and less discomfort [18]. Greater pore size is also linked to reduced inflammation [21]. In addition, they experience less shrinkage and diminished susceptibility to infection [18]. We suggest selecting a lightweight mesh with a wide aperture for implantation. Our patients were all treated with a lightweight monofilament polypropylene mesh with big holes. There was no occurrence of mesh infection. It is recommended to use preventive antibiotics.

Postoperative pain

With the advantages of laparoscopic surgery in general and Tension-Free Mesh Method due to the use of mesh, TAPP surgery helps patients greatly reduce post-operative pain and return to daily activities sooner. Our patient's postoperative hospital stay was 3.2 days.

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One or both of the following can cause postoperative pain: contracture, cicatrization of the implanted mesh, and nerve injury. For the former, greater results may be obtained using medical glue or a self-gripping mesh; for the latter, postoperative pain reduction may be aided by the use of a lightweight mesh. Postoperative discomfort may also be caused by tissue injury or postoperative edema. Tissue dissection therefore requires special attention, especially when resecting ligaments or dissecting a hernia sac.

Subclinical

In most cases, inguinal hernias will be ruled in by a careful physical checkup and the patient's medical history. Sometimes, ultrasound and/or CT will help to clarify better in case anamnesis is a high risk for hernia but limited clinical examination. When ultrasound is used along with a Valsava maneuver, it can identify an inguinal hernia with 86% sensitivity and 77% specificity. A CT scan has an 80% sensitivity and 65% specificity in detecting inguinal hernias, which offers improved visualization of groin anatomy and aids in identifying other potential causes of a groin mass or in instances of complex hernias [22].

Computed tomography (CT) of the pelvis is the gold standard for diagnosing obturator hernia (Figure 4), because its sensitivity can be greater than 90% and it can show asymptomatic bilateral hernias.

CONCLUSION

Due to its potential benefits in determining the hernia content and lowering the rate of incisional infection, the TAPP approach stands as a safe and efficient method for treating groin hernias (inguinal, femoral, and obturator hernias). To guarantee safety, however, skilled surgeons must pay close attention to crucial technical details and handle complications.

Ethics statement:

The study was approved by the Ethics Committee of the Hue Central Hospital according to the principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all patients.

Disclosure: The authors report no conflicts of interest in this work

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