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Groin Hernia in Females Routinely Treated by Totally Extraperitoneal Laparoscopic Approach

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ABSTRACT

Background and Objectives: There is a dearth of studies on laparoscopic treatment of female groin hernia. Our study assessed the outcome of groin hernia repair in females employing the totally extraperitoneal laparoscopic (TEP) access.

Methods: Data of all females who were subjected to laparoscopic groin herniorrhaphy, from August 1998 to February 2020 were retrospectively obtained. Groin hernia repair was routinely started with TEP access.

Results: A total of 2,399 patients who underwent laparoscopic groin herniorrhaphy, 254 (10.6%), were females. Most females (n = 191; 75.2%) had single hernia and the remaining (n = 63; 24.8%) had bilateral hernias, making a total of 317 hernias operated. Indirect inguinal hernia was the most common hernia type (72.5%), followed by femoral hernia (17.4%) and direct hernia (10.1%). Prior lower abdominal operations were recorded in 97 (38.2%) patients. Conversion to a laparoscopic transabdominal preperitoneal procedure was performed due to technical difficulties to dissect the preperitoneal space in 17 patients (6.7%) and to open procedure in only one patient (0.4%) with incarcerated femoral hernia in whom an incidental perforation of the small bowel occurred. Intra- and postoperative complications occurred in 12 (4.7%) and 15 (5.9%) patients, respectively. There was no mortality. Most patients (n = 221; 87%) were discharged on the same day of the operation. Hernia recurrence was diagnosed in 6 patients (2.4%).

Conclusion: It is concluded that females with groin hernia may be successfully treated with totally extraperitoneal laparoscopic access, with low conversion and complication rates.

Key Words: Laparoscopic herniorrhaphy, Inguinal hernia, Groin hernia, Totally extraperitoneal laparoscopy, Female.

INTRODUCTION

Groin hernia is one of the oldest recorded medical conditions of mankind and it affects millions of people globally. It is estimated that more than 20 million groin herniorrhaphies are performed annually worldwide.[1,2] Groin hernias are classified into indirect inguinal hernia, direct inguinal hernia, and femoral hernia.[2,3] There are significant differences in the incidence, types, and possibly treatment and outcome of groin hernias between genders.[4–7] Groin hernia is 10 times more common in males than females.[8,9] Although indirect inguinal hernia is the most common hernia in both genders, direct inguinal hernia is uncommon in females and femoral hernia unusual in males.[10–13]

Groin hernias may be effectively treated with several surgical approaches, including TAPP (laparoscopic transabdominal preperitoneal), TEP (totally extraperitoneal laparoscopy), and a multitude of open anterior techniques.[14,15] In the last years, laparoscopic access became the preferable access to treat groin hernia for most surgeons.[16–18] Laparoscopic access has several advantages over conventional open techniques, such as less pain, short recovery period, and better esthetic results.[19–21] There are only a few studies and systematic reviews focusing specifically on groin laparoscopic herniorrhaphy in females, possibly due to the lower prevalence of groin

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hernia in this gender.[4,22,23] To the best of our knowledge the present study is the largest series of groin laparoscopic herniorrhaphies in female gender in a study in Latin America. Our objective is to evaluate the outcome of groin hernia repair in females routinely employing totally extraperitoneal laparoscopic access.

METHODS

A retrospective review of the electronic medical records and study protocols of all consecutive patients who were subjected to laparoscopic groin herniorrhaphy at a single institution from August 1998 to February 2020 was performed. Diagnosis of groin hernia was established by the presence of mass or bulging in the inguinal and/or femoral region. Diagnosis was confirmed by ultrasonography in 80 patients (310.5%), computed tomography in 19 (70.5%), and magnetic resonance in 4 (10.6%).

Groin herniorrhaphy was routinely started with totally extraperitoneal (TEP) repair, independent of the presence of previous abdominal operations or hernia recurrence. The procedure was previously described.[14,17] Briefly, a Veress needle was initially inserted into the preperitoneal space at the midline immediately above the symphysis pubis. CO_2 was insufflated at a maximum pressure of 12-mm Hg. After a 10 mm trocar insertion at subumbilical fold midline, the created preperitoneal space was further expanded by blunt dissection with the laparoscope. Two additional trocars were placed midway between the laparoscope trocar and the pubis: one of 5 mm in the left flank and one of 10 mm in the right flank. Balloon dissection was not employed.

A 15 × 15-cm polypropylene mesh was rolled and introduced into the preperitoneal space through the 10-mm right lateral trocar. A 3-cm cut was done in the mesh to encircle the round ligament. In most patients the mesh was held in place by intra-abdominal pressure alone, with no fixation. However, in patients with large hernias, tacks were employed to fix the mesh.

Whenever the TEP repair could not be performed due to technical difficulties, the TAPP (transabdominal preperitoneal) procedure or open herniorrhaphy was used.

A dose of 2 g of cephazolin was administered at anesthesia induction. Enoxaparin sodium was also given subcutaneously at anesthesia induction in patients >50 years of age, obesity (BMI > 30 kg/m^2), malignant tumor or presence of other risk conditions.

Immediately prior to wound incision for trocar insertion, all abdominal layers at the trocar sites were infiltrated with local anesthetic (bupivacaine hydrochloride, .5%). The patients received a single intraoperative intravenous dose of 40 mg of parecoxib sodium, 100 mg of tramadol hydrochloride, and 2 g of dipyrone for analgesia. A single dose of 4 mg of ondansetron was also administered intravenously prior to completion of the procedure to prevent postoperative nausea and vomiting. No gastric tube or urinary catheter was used routinely.

All operations were performed or supervised by two experienced surgeons. Surgical residents participated in all operations. Laparoscopic groin herniorrhaphy has been performed routinely by our group for almost 3 decades.

The following data were obtained and analyzed: age, gender, history of prior lower abdominal operations, American Society of Anesthesiology (ASA) score, operative findings, herniorrhaphy performed, intra- and postoperative complications, hospital stay duration, hospital readmission, and hernia recurrence. Indications for conversion to either TAPP repair or open herniorrhaphy were also recorded.

Patients were discharged on the same day of the operation with orientation to return to normal diet and activity as soon as tolerated. Lifting weight was limited to 10 kg in the first month after surgery. Patients returned for ambulatory follow-up at the seventh day, and one and three months after operation. Follow-up was extended as needed in the presence of clinical manifestations, complications, or hernia recurrence. Values are expressed as mean ± standard deviation.

RESULTS

Demographic and Clinical Characteristics

Of a total of 2,399 patients who underwent laparoscopic groin herniorrhaphy, 254 (10.6%) were female and the subject of the present study. Most patients (n = 191; 75.2%) had a single hernia and the remaining (n = 63; 24.8%) had bilateral hernias, making a total of 317 hernias operated.

Patient demographic and clinical characteristics are presented in **Table 1**. The mean age was 53.9 ± 15.7 years with a range of 20 – 92 years. The largest group comprised indirect inguinal hernia (n = 230; 72.5%), followed by femoral hernia (n = 55; 17.4%), and direct hernia (n = 32; 10.1%).

Prior lower abdominal operations were recorded in 97 (38.2%) patients. The most common surgeries were gynecological procedures, including cesarean section (n = 26;

Table 1.
Demographic and Clinical Characteristics of 254 Females with 317 Groin Hernias

Characteristics	N	%
Number of patients	254	
Number of hernias	317	
Age (years)		
Mean ± SD	53.9 ± 15.7	
Range	20–92	
Type of hernia		
Indirect	230	72.5
Femoral	55	17.4
Direct	32	10.1
Site of hernia		
Right	101	39,8
Left	90	35,4
Bilateral	63	24,8
Prior lower abdominal operation	97	38.2
ASA score		
I	92	36.2
II	115	45.3
III	35	13.8
IV	12	4.7

ASA, American Society of Anesthesiology.

10.2%), hysterectomy (n = 15; 5.9%), and tubal ligation (n = 10; 3.9%) (**Table 2**). Twenty-four females (9.5%) had previous lower abdominal herniorrhaphies, including groin (n = 14; 5.5%) and incisional (n = 10; 3.9%) herniorrhaphies.

Preoperative ASA score distribution of the patients is also shown in **Table 2**. Most patients had score I (n = 92; 36.2%) or score II (n = 115; 45.3%). Thirty-five patients (13.8%) had score III (patients with severe systemic disease that is not life-threatening) and 12 (4.7%) had score IV (patients with severe systemic disease that is a constant threat to life).

Operative Aspects

The mean operative time was 39 ± 11 min for the unilateral hernias and 55 ± 14 min for the bilateral hernias. One patient had a 2-cm nodule within an indirect inguinal hernia sac that was resected. The pathologic examination of the

Table 2.
Previous Lower Abdominal Operations

Operation	N	%
Cesarean section	26	10.2
Lower abdominal herniorrhaphy	24	9.5
Hysterectomy	15	5.9
Tubal ligation	10	3.9
Appendectomy	9	3.6
Colectomy	3	1.2
Others	10	3.9
Total	97	38.2

mass revealed an endometrioma. Conversion to the TAPP procedure was performed due to technical difficulties to dissect the preperitoneal space in 17 patients (6.7%) due to the presence of intense abdominal wall fibrosis in patients with previous abdominal operations. Open procedure (McVay technique) was needed in only one patient (.4%) with incarcerated femoral hernia in whom an incidental perforation of the small bowel occurred.

Surgical Complications

Intra- and postoperative complications occurred in 12 (4.7%) and 15 (5.9%) patients, respectively. There was no mortality. The complications are demonstrated in **Table 3**.

The most common intraoperative complications were extensive subcutaneous emphysema and inferior epigastric vessel injury. Five patients (2.0%) had severe emphysema that extended from the lower abdomen to the thorax and face, causing important crepitation and swelling. Hypercapnia due to elevated absorption of CO_2 from the subcutaneous and preperitoneal space was adequately treated by increasing the ventilation rate and temporary interruption of CO_2 insufflation.

Inferior epigastric vessel injury occurred in 5 patients (2%) either at trocar insertion (n = 2) or during dissection of the preperitoneal space and identification of the hernia sac (n = 3). Bleeding was effectively controlled by clipping the injured vessel. The blood loss varied from 50 to 200 ml.

One patient had perforation of a small intestine loop during reduction of an incarcerated femoral hernia. Conversion to open operation was performed through an incision in the inguinal region. The perforated intestinal segment was resected and a termino-terminal hand-sewn anastomosis

Table 3.
Intraoperative and Postoperative Complications

Complications	n	%
Intraoperative complications		
Extensive subcutaneous emphysema	5	2.0
Inferior epigastric vessel injury	5	2.0
Small bowel perforation	1	0.4
Severe bronchospasm	1	0.4
Postoperative complications		
Urinary retention	4	1.6
Pulmonary atelectasis	3	1.2
Wound infection	3	1.2
Thrombophlebitis	2	0.8
Urinary infection	1	0.4
Pneumonia	1	0.4
Large hematoma	1	0.4

performed. Femoral hernia was treated with suture of the transversalis fascia to Cooper's ligament and lacunar ligament (McVay technique). The patient was discharged on the fourth postoperative day with no further complication.

One patient (0.1%) presented severe bronchospasm at extubation, which was effectively treated with administration of aminophylline and corticosteroid intravenously.

Urinary retention that required catheterization was the most common postoperative complication and it was observed in 4 patients (1.6%). One of these patients (0.4%) had lower urinary tract infection 2 weeks later, which was treated with antibiotics.

Chest radiography confirmed the presence of basal atelectasis in 3 patients (1.2%) with mild to moderate dyspnea. They were effectively treated with antipyretics and respiratory physiotherapy.

Superficial wound infection at the umbilical trocar site occurred in 3 patients (1.2%). Thrombophlebitis, pneumonia, and a large hematoma at the operative were diagnosed in one patient each. These complications were treated conservatively.

Hospital Discharge and Follow-up

Most patients (n = 221; 87%) were discharged on the same day of the hernia repair. Thirty-three patients (13%) stayed in the hospital from 1 to 4 days mainly due to refusal to be discharged (n = 20; 7.9%), nauseas and vomiting (n = 6; 2.4%), urinary retention (n = 4; 1.6%), and other transitory causes (n = 3; 1.2%). Five patients (2.0%) were readmitted to the hospital due to thrombophlebitis (n = 2; 0.8%), pulmonary atelectasis (n = 2; 0.8%), and pneumonia (n = 1; 0.4%).

Most patients (n = 241; 94.8%) had a minimum follow-up duration of 3 months, with a mean of 5.02 ± 2.87 months. Hernia recurrence was recorded in 6 patients (2.4%). Most recurrences (n = 5) were diagnosed in the first 2 months.

DISCUSSION

Our findings on some demographic and clinical aspects of groin hernia in females are similar to those of other publications that demonstrated that groin hernia is 10 times more common in males than in females.[4,24] The most common type of groin hernia in females is the indirect inguinal hernia, which corresponds to two-thirds to three-quarters of all groin hernias.[2,4,24–26] This is followed by femoral hernia, and direct inguinal hernia. One-quarter of females had bilateral groin hernia at the time of herniorrhaphy.

Numerous surgical procedures are available to treat groin hernias.[27–31] The technique selection depends on the surgeons' expertise and preference, patient- and hernia-related characteristics, and local resources available.[1,2] The international guidelines for management of groin hernias (HerniaSurge Group) suggest that laparoscopic repair is an optimal technique that is associated with faster recovery time, lower chronic pain, lower risk, and are cost-effective.[1,3] In addition, laparoscopic techniques have an important diagnostic advantage in identifying previously unrecognized femoral hernias. Crawford et al[27] have diagnosed unsuspected femoral hernias in 27 of 253 patients (11%) who underwent laparoscopic groin repair.

Several studies have compared TEP and TAPP procedures in the treatment of groin hernias.[1–3] The results have been controversial and subjected to criticism for several reasons, including a small number of patients, lack of patient randomization, occurrence of several types of bias, surgeons' different levels of experience with both procedures and the limited quality of some studies. Due to lack of evidence that one technique is superior to the other, international guidelines recommend that both procedures are suited for treatment of groin hernias.[1,3] Further prospec-

tive, randomized, and controlled studies are needed to clarify the advantages and limitations of each procedure.

We have employed the TEP approach to routinely correct groin hernias in females for the last 25 years. According to our protocol, we always start with TEP access in all females with groin hernia, independent of the presence of previous abdominal operations or hernia recurrence. As compared to TAPP, TEP has the advantage of not entering the peritoneal cavity and therefore reducing abdominal viscera lesions, especially in patients with intra-abdominal adherence.[15,26,29] However, some surgeons avoid or contraindicate the TEP and even the TAPP approach in patients with previous lower abdominal operations because of the difficulty to dissect the preperitoneal space and prevent intra-abdominal organ injuries.[13,15]

Intra-abdominal adherence and abdominal wall fibrosis secondary to prior abdominal operations increase operative time, conversion to open surgery, complication rate, and hospital stay and costs in patients subjects to either open or laparoscopic abdominal operations.[15,17,28] Our study as well as the report of Zuiki et al[26] have demonstrated the feasibility of the TEP procedure in the great majority of females with previous lower abdominal surgery. In our experience, prior lower abdominal operations were observed in 97 (380.2%) of the females. The most common previous surgeries were gynecological procedures, appendectomy, and lower abdominal herniorrhaphies.

Our conversion rate to TAPP or open access was low (70.1%). The main reason for conversion was technical difficulties to dissect the preperitoneal space in females with intense abdominal wall fibrosis. A similar conversion rate was reported by other authors.[5,26] Zuiki et al[26] have reported TEP conversion to either TAPP or open access in nine of 84 patients (11%) who were initially subjected to TEP. All nine patients had abdominal wall fibrosis due to prior lower abdominal surgeries. The indications for procedure conversion were difficult to obtain adequate preperitoneal space, opening of the peritoneum, and intraoperative bleeding.

We had a potentially severe intraoperative complication, a perforation of the small bowel, which occurred during content reduction of an incarcerated femoral hernia. The patient had an uneventful recovery following conversion to open surgery with enterectomy and hernia repair with no mesh. Inadvertent lesion of the small and large bowel, bladder, and other organs have been reported by others.[15,17]

Intestinal perforation during TEP groin hernia repair may be a major problem. The perforation may not be recognized during the operation because the peritoneal cavity is not entered during the procedure and therefore the intra-abdominal contents are not visualized.[3,17] Delayed diagnosis of small bowel perforation is associated with severe complications and dismal prognosis.[1,7,17]

Although mild subcutaneous emphysema is quite common and has no clinical importance, extensive subcutaneous emphysema may cause hypercapnia and respiratory acidosis.[17] All our cases of extensive emphysema occurred at the beginning of our experience when CO_2 insufflation pressure was elevated. This complication may be avoided by using CO_2 insufflation pressure to a maximum of 12 mm Hg.[17]

Accidental injury of the inferior epigastric vessels may cause significant bleeding and may be an indication for surgery conversion.[17] In our experience, all inferior epigastric vessel lesions were appropriately controlled with ligation of the bleeding vessel with clips. Most of our other intra and postoperative complications were treated conservatively, with uneventful recovery.

The major strength of our study is the large sample size of females with groin hernia treated with the TEP procedure in a single institution. We routinely started with the TEP approach in all females with groin hernias, independent of the presence of previous abdominal operations or hernia recurrence. The major limitations of our study are the retrospective evaluation of the data of our patients and the short follow-up. This is minimized because all surgical procedures were coordinated and supervised by only two surgeons and the data were retrieved from electronic medical records and study protocols. Our mean follow-up was not long enough to exclude late recurrences. However, most groin hernia recurrences occur in the first few months following herniorrhaphy.[2,17]

CONCLUSION

It is concluded from our study that females with groin hernia may be successfully treated with totally extraperitoneal laparoscopic access, with a low complication rate.

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