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Case Series

Laparoscopic femoral hernia repair: our experience - a case series with review of literature

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ABSTRACT

Femoral hernia is one of the rare types of groin hernia. Though classical clinical examination findings for its accurate diagnosis are well documented, it very often gets mistaken for the much commoner inguinal hernia. Traditionally, it has been surgically repaired by open approach. However, the advent of laparoscopy has brought femoral hernia repair under its purview. The purpose of this study is to evaluate the incidence of femoral hernia in our series and outcomes of its laparoscopic repair. We retrospectively evaluated the prospectively collected data of all the 796 patients who had undergone laparoscopic repair for groin hernias, performed by a single surgeon at our institution, over 15 years (from 2007 to 2022). There were 7 patients of femoral hernia in our series. All were diagnosed 'on table', while operating purportedly for inguinal hernia. Three out of these seven patients had occult femoral hernia. Femoral hernia is a rare entity and is often not accurately diagnosed pre-operatively. Its laparoscopic management is feasible, effective, and safe.

Keywords: Femoral hernia, Inguinal hernia, Laparoscopic management

INTRODUCTION

Femoral hernia (FH) is a protrusion of a part of abdominal viscus or preperitoneal fat through the femoral ring and canal. Lifetime occurrence of a groin hernia is 27% to 43% in men and 3% to 6% in women.[1] Femoral hernias occur less commonly than inguinal hernias and typically account for about 3% of all groin hernias.[1] While inguinal hernias are still most common, regardless of gender, femoral hernias have a female-to-male ratio of about 10:1.[1] Femoral hernias are rare in men. There may be other co-existing defects present at the time of diagnosis, as 10% of women and 50% of men with a FH either have or will develop an inguinal hernia. The prevalence of a FH increases with age as does the risk of complications including incarceration or strangulation.[1]

CASE SERIES

We performed a retrospective review of patients diagnosed with groin hernia who underwent laparoscopic repair at our institution over a 15-year period, from 2007 to 2022, performed by a single surgeon. Our study included all patients who were diagnosed with groin hernia based on clinical examination. At our institute, most patients having groin hernia undergo laparoscopic repair [totally extraperitoneal approach (TEPA) as well as trans-abdominal pre-peritoneal (TAPP)]. The TEPA is our preferred surgery for most of these patients. We prefer TAPP over TEPA only when the hernia is incarcerated, the patient has infra-umbilical midline scars of previous open surgery or in very short statured patients having relatively very large uncomplicated or complicated herniae. Our only exclusion criteria for laparoscopic repair are patients suspected to have strangulated hernia and patients unfit for

general anaesthesia (GA). We prefer open surgical repair over laparoscopy for both these categories.

Data was retrieved from the hospital's electronic medical records (EMR) for the following parameters: age, sex, laterality, whether pre-operatively diagnosed FH or not, operative time, duration of hospital stay, intra- and post-operative complications and recurrence. All patients physically followed up for their post-operative visit on day-10. Beyond this they were interviewed telephonically at 1, 3 and 6 months and additionally at the time of writing this paper.

In all our seven cases of femoral hernia, the pre-operative clinical diagnosis was inguinal hernia. However, after careful dissection both direct and indirect inguinal hernia were ruled out in four out of the seven cases. In these 4 patients, a femoral sac tenting into the femoral canal just medial to the external iliac vein was noted. This sac was completely reduced by proximal traction. The remaining 3 patients had occult FH. Two patients had ipsilateral occult FH in addition to a main clinical large inguinal hernia. One patient was found to have bilateral occult FH with clinically bilateral indirect inguinal hernia. An occult hernia appears as an indentation/pitting/defect wherein a tiny peritoneal sac may or may not be attached. All our 3 patients with occult FH had tiny peritoneal sacs in addition to the much larger clinical inguinal hernia sacs. These tiny peritoneal FH sacs were completely reduced. A 15×12 cm polypropylene mesh was then rolled, introduced inside and then spread out under vision so as to optimally cover the hernia defects. In our 7 patients with FH (both clinical and occult), we took special care to 'pull' down the mesh just enough so that it covered the entry to the femoral canal. Also, it was additionally secured with extra tacks fired through the mesh on to the ileopectineal ligament and pubic bone.

We found 7 patients with FH among a total of 796 patients, in our series, who were laparoscopically operated for groin hernia (TEPA+TAPP). Thus, the incidence of femoral hernia in our series was 0.88%. The 7 patients with FH comprised of 5 males (71.43%) and 2 females (28.57%). The mean age of the 7 patients was 53.45 years (range: 33-62 years) with a standard deviation (SD) of 1.01. The mean age of the female patients in the study was 61 years with an SD of 1.56, while the mean age of the male patients was 50.4 years (SD-0.59). The age difference between male and female patients in the study was not statistically significant ($p>0.05$). The mean operating time was 38 minutes (range: 25-51 minutes, SD-1.59). Three patients (42.86%) were associated with occult FH. All 7 patients were diagnosed preoperatively to have inguinal hernia. The 4 patients with standalone clinical FH comprised of 3 males (75%) and 1 female (25%). The remaining 3 patients having occult FH comprised of 2 males (66.67%) and 1 female (33.33%). The 7 FH patients comprised of 4 right FH (57.14%), 1 left FH (14.29%) and 2 bilateral FH (28.57%). Among the 4 clinical standalone FH patients, 2 had right FH (50 %), 1 had left FH (25 %) and the remaining 1 had bilateral FH (25%). Among the 3 patients with occult FH, 2 had right FH (66.67%) and 1 had bilateral FH (33.33%). Among the 2 patients having right sided occult FH, one had a clinical right indirect inguinal hernia while the other had a clinical right direct inguinal hernia. During the routine postoperative day 10 follow up visit, the operative wounds of all 7 patients had healed well and there were no complications such as hematoma, seroma, and chord edema. At 1, 3, and 6 months postoperatively and at the time of writing this paper, all 7 patients were telephonically interviewed with a standard questionnaire. Over an average follow up period of 9 years (range 5-13.8 years), all 7 patients were asymptomatic and without recurrences. Information about patient demographics along with perioperative details of our FH patients is summarised in Table 1.

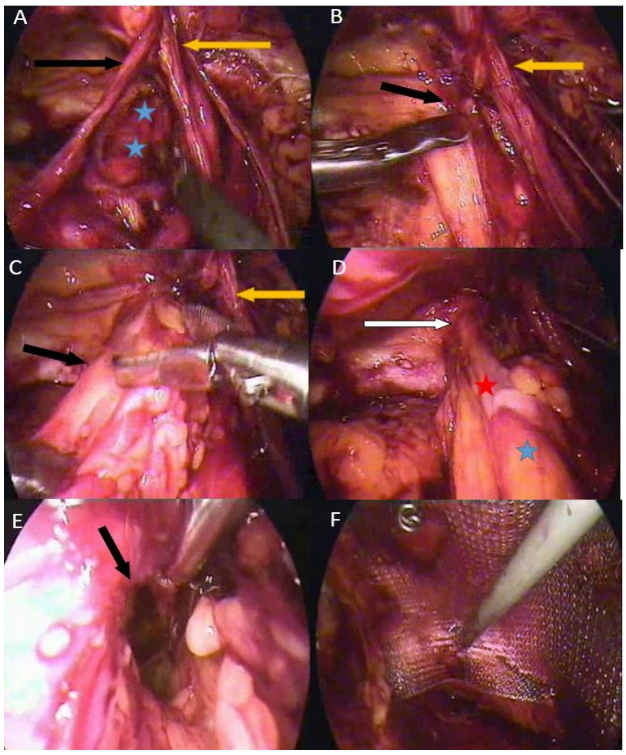

Figure 1: Operative pics of patient 1 (A) dissection of chord structures (black and yellow arrows) in progress for a presumed rt inguinal hernia with femoral hernia sac (blue asterisks) in the background, (B) after inguinal hernia was ruled out, the on table diagnosed femoral hernia sac being reduced (black arrow) with chord structures (yellow arrow) seen lateral to it, (C) further attempts at taxis (yellow arrow) on the femoral sac (black arrow), (D) fundus of the femoral hernia sac (blue asterisk) being separated from the pseudosac (red asterisk), (E) bare femoral hernia defect (black arrow) noted after complete reduction of the sac, and (F) polypropylene mesh placed optimally and tack-fixed to parietes and Cooper's ligament so as to cover the femoral hernia orifice.

Table 1: Patient demographics and peri-operative details.

S. no.	Clinical/ occult	Age (years)	Sex	Laterality	Pre-operative diagnosis	Intra-operative diagnosis	Total duration of operative procedure (min)	Post operative complica-tions
1	C	60	M	Right	Inguinal hernia	Femoral hernia	30	None
2	C	33	M	Left	Inguinal hernia	Femoral hernia	35	None
3	C	60	F	Right	Inguinal hernia	Femoral hernia	25	None
4	C	49	M	Bilateral	Inguinal hernia	Femoral hernia	40	None
5	O	53	M	Right	Inguinal hernia	Rt indirecting inguinal hernia+ occult Rt femoral hernia	45	None
6	O	57	M	Right	Inguinal hernia	Rt direct inguinal hernia+ occult Rt femoral hernia	41	None
7	O	62	F	Bilateral	Inguinal hernia	B/L indirect inguinal hernia+B/L occult femoral hernia	50	None

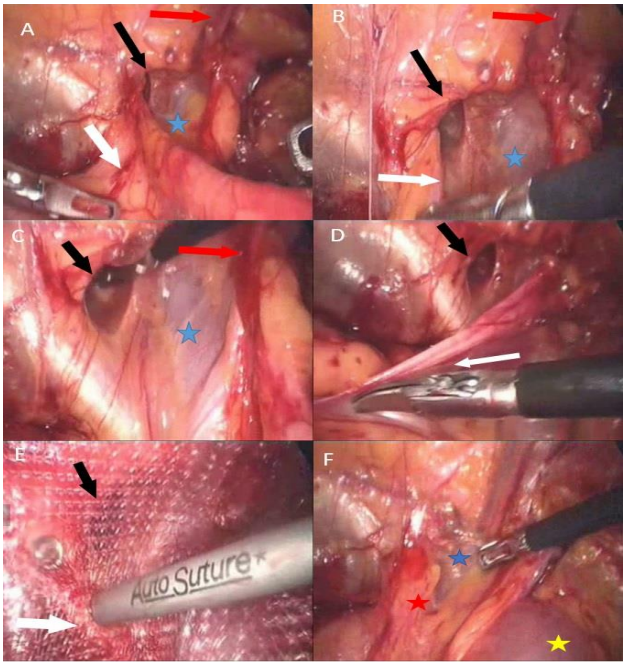

Figure 2: Operative pictures. (A) Rt. femoral hernia sac(white arrow) being reduced while the defect(black arrow) beginning to appear medial to the external iliac vein-EAV(blue asterisk); also seen is the inferior epigastric pedicle(red arrow); (B)Zoomed in image showing the same as (A); (C) Bare femoral defect(black arrow) after complete sac reduction, seen just medial to right EAV (blue asterisk); (D) After dissection-identification of right femoral defect(black arrow), the round ligament being bared(white arrow) to rule out indirect inguinal hernia; (E)Femoral hernial defect seen through an optimally placed Prolene mesh(black arrow) which is baing tack-fixed(white arrow) to the Cooper's ligament; (F) Pt.3 having right indirect inguinal hernia (yellow asterisks) with an ipsilateral occult femoral hernia(red asterisk) seen just medial to right EAV(blue asterisk).

DISCUSSION

The femoral canal is the medial most component of the femoral sheath. It extends from the femoral ring above to the saphenous opening below. The femoral ring and canal are bounded anteriorly by the inguinal ligament, medially by the lacunar ligament, laterally by a thin septum and posteriorly by the iliopectineal ligament, pubic bone and pectineal fascia. The contents of the femoral canal comprise of some fat, few lymphatics and the lymph node of Cloquet.

The contents of a FH first descend down the canal to the saphenous opening. Once they exit the opening, they expand, mushroom out and enlarge significantly; thereby extending above the inguinal ligament sometimes and assuming a classically described shape of a retort. The above-described constricted course in the femoral canal and the winding course after exiting the saphenous opening makes FH prone to complications such as irreducibility/incarceration and strangulation (15-20% - the highest, reported in literature).[2]

The much commoner inguinal as well as the much rarer femoral hernias have a preponderance for the right side. This is possibly because of a delay in closure of the processus vaginalis after the normal slower descent of the right testis during embryological development. There is consensus that the position of the sigmoid colon causes an occluding effect on the left femoral canal, thereby reducing the likelihood of a left-sided defect.[3]

A FH is rarely detected on routine physical exam. Around one-third of the patients are asymptomatic at the time of diagnosis.[3] Classically, a small swelling is noted below the level of the inguinal ligament. Occasionally, the swelling ascends upwards thereby mimicking the much more common inguinal hernia. The FH sac commonly contains pre-peritoneal fat which may reduce with direct taxis.

Incarceration indicates irreducibility of contents from within the hernia sac or defect. Strangulation is seen commonly with FH due to its peculiar anatomy. Hence, these patients may present to the emergency room for urgent evaluation. Strangulation indicates a compromise in blood supply to the hernial contents. It results in occlusion of arterial supply and/or venous drainage to the contents of a hernia. This results in possible engorgement of the hernia sac and contents. It presents with a painful, turgid lump. If the incarcerated hernia sac contains intestine, the patient may present with signs and symptoms of obstruction. Patients with FH may also present with paresthesias related to compression of nearby sensory nerves.[1] The FH sac usually contains omentum or is empty and surrounded by extra-peritoneal fat.[4] Rarely it may contain bowel as well. In even rarer instances, the appendix (DeGarengeot's hernia), bladder, Meckel's diverticulum, ectopic testis, stomach and fallopian tube have been reported as contents of FH.[5] In obese patients, ultrasonography, computed tomography or magnetic resonance imaging help in the diagnosis.[6]

It can be difficult to discern a FH from an inguinal hernia. They differ from each other only in their location in relation to the inguinal ligament. Elective repair of FH should be undertaken once the diagnosis is made because of the risk of strangulation (due to narrow neck, tortuous course and adhesions). The reported obstruction/strangulation rate of FH in literature is 30–86%, with mortality rates of 10–14%.[7-9] Emergency surgery with intestinal resections may be required in 9.3–33.7%, with a high mortality rate of 4.9%.[10,11] The hernia repair can be done by different open or laparoscopic approaches, with some advantages and disadvantages of each method. The choice is also affected by the surgeon's preference, the patient's condition and whether it is an elective or emergency situation.

Open repair can be performed via the low femoral (Lockwood), inguinal (Lotheissen) and the high pre-peritoneal (McEvedy) approaches. The Lockwood procedure is ideal for uncomplicated FH and involves a transverse groin incision below the inguinal ligament with reduction of contents, pulling down the neck of the sac along with its high ligation and finally closure of femoral canal by suturing inguinal ligament to ileo-pectineal line with or without mesh plug. The Lotheissen procedure is preferred in complicated FH with most of the steps similar to open inguinal hernia repair.[12] It provides good exposure of femoral ring and facilitates in dealing with non-viable contents that necessitates resection. In cases of obstruction at the narrow neck of the sac, the neck can be gently stretched with a hemostat. The neck is then closed with sutures or mesh plug. The defect is closed by suturing the conjoint tendon to ilio-pectineal line, so as to form a shutter. The layers of inguinal canal are then closed. The classical McVay repair (suturing conjoint tendon to Cooper's ligament) is strong but with high tension which eventually break resulting in recurrence.[13] The high pre-peritoneal McEvedy procedure is the best approach in emergency setting to deal with bowel strangulation as it allows generous incision in peritoneum to give proper exposure for bowel resection.[12] A horizontal (or vertical) incision is made in lower abdomen at the lateral edge of rectus muscle. Anterior rectus sheath is incised and rectus muscle retracted medially. Dissection is carried out deep to this muscle in the preperitoneal space. The femoral hernia is delivered and its sac opened to assess the viability of contents, which is then dealt accordingly. The sac is first closed and the defect is then closed with sutures, mesh or plug. Placement of mesh in preperitoneal space is advantageous, as it avoids reoperating through scar tissue in cases of recurrence.[14] The mesh-plug repair offers tension free easy repairs, with low recurrence rate and less postoperative pain. Laparoscopic surgery offers the advantages of minimal access surgery including excellent exposure, identification of occult hernia, reduce postoperative pain and faster recuperation. The totally extra-peritoneal (TEP) approach is suitable for uncomplicated femoral hernia, while for incarcerated or strangulated hernia the trans-abdominal pre-peritoneal (TAPP) approach can be used.

CONCLUSION

Femoral hernia is a rare clinical entity, as can be seen in this study. It is, often, not accurately diagnosed pre-operatively, but diagnosed 'on-table', as was seen in all our seven patients. The study also underscores the fact that laparoscopic repair of femoral hernia is feasible and gives good long-term results.

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