

Laparoscopic Repair, TAPP Approach, of a Type 1 Giant Inguinal Hernia. A Case Report and Literature Review

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Abstract

The surgical repair of a giant inguinal hernia remains controversial given the paucity of published data. There are no recognised guidelines from the established hernia societies worldwide. Open mesh herniorrhaphy remains the cornerstone for this condition. There has been a trend towards minimally invasive mesh herniorrhaphy, either laparoscopically or through robotic surgery. A trans-abdominal preperitoneal (TAPP) repair is shown to be superior to the totally extraperitoneal (TEP) repair. Our patient underwent a laparoscopic TAPP repair, and we hope our experience adds to the surgical armamentarium of hernia surgeons. There needs to be a stepwise approach to dealing with issues such as loss of domain and its physiological consequences, as well as analyzing the long-term outcomes of these repairs. Pre-operative patient preparation needs to be addressed in terms of abdominal cavity preparation and assessment of the patient's airway pressures, both intraoperatively and in the immediate post-operative period. Our patient underwent an anaesthesia and cardiology assessment, highlighting the multidisciplinary approach to this type of inguinal hernia surgery. Long term follow-up of more than five years duration is required to compare outcomes of the laparoscopic repair with that of open mesh herniorrhaphy.

Keywords: Giant Inguinal Hernia; Laparoscopic Inguinal Herniorrhaphy; Giant Inguinal Hernia Classification

Introduction

Lichtenstein tension-free open mesh herniorrhaphy has historically been the gold standard for giant inguinal hernia repair (GIH) [1]. This has recently been supplanted by the laparoscopic approach, either the transabdominal preperitoneal (TAPP) or totally extra peritoneal (TEP) approach. Robotic surgery, in the past decade has also been added to the surgical options playlist. Laparoscopic herniorrhaphy is associated with shorter hospital admission and fewer postoperative complications [1,2]. There remains limited documented research on laparoscopic TAPP approach for giant inguinal hernias (GIH). Published data references include case series or sporadic case reports. There are no published randomised controlled trials to date.

Case Report

An eighty-six-year-old male patient was referred to surgery for assessment of his left sided giant inguinal hernia (GIH). He had the hernia for over a decade, and it had gradually increased in size over time. He complained of inguinodynia if he stood for more than an hour and was unable to spontaneously reduce the hernia. He also complained of chronic constipation and difficulty passing urine. His medical

profile included atrial fibrillation, hypertension, and benign prostatic hypertrophy. He was emaciated with an estimated BMI of 25. Clinical abdominal examination revealed a large indirect inguinal hernia on the left side. The hernia was incarcerated and could not be spontaneously reduced. The hernia descended to the mid-thigh area, in keeping with a type one GIH (Table 1). He had no other abdominal wall herniae. Radiological imaging with computerised tomography (CT) scan showed a large indirect inguinal hernia with small bowel and sigmoid colonic contents (Figure 1.1-1.3). The bowel remained viable with no radiological signs of ischemia. There was significant hydronephrosis on the left kidney due to pressure on the left ureter at the hernia neck. The patient signed an informed consent for surgery and agreed to a laparoscopic attempt at mesh herniorrhaphy. He understood that conversion risk to open surgery was as high as 50 percent. We discussed the risk of loss of domain of the abdominal cavity given the hernia sac's significant size (Figure 1.3). He had a preoperative evaluation with anaesthesia and cardiology to assess his physiological status and the feasibility of a laparoscopic transabdominal preperitoneal (TAPP) surgical herniorrhaphy. Surgery was undertaken with great caution and was extremely difficult given the large volume of the hernia sac. He received one dose of a second-generation cephalosporin, 1-gram Cephazolin[®] intravenously at surgical induction. Small and large bowel was gradually reduced (Figure 2.1-2.3) with no obvious injuries and inferior and superior peritoneal flaps raised (Figure 2.4 and 2.5). The hernia neck was 4 cm in diameter (Figure 1.2). The appropriate surgical landmarks were visualised (Figure 2.5) and a 15 x 9 cm self-gripping polypropylene mesh was inserted to cover the hernia neck with a minimum two cm overlap in all four directions. The mesh was reperitonealised by closing the peritoneal flaps with Absorbatack[®] absorbable tackers. The entire hernia sac was reduced into the abdominal cavity and the left hemi-scrotum returned to its normal volume (Figure 3.1 and 3.2). Surgical operative time was one hour and forty-five minutes. A reduction in the hernia neck diameter was contemplated through laparoscopic suturing of the hernia neck. The patient's weak abdominal wall musculature and thin inguinal ligament were mitigating factors against the hernia neck reduction. He had an abdominal binder and a scrotal support applied post-surgery to support his abdominal musculature. Post-operative surgical recovery was a stormy one punctuated by urinary retention that required a urinary catheter for bladder drainage. He developed post-operative atelectasis that required intensive physiotherapy. He was reviewed by urology who advised keeping the urinary catheter for two weeks. A repeat abdominal ultrasound showed resolution of his left sided hydronephrosis post-surgical herniorrhaphy. He was discharged home on post-operative day seven. At his three-week surgical follow up, the patient had made steady progress with all his wounds healed. At his three-week and three-month surgical follow-up, he had a negative cough reflex, as well as no clinical signs of inguinodynia or a scrotal seroma. Three months post-surgery, the patient was still using a urinary catheter to treat his urinary retention (Figure 3.3) as per urology guidelines. His laparoscopic mesh herniorrhaphy was still intact.

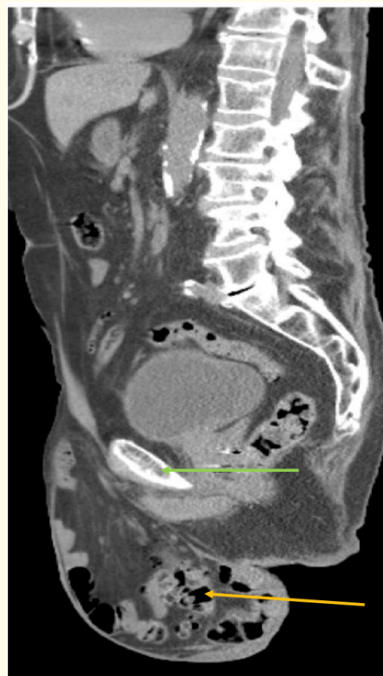


Figure 1.1: CT scan sagittal view showing the giant inguinal hernia (orange arrow) below the pubic bone (green arrow).



Figure 1.2: CT scan coronal view showing a 4cm hernia neck (orange arrows).



Figure 1.3: CT scan coronal view showing a type 1 giant inguinal hernia (orange arrows) to the level of the mid-thigh (green arrow).



Figure 2.1: Reduction of small intestine into the peritoneal cavity.

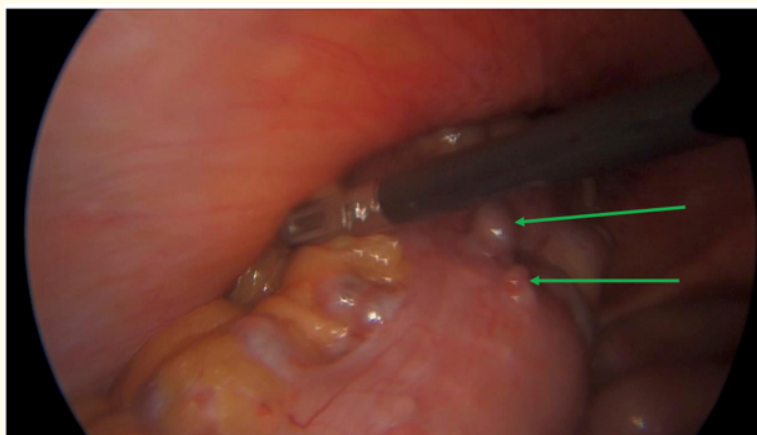


Figure 2.2: Reduction of sigmoid colon with diverticulae (green arrows) into the peritoneal cavity.

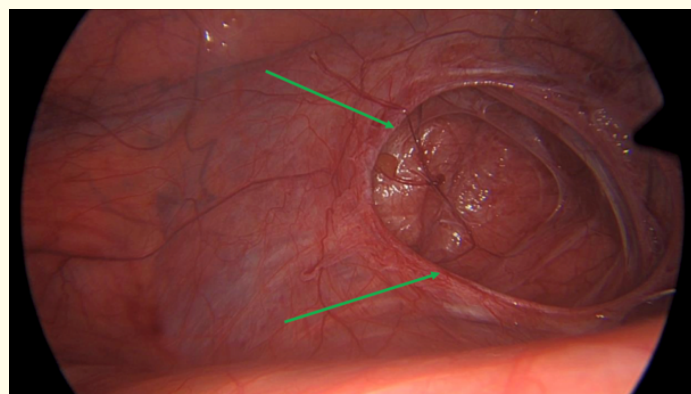


Figure 2.3: Within the hernial sac: post-hernial content reduction visualising the superficial inguinal ring (green arrows).

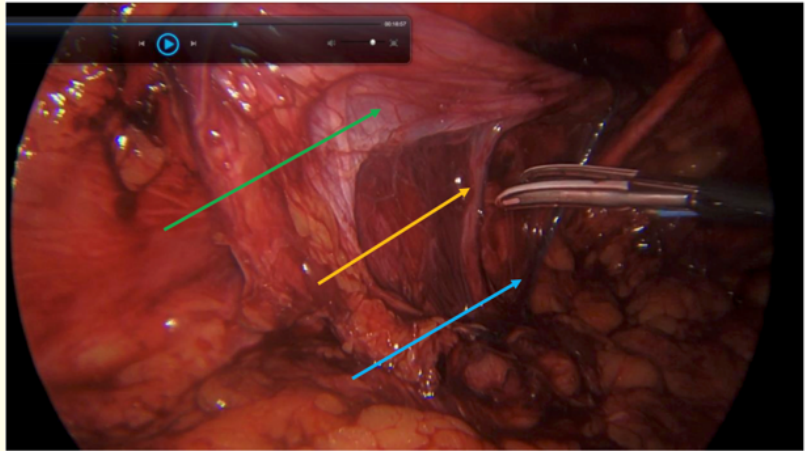


Figure 2.4: Distal end of the hernia sac (green arrow) with the spermatic chord (orange arrow) and left testicular vein (blue arrow) visualised.

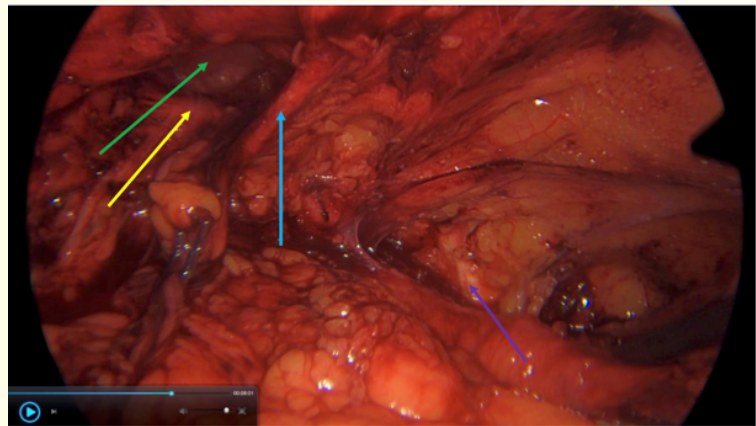


Figure 2.5: Complete hernial reduction showing the deep inguinal ring (green arrow),inguinal ligament (yellow arrow), left inferior epigastric vessels (blue arrow)and the right arch of the pubic ramus after crossing the midline (purple arrow).

Type 1	Hernia descends to the mid-inner thigh
Type 2	Hernia descends to the superior border of the patella
Type 3	Hernia descends beyond the superior border of the patella

Table 1: Classification of giant inguinal hernia.



Figure 3.1: Anterior view before and after laparoscopic TAPP herniorrhaphy.



Figure 3.2: Lateral view before and after laparoscopic TAPP herniorrhaphy.

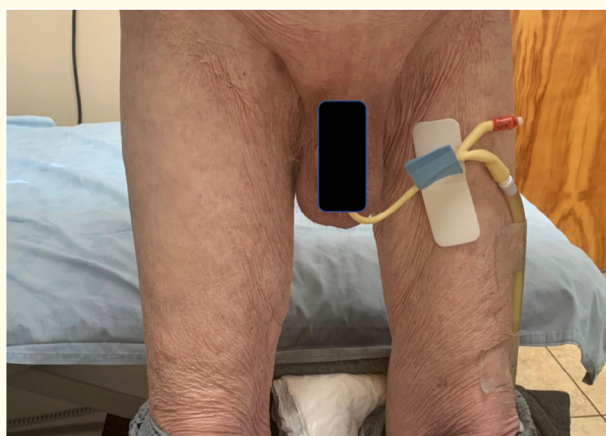


Figure 3.3: Three-month post operative follow-up with urinary catheter in situ and no hernia recurrence.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

A GIH (Table 1) is defined as an inguinal hernia that extends below the midpoint of the inner thigh, with the patient in a standing position [3]. Its prevalence rate is 2.81 - 5 percent of all inguinal hernias in the developed world. Few countries report an incidence as low as 1.1 percent [4,5]. Risk factors include obesity, multiple comorbidities and foregoing a hernia repair for years [1,6]. Surgical herniorrhaphy entails several techniques. Type I GIH (Figure 4) is repaired by herniorrhaphy with a forced hernial sac reduction. Type II and type III GIH are addressed with resection of hernial contents and possible increase in abdominal volume [3]. Any forced reduction is contraindicated in Type III GIH [3]. If a reduction of the hernia sac is possible this should be undertaken as the first option. Surgical sac resection helps to facilitate an easier solution to the hernia reduction and helps to prevent pathological intra-abdominal pressures. No clear societal guidelines exist for a surgical approach to GIH repair. The European Hernia Society guidelines state that the Lichtenstein herniorrhaphy is preferred for irreducible, large, scrotal, inguinal hernias [7]. The International Endohernia Society guidelines mention that the TAPP technique is possible for the repair of giant scrotal hernias [8]. Neither society specifically addresses a GIH repair. Our case report adds to the paucity of published data using the laparoscopic TAPP approach for GIH. There have been fewer than 50 documented cases worldwide of GIH repaired laparoscopically [1,9-14]. All published cases were surgically managed with the TAPP technique. Their approach to hernial reduction differed significantly. Several used the push-pull maneuver, which entailed pulling the hernia sac's contents with forceps while the assistant pushed upon the scrotum [1,11]. Two cases were laparoscopic robotic repairs [10,12]. Tang, *et al.* described a series of eight patients who were given preoperative botulin toxin subcutaneously and a progressive pneumoperitoneum for two to three weeks before their surgery to facilitate the loss of domain of the abdominal cavity [13]. We were fortunate that we could reduce the hernial contents laparoscopically in our patient. His advanced age and weak abdominal wall musculature played a significant contributory role. His abdominal wall laxity prevented a loss of domain and increased abdominal pressure due to the return of his abdominal bowel contents into the peritoneal cavity. The patient's abdominal pressures post-hernial reduction did not compromise his respiratory function intraoperatively or in the immediate post-operative period. This abdominal wall laxity prevented us from reducing the size of the hernia neck through laparoscopic suturing. This reduction in the hernia neck diameter facilitates a more efficient mesh overlap as we do not close the deep inguinal ring completely. This is the laparoscopic equivalent of tightening of the deep inguinal ring as performed in open herniorrhaphy. It was felt that the poor state of his abdominal wall musculature would not hold sutures well and could result in wound dehiscence. An inadvertent advantage of this laparoscopic TAPP approach was the reduction of his left-sided hydronephrosis. The aetiology was probably due to pressure from the hernia neck on the left ureter. The hydronephrosis reduced completely post herniorrhaphy. It remains to be seen whether the long-term outcomes of laparoscopic mesh herniorrhaphy are equivalent to that of a Lichtenstein repair. There are no published reports of surgical outcomes of over five years for laparoscopic GIH herniorrhaphy.

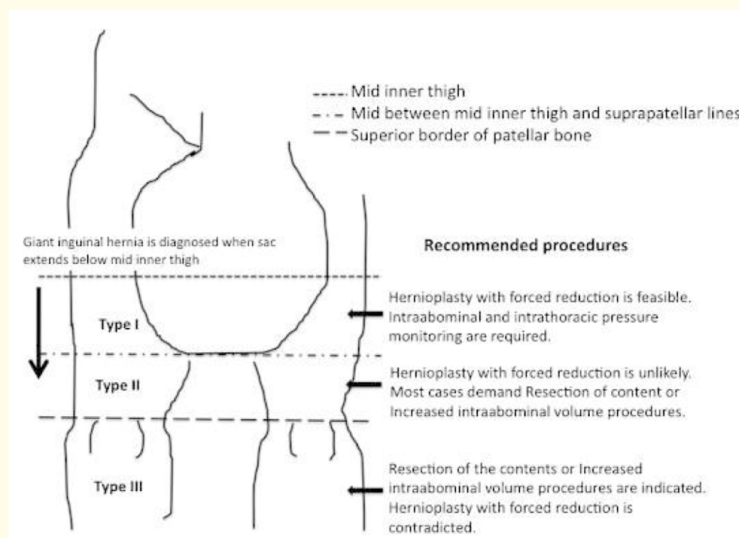


Figure 4: Classification of GIH and their recommended surgical intervention.

Conclusion

We present a case report of a GIH and its laparoscopic TAPP repair. We hope this adds to the surgical armamentarium of hernia surgeons and aids in generating guidelines for the laparoscopic approach and repair of GIH. The laparoscopic TAPP approach remains the choice of most hernia surgeons for type one GIH.

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