

Large Symptomatic Inguinoscrotal Seroma Occurred Early after Laparoscopic Total Extraperitoneal Hernia Repair (TEP): a Case Report and Literature Review

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ABSTRACT

Inguinoscrotal hernia (ISH) is an entity for which treatment is under debate. Open surgery is the standard approach, but the laparoscopic technique has a great outcome when used by experienced surgeons. Seroma is one of the complications following laparoscopic hernia repair for these scrotal hernias, which is due to the large hernia sac, usually transected, leaving in place a remnant of the sac. Conservative measures can be applied for the treatment of seroma; however, in symptomatic cases, puncture and aspiration of fluid are recommended. Sometimes, these seromas can reach a large size and require surgery to remove the remnant sac. Herein, we report the case of a 49-year-old male with a large seroma that occurred four days after the laparoscopic approach – total extraperitoneal repair (TEP) for inguinoscrotal hernia. Conservative measures failed, and

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because the symptoms were not alleviated, reintervention was opted for. The distal sac was excised and the patient recovered uneventfully. The six-month follow-up did not show any recurrence of the hernia or seroma. We emphasize the importance of sac management in large ISH cases and discuss seromas after laparoscopic hernia repair in such instances.

Keywords: seroma, total extraperitoneal repair (TEP), Rives-Stoppa, inguinal hernia, hernia repair, inguinoscrotal, pseudo sac, CRP (C-reactive protein).

INTRODUCTION

In adults, an inguinal hernia that extends to the scrotum is defined as inguinoscrotal hernia (ISH), with an incidence ranging from 6 to 67%, depending on the country's resources (1). Scrotal hernia management is difficult because of the higher morbidity and mortality compared to usual groin hernia repair. The open (anterior) approach is the default approach for scrotal hernia repair, although in some registries, the endoscopic approach is predominant (2, 3).

The laparoscopic techniques used for hernia repair include transabdominal peritoneal (TAPP) and extraperitoneal (TEP) approaches. Some authors recommend TAPP (4), whereas others suggest TEP (2, 3, 5); however, the choice depends on the surgeon's expertise. Usually, the difficulties encountered in TEP repair lead to conversion to TAPP; therefore, TAPP is probably better in some cases, especially in irreducible scrotal hernias (3). The advantages of a minimally invasive approach are related to earlier return to work, lower postoperative pain, and reduced surgical site occurrence (SSO) compared to open repair (2, 3). However, seroma is a frequent postoperative complication after minimally invasive repair of an inguinoscrotal hernia (6). Usually, spontaneous resolution of seromas takes up to 4-7 weeks. In most cases, seromas are asymptomatic. In rare instances, a seroma can increase in volume and create a burden for the patient and surgeon (7). Our case report presents a large symptomatic seroma that occurred after TEP repair in the early postoperative period and eventually required surgical intervention.

CASE PRESENTATION

We present the case of 49-year-old male (BMI 24 kg/m²), a heavy smoker with an acquired large inguinal right hernia extending to

the scrotum, with a history of 13 years. The patient had a medical history of open repair of a left inguinal hernia 15 years previously. A laparoscopic unilateral total extraperitoneal procedure (TEP) was performed using a standard technique (8). The large hernia sac was transected and the pseudo-sac was left in place, followed by mesh placement of a 15 × 12 cm polypropylene monofilament-tailored mesh. A suture was placed on Cooper's ligament to secure the mesh. Aspirative drainage was performed. The drain was kept in place for three days without being effective, and the patient complained of pain (7-8 on the visual analog scale) in the scrotum. Painkillers were administered and a compression bandage was applied.

Ultrasound showed a large seroma and computed tomography (CT) revealed a large, thin-walled, septate scrotal collection measuring 14/12 cm, extending to the right inguinal canal (Figure 1). No recurrence has been observed.

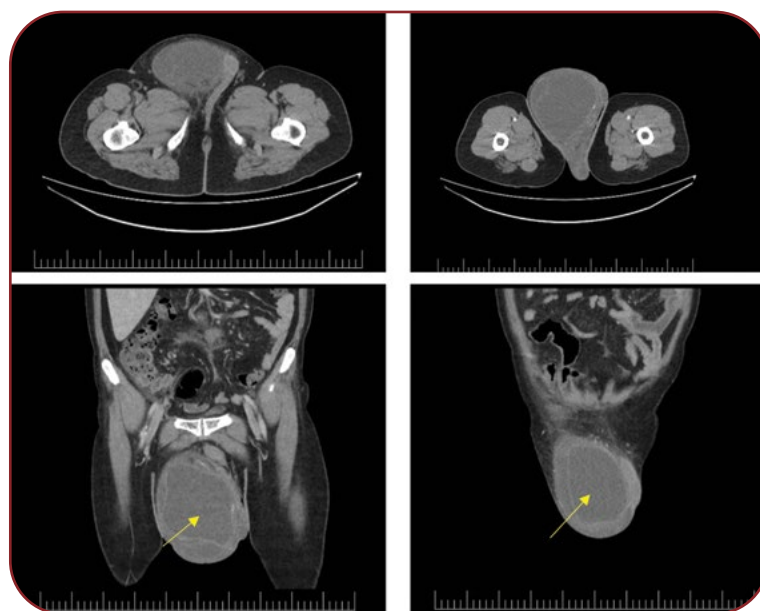


FIGURE 1. Computed tomography scan of the scrotal seroma occurred after TEP hernia repair (yellow arrow points to seroma)



FIGURE 2.
Surgical specimen –
the excised
pseudo-sac

The constant pain was not alleviated despite conservative measures. C-protein levels were elevated (250 mg/dL). On the 10th day postoperatively, the patient was reoperated. An open approach was used to identify a large pseudo-sac with a thick inflammatory wall. Tissues were dissected and excised completely (Figure 2). Drainage was placed. The evolution was favorable; the initial drainage volume was 300 mL, and then it reduced progressively and was removed when 50 mL was accumulated. No bacteria were detected in the initial seroma. Histopathological examination of the sac did not reveal any pathological findings. Follow-up at one month, three and six months did not reveal any recurrence or seroma.

DISCUSSION

In the laparoscopic treatment of large ISH (inguinoscrotal hernia), there are a couple of issues, one related to the limited surgical field, another to the management of the hernia sac, and finally, the management of the postoperative seroma. The first issue can be solved with either the TAPP approach or extended extraperitoneal (eTEP) repair, as suggested by Daes (7). Developed to tackle complex inguinal hernias, including ISH, this technique, based on the Rives-Stoppa procedure, aims to create more space than that achieved in TEP repair, thereby enhancing visualization and facilitating anatomical restoration and reconstruction (7).

Management of the hernia sac is strongly related to seroma formation during the postoperative period (9).

Seroma represents a postoperative localized collection of serous fluid in the surgical wound,

usually occurring as an inflammatory response to dissection related to surgery or hernia mesh when we refer to hernia repair (6). The seroma was located in the preperitoneal space in our case.

Clinical examination and diagnostic imaging techniques, such as ultrasonography and CT, confirmed the presence of seroma. It is a typical postoperative occurrence that can emerge following hernia repair, whether through an open or laparoscopic procedure, and it is commonly encountered in patients who have undergone ISH surgery. Scrotal hernias have been reported to carry a four-fold increased risk of developing seroma after TEP (6). Lau *et al* (6) report a 22.9% seroma rate in scrotal hernias, whereas Cihan *et al* (10) report over 50% seroma rate on the first postoperative day. Studies on large populations with large scrotal hernias revealed that 0.9% of seromas persisted after two months in Schwab's study and 4.4% in the third month in the study conducted by Aeberhard *et al* (11, 12).

Seromas that occur after hernia repair are classified as types 0-IV (13). Type 0 was defined as the absence of a clinical seroma. Types I and II are known to be often encountered in clinical practice, do not need to be dealt with, and are not regarded as complications. In contrast, types III and IV are complications that require external physical therapy or puncture in certain cases (3).

Surgical treatment is recommended for symptomatic seroma. Another problem related to seromas is that they can mimic early hernia recurrence and can cause anxiety. Some of these patients can be addressed to other surgeons who might consider the seroma as a recurrence, so there is a concern for the surgeon as well. Watchful waiting is a way to treat the issue, but informing the patient about the occurrence of seroma (4).

For types III and IV or symptomatic seromas, no treatment is needed. Analgesia and pressure in the inguinal area/scrotum are also useful. When there is a large seroma, puncture, and aspiration therapy a few times before resolution is the solution in the majority of cases (6). In some cases, hernias evolve for years, where the sac adheres to the surrounding tissues, provoking inflammation and thickening of the sac. In these instances, aspiration therapy may not provide a

TABLE 1. Techniques used in the management of the hernia sac

Technique	Study
Primary abandon the sac (PAS)	Morrel <i>et al.</i> (14)
Ligation of the inf. epigastric vessels	Ferzli <i>et al.</i> (15)
High and lateral fixation of the sac	Daes, Reddy (7, 16)
Endoloop technique	Berney <i>et al.</i> (18)
Fibrin glue in the dead space (sclerotherapy)	Surgit <i>et al.</i> (19, 20)
Closed-suction drains	(20-23)
Closure of the direct defect using barbed suture	Li J (25)
Closure of the direct defect	Petersen <i>et al.</i> (26)
Cauterization of the hernia sac	Tsimoyiannis <i>et al.</i> (27)

sufficient cure. Therefore, surgery is required. Either laparoscopic or open (9).

Measures to reduce seroma formation and improve the healing process are primarily based on optimal management of the hernia sac. However, this has proven to be difficult. This is due to adhesions of the sac formed in evolving hernias, making it difficult to excise the entire sac without damaging the cord or bleeding (13).

A summary of the techniques used in sac management is presented in Table 1.

One preferred technique is to abandon the distal sac in the scrotum. This technique was called the primary abandon-the-sac (PAS) technique developed by Morrell *et al.* (14). In their study on 70 patients, seromas were present in 22 (28.9%) subjects after seven days and nine (12.87%) patients still had seromas after 90 days.

Another technique is related to enlarging the internal ring by ligation of the inferior epigastric vessels and, therefore, complete reduction of the sac. This technique has shown a reduction in seroma, as observed in most cases, as reported by Ferzli *et al.* (15). In the eTEP approach, Daes proposed the following technique: the hernia sac was divided and ligated, followed by high and lateral fixation of the distal sac to the posterior inguinal canal 5-7 cm superior to the iliopubic tract, with a good outcome (one patient developed on postoperative day 8) (7). A similar approach has been proposed by Reddy *et al.* (16). A prospective randomized controlled study showed that the risk of postoperative seroma was higher for patients who had transection of the sac compared to complete dissection of the sac. The incidence of seroma was 18.4% vs. 6.0 % ($p=0.016$) seven days postoperatively and 14.5% vs. 4.8 % ($p=0.037$) one month after surgery (17).

Berney used the Endoloop technique to plicate the transversalis fascia and reported no complications (18). Surgit *et al.* performed the TEP approach, in which fibrin glue was used in the dead space behind the mesh in 40 patients, showing a seroma rate of 5% compared with 15% in controls. The mean seroma volume was $\frac{1}{2}$ for the group treated with fibrin sealant (19). Sclerotherapy for persistent seroma using various agents (talc, tetracycline antibiotics, ethanol, polidocanol, erythromycin, OK-432, fibrin glue and povidone-iodine) is widely used by plastic surgeons and appears to be effective (20). Some studies placed closed-suction drains in the preperitoneal space during the TEP approach, demonstrating less seroma formation in patients with surgical drains than in non-drain controls [2.1% vs. 23.8%; odds ratio (OR) 0.12, 95% confidence interval (CI) 0.08–0.19, $p<0.0001$] (21-23). Moreover, one study of 10 bilateral inguinal scrotal hernias treated with TAPP repair, with drains removed after three days, reported no seroma during follow-up (24).

One interesting approach is the Li J technique, which uses barbed sutures to close the direct defect and reduce the defect cavity. In 36 patients with direct hernias, only one patient developed seroma, which resolved one month later (25). A recent systematic review showed that closure of a direct hernia defect reduces the risk of recurrence and seroma formation (26). Tsimoyiannis *et al.* found that cauterization of the hernial sac can prevent seroma formation and hernia recurrence, but the study was performed with a small sample size (25 patients). The suggested mechanism is related to the destruction of the serosal surface followed by adhesions that promote the closure of the dead space (27). Finally, reducing the operative time might decrease the seroma rate, as suggested by Liu. In this study, the duration of surgery was significantly associated with the occurrence of postoperative seroma (OR 1.00; 95% CI 1.00–1.03; $P=0.026$) (28).

In our patient, we initially used a primary abandon of the sac as suggested by Morrell *et al.* (14). In addition, we associated it with a closed-suction drain, which was ineffective in draining the seroma in our case. After re-intervention, the pseudo-sac was completely excised. The postoperative evolution was favorable, and drainage

was suppressed on postoperative day 4. At one month follow-up no seroma was observed.

Another aspect that can be discussed is that the type of mesh can influence the seroma rate. There are a couple of studies on this matter, but to date there is a lack of high-quality evidence to conclude (29).

One issue that has not been sufficiently studied is the quantity of secretion produced by pseudo-sacs. Our case demonstrates that this can also be important in the immediate postoperative period.

As previously mentioned, Cihan *et al* (10) showed that on the first postoperative day, the seroma rate was 50%; however, the volume was not measured.

In the etiology of seroma, one factor is the hernial sac, as showed by Liu *et al*. They found a significant association between seroma occurrence and hernia sac defect measuring ≥ 3 cm (OR 2.24; 95% CI 1.17–4.28; $P=0.015$) and herniation into the scrotum (OR 2.50; 95% CI 1.26–5.00; $P=0.009$) (25).

Obesity is another factor which has been shown to increase the seroma rate. High BMI values can promote the occurrence of seroma (OR 1.14; 95% CI 1.03–1.27; $P=0.014$) (25).

Some studies have shown a relationship between smoking and seroma (30–32). Our patient was a heavy smoker, which might have been a contributing factor. Inflammation of the remnant sac and surrounding tissues can also be related to the operative time and monopolar current used in dissection (33). We can state that the minimal the trauma, the lower the seroma rate. In our patient, high C-reactive protein (CRP) levels during the postoperative period were related to a large seroma. Elevated plasma CRP levels have been proven to be highly suggestive of acute in-

fection or trauma, as well as the appearance of postoperative complications (34). However, the relationship between seroma formation and CRP levels requires further study. In our case, after the complete excision of the pseudo sac, the CRP values returned to normal, probably emphasizing that excision of the pseudo sac reduced inflammation and, hence, the secretion that accumulated the seroma. Similarly, Pochhammer *et al* reported that CRP values can predict infectious complications in ventral hernia repair (VHR) using synthetic mesh (35).

CONCLUSIONS

Large seromas can occur after laparoscopic repair of inguinoscrotal hernias. They are usually asymptomatic and self-resolving; however, when symptoms occur, conservative therapy and drainage are the proposed solutions. Surgery is required when symptoms persist in prolonged seroma. Our case demonstrates that large pseudo sacs in inguinoscrotal hernias can be associated with symptomatic seromas, which can occur early in the postoperative period. Persistent inflammation of the pseudo-sac in our patient was emphasized by high CRP values. After the initial attempt at conservative therapy that failed, the definitive treatment in our case was surgery, based on complete sac excision and drainage. Postoperatively, CRP values decreased to normal levels. Six months later, no recurrence or seroma formation was observed. $\square$

Informed consent: The patient's signed informed consent is available upon request.

Data availability: Available upon request.

Conflicts of interest: none declared. is deceased.

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