



Case Report

Endoscopic preaponeurotic access for complex ventral hernia repair with sublay mesh and bilateral anterior component separation: A case report

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ABSTRACT

Introduction: Minimally invasive techniques are now routine in complex abdominal wall defects repair. Although laparoscopy allows to reduce post-operative pain, promoting a more rapid recovery and shortening hospital stay, it is associated with risk of bowel injury and adhesions development, when intraperitoneal mesh is placed. We report the case of a patient affected by large recurrent incisional hernia, treated with a new hybrid endoscopic approach.

Presentation of case: Patient treated with the novel approach is a 53-year-old male, BMI 27, smoker, with epigastric recurrence of incisional hernia and prosthetic fistula. An endoscopic preaponeurotic subcutaneous access was used. Repair with sublay mesh, bilateral anterior component separation and muscular reinsertions was conducted. Three months after surgery, no signs of recurrence were observed and complete functional recovery had been achieved.

Discussion: The new technique adopted benefits from all the advantages of minimally invasive surgery, allowing to avoid risks associated with laparoscopic access. Bilateral anterior component separation with muscular reinsertions is the key for tension-free suture.

Conclusion: To our knowledge, this is the first time that a complex recurrent incisional hernia is repaired with the hybrid technique aforementioned. The approach used is certainly technically challenging, thus requiring a team skilled in the use of laparoscopy. Good outcomes reported are a further demonstration that minimally invasive surgery can be a valid alternative to traditional open techniques for large abdominal wall defects repair.

1. Introduction

Incisional hernias can develop in up to 16% of patients undergoing abdominal surgery [1,2]. Open technique (Rives-Stoppa) with positioning of a sublay polypropylene mesh is the most performed intervention. This sublay repair can reduce the risk of recurrence and surgical site infection [3]. Over the past three decades, abdominal wall defects surgery has undergone a tumultuous evolution, thanks to the introduction of new technologies in surgical practice, primarily laparoscopy. Minimally invasive approaches can reduce surgical trauma and post-operative pain, but strong evidence of their superiority is still lacking [4,5]. Component separation techniques (anterior/posterior, open/mini-invasive) are used to avoid suture tension in complex ventral hernia repair [6,7].

The aim of our report is to present the case of a patient affected by

complex recurrent incisional hernia with prosthetic fistula. The patient was treated with an innovative minimally invasive approach. This technique associates trocars position of Preaponeurotic Endoscopic Repair (REPA) [8], used for the treatment of rectus abdominis diastasis, with sublay mesh, bilateral anterior component separation and new muscular insertions.

The case is reported in line with the SCARE criteria [9].

2. Presentation of case

In June 2020, a patient suffering from epigastric incisional hernia recurrence (Fig. 1) underwent prosthetic repair with a new endoscopic approach at the General Surgery Unit of Chivasso Hospital (Italy). The patient is a 53-year-old man, BMI 27, smoker (20 cigarettes/die). He underwent radical robotic prostatectomy in June 2018. He later

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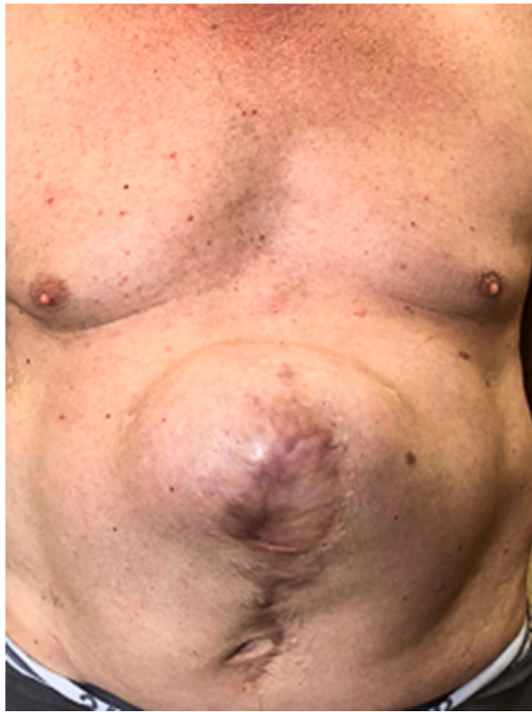


Fig. 1. Pre-surgical condition.

developed a small umbilical incisional hernia, so in April 2019 he underwent surgical repair of the defect with retromuscular prosthesis at another Centre. Early in the postoperative period he developed a massive abdominal bulging with surgical wound diastasis and prosthetic fistula. The abdomen computerized tomography showed conspicuous rectus abdominis diastasis (about 9 cm) with prosthesis apparently in the subcutaneous plane (Fig. 2). During the last examination before surgery, we observed complete closure of the fistula with residual eschar about 4 cm cranially to the umbilicus, non-inflamed dystrophic skin, no signs of infection in progress, hernia defect of about 10 × 15 cm.

2.1. Surgical technique

The patient was under general anesthesia, supine position, lower limbs abducted. 3 trocars were placed, located on the same transverse line that runs about 2 cm cranially to the upper margin of the pubis

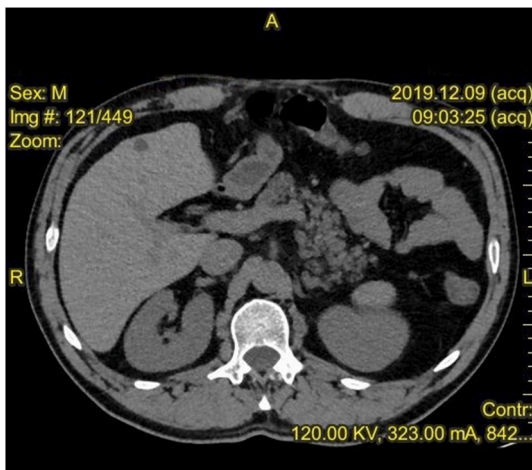


Fig. 2. Computerized tomography shows rectus abdominis diastasis (about 9 cm) with prosthesis displacement.

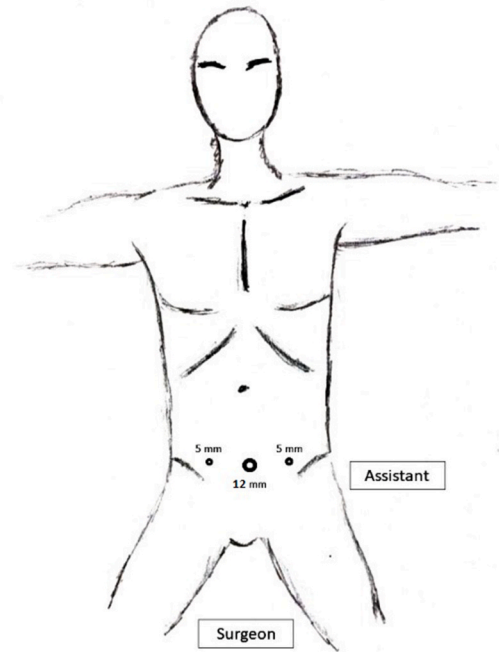


Fig. 3. Trocars position.

(Fig. 3). First 12 mm trocar was placed in the midline. Through the first incision we prepared preaponeurotic space with digitoclasia and the help of ring forceps. CO2 was blown at 10 mmHg. The other two 5 mm trocars were positioned at the level of iliac spines. Musculofascial plane dissection with disconnection of the umbilicus was performed.

In epigastrium, at the level of the external orifice of a prosthetic fistula now closed, skin was tightly attached to a fragment of polypropylene mesh, subsequently dissected and extracted. A large (10 × 15 cm) hernial defect associated with extensive diastasis of rectus abdominis muscles, located approximately at the level of midclavicular line bilaterally, was appreciated. A careful dissection of the peritoneal sac was carried out with its complete reduction in the abdomen. Then, according to Carbonell-Bonafé technique [10], a bilateral incision with disconnection of the external oblique muscle along the semilunar line and its detachment from the underlying internal oblique muscle was conducted (Fig. 4). We proceeded with incision of the anterior rectus sheath and isolation of the posterior sheath bilaterally. On the right, under the posterior surface of rectus muscle, the presence of crumpled polypropylene mesh was observed. The residual mesh was therefore

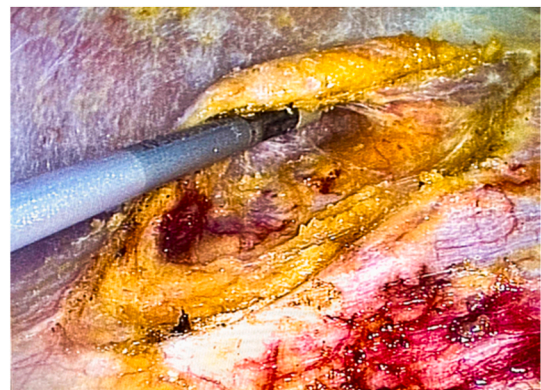


Fig. 4. Disconnection of external oblique muscle along the semilunar line.

dissected and removed. After adequate preparation of the posterior sheaths, we proceeded to suture them with resorbable barbed suture (Fig. 5). A prosthetic sublay repair was performed. In order to avoid a suture under tension, accordingly with Carbonell-Bonafé anterior component separation (ACS) technique, we realized new muscular insertions by suturing the medial margins of rectus abdominis muscles to the retromuscular prosthesis (Fig. 6). The prosthesis used was a lightweight macroporous 60 g/m² polypropylene mesh, adequately shaped in order to obtain a sufficient overlap on the wall defect of at least 5 cm circumferentially. Mesh was fixed to the posterior sheaths with resorbable self-anchoring circumferential suture. Intervention ended with navel reinsertion and the positioning of two 19 Fr suction drainages along lateral incisions. Removal of a dystrophic skin flap, including external orifice of the closed fistula, was necessary.

2.2. Post-operative course

Patient was discharged on post-operative day (POD) 10. Hospital stay was prolonged by vomiting and diarrhea on POD 5, with consequent slowdown in resumption of oral feeding. Coproculture was carried out with negative results.

With the exception of poor pain control in the early post-operative hours (Visual Analogic Scale, VAS, 8–9), for which the administration of a single morphine bolus was necessary, the algic symptoms were irrelevant for the duration of hospital stay (VAS < 3). Gas and stool release occurred respectively on POD 3 and 5. Given the patient's urological history, urinary catheter, positioned in the operating room, was kept in place until POD 5. Patient was mobilized with an abdominal binder starting from POD 3. Stitches and surgical drains were removed on POD 10. At the time of discharge, patient was asymptomatic.

2.3. Follow-up

One month after surgery, wounds were all well healed and without signs of inflammation or infection (Fig. 7). No hematomas were appreciable. A modest seroma was observable, without need for treatment. Gas and stool release were regular. No signs of recurrence were observed. Patient was asymptomatic and reported having resumed all daily activities a few days after discharge. He also reported an improvement in movements, lumbar stability, breathing and digestion compared to pre-surgical conditions.

Three months after surgery patient was asymptomatic and complete functional recovery had been achieved. Seroma was totally reabsorbed. No clinical signs of recurrence were appreciable.

3. Discussion

Results three months after surgery are satisfactory in terms of



Fig. 5. Posterior sheaths are connected in the midline with a barbed resorbable suture.



Fig. 6. Rectus abdominis margin is sutured to the medial third of the mesh bilaterally.



Fig. 7. Patient's abdomen one month after surgery.

absence of recurrence and quality of life reported by patient. Hospital stay was prolonged by episodes of vomiting and diarrhea, treated with medical therapy, and probably related to a mild withdrawal syndrome in cigarette smoker.

The surgical technique adopted for our patient is certainly hybrid. In fact, it combined REPA preaponeurotic subcutaneous endoscopic approach [8], repair with sublay prosthesis [11] and anterior component separation with new muscular insertions [10]. This hybrid approach made it possible to obtain all the advantages of the three aforementioned techniques. First of all, preaponeurotic subcutaneous endoscopic access, not providing direct access to the peritoneal cavity, avoided any risk of bowel injury during hernia sac reduction and adhesiolysis. This complication is a possible and particularly feared occurrence during intraperitoneal onlay mesh repair (IPOM) [12]. The minimally invasive endoscopic access performed has all the benefits of laparoscopy: less pain in the post-operative period, early mobilization and rapid resumption of daily activities, better aesthetic results, less risk of wound infection [4]. Pre-fascial retromuscular prosthesis avoids risk of adhesions between the mesh and the bowel, cause of complications such as occlusions and perforations, sometimes observable in patients undergoing IPOM. Sublay repair has also long been recognized as the gold standard for incisional hernia surgery, as it is associated with the lowest risk of recurrence [3]. In our case, despite the presence of cutaneous fistula outcomes, it was possible to carry out repair in a single time given the total absence of infection signs and fluid collections.

Circumferential suturing of the prosthesis to the posterior plane, without use of transfixed stitches and resorbable tacks, allowed to minimize risk of chronic pain in the post-operative period. However, a suture of the anterior sheaths in the midline, as originally planned, was not practicable, given the impossibility to obtain a tension-free result. Given the extension of hernial defect and the presence of important rectus abdominis diastasis, bilateral anterior component separation, extended from the anterior surface of IX and X ribs up to the anterior superior iliac spine, was necessary. Anterior component separation was the decisive element for surgery success, allowing adequate mobilization of anterior and posterior sheaths of rectus muscles; this approach, together with new muscular reinsertions following Carbonell-Bonafé ACS, allowed to obtain tension-free reparation.

We did not perform level 1 of Carbonell-Bonafé technique (positioning of a large interoblique mesh). The large mesh could prevent a possible occurrence of abdominal bulging due to external oblique muscles incisions that, however, we have not observed up to now in our patient. Moreover, in our case rectus abdominis muscles were reinserted, not the external obliques as in ACS technique.

The endoscopic approach used for our patient is certainly technically challenging and requires a surgical team skilled in the use of laparoscopy. Operative time was 5 hours and 30 minutes, therefore greater than the average duration reported for open techniques [4]. This is attributable both to the complexity of case (large recurrent incisional hernia and prosthesis dislocation) and the fact that it is the first application of the technique.

Finally, it should be emphasized that the access described is not applicable, due to trocars position and allowed view, to very low or immediately suprapubic defects.

4. Conclusion

To our knowledge, this is the first time that the endoscopic technique described is used to repair such type of recurrent incisional hernia. In our first experience, the approach used was reliable, safe and effective, allowing to avoid risks associated with laparoscopic access. Technique improvement (interoblique mesh placement) and application on a series of patients with long-term follow-up are needed to establish if recurrence risk is comparable to that of open and laparoscopic repair.

Provenance and peer review

Not commissioned, externally peer reviewed.

Declaration of competing interest

Salvatore Cuccomarino, Luca Domenico Bonomo, Silvia Rosa Romoli and Alberto Jannaci declare they have no conflict of interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.amsu.2020.10.066>

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Ethical approval

The study is exempt from ethical approval at our Institutions.

Consent

The patient has given informed consent to the processing of personal data, including consent to the use of health data and images for scientific purposes.

Author contribution

Salvatore Cuccomarino: Conceptualization, Data curation, Writing - review & editing.

Luca Domenico Bonomo: Data curation, Writing - review & editing.
Silvia Rosa Romoli: Review.

Alberto Jannaci: Review, Supervision.

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Guarantor

Dr. Salvatore Cuccomarino.

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