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Laparoscopic simultaneous repair of multiple hernias: an unusual clinical case and a literature review

Abstract

The coexistence of multiple hernias in different anatomical zones, such as the abdominal wall and bilateral inguinal region, is an uncommon condition scarcely documented in the literature. Most reports focus on individual hernia repair in specific locations, making the true incidence of simultaneous multiple hernia repair uncertain. This clinical case represents a significant contribution, as it demonstrates the feasibility of performing multiple laparoscopic repairs in a single surgical session for various hernias. We present the case of an octogenarian patient with a history of right nephrectomy due to benign pathology, with no additional risk factors. He presented with mild abdominal pain and a large bulge in the right abdominal flank and bilateral inguinal regions. Physical examination revealed a right lateral incisional hernia, an umbilical hernia, and bilateral inguinal hernias. A single-stage laparoscopic repair was performed, placing a mesh at each site and combining different approaches for each defect. The postoperative course was satisfactory, with no complications and rapid functional recovery. This case exemplifies that synchronous laparoscopic repair of multiple hernias is a viable, safe, and potentially beneficial option in selected patients, allowing adequate visualization, minimal postoperative pain, and shortened recovery time.

Keywords: Inguinal hernia, umbilical hernia, lateral incisional hernia, multiple abdominal hernias, simultaneous repair, laparoscopy, literature review

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Introduction

Simultaneous repair of incisional, umbilical, and bilateral inguinal hernias represents a rare technical challenge. Published case reports of multiple hernia defects using a single surgical approach are scarce. Hereditary factors and connective tissue abnormalities have been identified as predisposing factors for these types of hernias, although they rarely occur simultaneously, with the exception of inguinal hernias, which are frequently bilateral.[1–4] Advanced age is another relevant risk factor, with a higher prevalence of multiple hernias in patients over 70 years of age.[5] Recurrence varies according to the type of hernia, the technique used, and the patient's condition. In this context, laparoscopy has established itself as an effective strategy, offering complete visualization of the defects, especially if they are multiple, allowing their repair with minimal surgical trauma, less postoperative pain, faster recovery, and a possible reduction in recurrence. Although laparoscopic bilateral inguinal hernia repair is accepted, simultaneous repair of multiple abdominal hernias is not common. We present the case of a patient with an incisional lateral, umbilical, and bilateral inguinal hernias, corrected in a single laparoscopic surgical procedure. According to our review, this is the first reported case with this combination of defects treated simultaneously.

Clinical case

A 76-year-old male patient, a priest, non-smoker, with significant family history of three brothers with bilateral inguinal hernia, and personal medical history of lumbar spine fusion 10 years earlier and a right nephrectomy eight months earlier for a benign renal tumor. The procedure was performed laparoscopically and was assisted, with the kidney removed through an oblique incision in the right flank of the abdomen measuring approximately 12 cm. Two months later, the patient began experiencing progressive volume enlargement in the area of the surgical scar through which the kidney was removed. It was initially reducible and subsequently only partially reducible, with moderate discomfort during daily activities, especially with physical exertion. He presented with the perception of intestinal movement and noise in the hernia, with no symptoms of intestinal obstruction.

The patient was oriented and cooperative, weighed 89 kilos, had a BMI of 28 kg/m2, and had vital signs of HR 75 x', RR 20 X', BP 130/80, and $SatO_2$ 91%. No signs of obvious pathology were found on cardiopulmonary examination. The abdomen was globose, and a soft mass was identified in the right flank of the abdomen L2 of the international classification of the European Hernia Society[6], which protruded with the Valsalva maneuver. (Figure 1) It was partially reducible, with a palpable hernial orifice of 10 × 7 cm Also identified on physical examination was an M3 umbilical hernia with incarcerated omental contents, with a hernial orifice of 3 cm, through the insertion site of the umbilical trocar used for the laparoscopic nephrectomy, slightly painful to palpation, and a painless hernial mass that protruded with the Valsalva maneuver in the left inguinal region and probable right inguinal hernia. The complete blood count and the rest of the tests showed parameters within normal limits, with the exception of mild thrombocytopenia (122x10³/µL). The abdominal CT scan revealed an incisional hernia with protrusion of the omentum and ileum loops attached to the hernial sac, as well as an umbilical and left inguinal hernia, with no signs of complications (Figure 2, 3).

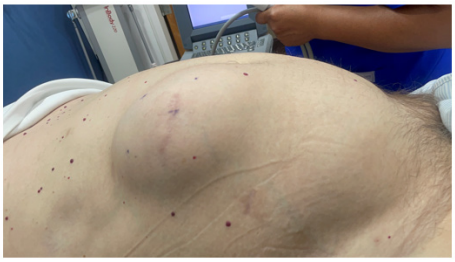

Figure 1 Incisional L2 hernia in the right abdominal flank (European Hernia Society international classification)[6], with Valsalva maneuver.

Figure 2 Abdominal CT scan showing incisional hernia with omental protrusion and ileal loops attached to the hernial sac.

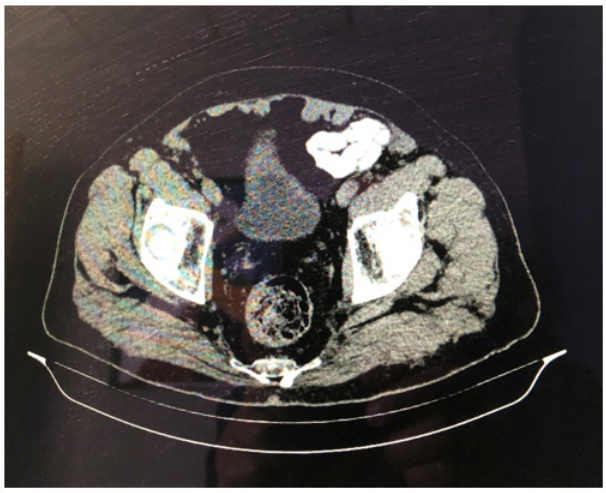

Figure 3 Abdominal CT scan showing the presence of a left inguinal hernia.

The possibility of simultaneous repair of all hernia defects using laparoscopic surgery was discussed with the patient. The unusual nature of the procedure was explained and documented in the informed consent form, which was signed by the patient. Since the patient had no associated risk factors such as smoking or diabetes, he was only prepared with prophylactic antibiotics, a liquid diet the day before surgery, and laxatives to facilitate safer bowel manipulation. The surgical procedure began with an incision in the skin of the umbilical hernia, dissecting the hernial sac until healthy aponeurosis was identified around the entire periphery, resecting the peritoneal hernial sac and the incarcerated omentum. The orifice was partially closed with a continuous #0 polypropylene suture, leaving space for the 12-mm trocar to be inserted without CO2 leakage. Once the pneumoperitoneum was established, a 5-mm trocar was inserted along the left midclavicular line at the level of the umbilical scar, and another one was inserted subxiphoidly on the right.

Laparoscopic examination identified intra-abdominal adhesions of the omentum and small bowel loops (Zühlke 2–3),[7] to the abdominal wall which were released using ultrasonic energy. An incisional hernia was seen on the right flank, approximately 10cm x 8cm, containing small bowel and omentum, with multiple firm adhesions to the hernial sac. These were released with scissors to reintegrate them into the abdominal cavity. The released bowel loops were carefully inspected for enterotomies (Figure 4, 5).

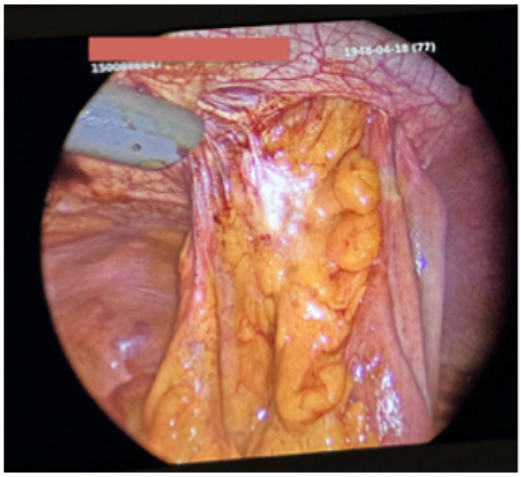

Figure 4 Incarcerated right flank incisional hernia.

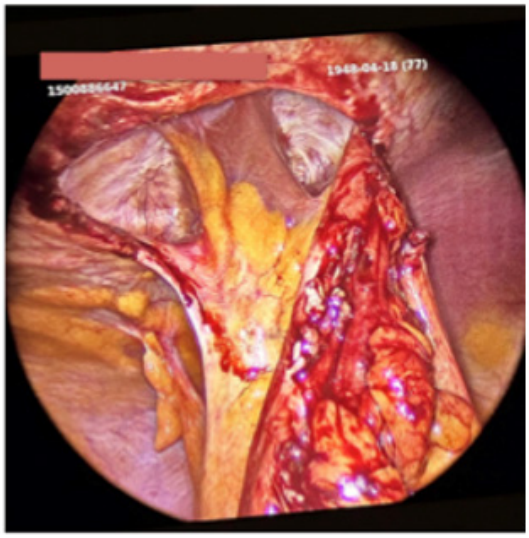

Figure 5 Contents of incarcerated hernia partially reduced with adhesions of omentum and ileum to the hernial sac.

The previously diagnosed left inguinal hernia was confirmed by imaging, and a right inguinal hernia, not reported on the CT scan but clinically suspected by ultrasound, was identified. Another 5-mm trocar was inserted over the scar from the previous surgery through the hernial orifice to facilitate inguinal hernia repair using the usual trocar placement of our group for this surgery. The right inguinal hernia was repaired using the transabdominal preperitoneal (TAPP) technique, resecting the hernial lipoma from the indirect hernia, covering the area with 15x13cm polypropylene mesh secured with Securestrap™, and closing the peritoneum with a continuous 00 barbed monocryl suture. The left hernia was similarly treated using the TAPP technique, with reduction and extraction of the hernial lipoma, placement of the polypropylene mesh which was secured as the right side and closure of the peritoneum (Figure 6).

For the incisional hernia repair, the 5 mm trocar placed through the hernia defect was removed, and the edges of the orifice were closed longitudinally using the Endoclose™ device with four #1 polypropylene sutures placed percutaneously without difficulty or tension (Figure 7 & 8). With the edges closed, it was deemed better to perform a hybrid procedure, opening the skin 5 cm at the site of the scar of the previous surgery. The entire hernia sac was resected

anteriorly, and the closure was reinforced with a continuous 0 barbed suture.

Figure 6 Both inguinal hernias repaired with TAPP technique.

Figure 7 Incisional hernia without intestinal adhesions with a 5mm trocar placed through the hernial orifice.

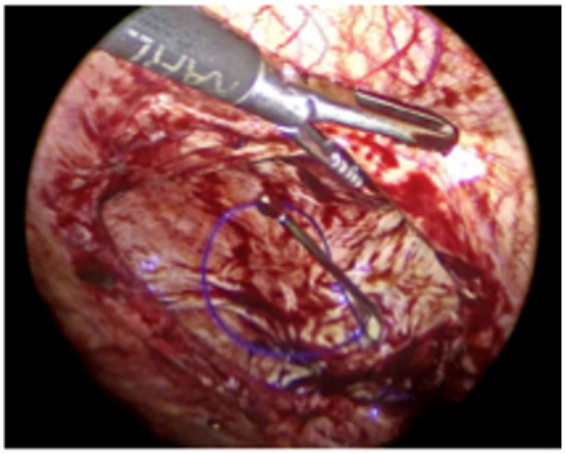

Figure 8 Facing hernia edges percutaneously with the Endoclose™ device.

Again, under laparoscopic vision, we measured the closed defect to select the size of the prosthesis. A 15x20 cm Symbotex Composit™ mesh (monofilament polyester coated on one side with an absorbable collagen and glycerol film) was placed, and secured with Securestrap™ absorbable staples (Figure 9). Before removing the 12 mm trocar, another 15x20 cm Symbotex Composit™ mesh was introduced to repair the umbilical hernia. Using an open approach, the defect was closed with sutures, and the umbilical prosthesis was secured with Securestrap™ absorbable staples through the 5 mm trocars (Figure 10).

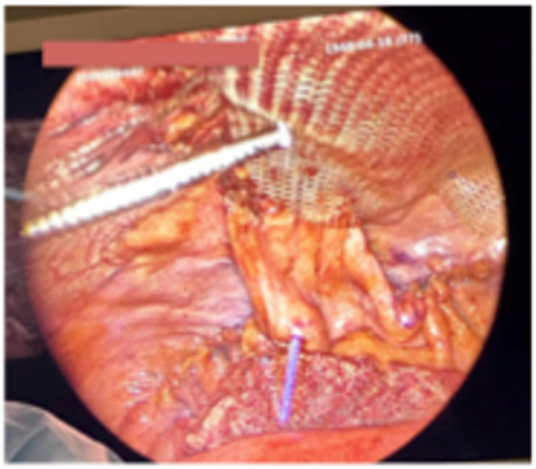

Figure 9 Fixation of the lateral hernia mesh.

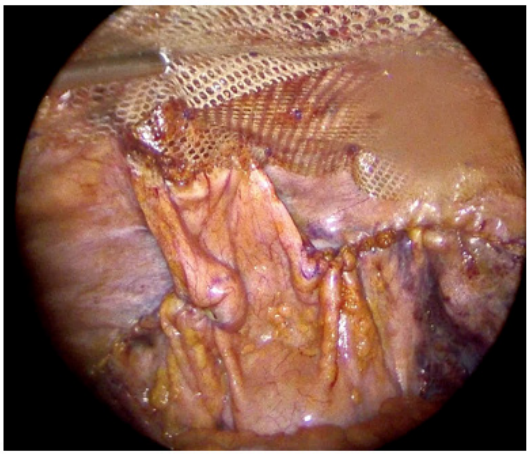

Figure 10 Fixation of the umbilical mesh overlaping the mesh of the lateral hernia.

The surgery lasted 6 hours and 15 minutes. Given the patient's age, anticoagulant therapy was started in the immediate postoperative period. The patient progressed favorably, tolerating oral intake the following day without complications. He was discharged 48 hours later with minimal pain and in good general condition. A week later, he was stable, performing his daily activities normally, and presenting no complications from any of the repairs at the one-month follow-up visit (Figure 11). A biannual follow-up is scheduled to rule out recurrence.

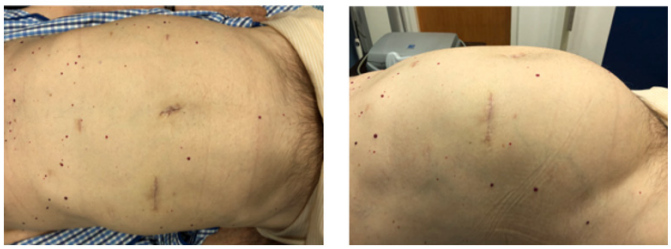

Figure 11 Postoperative results, no incisional hernia seen with Valsalva maneuvers.

Discussion

Repair of abdominal wall hernias is one of the most common practices in general surgery. Hereditary factors and alterations in connective tissue integrity predispose to the development of abdominal

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hernias, but these do not usually occur simultaneously in different anatomical sites.[8–10] However, in the inguinal region, bilaterality is a frequently documented factor. Primary midline abdominal, umbilical, and epigastric hernias also occur together in up to 50% of cases,[11] as do other types of concomitant hernias such as Spigelian, epigastric, and ventral hernias in conjunction with an inguinal hernia.[12–15]

Due to the unusual nature and the obstacles that this situation presents, reports of synchronous repair of multiple hernias are few, and the open surgery approach does not appear to be a suitable option.[16] However, laparoscopy has proven to be an alternative with benefits such as viewing all the defects, allowing to repair them in different anatomical sites of the abdomen simultaneously with minimal trauma, reduced hospitalization, accelerated functional recovery, and less pain. The most commonly used approaches for these repairs include TAPP, TEP (totally extraperitoneal), and IPOM (intraperitoneal onlay mesh), each chosen depending on the characteristics of the specific case, the location, the complexity of the defects, the available resources, and the surgeon's judgment and skill.[1]

The best-known and most accepted minimally invasive synchronous repair is for bilateral inguinal hernias, which, due to its frequency and anatomical proximity, constitutes the ideal technique. It is widely supported in the literature in both adults and children.[17] Esposito[18] indicates that the rates of recurrence, complications, and postoperative pain are lower than those of open surgery. Simultaneous endoscopic repair has also been documented in other concurrent hernias.[19] Chan et al.[20] reported TEP repair of Spigelian and ipsilateral inguinal hernias, demonstrating the feasibility of the technique. Dasgupta et al.[21] repaired an inguinal and ventral hernia using e-TEP. Li et al.[22] described TAPP repair of a perineal and inguinal hernia in a single stage after abdominoperineal resection for rectal cancer, with favorable outcomes and no complications. Similarly, good results have been reported with simultaneous preaponeurotic endoscopic repair of diastasis recti associated with abdominal wall hernias.[23,24]

However, the management of incisional hernias is different. Depending on their size, they can be more complex and pose greater difficulties for repair, especially if there is loss of domain, when the contents are irreducible, or when they are associated with other factors such as overweight or previous repairs. Therefore, these cases require a special analysis for the treatment plan.[25] Sometimes, they may require additional techniques in addition to prehabilitation with Botox®, prior pneumoperitoneum, or component separation, even when the laparoscopic approach is used.[25-28] To find out if there was a report of another similar case to the one we present. We, conducted a review of the English and Spanish literature using the terms "simultaneous, concomitant, synchronous, multiple and laparoscopic repair, laparoscopic, minimally invasive surgery" in the main medical databases. We found one case of incisional hernia repair and bilateral inguinal hernia repair in a patient in whom an open preperitoneal approach was used to cover all defects with a very large mesh. However, since it was not possible to place the entire prosthesis in that position, the upper part was placed onlay.

The simultaneous repair of incisional (post-nephrectomy and umbilical) and bilateral inguinal hernias that we report may be controversial.[30,31] A technical challenge, for which there are no guidelines or reports of similar cases are scarce. However, it must be taken into account that hernias can become complicated with an increased risk of recurrence, so elective repair is a better option.[27]

In a case of ventral midline hernia and unilateral inguinal hernia, Pacheco et al.[12] proposed an algorithm using a robotic approach or laparoscopic techniques, combined with open surgery. However, the repair of multiple concurrent hernias requires a personalized strategy, prioritizing patient safety and the chances of success. This incisional hernia was lateral, flank, classification L2. It has been described mainly after nephrectomies, appendectomies, or after stoma closure. Their management can be complex due to bony prominences and neurovascular structures that can make mesh fixation difficult. There is also no consensus regarding the technique for repairing them, and the recurrence rate is high because the proportion of muscle to fascia/aponeurosis is greater, making the repair less secure. In addition, these defects are subject to asymmetric forces caused by the independent contraction of the anterior and posterior muscles, requiring greater coverage of the defect closure with the mesh.[13,32] However, the laparoscopic approach is considered an adequate option.[14,33,34] Chio et al.[15] described the first TEP endoscopic repair of a Gibson hernia and an inguinal hernia repair in a kidney transplant recipient.

The case of this octogenarian patient, with a single kidney due to a benign renal pathology, but with compensated renal function, without other comorbidities or associated risk factors, raised the possibility of resolving all the defects in the same surgical time to avoid subsequent surgeries, even though there was no similar experience, which was discussed with the patient who accepted the procedure. There is evidence that advanced age is an independent risk factor for complications, readmissions, reoperations, or death within the first thirty days.[26] Therefore, in unusual cases like this, communication is important to clearly explain the nature, advantages, and possible complications, carrying out the informed consent process, so that the patient can decide whether to accept or not the proposal.[35]

The open incisional hernia repair has some advantages over the laparoscopic approach such as the facility to complete hernia sac resection and multiple mesh positioning options. So, as planned, the procedure began with an open approach to the umbilical hernia, dissecting the hernial sac and removing the incarcerated omentum. The orifice was used to insert the 12-mm trocar. The laparoscopic approach allowed for the meticulous identification and release of intra-abdominal adhesions of the omentum and bowel to the abdominal wall and the hernial sac. facilitating content manipulation. The abdominal cavity was freed of the adhesions, and the standard TAPP repair of inguinal hernias was performed. The suspected bilaterality was confirmed clinically, as the CT scan did not reveal the right inguinal hernia. This is another advantage of this intra-abdominal view, which allows for the identification of hernias not confirmed by clinical or imaging studies.[19,36,37]

In cases like this, a hybrid procedure that combines the laparoscopic and open approaches maintaining the advantages of both while minimizing their disadvantages, is worth to be considered. Recently a systematic review and meta-analysis of the hybrid technique to repair incisional hernias was conducted by Van den Hop and cols. and found a relatively low incidence of intra- and postoperative complications after the combined technique as compared to laparoscopic or open techniques with statistically significant lower odds of developing surgical site occurrences, seroma formation and postoperative procedural interventions required. Intra-operative complications also seem to occur less frequent compared to laparoscopic approach, although they did not find statistically significant difference.[38] Marcolin and cols. conducted another systematic review of Cochrane, Scopus, and MEDLINE databases to compare hybrid versus laparoscopic IPOM ventral hernia repair. They found no difference in recurrence, mortality, postoperative complications, reoperation, surgical site infection, and operative time between groups, concluding that hybrid IPOM is a safe and effective method for incisional hernia repair which facilitates fascial defect closure and decreases postoperative seromas.[39]

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So, we considered a hybrid approach to repair the incisional hernia, combining the safety and ease of open surgery, particularly the suturing of the defect, with the minimally invasive approach.[40–43] The edges of the orifice were first approached with a percutaneous suture under laparoscopic vision. Then a small skin incision over the scar from the previous surgery, was done to resect completely the peritoneal sac through it, while reinforcing the closure of the defect more comfortably without tension

The size of the composite prosthesis was selected to cover completely the defect using the IPOM technique. Through the 12-mm umbilical trocar, a second mesh was inserted to cover the umbilical hernia before removing it. A hybrid technique was used to suture the umbilical orifice anteriorly, and it was covered laparoscopically, securing the mesh using the stapler through the 5-mm trocars. We found it easier and more appropriate to use two separate meshes to better cover the hernias than with a single, larger mesh. This also does not hinder torso mobility and reduces discomfort and pain.[44]

Studies of the human abdominal wall still present unknowns, so it is unlikely that a single mesh material currently encompasses all the ideal characteristics of a prosthesis for hernia coverage. However, it is necessary to select the proper mesh to be used for the specific hernia so that it has the ideal properties of strength, distensibility, anisotropy, adequate tissue integration, and visceral adhesion, depending on the placement location and cost. Therefore, in this case, we chose to use different types of prostheses for the inguinal hernias than for the lateral and umbilical hernias. The development of better prosthetic materials and minimally invasive surgery have transformed the treatment of these problems and allow multiple repairs in the same surgical time.[45–49]

Combining TAPP approaches for inguinal hernias, and the hybrid laparoscopic technique for closure of lateral and umbilical hernia orifices, with IPOM placement of meshes in a single surgical procedure, provided the patient with a stable functional reconstruction with favorable evolution, and the benefits of minimally invasive surgery. This case exemplifies the feasibility and benefits of the procedure, including the ability to achieve a direct and complete visual diagnosis of the abdominal cavity, as has been described in reports on occult hernias, such as in this patient, which helped demonstrate the presence of an inguinal hernia that was not reported on the CT scan.[26,50] Follow-up has been brief, and we will continue to monitor him with regular visits, since although recurrence of any of the hernias is unlikely, it is the most serious medium- and long-term complication.

It is necessary to consider the disruption of the muscular wall caused by hernias, which, among other complications, affects the mechanical function of the abdomen, especially when they are multiple and synchronous. Multiple hernia repair cases are very rare. They should be individualized and considered, assessing patient safety and the feasibility of resolving all hernias in a single surgical procedure, choosing minimally invasive approaches to allow the best repair. Surgical experience and following consensus guidelines on abdominal wall hernia repair are key factors to minimizing complications and potential recurrences.[20,51,52]

Preoperative assessment and preparation are essential, especially in geriatric patients, to reduce risk factors.[53] A comprehensive, patient-centered approach also includes the economic aspect. A single surgical procedure, if appropriate, can reduce the costs of additional surgeries, which is also important.[54]

Conclusion

Simultaneous laparoscopic repair of multiple hernias, including incisional, umbilical, and bilateral inguinal hernias, is feasible and safe in selected cases. Although the evidence comes from small series and case reports, it allows for comprehensive treatment of multiple hernia defects in a single surgical procedure, with significant benefits for postoperative outcome and patient quality of life. The combination of techniques, careful management of adhesions, and appropriate prosthesis selection and fixation are fundamental elements for the success of these complex procedures.

To our knowledge, this is the first report of a bilateral L2, umbilical, and inguinal hernia repair in a single surgical procedure using this approach. More reports and accumulated evidence on similar cases are needed to validate the procedure and make recommendations.

Acknowledgements

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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