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Surgery for incisional hernia with loss of domain complicated by morbid obesity: A case report

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Abstract

Radical surgery for abdominal wall incisional hernia with loss of domain (LOD) has a high incidence of postoperative complications and recurrence, and there is no consistent consensus on the surgical approach. This article reports the surgical management of an incisional hernia with LOD complicated by morbid obesity. A 70-year-old female with a body mass index of 40.4 kg/m^2 was admitted to our hospital owing to severe abdominal pain. She had an adult-head-sized incisional hernia in the lower abdomen and an incarcerated intestine extending from the ileum to the transverse and sigmoid colons in the hernial sac. After 1 month of diet and exercise therapy prior to surgery, elective herniorrhaphy was performed. Intraperitoneal onlay mesh repair was used, and postoperative intensive care was provided to manage subsequent abdominal compartment syndrome (ACS). She was discharged on postoperative day 22 without morbidity. Three years postoperatively, no recurrence was observed. Careful perioperative strategies of surgical procedure and intensive management to prevent the progression of ACS are essential for optimal outcomes in LOD hernia complicated by morbid obesity.

Keywords:

Acute compartment syndrome, incisional hernia with loss of domain, morbid obesity

Introduction

Incisional hernia with loss of domain (LOD) is considered a complex ventral hernia pathology. Surgery for incisional hernia with LOD is usually a challenging procedure due to the high incidence of postoperative complications and recurrence. In LOD hernia, the surgical procedure and perioperative management must be carefully considered to prevent the incidence of subsequent acute compartment syndrome (ACS) due to reinsertion of organs into the reduced abdominal cavity. This article reports a case of recurrent incisional hernia with LOD, complicated by morbid obesity. Treatment with intraperitoneal onlay mesh repair (IPOM) and perioperative intensive management resulted in a good postoperative outcome.

Case History

A 70-year-old female who was being treated for morbid obesity (body mass index [BMI] 40.4 kg/m^2) and type 2 diabetes mellitus was urgently admitted to our hospital owing to severe abdominal pain. She had undergone three Cesarean sections and developed an incisional hernia in her 50s. She underwent herniorrhaphy at her 60s, but the hernia recurred in a few years and gradually worsened with increasing obesity.

In the midline of the lower abdomen, she had an incisional hernia of 30 cm × 28 cm × 20 cm in size and 6.2 cm × 6.0 cm of a hernia orifice; M4/W2 in European Hernia Society classification [Figure 1A and B]. Abdominal computed tomography showed an incarcerated intestine extending from

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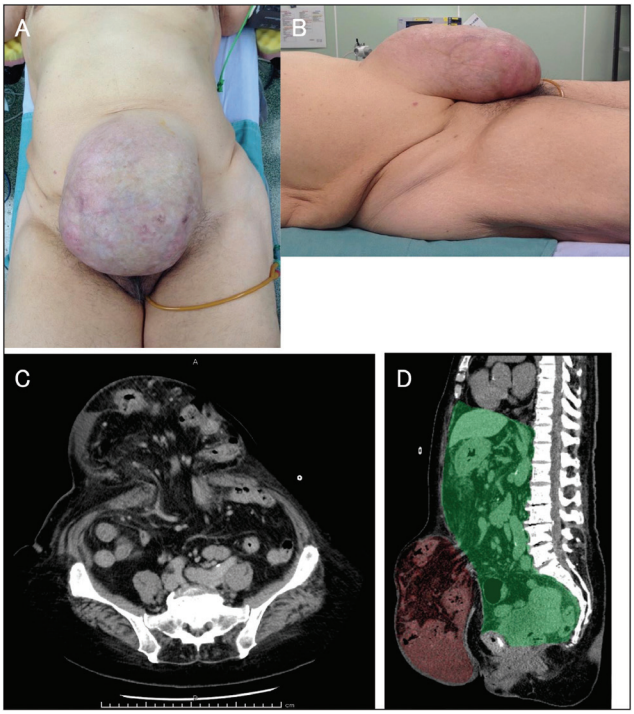

Figure 1: (A and B) Preoperative physical observations: an incisional abdominal hernia the size of an adult head, along a lower midline scar. The skin over the hernia was thin, with erosions and ulceration, due to the long-term irreducible hernia. (C and D) Preoperative abdominal computed tomography: 6.5L of abdominal cavity (green area) and 3.8L of hernia sac volume (red area)

the ileum to the transverse and sigmoid colons in the hernial sac and intestinal obstruction. After improvement in the intestinal obstruction by carrying out 1 week of intestinal decompression with a nasogastric tube, we planned to perform an elective herniorrhaphy to prevent future intestinal strangulation. She completed 1 month of preoperative diet and exercise, losing a weight of 6.8 kg (BMI of 37.5 kg/m^2). Preoperative computed tomography showed 6.5L of abdominal cavity and 3.8L of hernia sac volume (Tanaka method LOD 0.58 and Sabbagh method LOD 36.8%) [Figure 1C and D]. On the 26th day after admission, herniorrhaphy was performed.

A 20-cm midline incision was made around the apex of the hernia sac. The hernia contents included the omentum, ileum, cecum, and transverse and sigmoid colon without any adhesions. The hernia contents were easily returned to the abdominal cavity. However, soon after the contents were reinserted, blood pressure decreased and oxygen levels deteriorated, suggesting the development of ACS. Bard Ventrio ST® (3L; 27.1 cm × 22.1 cm) was inserted into the abdominal cavity, and the hernia orifice was fully recovered with 5-cm full circumferential overlap (the estimated area of the hernia orifice was 29.2 cm^3, and the mesh size was 470.4 cm^3) and fixed with non-absorbable tackers [Figure 2A-C]. The hernia sac and excess skin were removed by plastic surgery, and a closed continuous suction drain was placed subcutaneously [Figure 2D]. The operation time was 215 min, and the intraoperative blood loss volume was 74 mL.

She was admitted to the intensive care unit without extubation. She required several sympathomimetic drugs and mechanical ventilation. She was gradually weaned off oxygen and finally extubated on postoperative day (POD) 6 [Figure 3]. The subcutaneous drain was removed on POD7. She started eating on POD9 and was discharged on POD22 without any complications. Computed tomography 3 months after the surgery showed no recurrence [Figure 4]. Three years postoperatively, no recurrence was found.

Discussion

Abdominal wall incisional hernia occurs with a frequency of 0.5%–11% after abdominal surgery.[1] LOD refers to the loss of abdomino-pelvic compartment volume and the necessity for abdominal viscera to reside within the hernia sac. Recently, an International Delphi Consensus of Expert Surgeons has developed a standardized definition of LOD: a ventral hernia large enough such that simple reduction in its contents and primary fascial closure either cannot be achieved without additional reconstructive techniques or cannot be achieved without a significant risk of complications due to the increased intra-abdominal pressure.[2] However, there is still no consensus regarding the optimal surgical procedure.

Systemic treatment by a multidisciplinary team (surgeon, internist, anesthetist, respiratory physiotherapist, and nutritionist) is essential for optimal outcomes for LOD hernia.[3] The key points in the preoperative management are weight loss through diet and exercise therapy, management of comorbidities, and respiratory physiotherapy to prevent respiratory failure. Recently, the efficacy of progressive preoperative pneumoperitoneum or chemical component separation (CS) with botulinum toxin has been reported,[4,5] but these are not yet widely used and covered by insurance in Japan. Postoperative management should address intra-abdominal hypertension syndrome and, even worse, ACS in the treatment of LOD hernia. ACS is a serious condition caused by a sudden increase in the intra-abdominal pressure and can lead to multiple organ failure.[6] In addition, obesity can exacerbate the development of ACS.[7] In LOD hernia with morbid obesity such as the present case, we were able to prevent ACS progression by using postoperative mechanical ventilation to optimize the intra-thoracic and intra-abdominal pressures.

Regarding the choice of surgical procedure, we opted for IPOM using Bard Ventrio ST®. The 2019

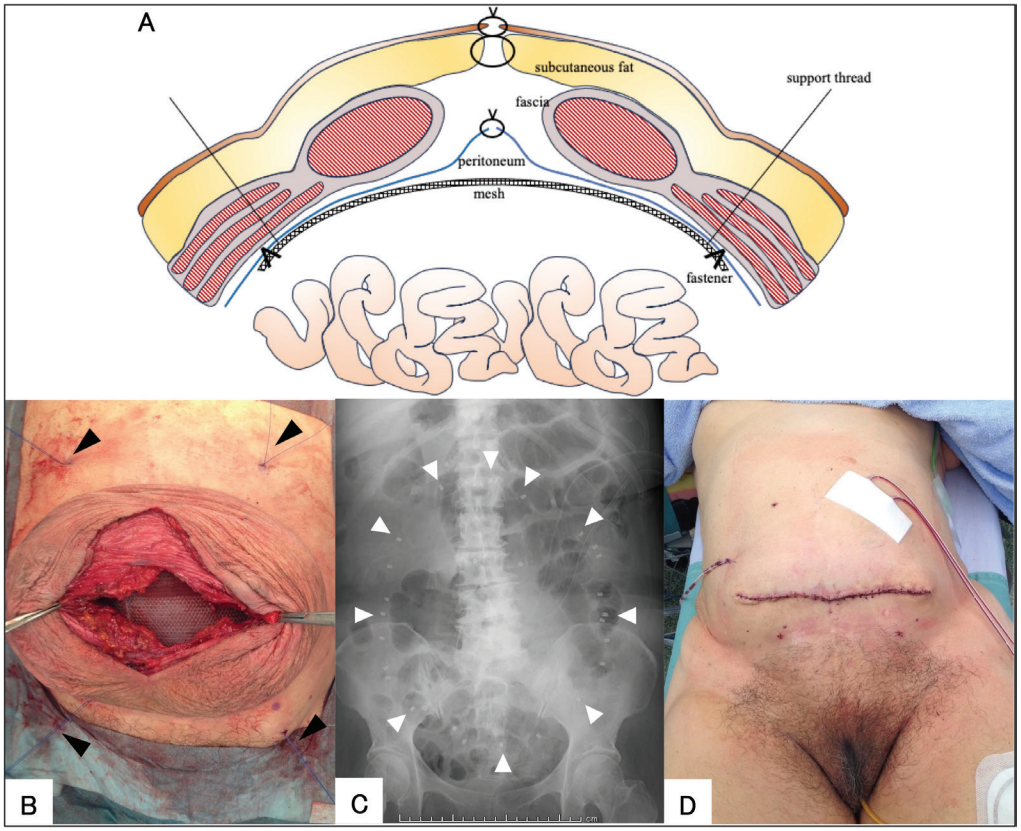

Figure 2: (A) Schema of the intraoperative findings. (B) Intraoperative images. First, the entire mesh was inserted into the abdominal cavity. The four support threads at the edge of the mesh were pulled from outside the body (black arrowheads). While being lifted by these threads, the mesh was fixed to the intra-abdominal wall using a non-absorbable fastener. The tip of the tacker was inserted through the slit in the mesh, and the fasteners were fixed to the abdominal wall inside the absorbent recoil ring of the mesh. (C) Intraoperative abdominal X-ray showing the non-absorbable tackers placed in an oval shape along the mesh (white arrowheads). (D) Postoperative wound findings

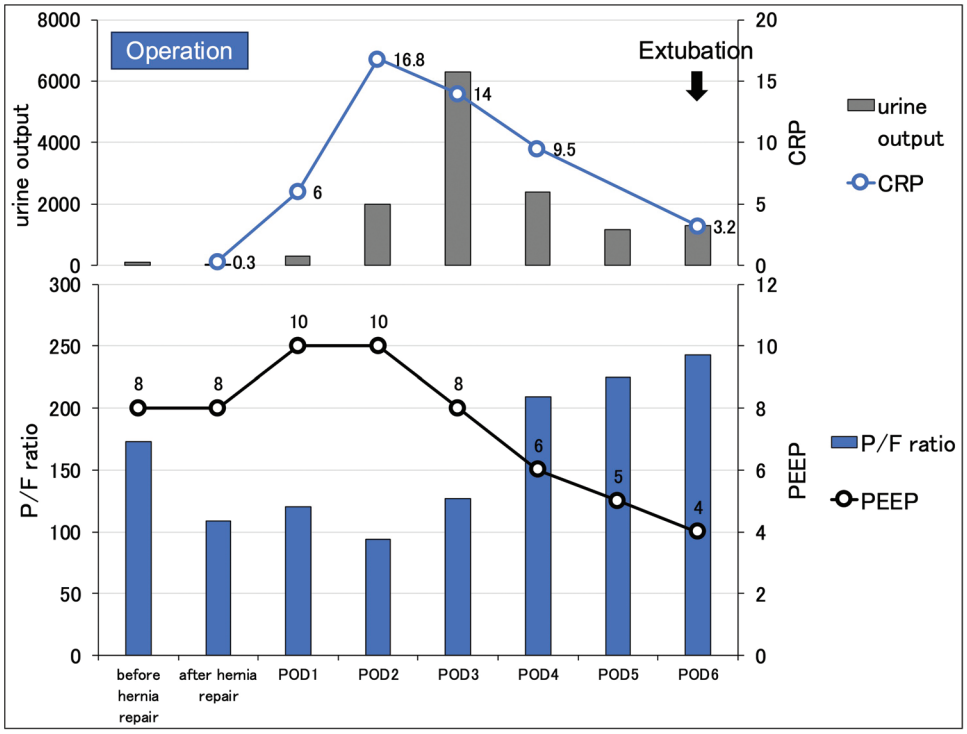

Figure 3: Postoperative course of the PaO_2/FiO_2 ratio, positive end-expiratory pressure in the ventilator setting, amount of urine output, and C-reactive protein (CRP)

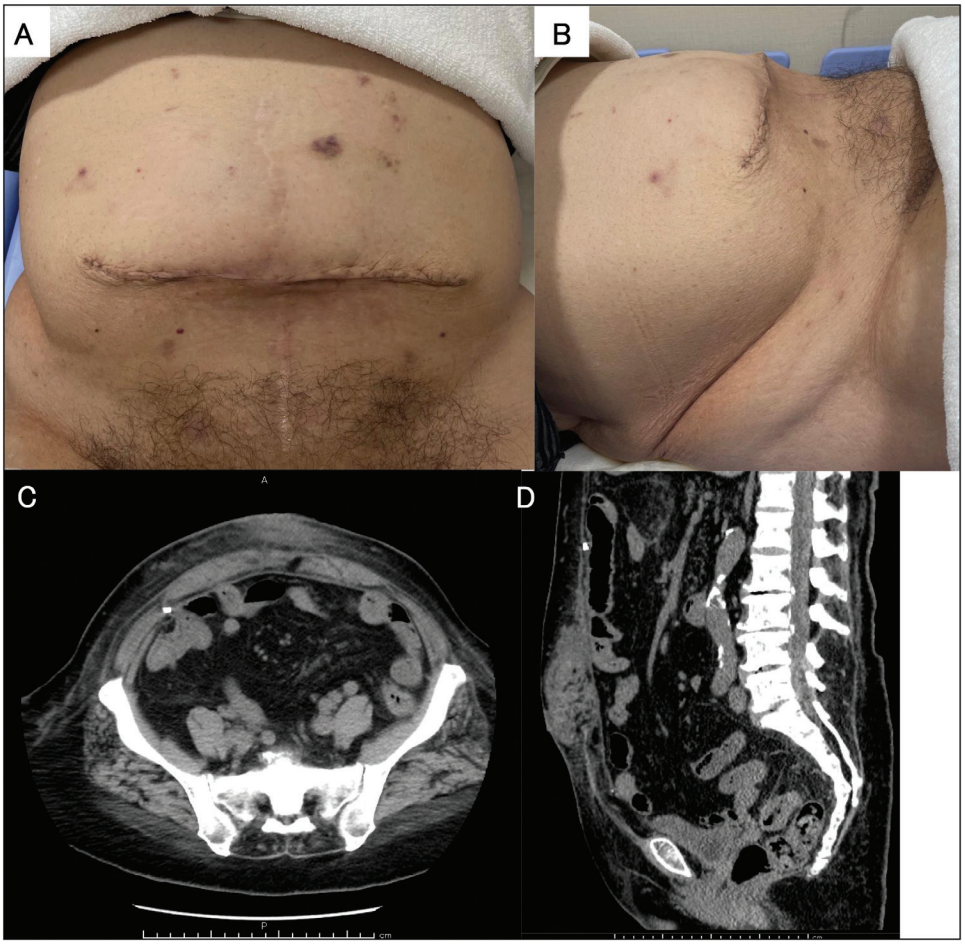

Figure 4: Postoperative findings 3 months after surgery. (A and B) Wound findings. (C and D) Abdominal computed tomography revealing no hernia prolapse or mesh bulging

International Endohernia Society guidelines state that closure of the hernia orifice should be attempted by laparoscopic incisional hernia repair (grade B recommendation).[8] Especially in midline incisional hernias, reconstruction of the linea alba is also very important in terms of restoring physiologic abdominal wall function. However, it is unclear whether closure of the hernia orifice in LOD hernia contributes to the prevention of recurrence. Rather, unreasonable closure of the muscle sheath not only increases the risk of ACS but also increases postoperative pain and discomfort due to increased intra-abdominal pressure. Some reports have described the value of using a tension-reducing incision for closure of the muscle sheath, such as the CS technique.[9] However, the risk of subsequent fascial necrosis due to impaired blood flow of fascia and the development of subsequent ventral hernias, such as a spigelian hernia, should be considered.[10] In addition, wide retrorectus dissection could lead to wound complications such as hematoma and seroma formation. In our case, we considered that IPOM was an appropriate choice to avoid deterioration of ACS, and IPOM-Plus (closure of the hernia orifice) with the CS technique was not appropriate because obesity and diabetes mellitus can cause delayed wound healing.

Surgery for incisional hernia with LOD is still being attempted and tested due to a lack of sufficient evidence. The registration of hernia disease cases by the Japanese Hernia Society, and the use of its database, will hopefully lead to the development of a treatment algorithm that includes guidance for difficult cases, such as LOD hernia.

Conclusions

Surgery for incisional hernia with LOD is associated with a significant risk of development of ACS. The selection of an appropriate surgical procedure and intensive perioperative management are essential for optimal outcomes in LOD hernia complicated by morbid obesity.

Author contributions

We certify that we have participated sufficiently in the intellectual content, conception and design of this work or the analysis and interpretation of the data (when

applicable), as well as the writing of the manuscript, to take public responsibility for it and have agreed to have our name listed as a contributor.

Ethical policy and institutional review board statement

Written informed consent was obtained in accordance with the Declaration of Helsinki, with due regard to the protection of personal information and privacy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Data availability statement

Due to the nature of this research, the patient of this study did not agree for their data to be shared publicly, so supporting data is not available.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Acknowledgments

Nil.

Abbreviation

BMI	Body mass index
EHS	European Hernia Society
CS	Component separation

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