

From Size to Solution: A Case Report on Surgical Repair of a Colossal Incisional Hernia

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ABSTRACT

A giant incisional hernia is a common health complication characterised by the loss of abdominal wall integrity. It is typically observed in patients who have undergone abdominal surgery. Incisional hernias present a significant burden in healthcare, particularly in cases involving laparoscopic surgeries. They occur when abdominal contents protrude through inadequately healed surgical incisions, with surgical history and obesity being major risk factors. Colossal incisional hernias are generally defined by their large size (>15 centimeters). Here, the authors present a case of a 45-year-old male who has had a large lump in his abdomen for the past two years. The lump worsened when the patient stood and improved when he lay down. The patient underwent umbilical hernia surgery eight years ago and has a history of heavy weight lifting. A positive cough impulse was observed, along with an old surgical scar. The patient underwent surgery that included adhesiolysis, omentectomy, omphalectomy, reduction of the hernia contents, closure of the defect with polypropylene loop sutures, and placement of a polypropylene mesh over the rectus sheath. The patient was discharged on the seventh Postoperative Day (POD). A six-month follow-up showed no signs of recurrence, indicating a favorable prognosis post-surgery. Anatomical knowledge is crucial for the effective management of any hernia. These hernias are managed through an interdisciplinary approach tailored to patient-specific factors.

Keywords: Abdominal girth, Abdominal lump, Laparoscopic surgery, Obesity

CASE REPORT

A 45-year-old male presented with a lump (swelling) in the abdomen. The swelling aggravated when he stood and relieved when lying down. The patient was well two years prior, when he developed a lump in the abdomen, which was insidious in onset and gradually progressed to its current size of 35×25 centimeters. The patient is a farmer and has a history of lifting heavy goods, with previous umbilical hernioplasty eight years ago in a government hospital.

In the current presentation, the patient primarily complained of a visible bulge and discomfort. However, he did not report significant abdominal pain or signs of bowel obstruction, such as vomiting, constipation, or abdominal distension. His current Body Mass Index (BMI) is 44.3 kg/m², indicative of morbid obesity. No changes were observed in skin color or texture, and the rest of the history was unremarkable, with no co-morbidities present.

Local examination revealed a swelling measuring 35×25×10 centimeters over the abdomen. A transverse scar of 6 centimeters was observed in the supraumbilical position over the swelling. There was no associated discharge or dilated veins noted, and a cough impulse was present. The abdominal girth preoperatively was 146 centimeters. The swelling was non-tender, soft in consistency, and globular in shape [Table/Fig-1]. The swelling was assessed by Computed Tomography (CT), which revealed an effusion of the anterior abdominal wall defect at the level of the umbilical region in the midline, with associated divarication of the rectus abdominis. The defect size was approximately 35×25×10 cm, indicating a high-volume hernia sac. The significant size and protrusion suggested a loss of domain, meaning that a large part of the abdominal contents had moved outside the cavity.

There were no signs of strangulation or reduced blood flow; however, free fluid was noted between the bowel and inflammation in the surrounding fat, pointing to early inflammation. The herniated contents were closely attached to the omentum and umbilicus. Herniation of the bowel, along with mesentery, occurred through this defect, with evidence of inter-bowel free fluid observed within the herniated bowel loops. Inflammatory fat stranding in the surrounding mesentery suggested an umbilical hernia with bowel



[Table/Fig-1]: Physical presentation of the abdominal swelling of 35×25×10 centimeters.

and mesentery as its contents [Table/Fig-2,3]. Differential diagnoses considered included rectus diastasis and abdominal carcinoma due to the associated clinical presentations. CT imaging ruled these out, confirming the presence of herniation.

The patient was managed surgically through adhesiolysis, during which the hernia sac, its components, and the adhesions were identified. The adhesiolysis was successful, accompanied by an omentectomy of the firmly adhered omentum. An omphalocele was also removed, as the sac was firmly adhered to the inner layers of the umbilicus. The contents of the sac were reduced, and the redundant sac was excised from surrounding structures. The anatomical defect was closed with a polypropylene loop using continuous sutures. The rectus fascia was dissected from the subcutaneous tissue, and a space was created for the placement of synthetic polypropylene mesh in an onlay position, following a thorough wash with saline and confirmation of hemostasis. The mesh was inserted and placed over the rectus sheath [Table/Fig-4].

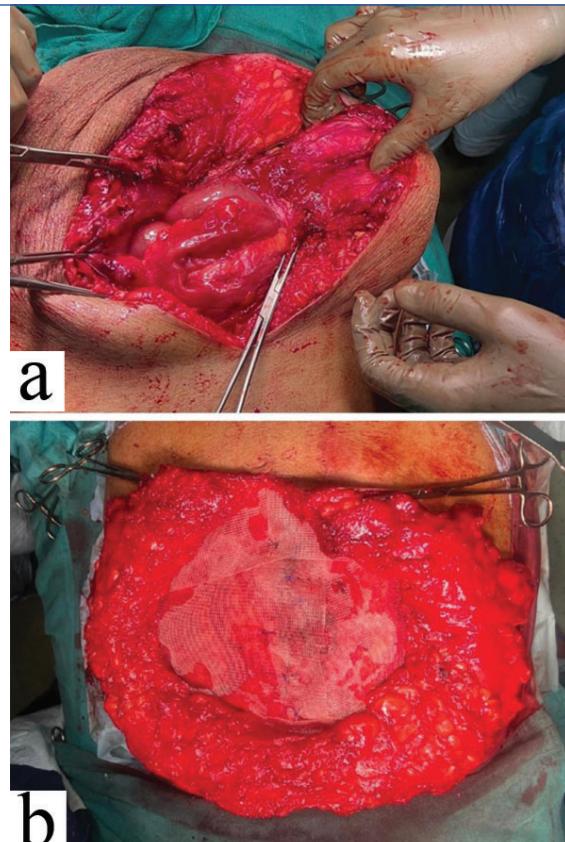
Immediate postoperative findings included a reduction in abdominal girth to 128 cm, compared to preoperative dimensions of 146 cm, marking an approximate decrease of 18 cm. Preoperative and postoperative BMI data were noted as 44.3 kg/m² and 39.0 kg/m², respectively. The excised sac and omentum specimens were



[Table/Fig-2]: Topogram of Computed Tomography (CT) image showing herniation of the bowel along with mesentery.



[Table/Fig-3]: CT image of anterior abdominal wall defect through which bowel and omentum are herniating. A) Represent the defect in the anterior abdominal wall; B) Represent the abdominal contents herniating through the defect.



[Table/Fig-4]: Intraoperative image showing the mesh fixation. a) Showing bowel and omentum as the content of hernia; b) Showing synthetic polypropylene mesh being placed over the rectus sheath.

analysed histopathologically, revealing normal mass with squamous epithelium of the skin flap and unremarkable findings of the omentum and sac.

The procedure was uneventful, and the patient was extubated and transferred to the postoperative Intensive Care Unit (ICU). An episode of tachypnea, tachycardia, and respiratory distress occurred, but the patient remained stable thereafter. Abdominal drains were removed on the fifth POD, and discharge occurred on the seventh POD, with instructions to return to the surgical outpatient department within 15 days for review. At the 6-month follow-up, the patient was found to be recovering well, with no signs of recurrence.

DISCUSSION

Incisional hernia is a common complication associated with both open and laparoscopic surgeries. An incisional hernia can be defined as a hernia occurring near or at any previous surgical scar site, compromising the integrity of the abdominal wall and allowing internal organs to protrude through it [1]. There are multifactorial underlying pathophysiologies associated with the incidence of hernias [1,2]. Colossal or giant hernias refer to those with a substantial defect, typically where the hernia sac contains a significant portion of intra-abdominal contents (often >20% of abdominal volume). The defect is usually ≥ 15 cm in diameter or involves loss of domain [3].

Colossal or giant hernias present several significant surgical and postoperative challenges. One major issue is the loss of domain, where a large part of the abdominal contents remains outside the abdominal cavity. A surgical reduction of hernial contents might cause a sudden rise in intra-abdominal pressure, potentially leading to breathing problems, elevated diaphragm placement, and even abdominal compartment syndrome [4]. Numerous common pathophysiological pathways contribute to the increased incidence of hernias, particularly incisional hernias. Impaired wound healing, which can be caused by ischemia, surgical site infections, or inadequate surgical closure methods, is one of the leading contributing factors [5].

Risk factors for incisional hernia formation and recurrence involve both patient-related and surgical factors. Patient-related risks include:

- Obesity
- Advanced age
- Male gender
- Smoking
- Malnutrition
- Chronic cough
- Constipation
- Conditions that increase intra-abdominal pressure (e.g., ascites or heavy lifting)

Poor wound healing due to diabetes, steroid use, or infection also plays a significant role [5,6]. Surgical risks involves:

- Inadequate fascial closure
- Use of absorbable sutures
- Emergency procedures
- Wound infections
- Midline incisions, especially if not properly reinforced

Recurrence is more common in cases with significant defects, prior hernia repairs, and when tension occurs during closure without mesh reinforcement [5]. Many research studies have related surgeons' technical expertise and experience in hernia management to better outcomes [5,6]. Recurrence after hernia repair has been reported to be 27.7% within a 2-year follow-up period [7]. Hernia repair techniques vary depending on the size of the hernia and patient-specific factors. Primary repair involves suturing without mesh but carries a high recurrence risk, particularly in significant defects [6]. The majority of research evidence suggests a statistically significant reduction in hernia recurrences with mesh repair [6-8].

Mesh repair: Synthetic mesh repair is the most common method, offering greater support and a lower recurrence rate. Mesh can be placed in different positions:

- Onlay: Over the fascia
- Inlay: Between edges
- Sublay: Behind the rectus muscle
- Underlay: Intraperitoneal

Each position has its own advantages and risks. However, synthetic meshes carry risks of infection and seroma formation. Biological mesh is used in contaminated cases to promote better healing but is costly and less durable [6,9,10].

In cases of chronic or recurrent hernias, adhesions may need to be addressed with omentectomy and adhesiolysis. For very large hernias, component separation enables tension-free closure by mobilizing the abdominal muscles, but this involves more complex surgery and carries a higher risk of complications. Conversely, mesh repair has its own set of complications, including re-admission, postoperative discomfort or pain, mesh infections, fistula formation, short-term complications, and bowel obstruction [9,11].

The potential for postoperative consequences, such as respiratory distress linked to elevated intra-abdominal pressure, is a primary concern [11,12].

This case exemplifies a long-term recurrence of an incisional hernia. The patient might have experienced a better quality of life had they not ignored the abdominal swelling, which currently measures 20x20 cm. The defect was too large to be closed properly, and the mesh available for hernioplasty was not in that particular size. Consequently, a total of four meshes, each measuring 15x15 cm, were utilised.

Postoperatively, the patient went into respiratory distress and developed Acute Respiratory Distress Syndrome (ARDS) due to the decompression of abdominal pressure from repairing the hernial defect. The patient was placed on Bilevel Positive Airway Pressure (BiPAP) support, with aggressive chest physiotherapy and close monitoring. Although this patient did not develop any other complications, there is always a risk of additional complications that may arise after repairing such large hernias.

Innovations in treatment: Innovations in the treatment of giant umbilical hernias have emerged. One recent development is the use of Progressive Preoperative Pneumoperitoneum (PPP), which helps accommodate herniated contents and reduces postoperative respiratory complications by gradually increasing intra-abdominal volume over days to weeks before surgery [13].

The approach to mesh placement, surgical techniques, and therapeutic interventions may vary, particularly concerning surgical technique and preoperative planning. The application of PPP also differs; in acute presentations, its use may not be emphasised, while others advocate its frequent application to enlarge the abdominal cavity. The creation of component separation techniques using

endoscopic or minimally invasive methods is another innovation that enhances abdominal wall function and reduces wound complications.

The use of newer material meshes designed for contaminated or high-risk fields has become more prevalent because they offer better integration and a lower risk of infection than conventional synthetic mesh [14]. Any mass or swelling at or near the incision site should not be ignored. Timely diagnosis and management are crucial in cases of recurrent incisional hernia to improve outcomes and quality of life. Stringent follow-up with a suspicion of recurrence can also aid in achieving a good prognosis, especially for obese and elderly patients.

CONCLUSION(S)

Postoperative care is essential in reducing the chances of hernia recurrence. Patients at risk should be counseled regarding any postoperative swelling and encouraged to seek healthcare assistance. An optimal surgical technique, such as a proper tension-free repair with mesh reinforcement, can facilitate faster recovery and reduce healing time.

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