

RARE CASE OF GIANT SPIGELIAN HERNIA WITH LOSS OF DOMAIN

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ABSTRACT

Spigelian hernia is a rare type of ventral abdominal wall hernia that develops through a defect in the Spigelian fascia along the semilunar line and accounts for less than 2% of all abdominal wall hernias. Owing to its interparietal location and frequently vague clinical presentation, diagnosis is often delayed until the hernia enlarges or complications develop. Giant Spigelian hernias associated with loss of domain are exceptionally uncommon and present significant reconstructive challenges because a considerable proportion of the abdominal viscera remain outside the abdominal cavity, increasing the risk of respiratory compromise and abdominal compartment syndrome following repair.

We report the case of a 68-year-old male who presented with a progressively enlarging swelling over the right lower anterior abdominal wall of several years duration. Contrast-enhanced computed tomography demonstrated a large right-sided Spigelian hernia with an abdominal wall defect measuring 8 × 8.1 cm containing bowel loops without evidence of obstruction. The patient also had an incidental left inguinal hernia containing omentum, bilateral renal calculi, and chronic right hydrocele. Considering the large defect and loss of abdominal domain, surgical repair was performed using a combined anterior and posterior component separation technique with prosthetic mesh reinforcement, achieving tension-free closure of the abdominal wall. The postoperative recovery was uneventful, and the patient was discharged in stable condition without early complications.

KEYWORDS: Spigelian hernia; Loss of domain; Ventral hernia; Component separation; Mesh repair; Abdominal wall reconstruction.

INTRODUCTION

Spigelian hernia is a rare primary ventral abdominal wall hernia arising through a defect in the Spigelian fascia and accounts for <2% of all abdominal wall hernias.[1–3] Owing to its interparietal location beneath the external oblique aponeurosis, clinical diagnosis is often challenging, leading to delayed presentation with complications such as incarceration, strangulation.[1,3,4]

Giant spigelian hernias are a rare entity sometimes presenting with loss of domain, our case is one such. [3,5].

Contrast-enhanced computed tomography (CT) is the imaging modality of choice, as it accurately defines the fascial defect, hernia contents, and associated abdominal pathology while facilitating operative planning. In giant hernias, CT volumetric analysis is particularly valuable for assessing LOD and planning abdominal wall reconstruction.[3,5,6]

LOD represents a complex surgical entity in which a significant proportion of the abdominal viscera reside permanently outside the abdominal cavity. Reintegration of these contents may result in increased intra-abdominal pressure, respiratory compromise, and abdominal compartment syndrome, necessitating meticulous preoperative planning and advanced reconstructive techniques.

Component separation techniques have revolutionized the management of complex ventral hernias by enabling medial advancement of the abdominal wall musculature while preserving its neurovascular supply. When combined with prosthetic mesh reinforcement, these techniques facilitate tension-free fascial closure, restore abdominal wall function, and reduce recurrence rates. Although several reports have described the repair of uncomplicated Spigelian hernias, giant Spigelian hernias associated with loss of domain remain exceedingly rare in the literature.[1,3]

We report a rare case of a giant right-sided Spigelian hernia with loss of domain, successfully managed using combined anterior and posterior component separation with mesh reinforcement. This case highlights the importance of early radiological diagnosis, meticulous preoperative planning, and advanced abdominal wall reconstruction in achieving favourable surgical outcomes in this uncommon clinical entity.

Case Report

A 68-year-old gentleman presented to the General Surgery outpatient department with a gradually progressive swelling over the right lower anterior abdominal wall of several years' duration. The swelling had progressively increased in size and had become more prominent on standing and during activities. The patient complained of discomfort while walking

and performing routine daily activities but denied any history of acute abdominal pain, vomiting, constipation, abdominal distension, or features suggestive of intestinal obstruction. There was no history of previous abdominal surgery or abdominal trauma. He was a known case of type 2 diabetes mellitus and hypertension, on regular treatment.

On general physical examination, the patient was with normal vital parameters. His weight was 100 kg, height was 170 cm, and BMI was 34.6 kg/m². Cardiovascular, respiratory, and central nervous system examinations were within normal limits.

Local examination revealed a huge swelling measuring approximately 20 × 18 cm over the right hemiabdomen, occupying the right lumbar region and extending into the right hypochondrium and right iliac fossa. A visible expansile cough impulse was noted on inspection. There was no local rise in temperature, and the swelling was non-tender. On palpation, the size, shape, and site of the swelling were confirmed. There was no divarication of the recti. All other hernial orifices were free, and the external genitalia were normal. An expansile cough impulse was palpable. The swelling was partially reducible, bowel sounds present over the swelling. There were no scars, sinuses, Dilated veins were seen over the skin. Ultrasonography of the Anterior Abdominal Wall demonstrated a large right-sided anterior abdominal wall hernia in the region of the semilunar line, measuring approximately 18 × 16 cm, with a fascial defect of about 8 × 8 cm, suggestive of a Spigelian hernia. The hernial sac contained multiple small bowel loops with preserved peristalsis. No omentum was visualized within the sac. The findings were consistent with a large right-sided Spigelian hernia.

Contrast-enhanced computed tomography (CECT) of the abdomen and pelvis demonstrated a large right-sided Spigelian hernia arising through a defect in the Spigelian fascia along the semilunar line. The fascial defect measured approximately 8 × 8.1 cm and contained only multiple small bowel loops without bowel wall thickening, no omentum present, obstruction, or ischemic changes. A significant proportion of the abdominal viscera remained outside the abdominal cavity, consistent with loss of domain. Preoperative CT volumetric analysis was performed to assess the degree of loss of domain. The Tanaka Index was calculated using the formula:

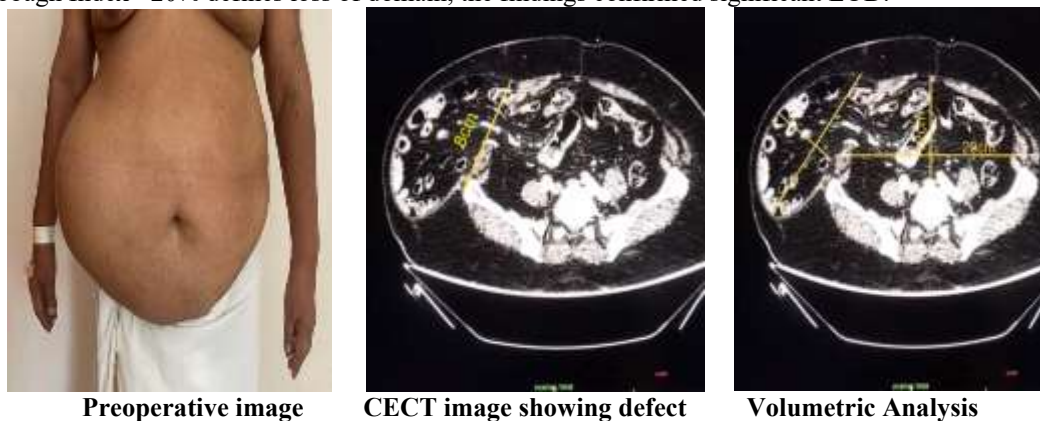
$$\text{Tanaka Index} = \text{Hernia Sac Volume (HSV)} / \text{Abdominal Cavity Volume (ACV)}$$

In our patient, the hernia sac volume (HSV) constituted 30% and the abdominal cavity volume (ACV) constituted 70%, giving a Tanaka Index of 0.43 (30/70). As a value >0.25 is considered indicative of loss of domain (LOD), our patient was classified as having significant LOD.

The Sabbagh Index was calculated using the formula:

$$\text{Sabbagh Index} = \text{Hernia Sac Volume (HSV)} / \text{Total Peritoneal Volume (TPV)}$$

In our patient, the HSV was 30% and the total peritoneal volume was 100%, resulting in a Sabbagh Index of 0.30 (30%). Since a Sabbagh Index >20% defines loss of domain, the findings confirmed significant LOD.



Preoperative image

CECT image showing defect

Volumetric Analysis

The patient underwent preoperative optimization over a period of 1 month, including weight reduction from 107 kg to 100 kg, improvement of glycaemic control with HbA1c reduced from 10% to 7%, one month of dietary modification, incentive spirometry, and daily brisk walking for 45 minutes. Following optimization, fitness for surgery was obtained. The patient was maintained on a liquid diet for 10 days before surgery.

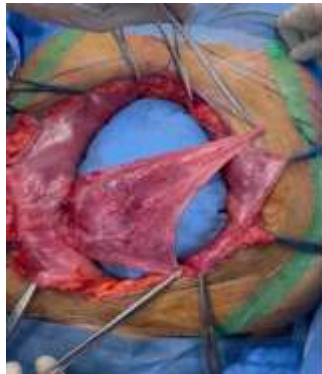
Open spigelian hernia mesh repair with bilateral PSC (TAR) and left ACS was performed. The patient underwent surgery under general anaesthesia with epidural analgesia. Through a midline incision abdomen opened reduction of entire small bowel contents done. The hernia contained irreducible small bowel loops, which were reduced into the abdominal cavity. Bilateral retrorectus dissection was performed, followed by bilateral transversus abdominis release (TAR). The hernial sac was completely preserved and was later used for coverage of the posterior peritoneal defect. After reduction of the sac, the spigelian fascia defect was closed from inside using no. 1 loop Ethilon sutures, and posterior peritoneal approximation was done with 2-0 PDS. Two 30 × 30 cm macroporous polypropylene meshes were placed in the retrorectus plane. Closure of the anterior rectus sheath was challenging; hence, a left-sided external oblique release (anterior component separation) was performed. Although anterior and posterior component separation are not routinely combined in a single patient, both techniques were required in this case. Anterior rectus sheath closure was achieved, and an onlay polypropylene mesh was placed over the left external oblique release area to prevent weakness. Romovac drains were placed in the retrorectus and subcutaneous planes.

The patient was extubated on the same day. The postoperative period was uneventful. There was no evidence of abdominal compartment syndrome following abdominal wall closure. The patient remained comfortable postoperatively. Wound occurrence of a small island of skin necrosis was noted, which was managed conservatively. The patient was discharged with the drains in situ. The retrorectus drain was removed on postoperative day 7, and the subcutaneous drain was removed on postoperative day 12.

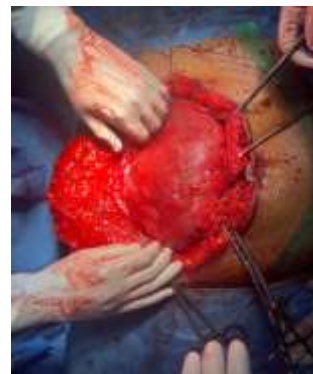
The patient on follow up 4 years without any recurrence and resumed work one month after surgery



Right Retrorectus Plane



Hernial sac preservation



Mesh in retrorectus plane



Posterior rectus sheath closure after TAR



Onlay mesh after ACS



Postoperative Image

DISCUSSION

Spigelian hernia is a rare ventral abdominal wall hernia occurring through a defect in the Spigelian aponeurosis along the semilunar line. It accounts for approximately 1–2% of all ventral hernias and most commonly occurs below the arcuate line within the Spigelian hernia belt, where the posterior rectus sheath is deficient. Because the hernia sac usually lies beneath the intact external oblique aponeurosis, clinical diagnosis is often difficult, leading to delayed presentation.[1–4]. Risk factors include advanced age, obesity, chronic cough, constipation, previous abdominal surgery, pregnancy, and other conditions associated with chronically increased intra-abdominal pressure. Patients commonly present with localized pain or a lateral abdominal wall swelling, although physical examination may be inconclusive due to the interparietal location of the hernia [3,4].

Unlike other ventral hernias, Spigelian hernias have a relatively high risk of incarceration and strangulation because of their narrow fascial neck. Therefore, surgical repair is recommended once the diagnosis is established, even in asymptomatic patients

Contrast-enhanced computed tomography (CT) is the investigation of choice as it accurately identifies the fascial defect, delineates the hernia contents, and assists in operative planning. In our patient, CT demonstrated a large 8 × 8.1 cm right-sided Spigelian hernia containing bowel loops with loss of domain, along with an incidental left inguinal hernia, bilateral renal calculi, and chronic right hydrocele. These findings were crucial in planning definitive surgical management.

Loss of domain is an uncommon finding in Spigelian hernia and represents a major reconstructive challenge because prolonged herniation reduces abdominal cavity capacity. Reintegration of the herniated viscera may result in increased intra-abdominal pressure and respiratory compromise, making careful preoperative planning essential.

For the assessment of loss of domain, preoperative CT volumetric analysis is an indispensable tool that enables calculation of the Tanaka Index and Sabbagh Index, providing an objective estimate of the percentage of loss of domain. A Sabbagh Index >20% defines loss of domain, while a Tanaka Index >0.25 (25%) is also indicative of significant loss of domain.[6,7] Preoperative progressive pneumoperitoneum (PPP), botulinum toxin (Botox) injection, and component separation techniques constitute the three major strategies for managing patients with loss of domain. In addition, comprehensive preoperative optimization of the patient—including physical, psychological, and physiological optimization—is essential to improve perioperative safety and postoperative outcomes.[7–9]

Mesh repair remains the standard treatment for adult Spigelian hernias because it reduces recurrence compared with primary tissue repair. Although laparoscopic techniques such as IPOM, TAPP, and TEP have shown excellent outcomes in uncomplicated cases, giant hernias with loss of domain often require open abdominal wall reconstruction. In the present

case, combined anterior and posterior component separation with mesh reinforcement enabled tension-free closure and restoration of abdominal wall integrity. The patient had an uneventful postoperative recovery without wound complications or early recurrence.

Giant Spigelian hernias associated with loss of domain are exceptionally rare, with only a few cases reported in the literature. Our case highlights the importance of maintaining a high index of suspicion, utilizing CT for accurate diagnosis, and adopting an individualized reconstructive approach. Combined anterior and posterior component separation with mesh reinforcement can be a safe and effective option for achieving durable abdominal wall reconstruction in complex Spigelian hernias with loss of domain.

CONCLUSION

Giant Spigelian hernia with loss of domain (LOD) is an exceedingly rare presentation. Successful management requires meticulous preoperative optimization and appropriate abdominal wall reconstruction techniques. Although anterior and posterior component separation are ideally not combined in the same patient, our case required bilateral transversus abdominis release (TAR) which helped us to close the posterior rectus sheath. The anterior component separation site was further reinforced with an additional onlay mesh. The patient has remained recurrence-free during 4 years of follow-up. Spigelian hernia is a rare abdominal wall hernia that often presents a diagnostic challenge because of its concealed anatomical location and nonspecific clinical manifestations. Contrast-enhanced computed tomography remains the imaging modality of choice for accurate diagnosis, assessment of hernia contents, and preoperative planning. In patients with giant defects associated with loss of domain, conventional hernia repair may be inadequate, necessitating advanced abdominal wall reconstruction techniques. The present case demonstrates that combined anterior and posterior component separation with prosthetic mesh reinforcement can provide a safe, effective, and durable method for achieving tension-free closure, restoring abdominal wall function, and minimizing recurrence in selected complex cases.

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