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Revisiting Spigelian hernia with emphasis on diagnostic challenges and outcomes of open mesh repair: a case report of two patients

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Abstract

Background Spigelian hernia is a rare defect of the anterior abdominal wall, accounting for less than 2% of all abdominal wall hernias. Despite its low incidence, it carries a clinically significant risk of incarceration and strangulation due to its deep interparietal location beneath an intact external oblique aponeurosis, which often delays the diagnosis.

Case presentations This report presents two surgically treated cases of Spigelian hernia and focuses on the operative outcomes and refinement of the open repair technique. Both patients were men aged 65 and 61 years, respectively, and presented with unilateral lower abdominal wall swelling that became more prominent during standing or straining. Clinical examination and preoperative ultrasonography confirmed the diagnosis in both cases, revealing fascial defects along the semilunar line, below the arcuate line. Open anterior repair was performed under spinal anaesthesia in both cases. The hernia sac was reduced without opening, and a polypropylene mesh was placed in an onlay position with adequate overlap and secured using non-absorbable sutures. In one patient, a concomitant inguinal hernia was repaired during the same surgical session. Postoperative recovery was uneventful in both patients. Follow-up at 6 and 12 months revealed no recurrence, chronic pain, or mesh-related complications.

Conclusions These cases demonstrate that open mesh repair is a safe and effective treatment option for Spigelian hernias, particularly in complex or urgent clinical settings. The choice of surgical approach should be individualized based on anatomical characteristics and the overall clinical context.

Clinical trial number
Not applicable.

Keywords Spigelian hernia, Abdominal wall hernia, Open mesh repair, Polypropylene mesh, Case report

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Background

Spigelian hernia is an uncommon defect of the anterior abdominal wall that occurs through the Spigelian aponeurosis. Although rare (< 2% of all hernias), its clinical importance lies in its potential for incarceration and strangulation. Diagnosis can be challenging because of its interparietal location beneath the intact external oblique aponeurosis. This report describes two surgically managed cases and emphasises the operative outcomes and technique refinement. These hernias arise from defects in the Spigelian aponeurosis, a fibrous sheet of the transversus abdominis muscle. Herniation tends to occur most frequently below the arcuate line and is more common in obese individuals, possibly because of increased intra-abdominal pressure and weakened abdominal wall integrity. These regions may correspond to embryological weak points where the layered muscles of the abdominal wall fail to completely fuse during mesenchymal development within the somatopleura [1]. The term "Spigelian hernia belt" refers to a 6 cm wide horizontal zone above the interspinal plane, where the majority of these hernias are observed [1]. In this region, a defect in the transversus aponeurosis allows protrusion of intra-abdominal contents, often interparietally, through the transversus and internal oblique muscles while remaining beneath the intact external oblique aponeurosis [2] (Fig. 1).

Spigelian hernias may result from congenital and acquired factors. One contributing molecular mechanism involves changes in collagen metabolism, specifically an increased ratio of immature type III collagen to structurally superior type I collagen. This alteration leads to thinner, weaker collagen fibres and compromised tensile strength of the abdominal wall, predisposing individuals to hernia formation and increasing the recurrence risk following surgical repair [3]. Clinically, Spigelian hernias often present with intermittent abdominal pain, typically localised to the lower abdomen, where these hernias are most frequently found [2]. The pain may be positional and intensifies when the abdominal wall is tense. In some cases, point tenderness was observed over the Spigelian aponeurosis. A soft, reducible mass may also be palpable, but its intermittent and deep-seated nature often leads to missed diagnosis [4]. Some patients may notice swelling that appears while standing, straining, or coughing, while others may be asymptomatic or report vague discomfort [2, 4]. The nonspecific clinical presentation highlights the importance of a high index of suspicion, especially in patients at risk of incarceration or strangulation [4]. Detailed anatomical knowledge of this region is essential for accurate diagnosis and timely surgical management of such cases.

Case presentations

Case 1

A 65-year-old man presented with a gradually enlarging swelling in the lower left abdominal quadrant that had been present for approximately four years (Fig. 2). He reported intermittent local discomfort, which increased with standing and straining, but denied nausea, vomiting, bowel habit changes or systemic symptoms. His medical history revealed no significant comorbidities and no history of previous abdominal surgery. Physical examination revealed an asymmetric, reducible protrusion along the left semilunar line that became more prominent during standing and straining, without overlying skin changes. Routine laboratory investigations, including complete blood count and basic biochemical parameters, were normal. Preoperative abdominal ultrasonography confirmed a left-sided Spigelian hernia, revealing a fascial defect measuring approximately 3 × 3 cm with a hernia sac of approximately 5 cm, containing preperitoneal fat without bowel involvement. Computed tomography was not performed because the hernia was clearly identified on ultrasonography, was clinically evident, and showed no signs of incarceration or strangulation.

Surgical repair was performed under spinal anaesthesia using an open technique. A transverse incision was made directly at the hernia site. After careful dissection of the subcutaneous tissues and division of the external oblique aponeurosis, the hernia sac was exposed and reduced without being opened. The defect margins were clearly delineated. A polypropylene mesh measuring approximately 10 × 15 cm was placed in an onlay position, ensuring at least 4 cm of overlap beyond the defect edges, and fixed with nonabsorbable sutures. A suction drain was inserted and removed on postoperative day 2. The patient was discharged on postoperative day 3. The postoperative course was unremarkable. At the 12-month follow-up, the patient was asymptomatic, and clinical examination showed no evidence of recurrence. No postoperative imaging was performed because no clinical signs suggested recurrence.

Case 2

A 61-year-old man presented with a painful swelling in the lower right abdomen that became prominent during straining and physical activity and had been present for approximately four months (Fig. 3). His medical history was unremarkable, and he had no history of abdominal surgery. Laboratory investigations were normal. On inspection, a localised bulge was observed along the right semilunar line during the Valsalva manoeuvre, corresponding to the site of maximal tenderness. The swelling spontaneously reduced at rest, supporting the diagnosis of a reducible Spigelian hernia. Preoperative ultrasonography confirmed a right-sided Spigelian hernia,

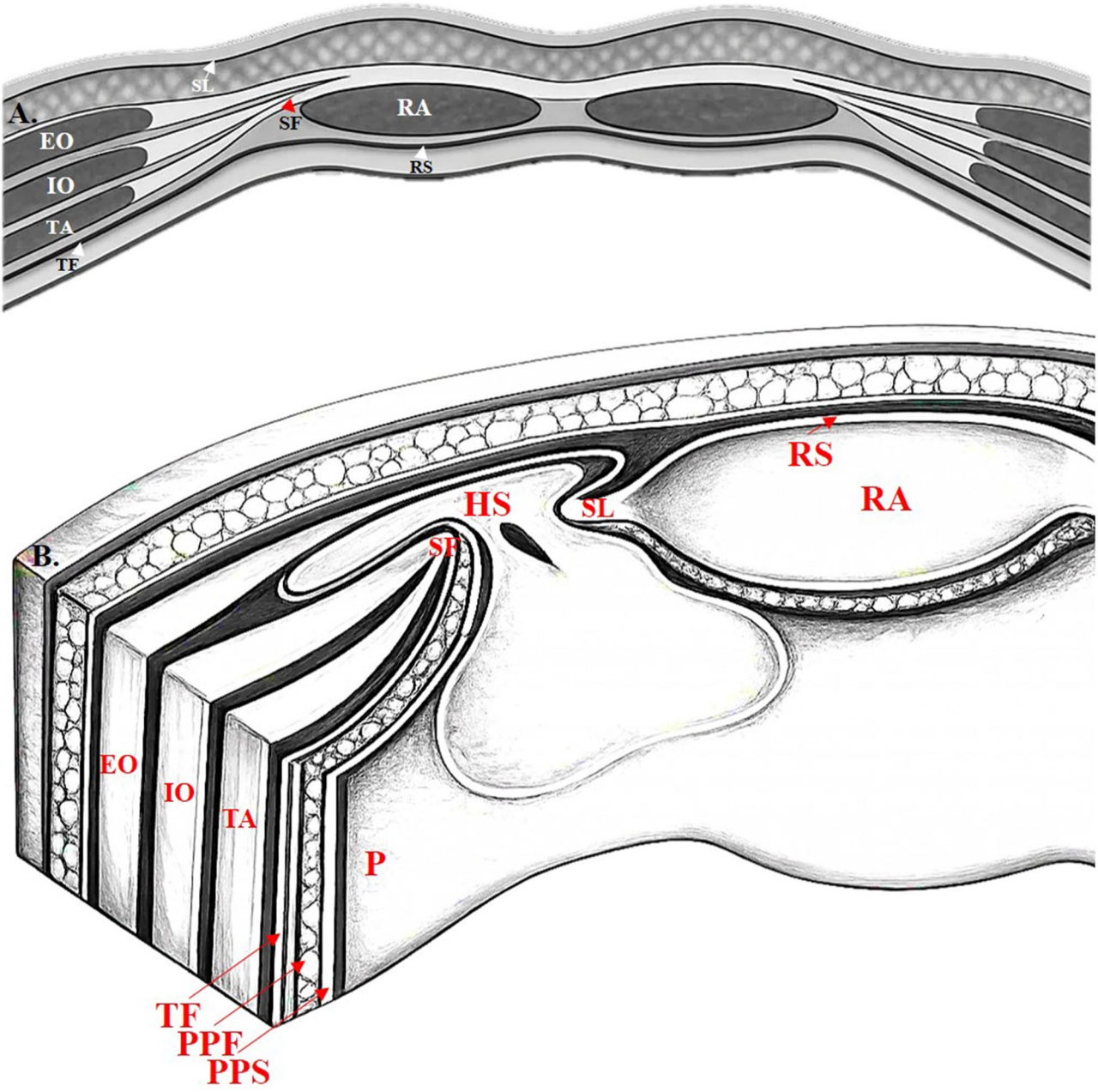

Fig. 1 Normal axial schematic illustration of the anterior abdominal wall demonstrating the intact layered anatomy. This illustration was created with the assistance of artificial intelligence based image generation tools. **A.** The external oblique (EO), internal oblique (IO), and transversus abdominis (TA) muscles form continuous aponeurotic layers contributing to the rectus sheath (RS), which encloses the rectus abdominis muscle (RA). The Spigelian fascia (SF) is preserved without any defect, and the transversalis fascia (TF) remains uninterrupted beneath the muscular layers. **B.** This illustration demonstrates a left-sided Spigelian hernia protruding through the Spigelian fascia (SF) at the level of the SL. The HS passes through the TA and IO layers while the EO remains intact, a characteristic feature of Spigelian hernias. The RA and its sheath are shown medially, with the SL marking the transition between the RS and the lateral abdominal wall. Deeper layers include the TF, and PPF highlighting the interparietal course. Abbreviations: EO: External oblique muscle and aponeurosis, HS: Herniated sac, IO: Internal oblique muscle and aponeurosis, P: Peritoneum, PPF: Preperitoneal fat, RA: Rectus abdominis muscle, RS: Rectus sheath, SF: Spigelian fascia, SL: Semilunar line, TA: Transversus abdominis muscle and aponeurosis, TF: Transversalis fascia

demonstrating a fascial defect measuring approximately 2.5 × 2 cm with a hernia sac of approximately 4 cm, containing small bowel loops. Additionally, a concomitant inguinal hernia was clinically identified. Computed tomography was not performed because ultrasonography clearly defined the hernia anatomy and contents, and surgical management was not expected to change based on additional imaging. The patient underwent open surgical repair under spinal anaesthesia. Through a direct incision over the Spigelian defect, the hernia sac was exposed

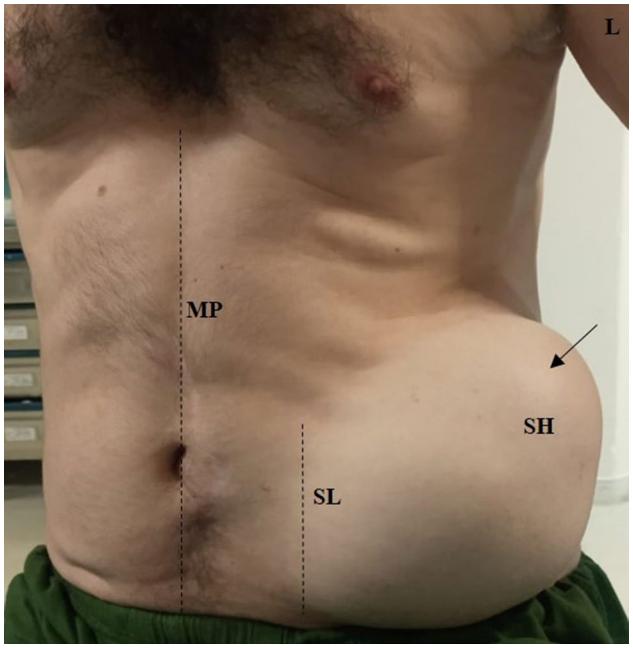

Fig. 2 Preoperative clinical photograph showing a left-sided unilateral Spigelian hernia in Case 1, with visible abdominal wall bulging along the semilunar line. Abbreviations: MP: Median Plane, SH: Spigelian Hernia, SL: Semilunar Line

Fig. 3 Preoperative clinical photograph of case 2 demonstrating right-sided abdominal wall bulging along the semilunar line during straining. Abbreviations: SL, semilunar line

and reduced without an opening. A polypropylene mesh measuring approximately 10 × 10 cm was placed in an onlay position and secured with nonabsorbable sutures. The associated inguinal hernia was repaired during the same surgical session using a standard open technique. A suction drain was placed and removed on postoperative day 2. The patient was discharged on postoperative day 3. Postoperative recovery was uncomplicated. At the 6-month follow-up, the patient remained symptom-free, with no clinical evidence of recurrence or mesh-related complications.

Surgical technique

In both cases, an open anterior approach was employed. After exposing the Spigelian fascia and identifying the defect, the hernia sac was reduced without an opening. Polypropylene mesh was placed in an onlay position with adequate overlap and fixed using nonabsorbable sutures (Fig. 4). Drains were routinely placed and removed after 48 h. Skin closure was performed in a single layer.

Discussion

Spigelian hernia is an uncommon form of anterior abdominal wall hernia, most frequently encountered in middle-aged and elderly patients, and remains prone to delayed or missed diagnosis because of its deep intermuscular location beneath the external oblique aponeurosis [1, 4]. This anatomical characteristic often obscures clinical detection during physical examination, making imaging an essential component of preoperative evaluation [2, 4, 5]. Computed tomography was not performed because ultrasonography clearly defined the hernia anatomy and contents, and surgical management was not expected to change based on additional imaging [2, 6]. Although Spigelian hernias are frequently discussed in the literature with an emphasis on diagnostic difficulty, the current cases primarily highlight surgical techniques and operative decision-making. In Case 1, the hernia was longstanding and relatively large, with a fascial defect measuring approximately 3 × 3 cm and a hernia sac of approximately 5 cm. In Case 2, a smaller Spigelian defect was associated with concomitant inguinal hernias. These anatomical findings directly influenced the choice of surgical approach. Open repair allows direct visualization of fascial layers, secure mesh fixation, and simultaneous management of associated hernias. These advantages are particularly relevant in patients with large defects where minimally invasive approaches may be less suitable [1, 7]. The operative technique used in this series consisted of a targeted incision over the hernia site, meticulous dissection to expose the Spigelian fascia, and reduction of the hernia sac without violating the contents. The polypropylene mesh was placed in an onlay position with at least a 4 cm overlap beyond the defect margins and fixed using non-absorbable sutures. This method allows precise anatomical reconstruction while minimising the risk of visceral injury and has been reported to yield reliable outcomes, particularly in open repairs of Spigelian hernias [7, 8]. The routine placement of a suction

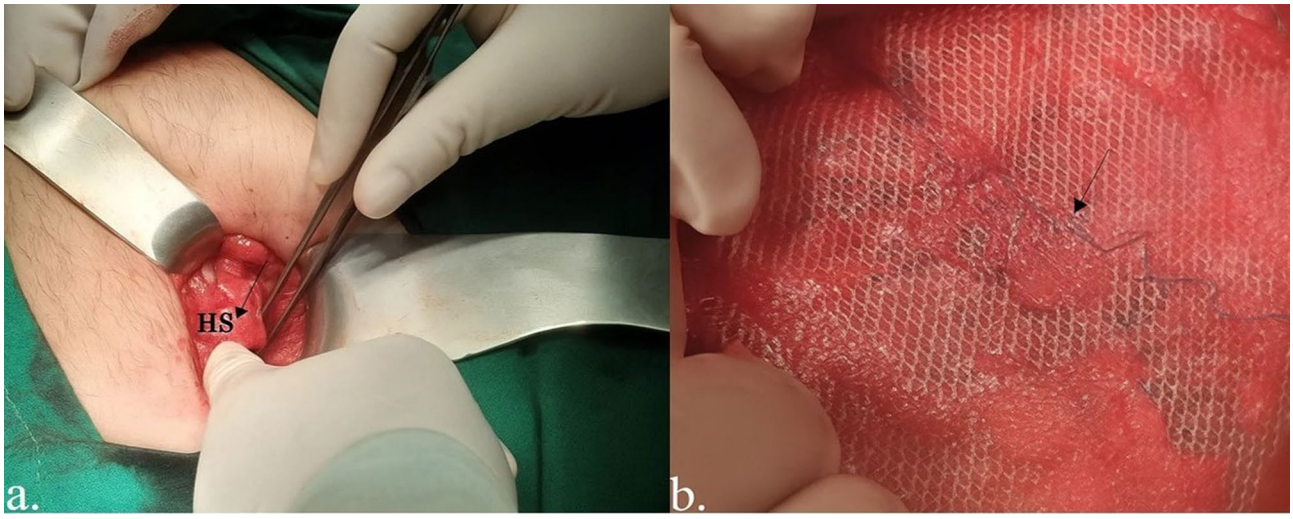

Fig. 4 Intraoperative views of open mesh repair for Spigelian hernia. (**a**) Exposure of the Spigelian fascial defect via an anterior approach. (**b**) Only polypropylene mesh positioned over the defect and fixed with non-absorbable sutures. Abbreviations: HS: Herniated Sac

drain, removed after 48 h, may further reduce the risk of seroma or haematoma formation, which are recognised but infrequent postoperative complications [9].

The presence of multiple abdominal wall defects in Case 2 further supports the rationale for choosing an open surgical approach. Repairing the Spigelian and inguinal hernias during a single surgical session through open access avoided multiple trocar insertions and eliminated the need for pneumoperitoneum. In such scenarios, open repair offers a practical advantage by enabling the simultaneous treatment of coexisting hernias while maintaining a clear anatomical orientation, which may be more challenging during laparoscopic repair [8, 10]. Laparoscopic repair of Spigelian hernias, including intraperitoneal onlay mesh and transabdominal preperitoneal techniques, has been associated with reduced postoperative pain, shorter hospital stay, and faster recovery in selected patients [10–12]. However, laparoscopic surgery may be less suitable for large defects, multiple hernias, dense adhesions, or when precise anatomical exposure is required. Moreover, trocar placement carries a small but recognised risk of iatrogenic incisional hernia formation [1, 4].

Postoperative complications following Spigelian hernia repair are generally uncommon but may include wound infection, seroma, haematoma, chronic pain, and recurrence [9, 12]. Haematoma formation, although infrequent, is a recognised complication that can be mitigated through meticulous haemostasis and short-term drainage, as applied in the present cases. Neither patient in this series experienced early or late postoperative complications, and both achieved complete resolution of symptoms.

An important limitation of this study is the relatively short follow-up period of 6 and 12 months. Although no recurrence was observed during this interval, recurrence of Spigelian hernia has been reported in the literature up to 10 years after surgical repair [5, 12]. Therefore, long-term follow-up and larger case series are required to assess the durability of different surgical techniques more accurately.

Conclusions

Spigelian hernias require timely surgical management due to their risk of incarceration and potential diagnostic delay. In the present report, both cases demonstrated a similar clinical presentation, characterized by reducible abdominal wall protrusions along the semilunar line. Open mesh repair proved to be a safe and effective surgical option in both patients, particularly in complex or urgent clinical settings. Therefore, surgical management should be individualized based on anatomical characteristics, defect size, and the presence of associated hernias, rather than relying on a single standardized operative approach.

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Author contributions
EO and FBY conceptualised the study and drafted the manuscript; EO contributed to the literature review and figure design; OM performed the surgical procedures and follow-up. All the authors approved the final version of the manuscript.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
All procedures were approved by the Akdeniz University Faculty of Medicine Ethics Committee (protocol ID: TBAEK-296) and were conducted in accordance with the Declaration of Helsinki.

Consent to participate
Written informed consent to participate in the study was obtained from both patients prior to inclusion.

Consent for publication
Written informed consent for publication of clinical data and images was obtained from both patients. All identifying information has been removed to ensure patient anonymity.

Informed consent
Written informed consent was obtained from both patients in accordance with the Declaration of Helsinki principles.

Competing interests
The authors declare no competing interests.

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