Case Report

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Traumatic Spigelian hernia following bicycle handlebar injury: A case report

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Abstract

Traumatic Spigelian hernia is an exceptionally rare clinical entity, often resulting from low-velocity, high-pressure blunt force, such as a bicycle "handlebar injury." It may pose a diagnostic challenge and can be associated with occult intra-abdominal pathologies. A 39-year-old female presented with a reducible right iliac fossa swelling and dull aching pain 7 days after a bicycle handlebar impact. She also reported nonpassage of stools for 48 h without features of bowel obstruction. Clinical examination and ultrasonography suggested a traumatic abdominal wall hernia. Contrast-enhanced computed tomography (CECT) confirmed a 1.85-cm defect in the right Spigelian fascia containing bowel loops and omentum. It also revealed an incidental, right adnexal mass of 6.5 cm × 8.2 cm × 7 cm with fat attenuation and calcific foci, suggestive of a mature cystic teratoma. The patient underwent open surgical exploration. The hernia was repaired using a sublay (preperitoneal) synthetic mesh technique. Simultaneously, a right ovarian cystectomy was performed. The postoperative course was uneventful, and the patient was discharged on the fifth postoperative day. Histopathological examination confirmed a mature cystic teratoma. On follow-up, the surgical site healed well with no evidence of recurrence. This case report highlights the "handlebar hernia" as a diagnostic challenge that requires a high index of clinical suspicion. CECT remains the gold standard for identifying fascial defects and associated intra-abdominal pathologies. Early imaging and thorough surgical exploration enable single-stage management of traumatic hernias and incidental findings, with sublay mesh repair providing a reliable and effective treatment approach for traumatic Spigelian hernias.

Keywords:

Handlebar hernia, mature cystic teratoma, Spigelian hernia, sublay mesh repair, traumatic abdominal wall hernia

Introduction

Traumatic abdominal wall hernias represent a rare clinical entity, accounting for < 1% of all abdominal hernias.[1] They are characterized by disruption of the myofascial layers and musculature of the abdomen without compromising the overlying skin due to high-energy blunt trauma.[2] A subset of these injuries is "handlebar hernia," caused by direct impact of a perpendicular blunt force, typically a bicycle or motorcycle handlebar, against the small surface area of the abdominal wall, which generates a sudden and intense increase in intra-abdominal pressure, thereby shearing the underlying fascia while the elasticity of the skin prevents its rupture.[3-5]

A Spigelian hernia is characterized by the protrusion of preperitoneal fat or viscera through the Spigelian fascia, an area bounded medially by the lateral border of the rectus abdominis and laterally by the semilunar line.[6] Primary Spigelian hernias account for 0.12%–2% of all hernia cases, whereas traumatic Spigelian hernias are even rarer entities.[1,6]

The diagnostic process is often challenging because the "handlebar sign" may be absent or disproportionate to the injury.[3] Furthermore, patients may be asymptomatic or present only

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with a vague bulge and dull pain.[7] This report presents the rare case of a 39-year-old female with a traumatic Spigelian hernia following a bicycle handlebar injury.

Case Report

Patient information

A 39-year-old female presented with swelling in the right lower abdomen for 7 days following blunt trauma to the abdomen by a bicycle handlebar, associated with dull aching pain and nonpassage of stools for the last 48 h without clinical signs of bowel obstruction. She had no history of previous abdominal surgeries or significant comorbidities.

Clinical findings

Patient was conscious and oriented, with a pulse rate of 84 bpm, blood pressure of 110/70 mmHg, and a body mass index of 24 kg/m^2. On examination, an 8 cm × 6 cm reducible swelling was present in the right iliac fossa with a positive cough impulse without overlying ecchymosis. Bowel sounds were present. The clinical timeline of events is summarized in Table 1.

Diagnostic assessment

Ultrasonography revealed a 3 cm × 3 cm anterior abdominal wall defect in the right iliac fossa with herniation of omentum and bowel loops, without strangulation or obstruction. Contrast-enhanced computed tomography (CECT) further revealed a 1.85-cm defect in the right Spigelian fascia, 6.2 cm lateral to the linea alba, with a 7.5 cm × 4.5 cm sac containing viable small bowel loops and omentum suggestive of a traumatic Spigelian hernia.

Additionally, a 6.48 cm × 8.24 cm × 6.95 cm right adnexal cystic lesion was identified with fat attenuation and peripheral calcifications, suggestive of a mature cystic teratoma [Figures 1–3]. The differential diagnosis included rectus sheath hematoma and abdominal wall lipoma; however, these were ruled out based on clinical history and imaging.

Table 1: Timeline of events

Time	Clinical events
Day 0	Bicycle handlebar injury
Day 7	•Onset of swelling and presentation to the hospital
	•Laboratory investigations and ultrasonography
Day 7–day 8	•CECT
	•Preanesthetic checkup
Day 9	Surgery
Postoperative day 5	Discharge
Follow-up (day 10 and 3 months)	Suture removal and wound assessment

CECT: contrast-enhanced computed tomography

Therapeutic intervention

The patient underwent an open surgical exploration through an 8-cm curvilinear incision over the swelling in the right iliac fossa. The subcutaneous tissue was dissected to reveal the hernia sac and contents, including viable bowel loops and omentum, which were reduced back into the peritoneal cavity [Figure 4].

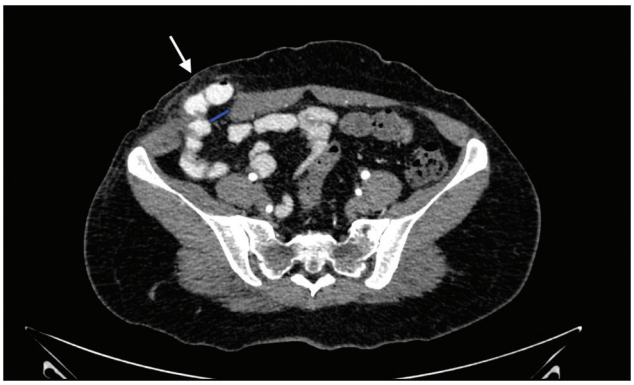


Figure 1: Axial contrast-enhanced computed tomography image of the abdomen showing a traumatic Spigelian hernia (arrow) along the right lateral abdominal wall, with herniation of bowel loops and omentum through a defect in the Spigelian fascia

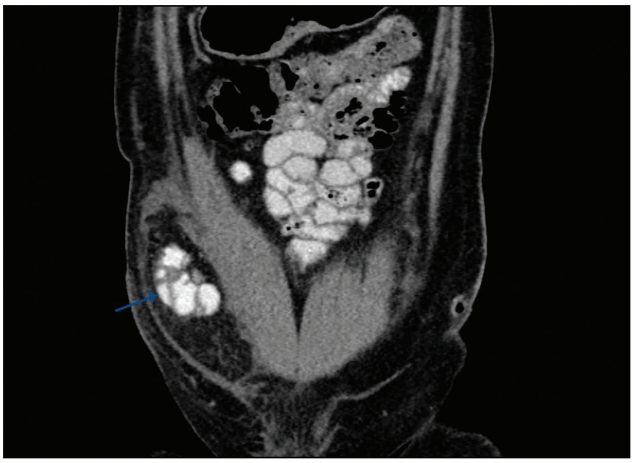


Figure 2: Sagittal contrast-enhanced computed tomography (CECT) image of the abdomen showing a traumatic Spigelian hernia (arrow) along the right lateral abdominal wall, with herniation of bowel loops and omentum through a defect in the Spigelian fascia

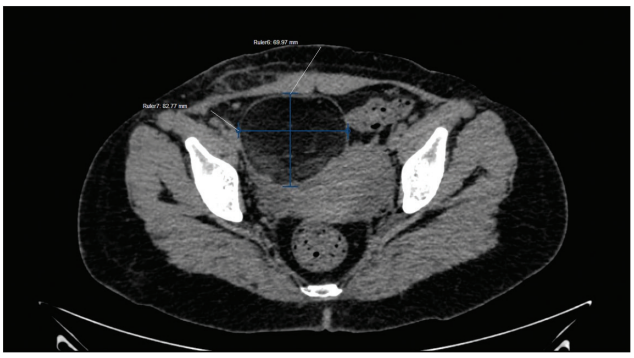


Figure 3: Axial contrast-enhanced computed tomography (CECT) image of the abdomen showing an incidental right ovarian dermoid cyst

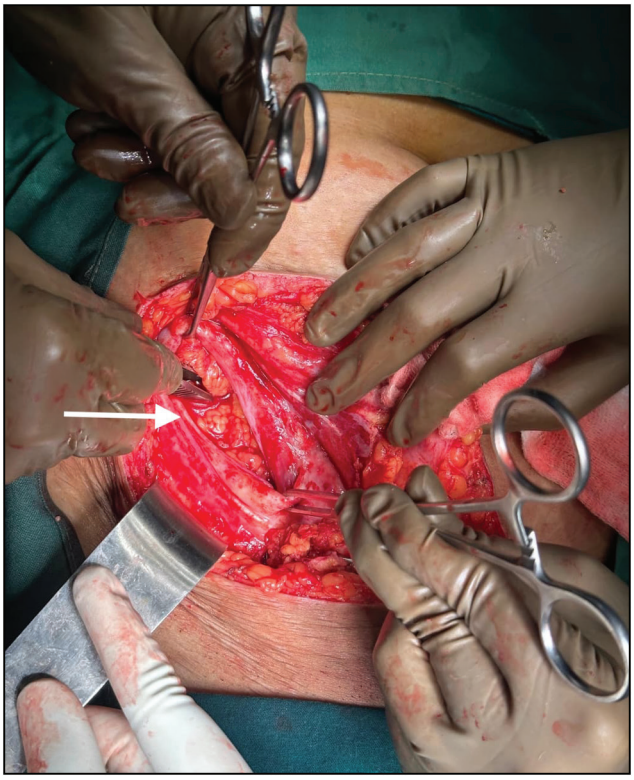


Figure 4: Intraoperative image demonstrating the defect in the Spigelian fascia with herniation of bowel loops and omentum

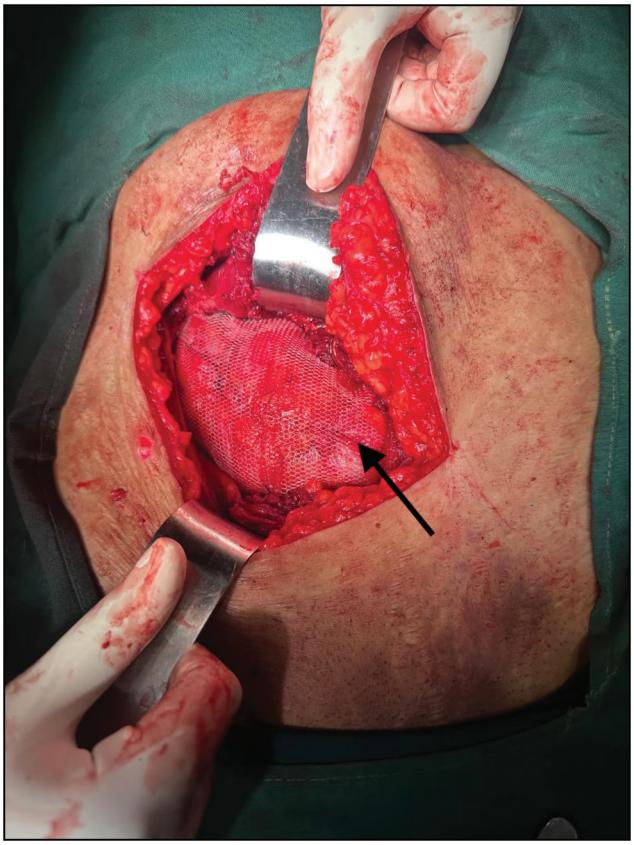


Figure 5: Intraoperative image demonstrating sublay mesh repair of the abdominal wall defect

Intraoperatively, a 10 cm × 8 cm right ovarian mass was identified, for which a right ovarian cystectomy was performed, and the specimen was sent for histopathological examination. The fascial defect of nearly 2 cm was repaired using the sublay technique. A synthetic polypropylene mesh of size 12 cm × 12 cm was positioned in the preperitoneal space to reinforce the Spigelian fascia, ensuring tension-free reconstruction [Figure 5]. A closed suction drain was placed in the preperitoneal plane.

Follow-up and outcomes

The postoperative course was uneventful. The patient was discharged on postoperative day 5, and follow-up at 3 months showed complete wound healing with no recurrence.

Patient perspective

The patient reported relief from symptoms and expressed satisfaction with overall management and outcome.

Discussion

The "handlebar hernia" represents a unique mechanism of blunt trauma in which a low-velocity, high-pressure impact by a small-surface-area object causes localized disruption of the abdominal wall musculature, including the transversus abdominis and internal oblique, without exceeding the elastic threshold of the skin.[3-5] The Spigelian aponeurosis represents an anatomical weakness between the rectus sheath and the semilunar line.[5,6]

It can be classified into high-energy and low-energy injuries. The diagnosis is challenging based on physical examination alone, as the overlying skin and subcutaneous fat mask the fascial defect.[7,8] The "handlebar sign," a localized ecchymosis, is a useful clinical indicator of potential underlying injury; however, its absence does not rule out underlying visceral or fascial injury.[3] CECT has emerged as the gold standard for diagnosis, as it allows precise visualization of myofascial rupture and identification of vascular or visceral damage.[2,7] In our case, CECT was instrumental in identifying the hernia and characterizing the adnexal mass.

Surgical management remains a subject of debate regarding the ideal timing and technique.[2,9] It involves open exploration to rule out concurrent intra-abdominal injuries.[7,10] However, laparoscopic and robotic repairs are gaining traction as it is advantageous to identify occult contralateral defects.[7,10]

In this case, a clean surgical field and absence of bowel compromise supported the safe use of prosthetic mesh,

in accordance with recent literature.[2,5] The sublay repair is favored for its biomechanical superiority, as intra-abdominal pressure helps secure the mesh against the posterior abdominal wall.[2]

Ovarian dermoid cysts can occasionally mimic or be associated with hernia sacs, in sliding hernias or in cases involving parasitic dermoid locations.[11,12] In this instance, trauma-focused imaging facilitated simultaneous management of a large mature ovarian teratoma that might have led to acute complications, such as torsion or rupture.[11,13] Although such pathology is exceedingly rare, incidental discovery during exploration necessitates meticulous excision.[11,13] The successful management of both the traumatic Spigelian hernia and the ovarian pathology highlights the importance of comprehensive clinical and radiological assessments in trauma settings.

Conclusion

Traumatic Spigelian hernias following bicycle handlebar injuries are rare and require a high index of clinical suspicion after focal blunt abdominal trauma. The "handlebar hernia" mechanism should prompt CECT imaging to confirm the diagnosis and evaluate associated injuries or concomitant pathology. Open surgical repair with sublay mesh reinforcement remains a safe and effective strategy for restoring abdominal wall integrity.

Author contributions

PP and AS designed the case report. AS drafted the manuscript. PP contributed to the imaging diagnosis and literature search. Both authors read and approved the final manuscript.

Ethics policy and institutional review board statement

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was waived as this is a single case report. This manuscript describes a single patient case report and does not constitute human subject research requiring formal ethics review. The patient received standard clinical care, and no experimental intervention or deviation from routine management was undertaken. Therefore, formal ethical approval was waived by the Institutional Ethics Sub-Committee, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune, in accordance with its institutional guidelines for individual case reports. Written informed consent for publication of the clinical details and images was obtained from the patient.

Declaration of patient consent

The authors certify that they obtained written informed consent from the patient for publication of the clinical details and accompanying images. The patient understands that names and initials will not be published and that all reasonable efforts will be made to maintain anonymity; however, complete anonymity cannot be guaranteed.

Data availability statement

The data supporting the findings of this study are available from the corresponding author on reasonable request.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Acknowledgment

Not applicable.

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