Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 14s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Twisting in the shadows: Omental torsion revealed on CT imaging

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Cite this paper as: Dr. Chethana S Reddy, Dr. Vettri Vignesh A,Dr. Baskar A, (2025) Omental Torsion: A Radiological Perspective Through Case Series.. *Journal of Neonatal Surgery*, 14 (14s), 873-881.

ABSTRACT

Omental torsion, a rare cause of acute abdomen with an incidence of 0.0016% to 0.37%, can be primary or secondary; the latter is more common and often associated with hernial sacs, wounds, or surgical scarring. We report the case of a 30-year-old male with a long-term right inguinal hernia who presented with severe abdominal pain for four days. Examination revealed tenderness and guarding in the right lumbar and iliac regions with mild leukocytosis on laboratory tests. Abdominal ultrasonography, CT, and MRI confirmed a large right inguinal hernia, with omental torsion and infarction. The patient underwent surgical resection of the necrotic omentum and open mesh hernioplasty, with uneventful postoperative recovery. Accurate diagnosis of omental torsion is challenging due to nonspecific clinical signs, and imaging modalities such as CT and MRI are crucial for proper diagnosis and treatment, as well as for excluding other gastrointestinal disorders with similar symptoms.

Keywords: *Inguinoscrotal hernia, Omental torsion, Acute abdomen, Ischemia, CT tomography, MRI, Necrosis.*

1. INTRODUCTION

Eitel published the first account of omental torsion in 1899 [1]. The diagnosis is still uncommon, with an incidence ranging from 0.0016% to 0.37% [2]. Literature has documented fewer than 250 instances of omental torsion [3]. This disorder causes compromised vascularity, as the omental apron pedicle twists along its longer axis. The main features of omental torsion on abdominal computed tomography (CT) imaging include the presence of a mass with heterogeneous fat tissue and the whirl sign, which resembles concentric lines inside the larger omentum [4].

Although omental torsion is rarely found before surgery, radiologists and other healthcare professionals should be aware of this condition because it shares similarities with the common causes of an acute surgical abdomen.

Case report

A 30-year-old male presented to the emergency department with severe abdominal pain that had persisted for four days. He also reported right inguinal swelling associated with dull pain over the past year, for which he had not sought medical advice. The patient had no history of surgery.

Physical Examination and Initial Findings

On physical examination, tenderness and guarding were noted in the right lumbar and iliac regions; however, no solid masses were palpable. Laboratory investigations revealed mild leukocytosis, while other parameters were within normal limits.

Imaging Studies

Abdominal ultrasonography revealed a large defect in the right inguinal region, with a hyperechoic omentum extending into the right scrotal sac and displacing the right testis inferiorly (Figure 1). A subsequent abdominal CT scan showed a focal fat density mass in the iliac fossa region of the greater omentum, characterized by a linear central hyperdense structure, likely representing thrombosed vessels surrounded by whirling streaks. Diffuse omental fat stranding herniated into the inguinal canal through a large defect measuring approximately 3.6 cm, extending to the right scrotal sac, with no signs of bowel obstruction (Figures 2-4).

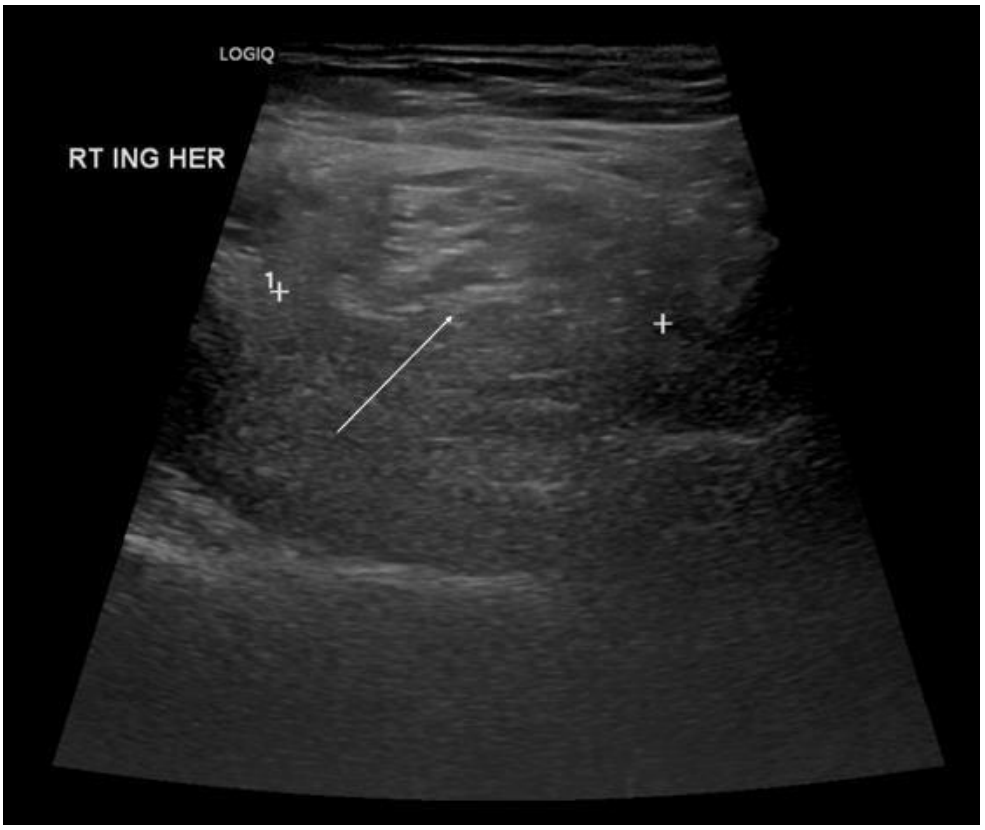

Figure 1. Abdominal ultrasonography revealed a large defect in the right inguinal region with a hyperechoic omentum.

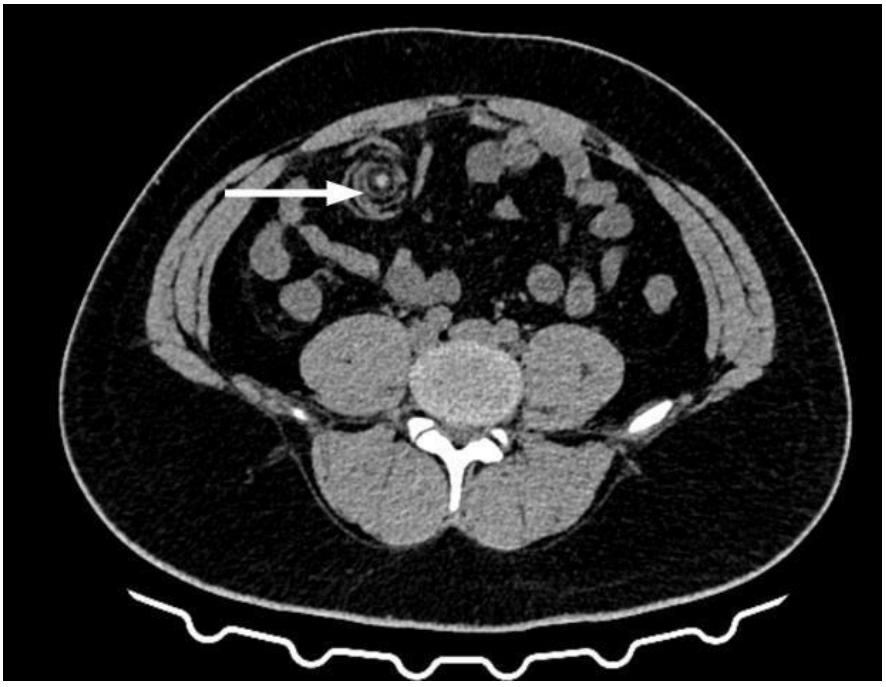

Figure 2. Plain CT abdominal axial section: Focal fat density mass in the right iliac fossa region of the greater omentum with linear central hyperdense structure (likely thrombosed vessels) with surrounding whirling streaks seen within this mass.

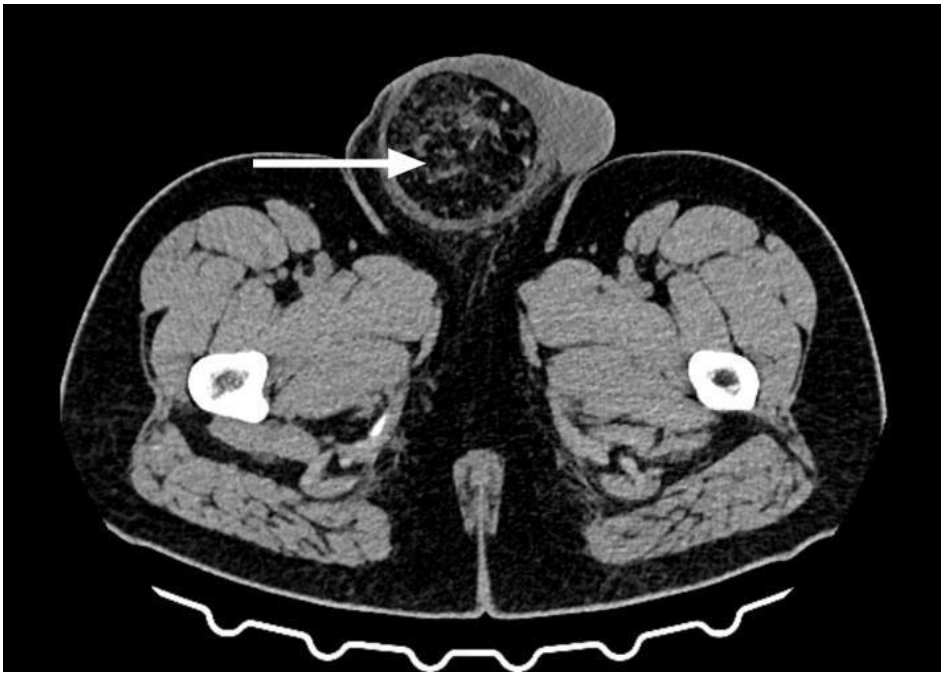

Figure 3. Plain CT abdominal axial section: Diffuse omental fat stranding seen herniating into the right scrotal sac.

Figure 4. Plain CT abdominal coronal section: Diffuse omental fat stranding, which is seen herniating into the right inguinal canal through a large defect extending into the right scrotal region.

Magnetic resonance imaging (MRI) of the pelvis revealed T2 hyperintense fat content with whirlpooling of the omentum around a hypointense vessel that herniated through the right inguinal defect into the right scrotum, pushing the right testis inferiorly and laterally displacing the left testis. No evidence of bowel loops within the herniated sac was found. T2 hyperintensities around the whirlpooling suggested inflammation and edema (Figures 5 and 6).

Figure 5. MRI of pelvis Coronal T2 Weighted image Diffuse omental fat stranding seen herniating into the right inguinal canal through a large defect extending up to the scrotal sac and seen pushing the right testis inferiorly.

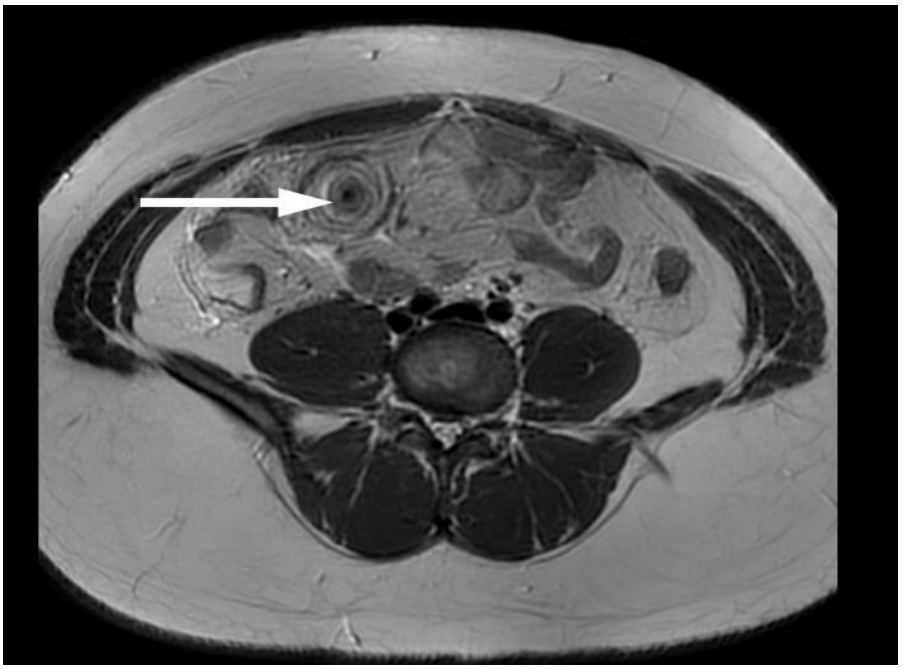

Figure 6. Magnetic resonance imaging (MRI) of the pelvis Axial T2 Weighted image: showed T2 hyperintense fat content

with whirlpooling of the omentum around a hypointense vessel. There is evidence of T2 hyperintensities around the whirlpooling, suggestive of inflammation and oedema.

Surgical Intervention

The patient underwent surgery immediately, during which the necrotic omentum was resected, and open mesh hernioplasty was performed. Postoperative recovery was uneventful, and the patient was discharged on postoperative day three.

2. DISCUSSION

Omental torsion rarely causes acute abdominal pain. It usually affects the right side of the omentum as seen in all three of our cases because it is longer, more mobile, and less richly vascularized with poor collateralization than the left side [5]. Omental torsion is classified as primary or secondary, with the latter being more prevalent. Local omental abnormalities, such as oversized, bifid, and auxiliary omentum or abnormally redundant omental veins, are associated with primary omental torsion [6]. An inguinal hernia, which is the most prevalent, as seen in our case, or adhesions to cysts, tumours, inflammatory foci, scars, or internal or external herniation, are linked to secondary omental torsion. Similar triggering events can cause any type of torsion: abrupt increase in intra-abdominal pressure from effort, coughing or sneezing, shift in body posture, or vibrating instruments used in the workplace. These circumstances can result in an abrupt change in the omentum, which can cause torsion [7,8].

Impaired venous return results in distal omentum congestion and edematous changes after the greater omentum is torsed [9]. As torsion progresses, there is resultant arterial occlusion causing infarction and necrosis.[10] Pain is typically experienced by patients in the right lower quadrant, as seen in our patient who had a long-standing untreated hernia. This typical location of pain on the right side mimics more prevalent conditions such as acute appendicitis, acute cholecystitis, cecal volvulus, Meckel's diverticulitis, and epiploic appendagitis. In addition to ovarian torsion and ectopic pregnancy in female patients, diverticulitis is a crucial differential diagnosis when pain is felt on the left side of the body. Other symptoms include nausea, vomiting, diarrhoea and fever [11].

Examining the patient may reveal rebound and discomfort, which complicates the diagnosis, particularly in cases of right-sided torsion. Occasionally, depending on the extent of the affected segment, a lump may be palpable [12]. Ultrasound typically has restricted diagnostic utility because of the obstruction of the area of interest by intestinal shadows and its dependence on operator skill. However, it helps rule out other more common causes of acute abdomen. It usually appears as a solid hyperechoic lesion. CT scan is considered very sensitive in diagnosing the condition, and the characteristic finding on CT is a ‘mass-like’ fat density in the mesentery with internal hyperattenuating streaks arranged in a concentric pattern giving a “whirlpool appearance” which is a key differentiating feature that points to a twisted omental pedicle. This sign is characteristic and is not observed in other diseases of the omentum [13]. These findings were also confirmed on pelvic MRI in case.

Surgical resection of the affected omentum is usually the primary treatment of choice with most patients undergoing laparotomy or laparoscopy for omental detorsion. In cases where infarction or necrosis of the omentum is noted, omentectomy is performed. The radiological findings in our case series highlight the importance of timely imaging in the evaluation of acute abdominal pain. The prognosis is generally favorable when the condition is diagnosed early, and prompt surgical intervention is performed. However, delayed diagnosis or misdiagnosis can lead to complications such as bowel obstruction, peritonitis, and sepsis.

3. CONCLUSION

Omental torsion is a challenging condition to detect because of its nonspecific clinical signs. Therefore, imaging is crucial for accurate therapy and preoperative diagnosis. CT imaging has proven to be a sensitive tool in diagnosing this condition and can be used to rule out other gastrointestinal disorders such as diverticulitis, appendicitis, and cholecystitis, which have similar clinical symptoms. This aids in visualizing the entire omentum and identifying the pedicle. Although it is a rare acute abdominal condition, torsion of the omentum should be carefully excluded in patients with known predisposing factors such as inguinal hernia.

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