

# TORSION OF ABDOMINAL APPENDAGES PRESENTING WITH ACUTE ABDOMINAL PAIN

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**Background:** Diseases of the abdominal appendages are rare causes of abdominal pain in all age groups.  
**Patients and Methods:** Nine patients with torsion and infarction of abdominal appendages were retrospectively reviewed.

**Results:** Four patients had torsion and infarction of the appendices epiploicae, four patients had torsion and infarction of part of the greater omentum, and one patient had torsion and infarction of the falciform ligament. The patient with the falciform ligament disease represents the first reported case of primary torsion and infarction of the falciform ligament, and the patient with the transverse colon epiploica represents the first reported case of vibration-induced appendix epiploica torsion and infarction. The patient with the falciform ligament disease presented with a tender upper abdominal mass, and the remaining patients were operated upon with the preoperative diagnosis of acute appendicitis.

**Conclusion:** The presence of normal appendix with free serosanguinous fluid in the peritoneal cavity should raise the possibility of a disease, and calls for further evaluation of the intra-abdominal organs. If the diagnosis is suspected preoperatively, CT scan and ultrasound may lead to a correct diagnosis and possibly conservative management. Laparoscopy is playing an increasing diagnostic and therapeutic role in such situations.  
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**Key Words:** Torsion, infarction, appendix epiploica, laparoscopy.

Diseases of the abdominal appendages are uncommon, but they continue to pose a diagnostic challenge for physicians. Complications of these appendages usually present with acute abdominal pain mimicking acute appendicitis. We review our experience with such complications, including those of the epiploic appendages, greater omentum, and falciform ligament.

## Patients and Methods

This is a retrospective review of all patients with complicated abdominal appendages who were treated at the Department of General Surgery at Princess Basma Teaching Hospital in Irbid, Jordan. The patients were seen between September 1993 and July 1998. The medical records of the patients were reviewed for age, sex, presenting complaints, physical examination, white blood cell count, preoperative diagnosis, intraoperative findings, treatment applied, and pathological diagnosis.

## Results

As shown in Table 1, nine patients showed complications of abdominal appendages. Four patients had torsion and infarction of an epiploic appendage; two in the cecum, one in the sigmoid colon, and one in the transverse colon. Four had torsion and infarction of the distal part of the right side of the greater omentum, and one patient had torsion and infarction of part of the falciform ligament. All the patients who had torsion and infarction of an appendix epiploica presented with right iliac fossa pain and nausea without vomiting.

Clinical examination revealed right iliac fossa (RIF) tenderness in all the patients, including one with torsion and infarction of the transverse colon appendix. Only one patient had a temperature of 38°C. White blood cell count ranged between 7000 and 10,500. All the patients were operated upon on the preoperative diagnosis of acute appendicitis, and were all treated by excision of the infarcted epiploic appendices.

All patients with greater omentum torsion and infarction had a similar presentation of RIF pain and nausea without vomiting. Clinical examination similarly revealed RIF tenderness. The highest temperature was 37.7°C, and the white blood cell count ranged between 7000 and 13,200.

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TABLE 1. Clinical data of nine patients with complications of abdominal appendages.

Sex	Age	Site	Temperature	WBC	Preoperative diagnosis	Operative diagnosis	Treatment
F	63	RIF	37.5	7000	Acute appendicitis	AE torsion (cecum)	Excision of the AE
F	45	RIF	37	10,500	Acute appendicitis	AE torsion (cecum)	Excision of the AE
M	26	RIF	37.5	9500	Acute appendicitis	AE torsion (sigmoid)	Excision of the AE
M	25	RIF	38	7000	Acute appendicitis	AE torsion (transverse)	Excision of the AE
M	25	RIF	37.7	13,200	Acute appendicitis	GO torsion	Excision of the GO
M	7	RIF	37.2	9600	Acute appendicitis	GO torsion	Excision of the GO
M	25	RIF	37.5	6500	Acute appendicitis	GO torsion	Excision of the GO
F	30	RIF	37.5	9000	Acute appendicitis	GO torsion	Excision of the GO
F	23	EP	37	7600	Tender EP mass	FL torsion	Excision of the FL

Site=site of the pain; WBC=white blood cell count prior to surgery; AE=appendix epiploica; RIF=right iliac fossa; EP=epigastrium; GO=greater omentum; FL=falciform ligament.

All the patients were operated upon on the preoperative diagnosis of acute appendicitis, and were all treated by excision of the infarcted segment of the greater omentum.

The patient with the falciform ligament torsion and infarction presented with epigastric abdominal pain. Examination revealed a tender epigastric mass, the nature of which could not be clearly identified preoperatively. Her temperature was 37°C, and her white blood cell count was 7600. Intraoperative findings revealed a 3x3 cm infarcted mass arising from the middle of the falciform ligament with torsion of its pedicle. The falciform ligament was completely excised. Histology revealed hemorrhagic necrosis secondary to torsion.

### Discussion

The abdominal appendages discussed here include the epiploic appendices, the greater omentum and the falciform ligament. The epiploic appendices are located on the antimesenteric border of the colon, mainly the cecum and the sigmoid colon, and may contain diverticulae. Complications related to the epiploic appendices include diverticulitis, intestinal obstruction secondary to adherence to small bowel, and torsion and infarction.<sup>1-3</sup> Only torsion and infarction were seen in four of our patients. Torsion and infarction are more common in obese patients where the epiploicae are bulky, and are usually found in the sigmoid colon where the epiploicae are longest.<sup>2,3</sup> Only one of our patients had the epiploic appendix torsion and infarction in the sigmoid colon.

Diseases of the epiploic appendices are most common in the 3rd and 4th decades of life, although they have been reported in a wide range of ages, ranging from 12 to 82 years of age.<sup>4</sup> Men and women are equally affected.<sup>4</sup> The right iliac fossa remains the most common site for the pain and tenderness, even if the sigmoid colon is the affected site. Appetite and bowel functions are usually unchanged.<sup>4</sup> Nausea and vomiting were reported in 25%-40% of the patients, and a palpable RIF mass was reported in a similar percentage,<sup>4,6</sup> but none of our patients had a palpable mass.

As was the case with our four patients, the most common differential diagnosis is acute appendicitis, and the correct diagnosis is usually made at the time of operation.

However, patients with epiploic complications are less unwell compared to those with acute appendicitis, usually with a slight increase in temperature and leukocyte count.<sup>4-6</sup> In other situations, the condition may mimic other acute abdominal conditions such as diverticulitis, torsion of an ovarian cyst and cholecystitis, depending on the location. Local abscess formation may occur, simulating a neoplastic process.<sup>2</sup> Calcified peritoneal loose bodies found during laparotomy are thought to be remnants resulting from spontaneous resolution of torsion.<sup>7</sup> Epiploic appendagitis may show a stricture on barium enema because of extrinsic compression simulating carcinoma.<sup>1,2,5</sup> CT scan may show a nonspecific mass effect,<sup>1,8,9</sup> and ultrasonography may show a multilobular finely echogenic mass.<sup>9</sup> Treatment includes ligation and excision, although there is a suggestion by some that the disease is self-limiting.<sup>10</sup>

The greater omentum may develop infarction without a known cause—primary idiopathic segmental infarction<sup>11-14</sup>—or as a result of primary torsion.<sup>15-21</sup> Our four patients developed omental infarction secondary to torsion. This form of torsion occurs in the absence of distal fixation, which differentiates it from infarction secondary to hernia incarceration, tumors, inflammation or adhesions. This condition is more encountered in the 3rd and 4th decades, with a male predominance of 3:2.<sup>15</sup>

Both primary omental infarction and infarction secondary to torsion have been reported in children.<sup>22-24</sup> Precipitating factors are thought to include trauma, over-exertion, bifid omentum, overeating and coughing.<sup>15</sup> In one patient, primary torsion of the omentum was reported in a jackhammer worker, and was considered to be a vibration-related injury.<sup>21</sup> It was interesting to note that our patient with torsion and infarction of the epiploic appendix of the transverse colon was a jackhammer worker who had performed a heavier load of work than normal the day before the admission. This confirms the possible role of vibration in the development of torsion and infarction of the abdominal appendages in general.

Omental torsion and infarction simulates infarction of the epiploic appendices by the fact that it usually mimics acute appendicitis.<sup>15-16</sup> However, the absence or minimal degree of systemic upset and a longer history favors the diagnosis.<sup>15-16</sup> The presence of free serosanguinous fluid

and normal appendix, findings that were observed in all four of our patients with this diagnosis, should raise suspicion.<sup>15</sup> Both CT scan and ultrasound can lead to the correct preoperative diagnosis,<sup>25-27</sup> which, in one reported case, led to conservative management.<sup>27</sup> However, such investigations are rarely performed preoperatively, unless the diagnosis of acute appendicitis is in doubt, and accordingly, none of our patients underwent such investigations.

Operative findings include a mass of hemorrhagic omentum, usually on the right side. One to three twists of the pedicle are usually present. Treatment includes excision of the infarcted or hemorrhagic mass with ligation of the pedicle.<sup>28</sup> Laparoscopy is emerging as a diagnostic and therapeutic tool of managing patients with diseases of the abdominal appendages, when it is used in evaluating some patients with acute abdominal pain.<sup>29-30</sup> Laparoscopy is being used more frequently in our department for patients with acute abdominal pain.

Surgical lesions of the falciform ligament requiring surgical intervention are extremely uncommon.<sup>31</sup> They present most often as a cystic abdominal mass and to a lesser extent as an abscess.<sup>31-33</sup> Cysts may undergo torsion and infarction.<sup>31-33</sup> We could not demonstrate any cyst in our patient who presented with falciform ligament torsion and infarction, making it a true case of primary torsion and infarction. On reviewing the literature, we could not find a similar case of primary falciform ligament torsion which was not on top of a cyst. Despite technological advances in CT scanning, the diagnosis of a falciform ligament mass is rarely made preoperatively.<sup>31</sup> Total excision of the falciform ligament is the preferred treatment.<sup>31</sup>

Diseases of the abdominal appendages, usually mimicking acute appendicitis, are rare causes of acute abdominal pain in all age groups. The presence of serosanguinous fluid in the peritoneal cavity and a normal appendix should call for a thorough evaluation of these appendages. If a preoperative diagnosis is suspected, CT scan and ultrasound may enable a correct diagnosis to be made. Laparoscopy is emerging as a diagnostic and therapeutic tool.

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