Imaging features of abdominal epiploic ischemic lesions

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Learning objectives

# To describe the clinical presentation of ischemic epiploic intra-abdominal lesions.

# To illustrate the imaging features in ultrasound and CT scan of epiploic appendagitis and omental infarction.
Background

The ischemic epiploic lesions are a relatively rare condition essentially represented by either the infarction and/or torsion of the greater omentum or the inflammation of an epiploic appendage [1]. They are an uncommon cause of acute abdominal pain. Non Specific, their clinical presentation might lead to a misdiagnose with other surgical affections such as appendicitis, cholecystitis or diverticulitis. Advances in imaging techniques, especially CT and ultrasound, have proven to be valuable to their diagnose [2], avoiding the patients unnecessary surgical intervention and guiding the further management.

This pictorial essay reviews the principle aspects of ischemic epiploic lesions.
Findings and procedure details

Ultrasound images were obtained using a high frequency linear probe. Plan and enhanced CT scans were performed for each patient.

**Epiploic appendagitis:**

Epiploic appendices are pouches of peritoneum that abut the surface of the colon, containing adipose tissue and vessels [3].

The term appendagitis denotes the inflammation of the epiploic appendages that could be primary or secondary [4]. In the primary form, the inflammation is caused by torsion or spontaneous thrombosis of the appendageal pedicle and its central draining vein [5, 6, 7, 8]. In the secondary form, inflammation is caused by another intra-abdominal process such as appendicitis, diverticulitis, or cholecystitis [4].

Although primary epiploic appendagitis can affect any age group, it is known to be more frequent in patients between the fourth and fifth decades of life. Excessive body weight and over-exercising are known to be contributing factors [9].

The clinical presentation is non-specific. Patients consult for a sharp localized abdominal pain. The most common sites of pain are the left and right lower quadrants of the abdomen [10]. Body temperature is normal or slightly elevated. In contrast with other affections such as appendicitis and diverticulitis, appendagitis is not usually associated with nausea, vomiting, anorexia, or change in bowel function [10]. The laboratory tests show a rather normal white blood cells count and slightly elevated serum levels of C Reactive Protein [11].

On account of advanced cross-sectional imaging techniques the diagnosis of this affection is no longer a surgical discovery.

In Ultrasound, an ovoid, non-compressible, hyperechoic mass of fat tissue is found at the site of maximum tenderness between the colon and the abdominal wall [12]. It is surrounded by a hypochoic peripheral rim (fig. 1, 2). A central hypochoic element, although inconstant, might be noted. It corresponds to a thrombosis of the central vessel of the appendage due to torsion (fig. 1).

The CT feature of acute appendagitis typically consists of an oval fatty mass abutting the colonic wall, of 1.5 to 3.5 cm of size, surrounded by a thin continuous peripheral rim of hyper-attenuation due to inflammation (fig. 3 to 7) [10]. It may contain, inconstantly, a central target lesion of hyper-attenuation, also called "dot sign" that corresponds to a thrombosed draining appendageal vessel or to internal hemorrhage (fig. 3, 6). The most common locations are: adjacent to the sigmoid and descendent colon, followed by the right colon. Other rare sites have also been reported such as the hepatic or...
splenic flexure of the colon (fig. 6) and the lesser omentum [13, 14]. Thickening of the parietal peritoneum, although uncommon, might be observed. The colonic wall is generally spared, although rarely, it can be thickened as a result of direct extension of inflammation (fig. 4) [15]. An epiploic appendage can completely get detached off of its pedicle thus becoming a mobile fatty abdominal mass that can calcify [16].

The treatment of acute appendagitis is based on oral anti-inflammatory medication. The clinical symptoms resolve within the ten days [5]. However, the CT changes may persist several months in spite of the clinical improvement.

**Omental infarction:**

The omentum, vestige of embryological development, is a fat laden fold of peritoneum. It is separated anatomically into the greater and lesser omentum [17]. The greater omentum is an apron-like fold of visceral peritoneum that hangs down from the stomach, anterior to the transverse colon, to which it is attached [16].

Segmental infarction of the omentum is also a rare cause of acute abdominal pain. It can be primitive, for which the etiology is uncertain, including a vascular compromise related to a kinking of veins or to a tenuous blood supply [16]. Sudden or unusual efforts, congenital abnormalities and excessive eating are also counted to be predisposing factors [18]. The infarction can, on the other hand be, more frequently, secondary to another intra-abdominal affection such as an inflammatory process a post-traumatic or surgical injury [16].

Non-specific the clinical presentation includes acute or sub-acute abdominal pain, typically in the right lower quadrant of the abdomen. Other digestive symptoms such as nausea, vomiting or diarrhea are generally absent. White blood cells count can be slightly elevated.

The diagnosis is made through cross-sectional imaging.

The typical US appearance is an ill-limited moderately hyperechoic non compressible fatty mass that is adherent to the peritoneum and located in the site of maximum tenderness. An infarction caused by torsion can be suspected when there is no Doppler signals [19].

The characteristic findings on CT are an ill-defined heterogeneous fat-density lesion. It is generally large of size (>5cm) with no enhancement (fig.8, 9 and 10) [20].Mild haziness in the fat can be the only sign of early or mild infarction [16]. The diagnosis of omental torsion resulting in an infarction can be suspected at CT when concentric linear strands forming a whirled pattern are seen [21]. Unlike the epiploic appendagitis, the central dot sign and the peripheral hyperattenuating rim are absent in omental infarction [12]. The fat adjacent to bowel being the center of the pathologic process explains the importance of the fat stranding disproportionally to the thickening of the colonic wall [15].
Unlike acute appendagitis for which the CT changes resolved completely at the follow up CT, those of omental infarction shrunk but did not disappear completely. Singh. A.K [21] showed in his study that the fatty heterogeneous lesion diminished in size and developed a well-defined hyperdense rim.

The process being self-limited, its treatment is usually conservative. However, the persistence of the symptoms or the outbreak of infectious complications may lead to surgery [22].
Images for this section:

**Fig. 1:** An ultrasound image showing an ovoid echogenic mass (white star) surrounded by a hypoechoic peripheral halo (white arrow) with a central hypoechoic element (red arrow).

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Fig. 2: an ultrasound image showing a fatty hyperechoic ovoid lesion (white star) surrounded by a hypoechoic ring (white arrow). Note that the central dot sign is absent.

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**Fig. 3:** Axial CT section showing an ovoid mass of attenuation similar to that of fat that abuts the anterior wall of the sigmoid colon (white arrow) surrounded by a thin rim of hyperattenuation (red arrow) with a central hyperattenuating element (yellow arrow). There is no thickening of the adjacent colonic wall.

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Fig. 4: Axial CT section showing an oblongue fatty mass adjacent to the sigmoid colon (white arrow). There is a peripheral continuous rim of hyperattenuation (red arrow) with local fat stranding (star) and a focal thickening of the colonic wall (yellow arrow).

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Fig. 5: axial CT section showing the fat-density mass adjacent to the descending colon (white arrow) with a peripheral dense rim (red arrow) and local fat stranding (white star).

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Fig. 6: An axial CT section showing a round mass of fat density located next to the hepatic flexure of the colon (white arrow) surrounded by a thin dense ring (red arrow) with a central "dot sign" (yellow arrow).

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**Fig. 7:** A round mass adjacent to the caecum surrounded by a ring of hyperattenuation (red arrow).

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Fig. 8: sagittal reconstruction CT image showing a large heterogeneous fatty mass (white arrows) with adjacent focal soft tissue stranding located in a large white line hernia.

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Fig. 9: axial CT section enhanced images showing a heterogeneous density fatty lesion (white arrows) in a white line hernia.

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**Fig. 10:** Axial image of enhanced CT showing an ill-defined area of streaky densities situated in the left upper quadrant of the abdomen anterior to the transverse colon (white arrows).

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Conclusion

Epiploic appendagitis and omental infarction are both focal fat ischemic lesions that can mimic acute surgical affections of the abdomen. The recognition of their imaging features is crucial, for their treatment to be conservative, thus avoiding the patient unnecessary surgery.
References


