

Ultrasound Diagnosis of Primary Epiploic Appendagitis: A Case Report

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Abstract

A rare differential diagnosis for severe abdominal pain is acute epiploic appendagitis. Its symptoms resemble those of acute diverticulitis, acute appendicitis, or omental infarction quite a bit. The primary imaging method used for diagnosis is computed tomography (CT). We are describing the case of a 27-year-old guy who underwent an abdominal ultrasonography after complaining of severe left lower quadrant abdominal pain. It identified an oval and non-compressible hyperechoic mass in the left iliac fossa. The mass was surrounded by a hypoechoic rim and there was no color Doppler signal. In the absence of CT, radiologists must be able to diagnose acute epiploic appendagitis on ultrasound in order to avoid unnecessary hospital admission, pricey laboratory tests, antibiotic treatment, and unnecessary surgery. In this instance, the patient was spared from ionization exposure from a potential CT scan and other invasive treatments including surgery with associated costs because of the reliable ultrasound diagnosis of epiploic appendagitis. After receiving conservative medical treatment, the patient was placed under surveillance and then discharged.

Keywords

Acute Abdominal Pain, Epiploic Appendagitis, Ultrasound Scan

1. Introduction

Primary epiploic appendagitis (PEA) is caused by ischemia, inflammation or torsion of an epiploic appendice at the surface of the colon serosa [1]. It is an un-

common cause of abdominal pain with symptoms resembling those of other acute and subacute situations such as diverticulitis, appendicitis, cholecystitis or omental infarction [2] [3]. Unlike these conditions, PEA is a self-limiting condition with conservative management [4]. Due to the lack of pathognomonic clinical signs and symptoms of epiploic appendagitis and the fact that gastroenterologists, general surgeons and other medical personnel are not aware of this condition, its diagnosis is rare and difficult [2] [3]. In the past, before the widespread use of newer imaging diagnostic modalities, PEA was considered a surgical disease and was usually diagnosed and treated during surgical operations for more severe cause of acute abdomen [5] [6]. But nowadays, abdominal computed tomography (CT) is the gold standard for diagnosis of PEA, even though occasionally sonography has been used [7] [8]. In low-income countries there is a problem of availability and affordability of CT-scan, so radiologists practicing in those countries should be able to recognize and diagnose epiploic appendagitis using ultrasonography if the technical conditions permit. We present this case of ultrasound diagnosis of primary epiploic appendagitis in a 27-year-old patient with acute abdominal pains and no relevant laboratory findings.

2. Case Presentation

We received a 27-year-old male patient referred for an abdominal ultrasound scan from the outpatient department of Regional Hospital of Buea, with acute left lower quadrant abdominal pain and tenderness, 2 days prior to consultation. The pain was described as sharp, constant, not radiating, with no exacerbating or relieving factors. The patient reported associated anorexia, nausea and constipation. He denied any notion of trauma, fever, vomiting, diarrhea or dysuria. He is a student with no relevant medical or surgical past history. The review of systems was otherwise negative.

On physical examination of the abdomen, a tenderness at the left iliac fossa was noticed and the abdomen was not distended. There was no lumbar tenderness, no pulsatile nor palpable mass. Elsewhere, physical examination was unremarkable.

Laboratory investigations showed normal white blood cell count and normal hemoglobin level and negative C-reactive protein (CRP), <6 mg/L. Urinalysis and stool analysis were unremarkable.

An abdominal ultrasound scan was performed with a *Sonoscape E1 Exp*® portable machine in use since June 2021, using a high frequency linear probe (7 - 12 MHz), the patient on supine position. It revealed at the site of maximum tenderness a mass adjacent to the descending colon surface, attached to the anterior abdominal wall. This mass was oval, hyperechoic, non-compressible, measuring 1.7 cm, without color Doppler signal and surrounded by a hypoechoic rim (**Figure 1** and **Figure 2**). There was mild reactive bowel wall thickening of the adjacent descending colon (**Figure 2**). There was no perivisceral lymph node or peritoneal collection. The appendix was not depicted and there were no infiltration of the mesenteric fat at the right iliac fossa.

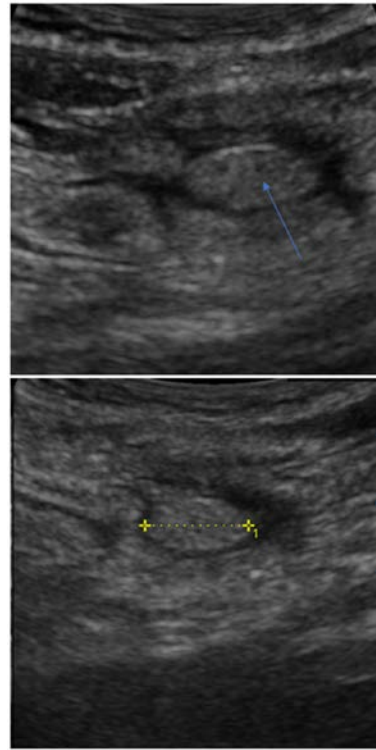


Figure 1. Ultrasound images (using a high frequency probe) showing a hyperechoic ovoid mass attached to the anterior abdominal wall and adjacent to the descending colon. The mass is surrounded by a hypoechoic rim (arrow) and measuring 1.7 cm.

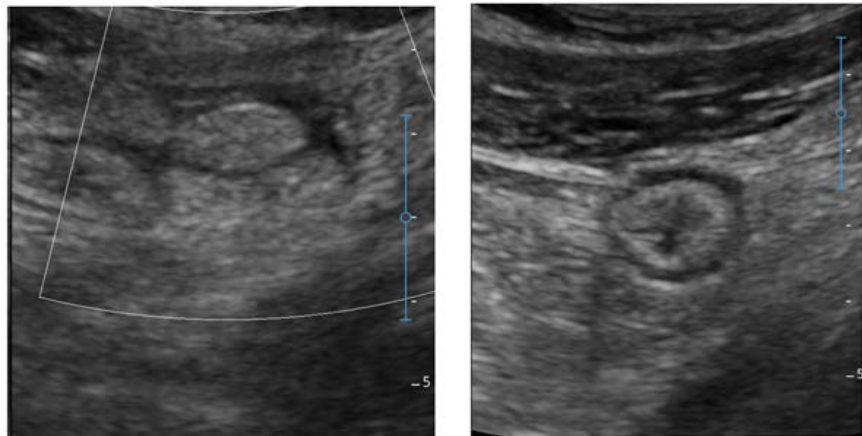


Figure 2. Ultrasound images. There is no Doppler color and there is thickening of the adjacent descending colon wall.

Considering the clinical presentation, laboratory and ultrasound findings, the diagnosis of acute epiploic appendagitis was made. A CT was not performed because it is not available in our setting.

The patient was admitted for observation, placed on anti-inflammatory drugs and analgesics and was discharged about 24 hours later. There was positive clinical improvement and the abdominal pain progressively disappears a week later. There was no complication or pain relapse.

3. Ethics and Consent

No experiments were performed on the patient. There is no personal information that could lead to the identification of the patient. Before publication of the case report a written informed consent was obtained from the patient.

4. Discussion

Epiploic appendagitis, also called appendicitis epiploicae or appendagitis, is a relatively rare, benign, and local inflammatory disease involving the epiploic appendices [4] [9] [10]. Its frequency is estimated to be 1.3% with an incidence of 8.8 cases/million/year [4] [5]. It is frequent in male in their fourth to fifth decades of life. However, it can occur at any age; Baajlana *et al.* reported a case of EA in a patient of 10 years [11]. In the case reported here the patient was 27 years old. Risk or associated factors could be colonic diverticula, obesity, strenuous exercise, and hernias [8] [12] [13].

5. Anatomical Review and Pathogenesis

Epiploic appendages are vascular stalk-attached pouches of subserosal fat that line the surface of the colon [12] [14]. Their average size is between 1 - 2 cm in thickness and 3 cm in length, with the largest ones being found close to the sigmoid colon. They are rarely seen in the rectum, but are found from the cecum to the recto-sigmoid [3] [8] [15] [16]. Each epiploic appendage receives one or two small arteries from the colonic vasa recta for supply, and a tortuous vein drains it through its small pedicle [14] [17].

Because they are pedunculated, highly mobile, and have a poor blood supply, epiploic appendages are vulnerable to torsion and ischemia infarction [14] [18].

Primary epiploic appendagitis is due to torsion and infarction [6] and is most commonly seen in the sigmoid colon (41.5%), the cecum (15.1%) and the descending colon (as it was the case in this case report). Singh *et al.* described the location of the colon lesion in decreasing order of frequency in the sigmoid colon (62%), descending colon (18%), cecum (12%), and ascending colon (8%) [8]. Yousaf *et al.* described a case of bilateral epiploic appendagitis in a 26-year-old Asian male with bilateral iliac fossa acute pain [19]. Spontaneous venous thrombosis of an appendageal draining vein was also described as an etiology of PEA [6].

Secondary epiploic appendagitis is the inflammation of a normal epiploic appendage adjacent to an inflammatory process such as diverticulitis, appendicitis or cholecystitis [6] [15].

6. Clinical Presentation and Laboratory Findings

PEA has no pathognomical clinical sign or symptom. It usually presents as an acute onset of focal pain in the left or right lower abdominal quadrant, non-migratory, continuous and intense, that may be exacerbated by cough or movement [12]. Ergelen *et al.* in their retrospective analysis of 45 PEA patients reported 35%

(16) presenting with right lower quadrant pain and 41% (19) with left lower quadrant pain [14]. Generally, patients overall condition is stable, their appetite and bowel function are usually unchanged; usually associated symptoms such as fever, nausea, vomiting, diarrhea, or constipation are not present [2] [3] [6]. Our patient experienced associated anorexia, nausea and constipation, however he did not presented with fever, vomiting or diarrhea. Young *et al.* retrospectively analyzed 31 patients with PEA in Korea and found that for all patients there was abdominal pain, and other symptoms were anorexia (9.7%), nausea (12.9%), vomiting (3.2%), diarrhea (6.5%), and constipation (12.9%); whereas muscle rigidity and fever were absent in all patients. All patients demonstrated revealed localized abdominal tenderness on physical examination [20].

Laboratory investigation findings in patients with PEA are usually normal or non-specific. Infrequently, a slightly elevated white blood cell count (WBC) and C-reactive protein may be observed, as a result of ischemic fat necrosis induced inflammatory response [6] [13] [20] [21]. For the case reported here there was no relevant laboratory findings.

7. Imaging Diagnosis

The accurate diagnosis of epiploic appendagitis is based on medical imaging, since there is no pathognomonic clinical signs and laboratory findings. So it is a challenge to differentiate it from other causes of abdominal acute pain with surgical management especially acute diverticulitis and acute appendicitis [10] [14].

PEA can currently be detected by ultrasonography and confirmed on CT. High frequency ultrasound imaging typically reveals an oval, non-compressible hyperechoic mass encircled by a hypoechoic rim at the location of maximum tenderness. The mass is adherent to the anterior abdominal wall with no color Doppler signal [10] [13] [22] [23] [24] [25] [26]. The mass may also be entirely hypoechoic or contain central hypoechoic areas of hemorrhage and/or can be surrounded by altered, hyperechoic fat, due to inflammatory changes in adjacent tissue [22]. Slight thickening of the neighboring colon wall can be visible but it is usually normal [22]. There could be slight to moderate color signals around the ischemic lesion. Additionally, ultrasound can be used to evaluate the presence of a central dot-shaped, hyperdense focus, which suggests a thrombosed vein [12]. With contrast enhanced ultrasound (CEUS), the mass shows a central unenhanced area and broad perilesional enhancement (>1 mm) [27] [28].

Being aware of the typical ultrasound imaging patterns of this rare condition and having some experience are necessary for accurate and rapid diagnosis of PEA, especially in our setting where CT is not available or not affordable for the majority of patients.

Although Color Doppler ultrasound (CDUS) has the advantages of being non-invasive, non-radiating, and of locating the lesion at the area of maximum tenderness, its findings could be often unremarkable. Thus, CT currently represents the gold standard imaging modality for the accurate and positive diagnosis of PEA since it confirms the fatty nature of the mass [10] [13] [29].

The CT characteristic findings in case of PEA are; oval shaped, well-defined focus of hypodense fat tissue of 1 to 5 cm in axial diameter, attached to the anterior colonic wall; thick peripheral high attenuation rim (2 - 3 mm) surrounding the oval lesion as expression of the inflamed visceral peritoneum covering the epiploic appendage (“hyperattenuating ring sign”); and peri-appendageal fat stranding (inflammatory changes) as shown on **Figure 3** and **Figure 4** [6] [7] [8] [9] [10] [12] [14] [30] [31]. In addition, a central high-attenuation focus called “central dot sign” may be seen, indicative of thrombosis of the central venous pedicle [6] [8] [10]. There is no enhancement depicted on post-contrast series [6] [10] [31].

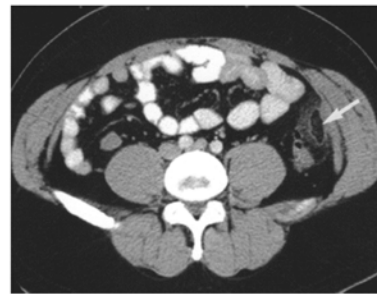


Figure 3. 41-year-old man with left lower quadrant pain from acute epiploic appendagitis. Axial contrast-enhanced CT scan shows fat-density lesion with surrounding hyperdense rim and inflammation (arrow) adjacent to the distal descending colon. Singh AK, 2005 [31].

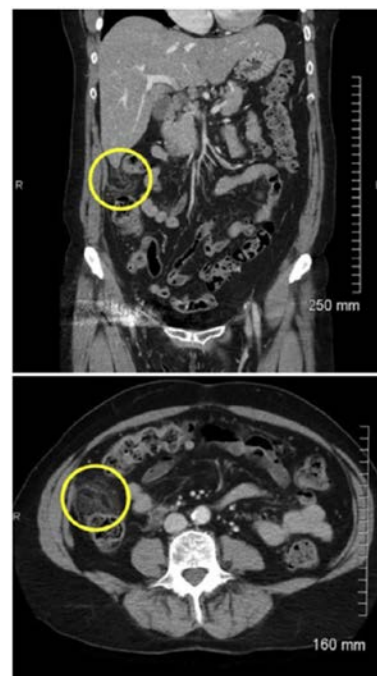


Figure 4. 65-year-old woman presenting with a sharp, right-sided flank pain. Coronal and axial contrast-enhanced CT scan show epiploic appendagitis located on the antimesenteric margin of the colon with a central lucent area of fat attenuation and hyperechoic ring and mesenteric fat stranding. Chu EA, 2018 [12].

Magnetic resonance imaging (MRI) is not used as a routine diagnostic technique for PEA, but it has a better tissue resolution compared to CT, does not involve ionizing radiations, so could be an alternative to CT in the diagnosis of PEA, especially in pediatric and obstetric patients [10] [12] [13]. T1- and T2-weighted images show a focal lesion of fatty signal, and contrast-enhanced T1-weighted images show an enhancing rim around the oval fatty lesion [12] [31].

8. Treatment

PEA is described by many authors as a self-resolving condition in the majority of patients, with only conservative management. The goal of the treatment is to control the pain. Oral anti-inflammatory drugs are prescribed often for 4 to 7 days, and antibiotics are not usually indicated [3] [9] [12] [31]. CT findings subside slowly compared to the clinical signs and may persist for up to 6 months [6]. Surgery is performed in case there is no improvement on conservative treatment or for patients who develop complications which need surgical management. In that case, laparoscopic excision of the affected appendage is required [6] [9] [12] [31]. Complications of epiploic appendagitis include adhesions, abscess formation, peritonitis, bowel obstruction and intussusception; so patients are advised to seek medical attention as soon as worsening signs appear [6] [12] [31].

9. Conclusion

Epiploic appendagitis is an uncommon condition, but should be kept in mind in the evaluation of acute abdomen by clinicians and radiologists. Ultrasonographic pathognomonic findings could be a reliable alternative to CT in situations where this technology is not available. However, CT remains the gold standard imaging modality for the diagnosis of epiploic appendagitis as it confirms the diagnosis and eliminates the differentials.

Limits

The limit of this report is absence of CT scan images (CT not available in our setting).

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Conflicts of Interest

The authors declare no conflict of interest.

Authors' Contribution

SD did the ultrasound examination, analyzed the images, made the literature review and drafted the manuscript. JT and YO reviewed the images and contributed in drafting the manuscript. NN contributed in reviewing the manuscript. EW and EG corrected the final version of the manuscript. All the authors have

read and agreed to the final manuscript version.

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