Scientific Research Publishing

Advances in Computed Tomography, 2017, 6, 21-27
http://www.scirp.org/journal/act
ISSN Online: 2169-2483
ISSN Print: 2169-2475

Acute Epiploic Appendagitis of the Vermiform Appendix: Typical Computed Tomographic Image with Pathologic Correlation

Jung Wook Seo

Department of Radiology, Ilsan Paik Hospital, Inje University College of Medicine, Goyang-Si, Korea
Email: seojwrad@paik.ac.kr

How to cite this paper: Seo, J.W. (2017) Acute Epiploic Appendagitis of the Vermiform Appendix: Typical Computed Tomographic Image with Pathologic Correlation. *Advances in Computed Tomography*, **6**, 21-27.
https://doi.org/10.4236/act.2017.64004

Received: September 22, 2017
Accepted: November 5, 2017
Published: November 8, 2017

Abstract

Epiploic appendages can become ischemic and infarcted, which can present acute abdominal pain that mimics other diseases, such as diverticulitis or appendicitis. Particularly, inflammation of an epiploic appendage attached to the vermiform appendix is a very rare cause of acute abdominal pain, and it is difficult to diagnose this condition preoperatively. We present a case of epiploic appendagitis of the vermiform appendix that was identified with a typical radiologic image and was pathologically confirmed. In addition, we review the literature of similar cases and analyze the clinical and radiologic features of EA of the vermiform appendix.

Keywords

Acute Abdomen, Appendix Epiploica, Epiploica Appendagitis, Vermiform Appendix, Computed Tomography

1. Introduction

Epiploic appendagitis (EA) is an uncommon self-limited condition that is caused by inflammation and ischemia related to torsion, or venous thrombosis, of the epiploic appendages [1]. In particular, inflammation or torsion of the epiploic appendages in the vermiform appendix is an extremely rare cause of acute abdominal pain and it is difficult to diagnose this condition preoperatively [2]. To our knowledge, fewer than 10 cases have been reported in the English literature since Hambury first reported the disease in 1952 [3]. Although EA is rarely diagnosed preoperatively; knowledge of this condition is important as it may mimic other forms of acute abdominal pain that require surgery, when it can be

treated conservatively with pain management. Therefore, clinicians and radiologists should be familiar with the characteristic radiologic features of EA to prevent unnecessary surgery.

We report the first case of EA of the vermiform appendix identified with a typical computed tomography image and pathologic correlation, and review 5 additional cases reported in the literature.

2. Case Presentation

A 32-year-old man visited the emergency department complaining of acute right lower abdominal pain that had started 6 hours previously. He had no underlying disease and no other associated symptoms, such as nausea, vomiting, or diarrhea. His vital signs were immediately assessed: body temperature was 36.6˚C, pulse rate was 71 beats per minute, blood pressure was 145/75 mmHg, and respiratory rate was 20 breaths per minute. Physical examination revealed marked tenderness in the right lower quadrant. Clinical laboratory results indicated leukocytosis (white blood cell count 10,950/mm^3, normal: 4000 - 10,000 mm^3) and elevated erythrocyte sedimentation rate of 14 mm/h (normal < 12 mm/h). Although an intravenous painkiller and fluid therapy were administered, his right lower quadrant pain worsened.

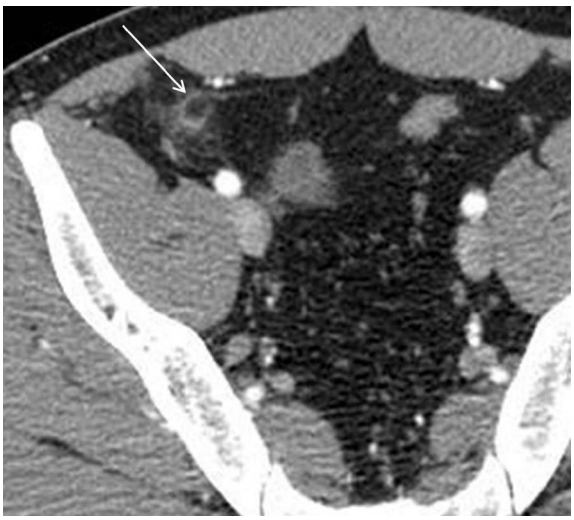
Abdominal radiography showed nonspecific distribution of bowel gas without any sign of bowel obstruction. Abdominopelvic computed tomography (APCT) was performed using a 64-channel multi-detector CT system (Aquilion; Toshiba, Tokyo, Japan), and the contrast medium used was Iohexol (IO-Brix; Taejoon Pharm, Seoul, Korea). APCT showed a 1.5-cm oval, fatty lesion with localized fat stranding and an engorged central vessel closely abutted to the tip of the vermiform appendix. The proximal portion of the vermiform appendix showed no definite evidence of inflammatory change and had a relatively normal diameter (**Figure 1(a)**, **Figure 1(b)**). However, the surgeon considered the patient to have acute appendicitis and decided to perform an immediate surgical intervention before the CT results were provided.

During surgery, the vermiform appendix was found to be normal in appearance, with mild inflammatory changes in the tip portion and inflamed epiploic appendages attached to the tip of the vermiform appendix. Therefore, a laparoscopic appendectomy was performed. Pathology showed lobulated fibrofatty tissue attached to tip of appendix, with fibrin components, acute inflammation, and a tubular structure suspected to be an engorged vessel, and showed reactive hyperemia in tip of appendix (**Figure 1(c)**).

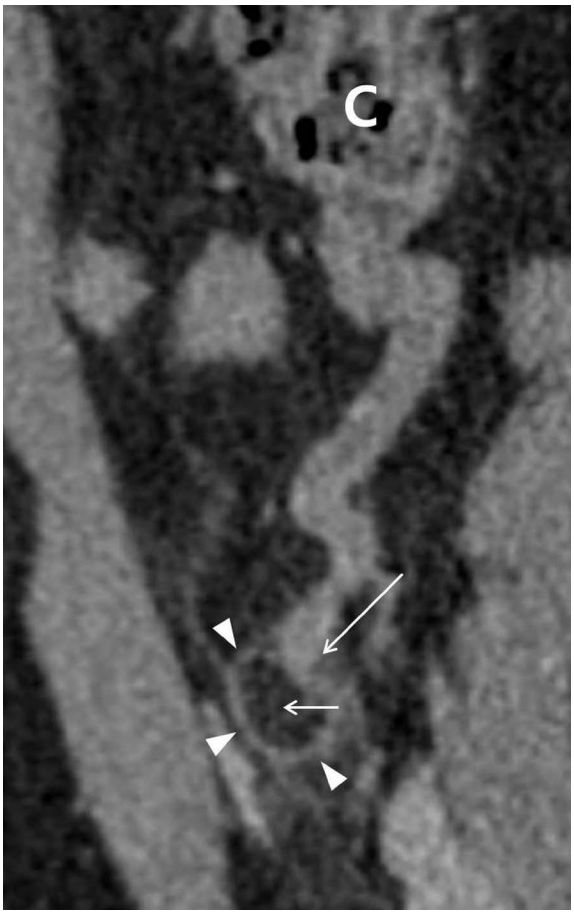
3. Discussion

Inflammation or torsion of epiploic appendages are rare causes of acute abdominal pain. EA is a self-limited condition, most often affecting middle-aged men, which is caused by inflammatory and ischemic changes related to torsion or venous thrombosis of the epiploic appendages. Because epiploic appendages

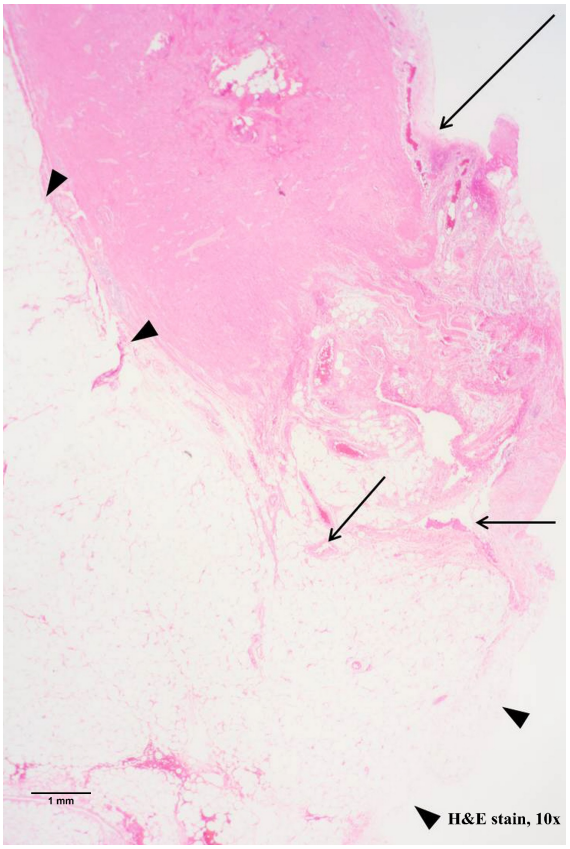
are larger and more numerous in the descending and sigmoid colon, EA typically manifests as left lower quadrant pain, mimicking acute diverticulitis. Less frequently, it can also involve the cecum and ascending colon, and this may clinically mimics appendicitis. Epiploic appendages can also exist in the vermiform appendix and are usually smaller than those on the colon. However,



(a)



(b)



(c)

Figure 1. A 32-year-old man with EAA. (a) Axial scan of contrast-enhanced abdominopelvic computed tomography (CT) shows a fatty oval lesion (arrow) with hyperattenuating rim and fat stranding in the right lower quadrant, around the tip of the vermiform appendix; (b) Multiplanar reconstructed CT scan shows inflamed epiploic appendage (arrowhead) of the tip portion of a normal vermiform appendix (arrow), with a central linear high attenuation (short arrow). C = normal cecum; (c) Histopathologic examination shows large fibrofatty tissue (arrowhead) containing tubular structures (short arrows) suspected as engorged vessel and fibrin components, around the tip of the appendix (arrow) (hematoxylin and eosin stain, × 10).

epiploic appendagitis of the vermiform appendix (EAA) is rare [1]. Since Hambury [3] reported the first case of primary EAA, similar cases have been reported by Purysko [1], Aslam [2], Sand [4] and Magnuson [5]; the authors diagnosed the patients as having acute appendicitis and immediate appendectomy was performed.

To our knowledge, 5 cases have been previously reported in the English literature, and only one case included radiologic findings [1]. In contrast, our report correlates radiologic and histopathologic findings. The characteristics of the 5 previously reported cases, as well as our own, are summarized in **Table 1**.

In the literature review, the clinical symptoms of the patients were alike. The presenting symptom of all patients was right lower quadrant pain. Two patients had laboratory results indicative of leukocytosis, and one had mild elevation of C-reactive protein. The size of the inflamed appendage was mentioned for only

Table 1. Clinical and radiologic features of 6 patients with epiploic appendagitis of the vermiform appendix.

Literature source	Age (years)	Sex	Symptom	Laboratory results	Size of the lesion	Location of the lesion	CT appearance	Outcomes
1 Hambury [3]	34	F	RLQ pain	Not mentioned	1.3 cm	Junction of the middle and distal one-third of the appendix	Not applicable	Surgically confirmed
2 Sand [4]	50	M	RLQ pain	Leukocytosis (WBC 12/nL) Elevated CRP (1 mg/dL)	Not mentioned	Not mentioned	Not applicable	Surgically confirmed
3 Aslam [2]	57	M	RLQ pain	Leukocytosis	Not mentioned	Near the tip of appendix	Not applicable	Surgically confirmed
4 Magnuson [5]	36	F	RLQ pain	Within normal range	Not mentioned	Proximal appendix	Not applicable	Surgically confirmed
5 Purysko [1]	38	M	RLQ pain	Not mentioned	Not mentioned	Near the tip of appendix	Periappendiceal fatty oval lesion with hyperattenuating rim	Surgically confirmed
Our patient	32	M	RLQ pain	Leukocytosis (WBC 10,950/mm^3) Elevated ESR (14 mm/h)	1.5 cm	Near the tip of appendix	Periappendiceal fatty oval lesion with hyperattenuating rim and central linear hyperattenuation	Surgically and pathologically confirmed

F = female; M = male; RLQ = right lower quadrant; WBC = white blood cells; CRP = C-reactive protein; ESR = erythrocyte sedimentation rate.

one patient as 1.3 cm, which is similar to that of our patient, which was measured as 1.5 cm. The location of the lesion was provided in 5 cases, including our case. The most common location of the inflamed appendage was near the tip of the vermiform appendix, in 3 cases. In two cases, the locations of the lesions were the proximal appendix the junction of the middle and distal one-third of the appendix.

The imaging features of acute EA have been well described in CT examinations, that is the most common modality applied for initial diagnosis of acute abdominal pain. The common CT appearance of EA is a fat attenuating pericolic oval lesion with a hyperattenuating rim. A high attenuated central dot, an irregular or a linear focus, may also be present and correspond to thrombosed or engorged central vessels, or central areas of hemorrhage or fibrosis. Wall thickening of the adjacent colon may be present but it is most often normal in thickness [1]. Other findings include localized edema, which is often manifested as streaky fluid attenuation around the appendage that is the source of the image description of "fat stranding", and visibility of the appendage serosa either due to fluid or vascular engorgement [6]. There is little difference in radiologic findings between epiploic appendagitis of the vermiform appendix and that of the colon. The only difference is that lesions of the vermiform appendix are relatively smaller (1.3 to 1.5 cm) than those on the serosal surface of the colon (2 to 4 cm) [1]. In our case, a 1.5-cm fatty, oval lesion was seen adjacent to the tip portion of the vermiform appendix with a hyperattenuating rim and central linear high attenuation (**Figure 1(a)**, **Figure 1(b)**).

Representative differential diagnoses of EA are acute appendicitis and acute appendiceal diverticulitis. Unlike acute appendicitis, the appendix is normal in

caliber, wall enhancement, and thickness, but there can be infiltration of the periappendiceal fat observed on CT due to secondary inflammation [7]. In appendiceal diverticulitis, the typical CT findings include the presence of a round, outpouching lesion beyond the margin of the appendix with prominent enhancement of the diverticulum wall and surrounding fat stranding [1].

EA is generally a self-limited disease, with patients spontaneously recovering within 7 to 30 days. Conservative management with oral anti-inflammatory medication is currently considered the standard management, once an accurate radiological diagnosis has been established [8]. Antibiotics or surgical treatments are rarely warranted and surgical intervention is used only for complications such as inflammation-induced adhesions, secondary abscess, or intestinal occlusions [9] [10]. But in our case, laparoscopic appendectomy was performed by the surgeon, prior to confirmation by CT.

EAA is often misdiagnosed because clinical symptoms are nonspecific and similar to those of other diseases that induce right lower quadrant pain, such as acute appendicitis or diverticulitis, including abdominal pain, nausea, and vomiting. However, if radiologists are familiar with the characteristic radiologic findings of EAA, it is possible to avoid unnecessary surgery, such as negative appendectomy.

We present the first case of EAA in which a typical radiologic image was confirmed by the pathologic findings.

Financial Disclosure

No funding support or grant was received for this study.

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Abbreviations

APCT	abdominopelvic computed tomography
CT	computed tomography
EA	epiploic appendagitis
EAA	epiploic appendagitis of the vermiform appendix
WBC	white blood cells
CRP	C-reactive protein
ESR	erythrocyte sedimentation rate
RLQ	right lower quadrant