

Primary epiploic appendagitis CT manifestations

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Abstract

Inflammation of an epiploic appendage is considered to be a rare cause of acute abdomen. Recently, it has been reported that typical computed tomography (CT) findings of primary epiploic appendagitis (PEA) provide a definitive diagnosis in most of the cases. However, since these papers are only few, they are easily overlooked by the practicing radiologists. Our purpose is to add four new cases to the existing literature and to perform a review of the literature. © 2001 Elsevier Science Inc. All rights reserved.

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1. Introduction

The appendages epiploicae are small, fat-containing sacs of peritoneum that are arranged along the serosal surface of the colon in a double fashion. The average number of epiploic appendages, which measure from 0.5 to 5 cm in length [1], is about 100 in an adult human being and mostly encountered in the transverse and sigmoidal segments [2,3].

Primary epiploic appendagitis (PEA) is the inflammatory response of an appendage to infarction caused by torsion or spontaneous venous thrombosis [4]. PEA is a relatively infrequent pathologic process among the many acute abdominal conditions [1,3]. However, it probably occurs more commonly, but is not correctly diagnosed and treated in most of the cases [1,3]. Historically, diagnosis could only be made by laparotomies with clinical misdiagnosis of diverticulitis or appendicitis [1,2]. Recently, it has been stated that pathognomonic computed

tomography (CT) features of PEA may provide a definitive CT diagnosis [4]; thus, unnecessary surgical interventions can be avoided.

The purpose of this study is to describe the CT appearance of four cases of PEA and review the literature.

2. Materials and methods

All the patients were referred from the emergency departments of our hospitals and were examined with helical CT (SX Power and Sytec SRI, GE Medical Systems, Milwaukee, WI). Oral and intravenous contrast agents were administered. Oral contrast solution 30 cm³/1500 cm³ megluminamidotrizoat (Urovisit Angiografın, Schering, Germany) were drunk by the patients during 2 hours prior to the CT examination. Iopamidol 76%, 1.5 cm³/kg (Iopamiro 370, Bracco), was administered intravenously with an injection rate of 2.5 cm³/s. The scan delay time between the beginning of CT examination and the start of bolus intravenous infusion was 50 s.

CT scans were performed with spiral technique by 10 mm slice thickness/10 mm table feed (pitch 1:1) and reconstruction with 8-mm-interval standard algorithm. Area of interest is then re-examined by 5 mm slice thickness/8

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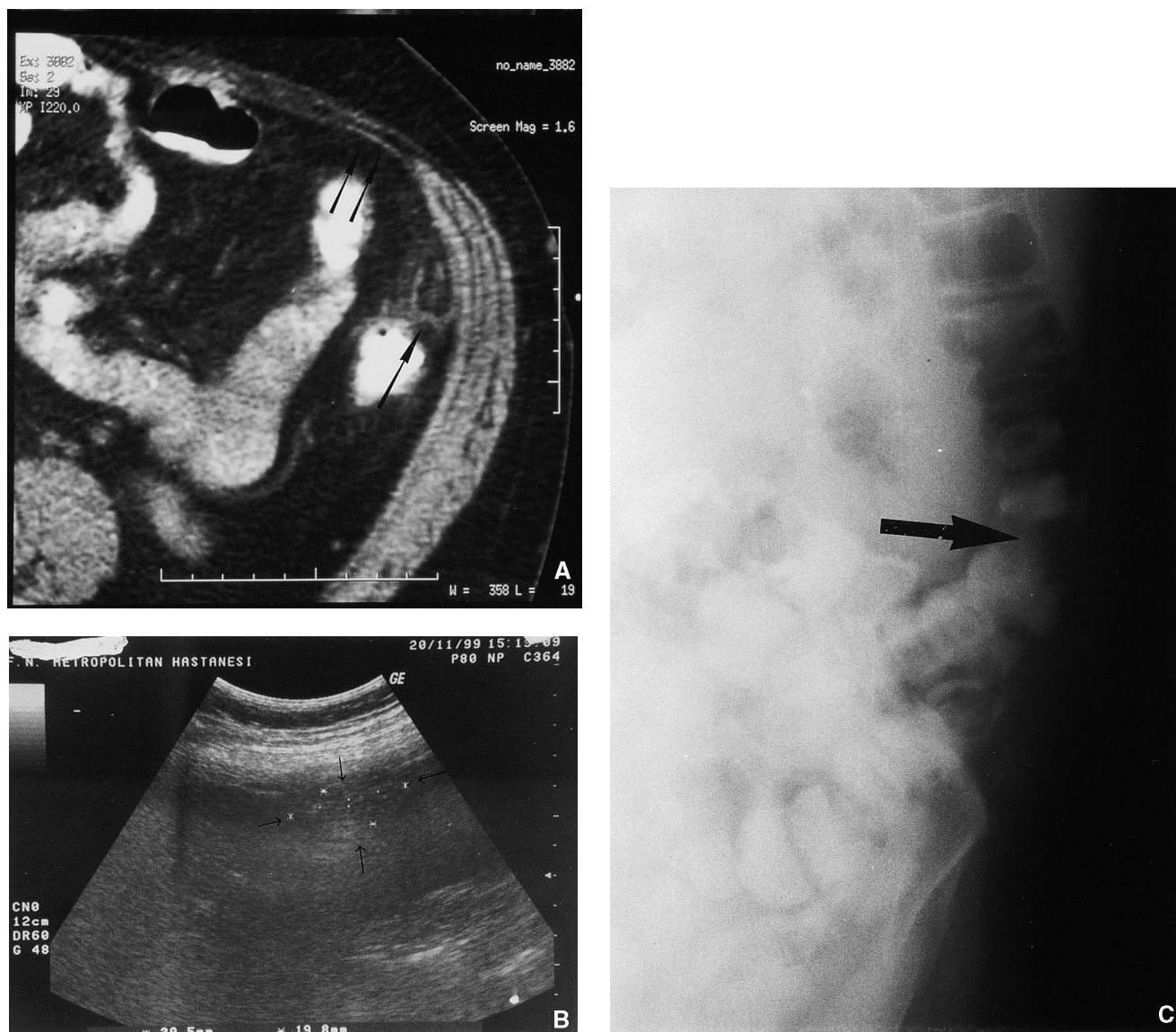


Fig. 4. (A) CT scan shows the fat-containing mass with a central hyperdense band (arrow) and periappendageal fat-stranding. Parietal peritoneum is thickened (double arrow). (B) US section at the point of maximum tenderness shows an echogenic mass (arrow) surrounded by a hypoechoic halo just beneath the abdominal wall. (C) Plain film obtained after CT examination. Extrinsic compression is seen on the lateral wall of descending colon (arrow).

were obtained. The other two, with the correct CT diagnosis of PEA, were treated conservatively and a follow-up CT scan was performed 2 weeks later in one patient.

3. Results

CT scans revealed pericolonic oval-shaped fat density (from -65 to -47 HU) lesions located anterolateral to the left colon with a thickened visceral peritoneal rim (Figs. 1, 2, 3A and 4A). Comparing with uninvolved mesenteric fat, lesion density was higher but still within fat density limits. Three of the cases showed local parietal peritoneal thickening. Lesions varied from 3 to 3.5 cm in size. Lesion size of

the patient who underwent a follow-up CT scan decreased (Fig. 3A and C). Adjacent colonic (sigmoid) wall thickening was observed in one patient (Fig. 2). Pericolonic fat-stranding was seen in all of the patients.

US findings were also typical in a single patient in whom US examination was performed. A hyperechoic oval mass was detected just beneath the anterolateral abdominal wall at the point of maximum tenderness. The mass showed a hypoechoic peripheral rim (Fig. 4B). These findings were consistent with the study of the series of seven cases of Molla et al. [1].

Pathological reports of the two patients that underwent laparotomy were acute and chronic inflammation with fat necrosis in both and septal fibrosis in one.

4. Discussion

Appendages epiploicae, round, lobulated or elongated subserosal fat pads that are located along the anterior and posterolateral walls of the colon [5] have no definitely known function but sometimes, surgeons may use them to protect a suture line or close a perforation [6]. Some authors also believe that they may act as a protective cushion during peristalsis or as a depot of blood when the colon and its intramural vessels are contracted [5]. Prominence of epiploic appendages in obese people, especially in those who have recently lost weight, has led to the idea that they may serve as fat deposits [2]. Some investigators suggested that epiploic appendages have a role of vascular reservoir, without obliteration of their lumens, when the bowel is distended [7].

Epiploic appendagitis is primary or secondary inflammation of epiploic appendages. PEA, which is the subject of this study, is the result of torsion with subsequent ischemia [1,7,8] or is due to spontaneous venous thrombosis without torsion [1,7]. Secondary epiploic appendagitis is the inflammation of the epiploic appendages caused by nearby pathological processes, such as diverticulitis, appendicitis (vermiform), or cholecystitis [1,9].

Patients are typically obese people in the second to fifth decades of life complaining of motion-aggravated abdominal pain [3,8]. Depending on the location of the inflammatory process, the location of the pain varies but is mostly in the left or right lower quadrant [1–3]. Left lower quadrant pain is the more commonly encountered localization [1,5,9]. Patients do not seem to be seriously ill like other patients suffering from more common and more severe causes of acute abdomen [3]. Although loss of appetite is seldom seen, it can sometimes occur even with nausea and vomiting [3]. White blood cell count is normal or slightly elevated in most of the cases [1,6,9]. Physical examination shows localized tenderness and some guarding, but no rigidity [3]. Symptoms usually subside within less than 1 week duration [1,3,9]. This entity is a self-limiting process with spontaneous resolution [4] and conservative (analgesics) treatment is sufficient [1,4,7]. Pain of longer than 1 month duration is reported in the literature with one patient complaining of pain recurrence during a 4-year period [8]. One of our patients presented with a second pain attack which was identical with the previous episode 5 weeks before. First episode was misdiagnosed as renal colic, but was successfully treated with conservative measures.

Early case reports describing the CT manifestations of PEA stated that the CT findings were not specific, but should be kept in mind in the differential diagnosis of more often causes of acute abdomen [6,10]. However, recent articles regarding PEA suggested that the CT findings of this entity are so characteristic that they enable its definitive diagnosis, thus avoiding unnecessary surgical operations [1]. Despite the surgical reports [8] which offer surgical

Table 1

	Number of patients	Parietal peritoneal thickening	Adjacent bowel compression	Adjacent wall thickening	Central dot
Christine et al.	1	?	?	?	?
Torres et al.	2	?	?	?	?
Rioux and Langis	14	13	10	?	3
Danielson et al.	1	?	?	?	?
Molla et al.	7	4	?	?	4
Rao et al.	10	7	2	4	2
Total	35	24/31	12/24	4/10	9/31
Our patients	4	3	2	1	2
Total	39	27/35	14/28	5/14	11/35
Percentage		77%	50%	36%	31%

ligation and removal for the optimal treatment of PEA, conservative approach with only analgesics is the currently accepted method [9].

Literature survey revealed a total of 35 cases of PEA with description of CT manifestations [1,4–6,9–11]. CT findings of these 35 and our four cases are listed in Table 1. Pericolonic fat density oval-shaped lesions (representing the inflamed appendage) with a rim of soft tissue density (representing the thickened visceral peritoneal lining) associated with periappendageal fat stranding [9,11] are the major characteristics of PEA and were detected in all of our four patients. Central high-density dot or linear hyperdensity in the center of the mass, adjacent colonic wall thickening, nearby parietal peritoneal thickening, and adjacent bowel compression are other associated findings that are typical of PEA [11]. Central high-density dot was seen in none of our cases; however, central linear hyperdensity, which probably is an identical finding as central dot depending on the plane of the acquired CT slice, was detected in two of our patients (Figs. 3B, 4A). This sign may correspond to the histopathological finding of septal fibrosis which was detected in one of our surgically confirmed cases. Nearby parietal peritoneal thickening, which was seen in 24/31 (77%) of patients in the literature, was detected in three of our patients. Adjacent colonic wall thickening, which was seen in four of 10 patients in the series of Rao et al. [11], was detected in only one of our cases (Fig. 2). Mass effect on the adjacent bowel, which is also a typical CT sign of PEA, was reported to occur in 12 of the series of 24 patients of Rioux and Langis [9] and Rao et al. [11]. We detected this finding in two of our patients (Figs. 2, 4C).

Only a few pathological processes are likely to be confused with PEA according to the CT findings. These are simply omental infarction and secondary epiploic appendagitis. Infarction of the greater omentum may present with identical clinical signs of PEA of the transverse colon. However, considerably larger size (3–15 cm in diameter) of omental infarction and lack of peripheral thickened visceral peritoneum [11,12] aid in the differential diagnosis. In addition, infarction of the omentum is localized medial to the colon unlike PEA which is located anterolaterally [1]. Secondary epiploic appendagitis (e.g., due to diverticulitis) presents with findings of

luminal narrowing, diverticula, pericolonic fluid, air bubbles, phlegmon, and/or abscess formation which are diagnostic for the original disease [9,11].

On follow-up CT scan of one of the patients who were treated conservatively, the lesion size was reduced from 29×20 to 21×13 mm². Lesion attenuation was decreased compared with the initial scan. On the follow-up CT examination, surrounding fat-stranding has cleared with marked regression in visceral peritoneal thickening (Fig. 3A and C). These results are consistent with the findings of Rao et al. [11] in their investigation regarding the evolution of the CT appearance of PEA.

5. Conclusion

Though not as rare as once thought, PEA is an uncommon condition that should be kept in mind during the CT evaluation of acute abdomen patients. Because there are only a few articles about the pathognomonic CT features of PEA, they are often overlooked among practicing radiologists. In this paper, we present four patients of PEA, two of which were diagnosed with surgical operations, and this experience led to the correct CT diagnosis of the other two cases.

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