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Inflammatory pseudotumor of the omentum in contrast-enhanced ultrasound

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Abstract

Aim of the study: Inflammatory pseudotumor is a rare benign tumor that can occur at various body sites. Due to its rare occurrence and histological variety radiological data is heterogeneous and limited. **Case description:** We present a case of a 71-year-old man with inflammatory pseudotumor of the omentum. Contrast-enhanced ultrasound perfusion pattern showed homogeneous, isoechoic enhancement in the arterial phase with a washout phenomenon in the parenchymal phase, mimicking a peritoneal carcinomatosis. **Conclusions:** Inflammatory pseudotumor represents a rare, but important benign differential diagnostic option when considering a malignant disorder. Contrast-enhanced ultrasound is helpful in identifying vital tissue for a targeted biopsy for subsequent histological examination that is essential for the exclusion of malignancy.

Introduction

The term “inflammatory pseudotumor” (IPT) includes a variety of rare neoplastic and reactive lesions that share a similar histological appearance. IPT embraces inflammatory myofibroblastic tumor (IMT), pseudosarcomatous myofibroblastic proliferations of the bladder (PMP), postinfectious lesions, and IPT of the lymphatic tissue of the orbit. Histologically, it is characterized by myofibroblastic cell proliferation and mixed inflammation cells⁽¹⁾. Due to its rarity the knowledge of diagnostic and therapeutic procedures in IPT is limited. Radiographic descriptions, based on case reports and small sample studies, are both nonspecific and heterogeneous⁽²⁾. The therapeutic concepts vary from conservative approaches to immunosuppressive therapy and surgery⁽³⁾. Despite the above considerations, IPT represents an important benign differential diagnostic option when considering a malignant disorder. This case report describes the contrast-enhanced ultrasound (CEUS) pattern in IPT of the omentum.

Case report

A 71-year-old male patient was admitted to the hospital with right upper quadrant abdominal pain for three days. There were no other symptoms including nausea, vomiting, change in bowel habits, night sweats, fever or weight loss.

The patient had a history of coronary heart disease, type 2 diabetes mellitus with diabetic foot syndrome, obesity (body mass index 30.4 kg/m², 104 kg) and nicotine consumption (40 pack-years). A cholecystectomy was performed three years previously.

The physical examination revealed normal vital parameters and normal body temperature. No abnormalities were identified apart from right-sided subcostal pain on palpation.

The blood tests were normal except for an elevated CRP level – 88 mg/l (normal <5 mg/l) and slightly elevated bilirubin – 1.44 mg/dl

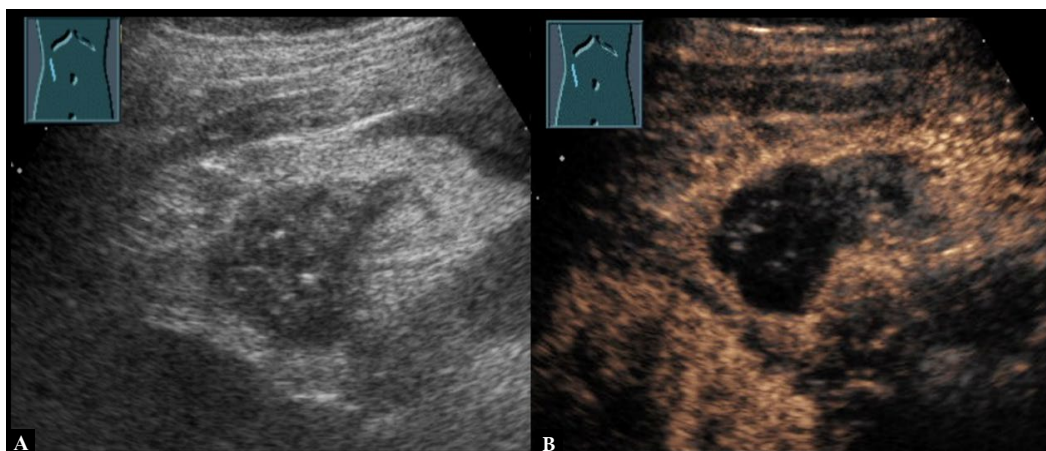


Fig. 1. Hypoechoic lesion on B-mode US in the right upper lateral quadrant with imbibition of the surrounding fat tissue (A) and without enhancement in contrast-enhanced ultrasound (CEUS) (B)

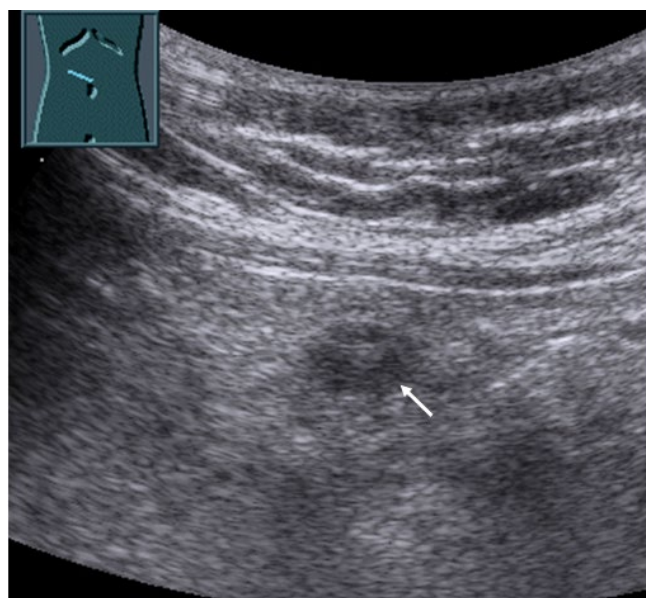


Fig. 2. Hypoechoic lesion in the lesser omentum, measuring 1 cm, on B-mode US

(0.1–1.2 mg/dl). Blood cultures remained negative. A chest X-ray and urine sample showed no signs indicative of an inflammatory focus.

B-mode ultrasound (US) examination revealed a subhepatic retroperitoneal, hypoechoic, inhomogeneous lesion, measuring 3.5 × 4.0 cm, with imbibition of the surrounding omental tissue, and without contact with the liver, right kidney or ascending colon (Fig. 1A). On CEUS, the lesion was not vascularized and hence consistent with an abscess (Fig. 1B). The lesion was biopsied under sonographic guidance, and 50 ml of pus was removed. The microbiological results revealed *Enterobacter cloacae* and *Klebsiella pneumoniae*. In the follow-up, repetitive abscess punctures as well as intravenous antibiotic treatment were necessary for healing. In the context of treatment, the pain resolved and the CRP level normalized.

Furthermore, a 1 cm small hypoechoic lesion was seen in the thickened and hyperechoic lesser omentum by sonography (Fig. 2). The lesion showed homogeneous and isoechoic enhancement in the arterial phase (Fig. 3A) and a washout phenomenon in the parenchymal phase (Fig. 3B) in CEUS. Based on the findings, peritoneal carcinomatosis was suspected. An ultrasound-guided core needle biopsy was recommended.

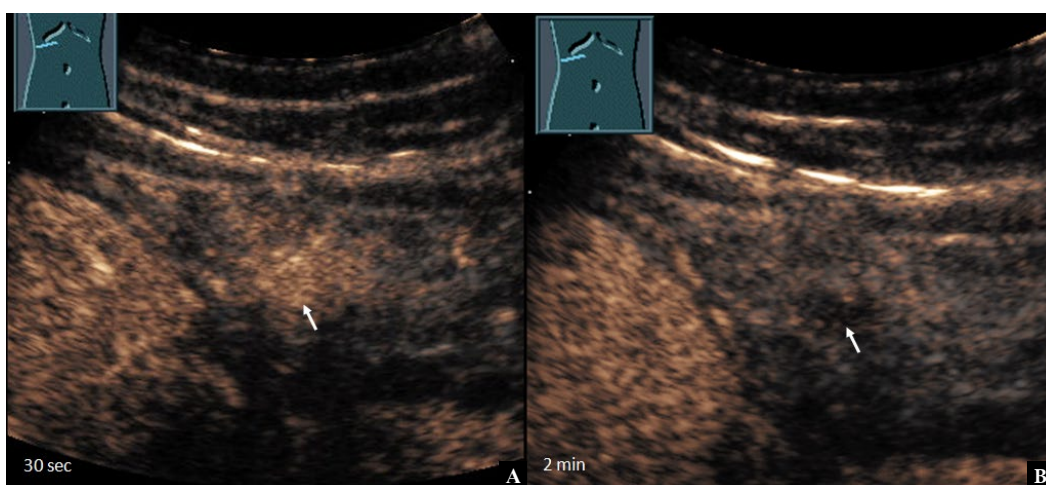


Fig. 3. In CEUS, the lesion (arrow) shows isoechoic enhancement in the arterial phase compared to the liver (A) – with a washout phenomenon (arrow) after two minutes (B)

For further clarification of the omental lesion and the cause of the abscess, a CT of the abdomen (Fig. 4) and a colonoscopy were carried out, without revealing any other abdominal pathology. The histology of the omental lesion demonstrated connective and fatty tissue of the omentum with a dense infiltrate of plasma cells and macrophages, sharply demarcated by a fibrotic rim. Single eosinophils were intermingled, and residues of hemorrhage were evident. The morphological pattern was consistent with the diagnosis of inflammatory pseudotumor (IPT). An IgG4-associated pathogenesis was excluded immunohistochemically, and a myofibroblastic component was not evident.

Discussion

IPT is an unusual entity, and thus difficult to identify in the differential diagnosis. In the past, a broad spectrum of synonyms was used to describe this benign tumor entity, mimicking malignancies. Two main types can be distinguished: inflammatory myofibroblastic tumors (IMT), occurring predominantly in children and younger adults, and distinguishable from other not precisely defined inflammatory pseudotumors, which are more often seen in middle-aged or older adults⁽⁴⁾. The etiology of IPT is unknown. One theory suggests an inflammatory reaction to an infection, trauma or autoimmune disease. Consequently, different agents have been linked to the development of IPT. The possibility of low-grade sarcoma has been discussed by some authors as well⁽¹⁾. In the patient reported here, *Enterobacter cloacae* and *Klebsiella pneumonia* were isolated from the abscess, which could have been the trigger for IPT formation⁽⁵⁾. The etiology of the abscess remained unclear after diagnosis. Local infection of the kidney or intestine could not be demonstrated. Metabolic syndrome is known to contribute to an immunosuppressive and hypoxic environment on the cellular level, and thus promotes abscess formation. The hematogenous origin could not be ruled out despite a negative blood culture.

In B-mode-ultrasound and CEUS, IPT of the liver has been the main subject of study^(6,7).

In the present case, it was particularly important to exclude another abscess within the omental tissue. CEUS showed marked homogeneous enhancement in the arterial phase and a washout phenomenon in the parenchymal phase, indicating a vital perfused tumor lesion and excluding an abscess. Hence, peritoneal carcinomatosis is an important differential diagnostic option, as it is characterized by a similar perfusion pattern⁽⁸⁾. In this study, CEUS showed marked enhancement (arterial phase) with consecutive hypoechoic enhance-

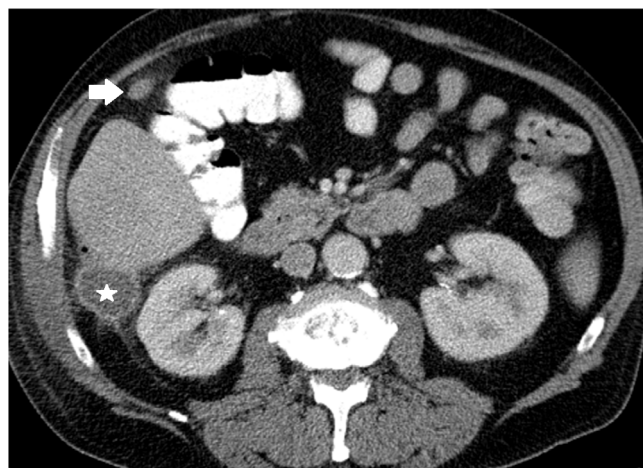


Fig. 4. Transverse CT scan of the abdomen visualizes the location of the IPT (arrow) and abscess formation between the liver and the kidney (asterisk) (courtesy of Prof. Dr. A. Mahnken, Department of Diagnostic and Interventional Radiology at Marburg University Hospital)

ment (parenchymatous phase). This is the pattern seen in approximately 85% of malignant omental lesions. In this situation, malignancy was excluded by ultrasound-guided needle biopsy. If there had been no enhancement of the omental lesion, the differential diagnosis of acute epiploic appendicitis should have been considered⁽⁹⁾.

Therefore, IPT is a rare differential diagnosis of peritoneal carcinomatosis in the work-up of omental lesions. CEUS is helpful in identifying vital tissue for a targeted biopsy for subsequent histological examination that is essential for the exclusion of malignancy.

Conflict of interest

The authors do not report any financial or personal connections with other persons or organizations which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

Author contributions

Original concept of study: CG. Writing of manuscript: HF, ESZ. Analysis and interpretation of data: HF, ESZ, CG. Collection, recording and/or compilation of data: CW, CG. Critical review of manuscript: CFD, CT, AA, ESZ, CG.

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