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ScienceDirect
Journal of the Chinese Medical Association 74 (2011) 44–47
www.jcma-online.com

Case Report

Imaging findings of primary urachal actinomycosis

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Received 8 April 2010; accepted 8 June 2010

Abstract

Primary actinomycosis in urachal remnant is documented rarely in the English literature. The disease is usually misdiagnosed as urachal carcinoma because of its infiltrating and enhancing natures. We illustrate a case of urachal actinomycosis with ultrasound, computed tomography, and magnetic resonance images. The clinical, radiological, and pathological findings are reviewed. Some imaging findings may help us to differentiate an inflammatory process from malignancy.

Keywords: Actinomycosis; Computed tomography; Magnetic resonance imaging; Ultrasonography; Urachus

1. Introduction

Primary actinomycosis in urachal remnant is documented rarely in the English literature.[1] It is usually mistaken for urachal malignancy. Many patients undergo resection before the diagnosis has been established. We report a case of primary actinomycosis mimicking urachal malignancy treated by surgical excision.

2. Case report

A 57-year-old male without medical and operative history was admitted because of a palpable mass in his lower abdomen for 2 months. He denied fever, nausea/vomiting, body weight loss, and loss of appetite. The physical examination found an about 10-cm, tender, firm mass in the periumbilical region. Laboratory studies on admission revealed leukocytosis (white blood cell count 10,290/L). Abdominal ultrasonography disclosed an echo-complex mass lesion, about 8×5 cm in size, in the left lower quadrant near the periumbilical region. Abdominal computed tomography (CT) disclosed an infiltrative and enhancing soft tissue mass at the midline of the lower abdomen with streaks of fat inclusion in the mass. The tissue plane between the mass and abdominal wall was not clear, which was suggestive of the aggressive nature of the mass (Fig. 1). Magnetic resonance imaging (MRI) revealed a mass with intermediate intensity and focal areas of hypointensity within it on LAVA sequence (General Electric (GE), Milwaukee, WI, USA product name: LAVA, which stands for liver acquisition with volume acceleration and has a characteristic of superb fat suppression), and heterogeneous intensities on T2-weighted images. On T2 fat-suppression series, some hyperintensities were noted peri- and intralesionally, which was suggestive of either fluid collection or hematoma. Comparing non–fat suppression and fat-suppression images, streaks of fat inclusion could be identified and confirmed in the mass. After gadolinium diethylenetriamine penta-acetic acid administration (Gd DTPA), the images showed an irregular mass that infiltrated the left rectus abdominis muscle and demonstrated enhancement. It ranged from the umbilicus to the urinary bladder dome, which was compatible with a urachal origin (Fig. 2). No lymphadenopathy could be identified in these studies.

This patient received *en bloc* resection of the urachal mass afterward, and an irregular mass with abscess at urachal remnant

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1726-4901/$ - see front matter
doi:10.1016/j.jcma.2011.01.007

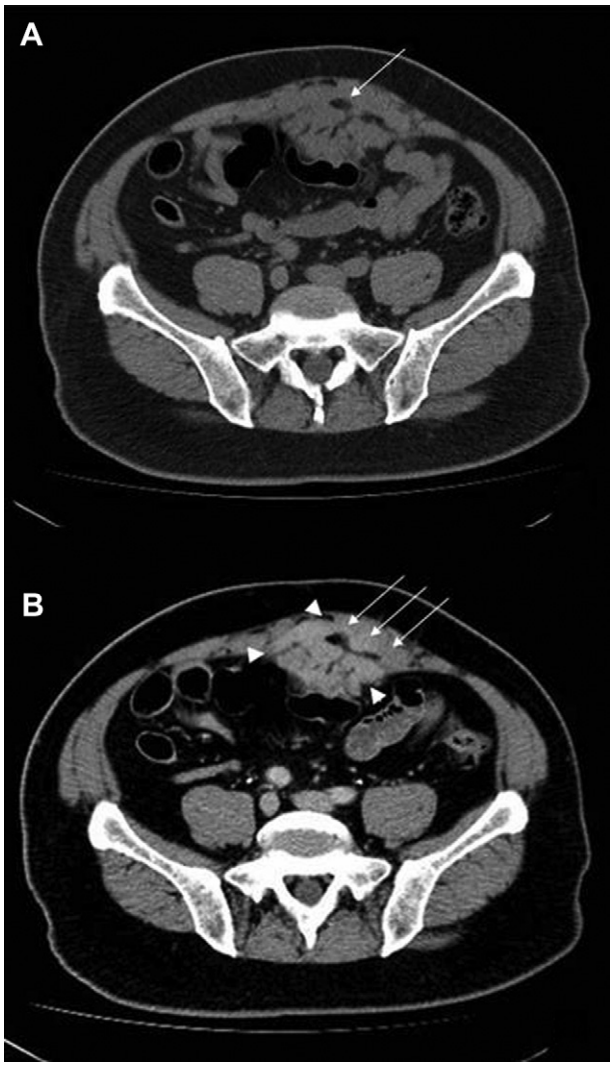

Fig. 1. (A) Noncontrast CT in axial view reveals a mass with fat inclusion (−90 HU, arrow) and no calcification at the midline of the lower abdomen. (B) Contrast-enhanced CT in axial view shows an ill-defined heterogeneously enhancing mass (arrowhead) at the midline of the lower abdomen. The tissue plane between the mass and the rectus abdominis muscle is not clear (arrow), which is suggestive of abdominal wall invasion. CT = computed tomography.

site was noted. The mass was adhesively surrounded by greater omentum and adhered to the sigmoid colon. Pathology examination showed typically actinomycotic colonies with suppurative inflammation, abscess formation, and granulation tissue, compatible with actinomycosis. There was no evidence of malignancy in the examined sections (Fig. 3). The patient was discharged 2 weeks later and took long-term antibiotics for infection control. The antibiotics treatment plan was amoxicillin and clavulanate for 1 month and amoxicillin for 5 months. The follow-up abdominal CT 4 months later disclosed no recurrence of actinomycosis.

3. Discussion

Actinomycosis is a chronic granulomatous infection caused by filamentous, gram-positive, non–acid fast, and anaerobic-to-microaerophilic bacteria. The predominant form in human disease is *Actinomyces israelli.* Clinical actinomycosis includes cervicofacial (60%), thoracic (15%), and abdominal/pelvic (25%) actinomycosis.[2] Abdominopelvic actinomycosis is characterized by a chronic, indolent course with nonspecific symptoms, such as fatigue, fever, weight loss, and abdominal pain. Physical findings may include a palpable mass, visible sinus tracts, or fistulas. Laboratory abnormalities may show anemia and leukocytosis. Actinomycosis is difficult to diagnose preoperatively by virtue of its rarity, nonspecific symptoms, and imitation of more common conditions, such as malignancy, Crohn's disease, and tuberculosis. It has been estimated that fewer than 10% of cases are diagnosed preoperatively.[2]

Although imaging studies cannot make definite diagnosis, they are useful in localizing the lesion, verifying the extent of disease, and posttreatment follow-up. Radiological findings in most common site, including cervicofacial,[3] thoracic,[4] and abdominal/pelvic regions[5] share resembling characteristics. Ultrasonography drew little attention in the literature and is not specific because it underestimates the adjacent inflammatory reaction and the obliteration of tissue planes.[6] CT and MRI have multiplanar capacity and thus are able to determine exact location and extent of the lesion. In contrast to MRI, CT is more accessible and has a better quality/cost ratio in radiological diagnosis. CT findings of abdominopelvic actinomycosis revealed solid mass (pseudotumor) with focal low-attenuation areas or cystic lesions and infiltrative nature and dense contrast enhancement in the walls or solid components of the masses. These findings reflect the histological features of actinomycosis: central suppurative necrosis surrounded by granulation tissue and intense fibrosis. The infiltrative nature of actinomycosis results from proteolytic enzyme produced by *A. israelli*. In addition to its infiltrative nature, this proliferative pseudotumor pattern is often misinterpreted as evidence of malignant disease.[5]

The MRI features are mentioned in few reports. In early stages of the infection, MRI might disclose a well-demarcated mass presenting with hypointensity on T1-weighted images and hyperintensity on T2-weighted images, and these are common findings for either an abscess or tumor necrosis. In chronic stage, T1- and T2-weighted magnetic resonance images show an infiltrative mass with an intermediate signal intensity and moderate contrast enhancement. This characteristic signal intensity may be associated with the histological features of abundant granulation and fibrotic tissue in actinomycosis,[3] which might explain why our case presented with a marked contrast enhancement, which is another imaging feature.[7]

Urachal carcinoma predominantly manifests as adenocarcinoma (90% of cases). On CT, it may be solid, cystic, or a combination of the two. Low-attenuation components reflecting mucin content are seen in 60% of cases, and 50%–70% of cases have calcification, which may be punctate, stippled, curvilinear, or peripheral.[8] The presence of hematuria, mural nodularity, and calcification, along with a lack of adjacent inflammatory change, can be helpful for differentiating between infection and tumor in some cases.[8]