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Case Report

Erdheim-Chester disease presenting with cough, abdominal pain, and headache ☆

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ABSTRACT

Erdheim-Chester disease (ECD) is a rare non-Langerhans cell histiocytic disorder. The diagnosis was based on the relationship between radiologic findings, clinical manifestations, and pathologic features of the bone biopsy. We report a case of ECD with unusual presenting symptoms: a 56 year-old man presented with cough, abdominal pain, and recurrent episodes of headache associated without any seizures. Peculiar computer tomography (CT) findings were key for the diagnostic suspicion. Bone biopsy and other radiological investigations confirmed the diagnosis. CT findings can help raise the suspicion of ECD. CT is easy to perform and widely available in comparison with kinetic cardiac magnetic resonance imaging and nuclear imaging. Therefore, CT findings of ECD can reduce the therapeutic delay between diagnosis and therapy prescription.

Introduction

Erdheim-Chester disease (ECD) is a rare non-Langerhans cell histiocytic disorder, classified as macrophage-dendritic cell neoplasm by WHO [1]. The etiology is unknown; it occurs more frequently in adults, from the fifth to the 7 decade of life [2–6]. Typical histopathologic finding is the accumulation of foamy histiocytes in the tissues, associated with a concomitant inflammation and fibrosis [2].

Long bones are mainly affected with cortical osteosclerosis in more than 95% of ECD patients [6–9]. However, ECD can

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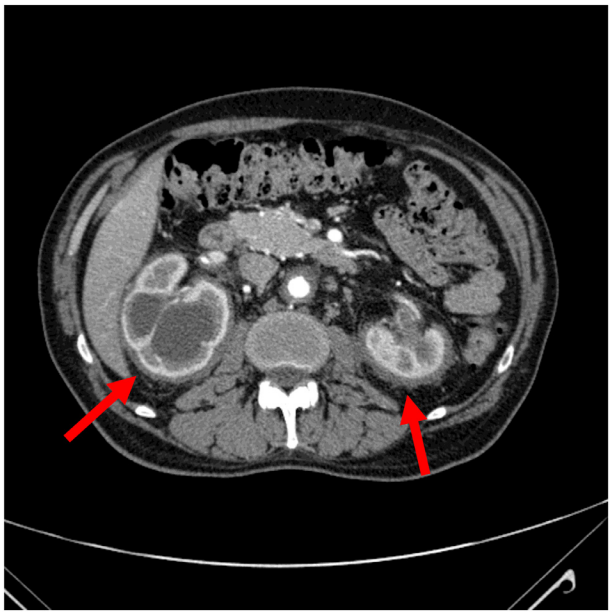

Fig. 1 – Axial contrast enhanced CT scan showed ureters and renal involvement (red arrows). CT, computer tomography. (Color version is available online.)

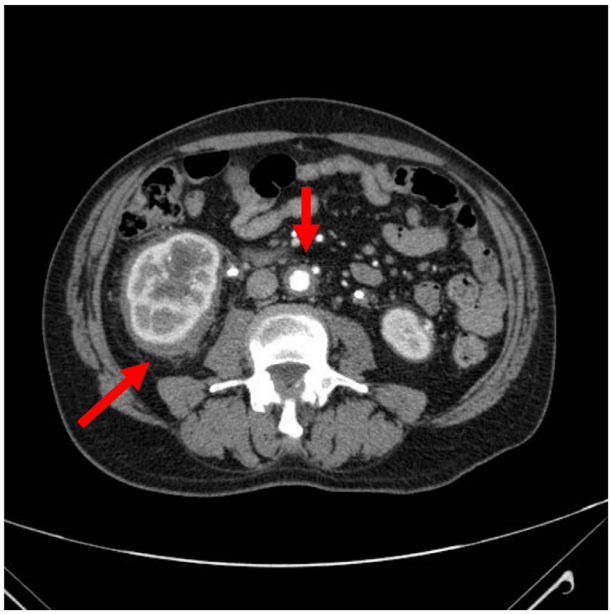

Fig. 2 – Axial contrast enhanced CT scan revealed soft tissue surrounding the aorta artery and the "hairy kidney" appearance (red arrows). CT, computer tomography. (Color version is available online.)

show a multiorgan involvement and, then, a heterogeneous clinical presentation [1–4]: a worse prognosis seems to be associated with the central nervous system (CNS) involvement [8]. Lungs, skin, heart, large vessels, and kidneys can show pathological signs [7–12].

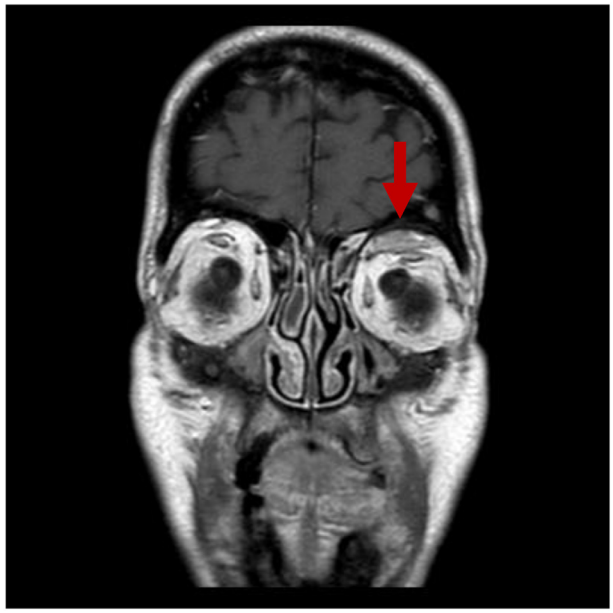

Fig. 3 – Coronal T1-W post contrast (gadolinium) MRI imaging showed a superior extraconal lesion characterized by soft-tissue within the left orbital cavity (red arrow). MRI, magnetic resonance imaging. (Color version is available online.)

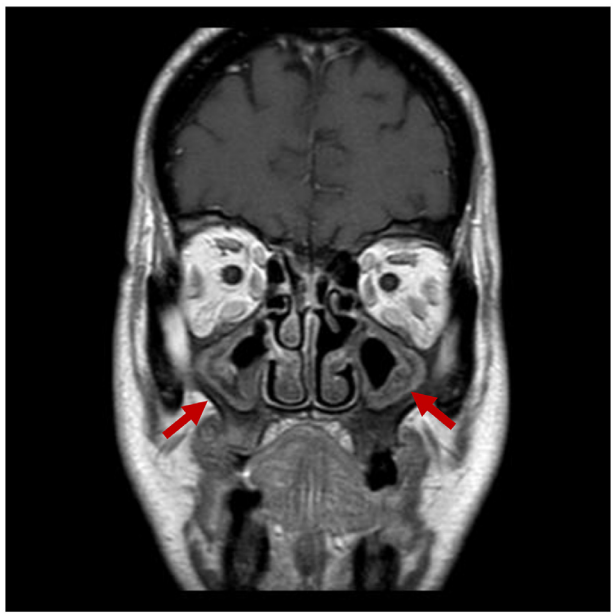

Fig. 4 – Coronal T1-W postcontrast (gadolinium) MRI imaging revealed abnormal mucosal thickening of both maxillary sinuses (red arrows). MRI, magnetic resonance imaging. (Color version is available online.)

The diagnosis is challenging following its rare incidence and the multiorgan involvement. However, some peculiar radiological findings can help diagnose the disease: Computed Tomography (CT) can showcase a retroperitoneal space infiltration ("hairy kidney") and a circumferential infiltration of the thoracic or abdominal aorta (coated aorta) [7,9].

The diagnosis is based on the relationship between radiologic findings, clinical manifestations, and pathologic features found in the bone biopsy [8,12–15].

Several radiological investigations are often required before performing bone biopsy, which can confirm the diagnosis [8,13]. However, recognition can be challenging due to findings such as reactive or neoplastic histiocytic lesions similar to ECD. We report a case of ECD with unusual presenting symptoms in order to increase the awareness of this rare disease.

Case report

A 56 year-old man presented in the emergency room with cough, abdominal pain, and recurrent episodes of headache, without any seizures. These symptoms were appeared from 6 months. The patient was clinically evaluated: a whole-body CT scan was performed to rule out an occult malignancy. It showed soft tissue surrounding the aorta artery (coated aorta) from the arch to the iliac bifurcation. An abnormal thickening was observed around the ureters and kidneys (Fig. 1). The renal involvement displayed in this image (Fig. 2) shows a pathognomonic perirenal space infiltration ("hairy kidney"). Subpleural and interlobular septa thickening was found in the inferior lobe of the left lung.

Magnetic resonance imaging (MRI) of the brain was performed to assess the origin of the recurrent episodes of headache. It showed a superior extraconal lesion characterized by soft-tissue within the left orbital cavity (Fig. 3). Furthermore, abnormal mucosal thickening of both maxillary sinuses was detected (Fig. 4). Although CT and MRI findings were suggestive for ECD, a kinetic cardiac MRI was performed to confirm the abovementioned clinical suspicion.

MRI showed hyperintense tissue surrounding the right atrium and the superior vena cava. This tissue accumulation involved the right atrioventricular groove encircling the right coronary artery. Biventricular systolic function was preserved without any alterations of global and segmental kinesis (ventricle left and right ejection fraction were 73% and 68%, respectively) (Fig. 5). Furthermore, pericardial effusion was detected. The patients showed an asymptomatic bone involvement. However, following the suspicion of ECD, X-rays of lower limbs was performed: sclerotic lesion in right femur was found (Fig. 6). 99mTc scintigraphy confirmed an increased uptake of tracer in the same anatomical area. Bone biopsy was performed and the lesion was sampled from the maxillary bone (ie, the anatomical site mainly impaired). The histology confirmed the diagnostic suspicion: it revealed an infiltration that was CD163, p16 positive and negative for CD1a and S100. Once the diagnosis of ECD was confirmed and because of its aggressive nature mainly related to CNS and heart involvement, pegylated IFN-α was admistered.

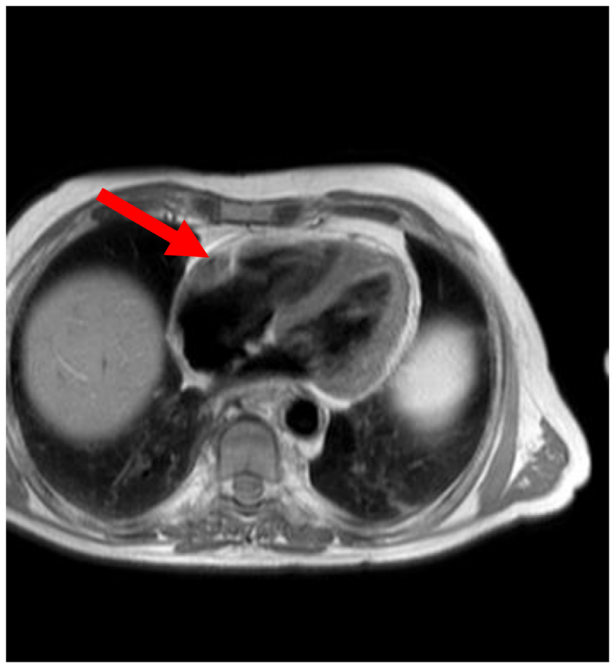

Fig. 5 – Black blood T2-W MRI imaging showed hypointense tissue surrounding the right atrium (red arrow). MRI, magnetic resonance imaging. (Color version is available online.)

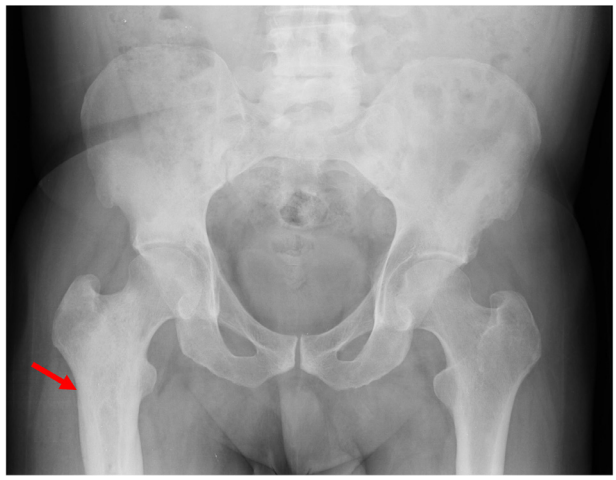

Fig. 6 – X-rays (anteroposterior projection) showed sclerotic lesion in right femur (red arrow). (Color version is available online.)

Discussion

ECD is a rare disease, showing prevalent lesions in the bone. Bone pain is the most incident presenting symptom [3,4]. Other extraskeletal sites of involvement include orbits, CNS, heart, retroperitoneal region, lungs, and skin [5–9]. The rarity and the heterogeneous presentation could lead to a di-

agnostic delay. Despite the clinical diagnosis of ECD remains challenging, imaging plays a key role. In the initial diagnostic work-up either 99mTc bone scintigraphy and radiography are key for the detection of osteosclerotic lesions of the long bones.

CT can detect pathognomonic morphological abnormalities (ie, hairy kidney or coated aorta). Assessment of the systemic involvement and of the severity of the disease can be performed with a PET-CT [16]. It can detect specific lesions found in ECD patients [17]. However, PET/CT is expensive and, then, not available everywhere. Pathognomonic CT signs could be sufficient to formulate a diagnostic suspicion of ECD.

No staging system was implemented for ECD. However, since that the majority of ECD patients have at least 1 extraskeletal lesion during autopsy, the clinical condition could fit with the stage C of Ekert's classification of Langerhans cell histiocytosis (involvement of bones and soft tissue), characterized by the worst prognosis [18]. Prognosis is poor, especially when brain and heart are impaired. CNS impairment could be an independent predictor of death [15] and mortality can depend on cardiac complications in 60% of the cases [18].

The initial presentation of our case was unusual: cough, abdominal pain, and headache without any seizures. The occurrence of those symptoms underscored a multi-site involvement. The diagnosis was carried out considering the radiological findings. In particular, the identification of peculiar CT features, such as "hairy kidney sign" and "coated aorta," increased the diagnostic suspicion. Other radiological investigations (eg, X-rays, brain and cardiac MRI), and bone biopsy were essential to confirm the diagnosis.

On the basis of the findings, a differential diagnosis was mainly performed with retroperitoneal fibrosis (RF), which is a rare systemic disease characterized by proliferation of fibrous tissue. Skeletal radiological signs can differentiate between ECD and RF: whilst the bone involvement is always found in ECD, it is not detected in RF [18].

This case proved that specific CT findings could be sufficient to raise the suspicion of ECD in case of compatible symptoms and signs. CT is easy to perform, widely available, and offers a comprehensive assessment of the affected sites., kinetic cardiac MRI and nuclear imaging tests should be prescribed for staging, being more expensive and less easily implemented [10].

We would like to highlight the importance of being aware and of recognizing the radiological pattern: clinicians and radiologists should interpret the clinical manifestations and imaging findings to establish an early diagnosis. The timing for initiating an appropriate therapy may be decisive for the course of the disease.

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