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Short communication

MRI-findings of nodular lesions in an enlarged spleen, associated with visceral Leishmaniasis

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ABSTRACT

We present a case of a 15-month-old Moroccan girl with fever of unknown origin, hepatosplenomegaly and multiple hypoechoic nodular splenic lesions that appear hypodense on CT. T2-weighted MRI sequences show a markedly inhomogeneous intensity of the parenchyma, seemingly caused by multiple ill-defined and heterogeneous hypointense nodules. Laboratory tests confirmed a recent infection with Leishmania, a parasite endemic to (sub)tropic regions. During and after therapy these lesions gradually resolved. To our knowledge this is the second published case in which different imaging modalities were able to demonstrate organ lesions associated with Leishmania. It is also the first report of MRI-findings associated with these lesions.

1. Introduction

Leishmaniasis is a protozoan infection that is transmitted through the bite of the Phlebotomus sandfly infected with *Leishmania donovani* or *L. infantum*. It is endemic in many tropic and subtropic regions, including the Mediterranean region. Promastigotes are injected into the patient's bloodstream and infect macrophages. Here they transform into amastigotes, lacking both flagellum or ciliae. These amastigotes reproduce intracellularly in the phagolysosome of the macrophage. When cell lysis occurs, the amastigotes are released and subsequently infect other macrophages. Visceral Leishmaniasis or kala azar is the most insidious form of infection in which the parasites migrate to internal organs such as liver, spleen and bone marrow. If left untreated, this condition is almost always fatal [1,2].

Clinical signs of visceral Leishmaniasis include fever and splenomegaly, caused by reticuloendothelial cell hyperplasia. Other signs include anemia, leucopenia or thrombocytopenia and hypergammaglobulinemia as well as hepatomegaly [3].

Gold standard diagnosis of the disease relies on the detection of amastigotes in an aspirate of the spleen or bone marrow. Serological testing is available but does not offer the same specificity, as cross-reactions do exist with tuberculosis and trypanosomiasis. The serological tests also remain positive after previous contact with Leishmania. PCR-testing is available in specialised institutes; it offers rapid identification of Leishmania and provides a useful molecular tool to assist both epidemiologists and clinicians [4].

2. Case report

A 15-month-old Moroccan girl presented at the emergency department of our hospital. She had a swollen abdomen and had suffered multiple episodes of fever over the past few weeks. Upon clinical examination the abdominal swelling was thought to be caused by extensive hepatosplenomegaly. The exact onset of the fever remained unknown, it was however already present during a physical examination one month before. The girl had been to Morocco during the summer, some 4 months before. The patient was admitted to the children's hospital for a diagnostic work-out of hepatosplenomegaly and fever of unknown origin.

An abdominal ultrasound (Fig. 1) was performed and revealed a somewhat enlarged liver with homogeneous parenchyma. The spleen was notably enlarged, the largest diameter measuring up to 12 cm (normal values 1–2 yo: 5.1–8.2 cm [5]). The contour of the spleen was found to be very irregular, attributed to the presence of multiple ill-defined hypoechoic nodules spread throughout the rather hyporeflective parenchyma of the spleen. No other anomalies were found on ultrasound.

An abdominal CT-scan was performed after administration of intravenous contrast (Fig. 2). The ultrasound findings were confirmed, revealing a mildly enlarged liver and obvious splenomegaly. The parenchyma of the spleen contained numerous hypodense

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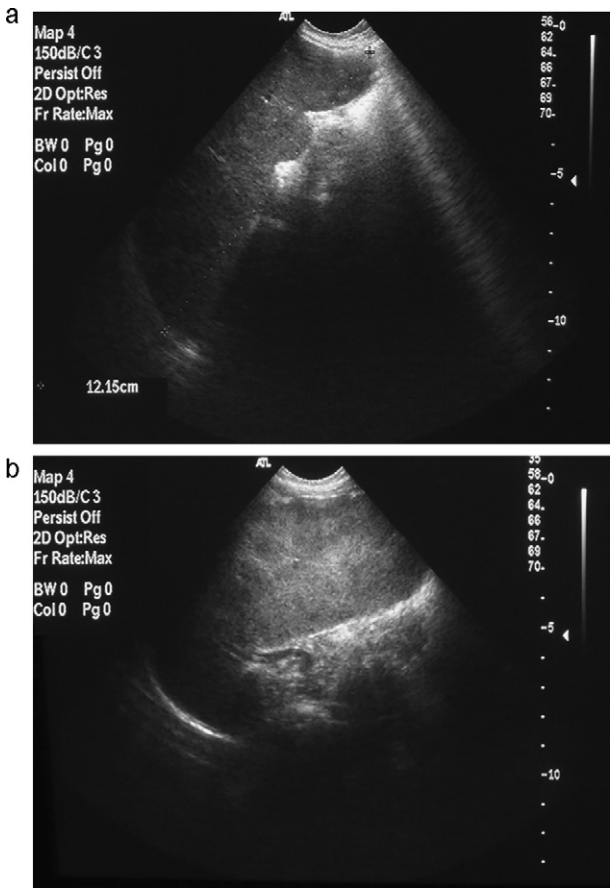

Fig. 1. Ultrasound of the spleen. (a) Splenomegaly, largest diameter up to 12 cm, longitudinal plane. Also note the irregular contour of the spleen. (b) Nodules throughout the parenchyma, axial plane.

nodules that were clearly deforming the contour of the organ. No other abnormalities could be detected.

A follow-up MRI examination of the abdomen a few weeks later demonstrated markedly inhomogeneous intensity of the spleen, best appreciated whilst scrolling through a T2 weighted sequence. Upon closer examination we can note multiple ill-defined and heterogeneous hypointense nodules on the T2-weighted images, distributed throughout the parenchyma (Fig. 3). Motion artefacts are present as well, despite the use of respiratory gating. Again no other abnormalities could be detected.

Diagnostic tests for tuberculosis and other infectious diseases came back negative, neither was there any clinical evidence to support the diagnosis of a granulomatous disease (sarcoidosis, tuberculosis, cat-scratch disease) nor lymphoma or other tumoural pathology. Seeing as the patient had recently visited Morocco, serological tests for Leishmania were conducted and proved negative. Microbiologic examination of a bone marrow aspirate could not demonstrate any amastigotes, however PCR done in a specialised institute tested clearly positive for Leishmania. We therefore abstained from a more invasive spleen biopsy and started the patient on liposomal amphotericin B, a polyene antifungal and antiprotozoan drug [6]. A serology taken one month afterwards tested positive for Leishmania antibodies, proof of a recent seroconversion.

During and after treatment with liposomal amphotericin B various ultrasound examinations demonstrated quick and progressive normalisation of the diameter of the spleen (Fig. 4). The nodules had completely resolved four months after the start of the treatment, with a subtly heterogeneous spleen as the only remaining sign.

Fig. 2. (a) CT-scan of the abdomen, axial plane. Note the numerous hypodense nodules. (b) CT-scan of the abdomen, axial plane. Note the deformation of the splenic contours. (c) CT-scan of the abdomen, coronal plane.

3. Discussion

In children as well as adults, the normal spleen demonstrates a homogenous echotexture, hyperechoic when compared to the left kidney. During the early arterial phase of a contrast enhanced CT a heterogenous pattern may be seen, evolving to a homogenous