Hepatic and Splenic Sarcoidosis Evaluated by Multiple Imaging Modalities

Mikio Kataoka, Yasunari Nakata, Jun-ichi Hiramatsu, Kazunori Okazaki, Yosiaki Fujimori, Yoshiki Ueno, Yasushi Tanimoto, Arihiko Kanehiro, Shinya Tada and Mine Harada

We present a case of hepatosplenic sarcoidosis. A 51-year-old Japanese male, who was diagnosed to have sarcoidosis 4 years previously, was presented to our hospital because of dry cough and anorexia with weight loss. He had tender hepatosplenomegaly. A dynamic abdominal computed tomography (CT) revealed multiple small low-density areas in both liver and spleen, as well as in magnetic resonance imaging (MRI). The laparoscopic photographs showed many small whitish nodules surfacing on the liver and several tumorous nodules on the spleen. Multiple imaging modalities including dynamic CT and MRI are valuable for detecting focal hepatic and splenic lesions of sarcoidosis.

Key words: hepatosplenomegaly, dynamic computed tomography (CT), magnetic resonance imaging (MRI)

Introduction

Sarcoidosis is a multisystem granulomatous disease of unknown etiology, most frequently involving the lungs, lymph nodes, eyes, spleen, liver and skin. Extrathoracic disease can occur in association with or in the absence of intrathoracic disease (1). Noncaseating granulomatous lesions are frequently found in liver biopsy specimens from patients with sarcoidosis (2). Although diffuse hepatosplenomegaly is often present on computed tomography (CT) imaging, it usually shows no distinct lesions in liver and spleen. Here we report a case of sarcoidosis with multiple mass lesions of the liver and the spleen evaluated by a combination of imaging modalities consisting of CT, ultrasonography (US), Gallium-67 scintigraphy, magnetic resonance imaging (MRI), and laparoscopy.

Case Report

A 47-year-old Japanese male was presented to the Okayama University Hospital with a 3-month history of fever, anorexia, weight loss, and subcutaneous nodule of left forehead in October 1990. On admission, further examination revealed that serum angiotensin converting enzyme (SACE) and serum lysozyme levels were elevated and the chest roentgenogram showed bilateral hilar lymphadenopathy (BHL) and micro-nodular infiltrates of both lung fields (stage II) and tuberculin skin test was negative. He was diagnosed to have sarcoidosis by transbronchial lung biopsy (TBLB) (Fig. 1) and biopsy of the skin. At this time, the organs affected by sarcoidosis were lungs, skin and eyes. After that he visited the Outpatient Department at the University Hospital without therapy. Dexamethasone (3 mg/day) was started because uveitis became worse during the three-month period after the discharge. Subsequently dexamethasone was tapered until February 1994 and symptoms due to sarcoidosis subsided, but psoriasis vulgaris developed and then disappeared during the course of steroid therapy.

He was readmitted on October 1994 to the University Hospital with anorexia, weight loss, dry cough, and hepatosplenomegaly six months after the cessation of steroid therapy. On the second admission, his blood pressure was 120/75 mmHg, pulse rate 85 per minute, respiratory rate 16 per minute, and temperature 37.8°C. The physical examination was notable for clear breath sounds, normal heart sounds without cardiomegaly, and the liver was palpable 8 cm below the right costal margin and spleen was 4 cm below the left costal margin, without peripheral adenopathy. Initial laboratory data included red blood cell count 5,570,000/μl, platelet count 320,000/μl, white blood cell count 4,900/μl with 49% neutrophils, 41% lymphocytes, 6% monocytes, 4% eosinophils, 0% basophils. The erythrocyte sedimentation rate (ESR) was 38 mm/h, and
the C-reactive protein (CRP) was 3.5 mg/dl. Total protein was 8.2 g/dl, immunoglobulin (Ig)G 2,700 mg/dl, IgA 655 mg/dl, IgM 176 mg/dl, IgE 1,237 IU/ml. Total bilirubin was 1.38 mg/dl, direct bilirubin 0.50 mg/dl, aspartate aminotransferase (AST) 67 IU/l (normal 9–38), alanine aminotransferase (ALT) 74 IU/l (normal 4–37), alkaline phosphatase (ALP) 494 IU/l (normal 42–172), γ-glutamyltranspeptidase (γ-GTP) 665 IU/l (normal 8–45), leucine aminopeptidase (LAP) 661 IU/l (normal 31–78), lactate dehydrogenase (LDH) 439 IU/l (normal 203–442), choline esterase (CHE) 93 IU/l (normal 67–219). Serum calcium was 10.3 mg/dl (normal 8–10), uric acid 10.1 mg/dl (normal 2.5–8.3) and hypercalcuria was noted. The SACE was 45.7 IU/l (normal 8.3–21.4), serum lysozyme 28.8 mg/ml (normal 5.4–9.8), immune complex 3.3 mg/ml (normal <3). Anti-mitochondrial antibody was negative. Tuberculin
skin test was negative and lymphocyte blastogenesis stimulated by either ConA or phytohemagglutinin (PHA) was decreased. The pulmonary function test demonstrated normal spirometry (%VC 95.7, FEV1% 94.2) with normal diffusing capacity for carbon monoxide (%DLCO 102). Chest roentgenogram showed moderate BHL and micronodular shadows in both lung fields (stage II) (Fig. 2). On precontrast CT scan, geographically-distributed low-density areas were evident in the enlarged liver and splenomegaly was found with no remarkable findings (Fig. 3). Postcontrast CT scan showed multiple low-attenuation nodules, 1–2 cm in diameter, in the spleen. On the other hand, low-attenuation areas in the liver were not enhanced and were considered to be slightly well visualized after contrast-enhancement (Fig. 4). On MRI, T1-weighted MR imaging of the liver showed heterogeneous signal intensity, T2-weighted and Gd-DTPA enhanced images showed high signal intensity in some parts of the liver. Both T1- and T2-weighted MR images of the spleen showed low signal intensity revealing multiple nodules (Fig. 5), as well after Gd-DTPA enhancement. Abdominal ultrasonography revealed homogeneously increased echodensity in the markedly enlarged liver and spleen. Ga-67 scintigraphy showed abnormal uptake on both lung fields, but no remarkable findings in liver and spleen. In laparoscopic photographs, many small whitish flat lesions were geographically scattered on the liver (Fig. 6A) and several tumorous nodules, 1–2 cm in diameter, were observed on the spleen (Fig. 6B). Furthermore, multiple small whitish nodules were seen on subphrenic peritoneum. Liver biopsy showed multiple noncaseating epitheloid cell granulomas with multinucleated giant cells of Langhans type adjacent to the normal liver tissue confirming sarcoidosis (Fig. 7). The low density areas in the liver and the spleen on CT gradually decreased after 4 months of steroid therapy. These lesions disappeared one year after the cessation of steroid therapy (Fig. 8).

Discussion

Sarcoidosis is a disease of unknown cause, characterized by the presence of noncaseating granulomatous lesions in multiple organs. Dysfunction of liver and spleen is uncommon, although evidence of liver and spleen involvement is frequently obtained at microscopic examination. Needle biopsy of the liver demonstrated granuloma in 24%–79% of patients (3, 4) and similar studies in the spleen showed sarcoid lesions in 24%–59% of patients (5, 6). Moreover, autopsy studies demonstrated liver

Figure 5. T2-weighted MR image shows high signal intensity in some part of the liver and low signal intensity revealing multiple nodules in the spleen.

Figure 6. Laparoscopic photograph shows many small whitish flat lesions on the liver (A) and several tumorous nodules on the spleen (B).
Figure 7. Biopsy specimen of the liver shows multiple noncaseating epitheloid cell granulomas with multinucleated giant cells adjacent to the normal liver tissue (HE stain, x100).

Figure 8. Follow-up abdominal CT scan with contrast enhancement following treatment with prednisolone. There is improvement of the previous involved areas of the liver and spleen.

and spleen involvement in 44.6% and 41.4% respectively (7). Therefore the liver and spleen involvement is not rare in sarcoidosis. Clinically, however, less than 20% of patients with sarcoidosis have hepatosplenomegaly and dysfunction of the liver is found in only 4% of patients (1). In most cases liver and spleen involvement was detected casually by multi-imaging modality. Radiographically evident hepatic and splenic sarcoidosis may be present in the absence of clinical or laboratory abnormalities. Our patient was referred for not only clinical symptoms such as weight loss, anorexia, general fatigue and painful hepatosplenomegaly, but also for liver dysfunction. As we supposed, the recurrence of sarcoidosis occurred, further examinations including abdominal CT scan, MRI, laparoscopy were done. In the present case, abdominal CT finding is inhomogenous because the hepatic lesions observed at laparoscopy appeared to be diffusely distributed and several granulomas were aggregated. In contrast, multiple tumorous nodules were present in the spleen of abdominal CT. This finding is compatible with laparoscopic finding. Although radiological features of hepatic and splenic sarcoidosis have been reported (8–12), the most frequent described finding is diffuse parenchymal heterogeneity. It is likely that inhomogeneity on abdominal CT is the result of poor imaging resolution of small lesions, which are histologically less than 2 mm in diameter (13). Oketani et al reported a case of tumorous lesions mimicking malignancy (14). It is important to recognize a nodular appearance to distinguish it from diseases including infection, metastatic disease and lymphoma, in which low-attenuation nodules are seen in liver and spleen on CT (15, 16). In this patient, steroid therapy was effective and the hepatic and splenic lesions disappeared. The prognostic importance of nodularity is unclear and the abdominal manifestation of sarcoidosis was not associated with the changes of pulmonary lesion as reported by Warshauer et al (17). However, hepatic and splenic involvement is frequently accompanied by systemic symptoms and elevation in the serum ACE level, which was seen in this patient. MRI demonstrated hepatic and splenic lesions of sarcoidosis as well as CT (18, 19). Splenic sarcoidosis is easy to detect on MRI, while hepatic lesions may be difficult to detect. The combination of CT and MRI may be valuable for the detection of hepatosplenic sarcoidosis.

References
Sarcoidosis of Liver and Spleen


