Sarcoidosis Associated with Renal Masses on Computed Tomography

Syunji Mizunoe, Tohru Yamasaki, Issei Tokimatsu, Hisako Kushima, Naoko Matsunaga, Kazuhiko Hashinaga, Yasuhiro Miyazaki, Eiji Komatsu, and Jun-ichi Kadota

Abstract

A 50-year-old woman was admitted to our hospital after computed tomography (CT) revealed renal masses and mediastinal lymphadenopathy. Uveitis had previously been diagnosed by a local ophthalmologist. Elevated levels of serum soluble IL-2 receptor were observed. However, renal function was not compromised. Abdominal CT showed multiple low attenuation tumor-like nodules in both kidneys. As lymphoma was considered likely, CT-guided renal biopsy was performed; however, histological examination of the excised specimens revealed noncaseating granulomas. Analysis of bronchoalveolar lavage fluid demonstrated a sarcoidosis pattern. The final diagnosis was sarcoidosis with renal involvement.

Key words: Renal sarcoidosis, Granulomatous interstitial nephritis

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Introduction

Sarcoidosis is a systemic disorder of unknown origin, characterized by noncaseating granulomas composed of epitheloid cells. Clinical signs and symptoms are nonspecific; some patients report fatigue, weight loss, general malaise or fever, while around half remain asymptomatic (1). Although skin and ocular lesions are common, radiologic signs of renal sarcoidosis are rare, and renal sarcoidosis can mimic malignant lymphoma in radiologic appearance (2, 3).

Herein, we report a case of renal sarcoidosis manifesting as noncalcified masses on computed tomography (CT).

Case Report

A 50-year-old woman underwent surgical treatment of right breast cancer in 2004. After surgery, she was followed without adjuvant therapy. When CT was performed to investigate suspected recurrence of breast cancer, renal masses and mediastinal lymphadenopathy were observed. She had no symptoms of fever, general malaise, or pain, but reported a history of uveitis, for which administration of prednisolone (30 mg/day) had resulted in a clinical improvement in eye signs after 3 months. At the time of admission, she was currently maintained on 10 mg prednisolone daily. No history of allergic reaction, kidney stones or facial paralysis was evident. She did not smoke or drink alcohol or take any other medications other than prednisolone. Her body temperature was 36.6°C, pulse was 74 beats per minute, regular, and respiratory rate was 16 breaths per minute. Blood pressure was 120/68 mmHg. Neither anemia nor jaundice were apparent on examination. Respiratory and heart sounds were normal, as were the abdomen and extremities. Neurological examination revealed no abnormal findings, and superficial lymph nodes were not palpable.

Laboratory data on admission are shown in Table 1. Complete blood count, and levels of urea nitrogen, creatinine, lactate dehydrogenase, calcium, and phosphorus were within normal range. However, levels of serum angiotensin converting enzyme, lysozyme, and soluble IL-2 receptor were elevated, at 21.2 IU/l (normal range, 6.0-21.0 IU/l), 14.3 μg/ml (normal range, 3.0-10.6 μg/ml), and 1,570 U/ml (normal range, 145-519 U/ml), respectively. Intact parathyroid hormone (PTH) level was 50 pg/ml (normal range, 10-65 pg/ml) and 1.25-dihydroxyvitamin D level was 63.5 pg/ml (normal range, 20-60 pg/ml). Urinary excretion of β2 microglobulin and calcium was normal. Urinalysis revealed specific gravity

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Table 1. Laboratory Findings on Admission

<table>
<thead>
<tr>
<th>Hematology</th>
<th>Biochemistry</th>
<th>Urinalysis</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>WBC: 3200/mm³</td>
<td>TP: 7.2 g/dl</td>
<td>SG: 1.099</td>
</tr>
<tr>
<td>Neutrophils: 68.5 %</td>
<td>T-Hb: 10.0 mg/dl</td>
<td>pH: 7.0</td>
</tr>
<tr>
<td>Lymphocytes: 14.5 %</td>
<td>AST: 18 IU/l</td>
<td>Protein (+)</td>
</tr>
<tr>
<td>Monocytes: 9.8 %</td>
<td>ALT: 20 IU/l</td>
<td>Glucose (-)</td>
</tr>
<tr>
<td>Eosinophils: 3.1 %</td>
<td>ALP: 271 IU/l</td>
<td>Creatinine (-)</td>
</tr>
<tr>
<td>Basophils: 1.3 %</td>
<td>LDH: 342 IU/l</td>
<td>WBC: 1-4.0×10⁹/mm³</td>
</tr>
<tr>
<td>RBC: 457×10¹²/mm³</td>
<td>ESR: 11.7 mg/dl</td>
<td>RBC: 1-4.0×10¹²/mm³</td>
</tr>
<tr>
<td>Hb: 13.9 g/dl</td>
<td>Cre: 0.78 mg/dl</td>
<td>Ca: 99 mg/dl</td>
</tr>
<tr>
<td>Ht: 39.6 %</td>
<td>Na: 142 mEq/l</td>
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<tr>
<td>PLT: 259×10⁹/mm³</td>
<td>K: 3.9 mEq/l</td>
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<tr>
<td>CRP: 0.05 mg/dl</td>
<td>Cl: 104 mEq/l</td>
<td></td>
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<tr>
<td>sIL-2R: 1570 U/ml</td>
<td>Ca: 8.9 mg/dl</td>
<td></td>
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<tr>
<td>ACE: 21.2 U/I</td>
<td>FBS: 97 mg/dl</td>
<td></td>
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<tr>
<td>Lysiszyme: 14.3 μg/ml</td>
<td></td>
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<tr>
<td>Inact PT: 50.0 pg/ml</td>
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<tr>
<td>1α25-VitD: 43.5 pg/ml</td>
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</table>

Figure 1. Posteroanterior radiograph of the chest on admission showing hilar and mediastinal lymphadenopathy.

Figure 2. Computed tomography (CT) of the chest demonstrating mediastinal lymphadenopathy, but no pulmonary infiltrates.

Figure 3. CT of the abdomen showing multiple round and pyramidal low density lesions in both kidneys.

Figure 4. Total body gallium-67 scintigraphy showing uptake in the enlarged mediastinal lymph nodes and in both kidneys.

Figure 5. CT-guided renal biopsy was performed to differentiate between lymphoma, recurrence of breast cancer, and sarcoidosis. Histopathological examination of the biopsy specimen revealed noncaseating granulomas composed of aggregates of epitheloid cells. Acid-fast bacilli were not detected, and no evidence of lymphoma was apparent.

A transbronchial biopsy specimen showed no granuloma. Recovery rate of bronchoalveolar lavage fluid (BALF) was 66%; 99 ml/150 ml. BALF analysis revealed a sarcoidosis pattern: total cell concentration was 3.5×10⁶ cells/ml, with 44.6% macrophages, 51.8% lymphocytes (CD3: 96.6%, CD4: 90.8%, CD8: 9.1%, CD4/CD8 ratio: 9.98), 0.4% neutrophils, and 1.6% eosinophils.

Electrocardiography showed no arrhythmias or blocks. Echocardiography revealed no evidence of a granulomatous lesion in the myocardium, including the ventricular septum, and demonstrated normal myocardial contraction.

As the patient demonstrated no signs of cardiac sarcoidosis or renal dysfunction and was already taking prednisolone for uveitis at this time, it was continued at the same dose.

Discussion

Sarcoidosis is a systemic disorder of unknown origin, typically presenting in young and middle-aged adults, and histologically characterized by granulomatous lesions. It can affect the kidney as well as the lung, skin, and eye. Pulmonary changes are the most common manifestation, and bilateral hilar lymphadenopathy is the most frequent radiologic finding, often with associated pulmonary infiltrates (1, 4). The involvement of abdominal viscera is rare and can be difficult to differentiate from more common infectious or neoplastic conditions (5).

Renal manifestation in sarcoidosis commonly involves disordered calcium metabolism, interstitial noncaseating granulomas, and glomerular lesions (6-13). In the present case, although 1.25-dihydroxyvitamin D was slightly ele-
is observed in approximately 2.5 to 17% of patients with sarcoidosis and can progress to hypercalcuiuria, and result in impaired urine concentration, decreased glomerular filtration, and nephrocalcinosis. Macrophages, probably under the influence of IFN\(\gamma\), acquire 25-dihydroxyvitamin D, \(\alpha_1\)-hydroxylase activity. The overproduction of 1,25-dihydroxyvitamin D3 can cause increased intestinal absorption of calcium, enhanced bone resorption, and resultant hypercalcuiuria with or without hypercalcemia. This process can ultimately result in nephrocalcinosis and renal failure. (14, 15) Glomerulonephritis is generally rare, although membranous nephropathy, membranoproliferative glomerulonephritis, rapidly progressive glomerulonephritis, IgA nephropathy, minimal change nephritic syndrome, and focal glomerulosclerosis have been documented in some case reports (8-13). The present case exhibited granulomatous interstitial nephritis; however, proteinuria, hematuria, and renal dysfunction were absent.

Granulomatous interstitial nephritis is usually treated with corticosteroids (1, 4, 16), and this approach can rapidly improve renal dysfunction. Because corticosteroid treatment of less than 6 months is frequently followed by relapse, it should be maintained for at least one year. In the present case, as the serum creatinine level was within normal range and the patient was already taking prednisolone, this was continued at the same dose.

Renal involvement is a common occurrence in sarcoidosis. However, radiographically detectable renal masses are unusual in this condition (17). Contrast-enhanced CT has been reported to produce a striated nephrogram in cases of interstitial nephritis (18). Moreover, multiple isodense masses that enhance less than the adjacent normal renal parenchyma have been reported in a patient with nodular involvement of the liver and spleen (3). Differentiating lymphoma from sarcoidosis is commonly a problem when a patient presents with adenopathy. The typical CT appearance in renal lymphoma is of single or multiple masses, invasion from contiguous retroperitoneal extension, perirenal disease, and diffuse renal infiltration (2, 3, 19). Renal deposits in sarcoidosis may mimic the appearance of lymphoma or metastatic tumors.

Although renal involvement in sarcoidosis is well known, space-occupying masses in the kidney are a rare finding. As renal sarcoidosis often has radiographic findings similar to malignant lymphoma, both these conditions should be considered in the differential diagnosis when imaging shows multiple low attenuation tumor-like nodules in both kidneys, and renal biopsy should be performed.

References


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