Diffuse Abdominal Uptake Mimicking Peritonitis in Gallium Inflammatory Scan: An Unusual Feature of Acute Q Fever

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The clinical features in patients with acute Q fever are variable. We present a patient with fever, abdominal distension, pericardial effusion, and diffuse gallium uptake in the abdominal cavity, mimicking peritonitis or peritoneum carcinomatosis. Serologic surveys revealed acute infection by *Coxiella burnetii.* The patient responded poorly to doxycycline and improved with oral levofloxacin. During the afebrile period, gallium inflammatory scan showed resolution of previous diffuse uptake in the abdomen, and cardiac echo resolution of pericardial effusion, which was suggestive of peritoneal inflammation related to acute *C. burnetii* infection. Therefore, clinicians in Taiwan should be alert to the possibility of acute Q fever in patients with fever of unknown cause, especially with clinical evidence of peritoneal and/or pericardial inflammation.

Key Words: *Coxiella burnetii,* gallium scan, pericarditis, peritonitis, Q fever
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Q fever caused by *Coxiella burnetii* is an infectious disease with variable presentations. The spectrum of acute Q fever ranges from self-limited febrile illness to hepatitis, pneumonia, myocarditis, and endocarditis. Endocarditis is the major form of chronic Q fever and hepatitis has been reported as the major clinical manifestation of acute Q fever [1]. In southern Taiwan, acute febrile illness with acute hepatitis is the predominant presentation of acute Q fever [2,3].

Although gallium scan has been widely used in the detection of acute and chronic infectious diseases, there are no reported characteristic features in patients with acute Q fever. Herein, we describe the clinical and imaging characteristics of a patient with *C. burnetii* infection that manifested as acute peritonitis and pericarditis. To our knowledge, this is the first case report of this unique presentation together with nuclear images.

Case Presentation

A 55-year-old man with type 2 diabetes mellitus complained of fever and chills for 20 days prior to admission. During that time, he also felt the sensation of abdominal fullness. He could not recall any history of traveling or insect bite during the 1 month prior to admission. However, there were sheep breeding in his neighborhood. Initially, he visited a local hospital and abdominal sonography showed a hepatic nodule only. Abdominal computed tomography (CT) revealed no definite lesion. Finally, he visited our hospital and was admitted for further evaluation of the fever with suspected hepatic origin.

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During admission, physical examination disclosed hepatomegaly and diffuse abdominal fullness without tenderness or rebounding pain. The white blood cell count was 11,500/mm^3 and the platelet count was 365,000/mm^3. The patient had mild anemia with a hemoglobin level of 11.6 g/dL. The prothrombin time was 13.2 seconds (reference, 11.4 seconds) and the activated partial thrombin time (aPTT) was prolonged at 74.5 seconds (reference, 29.6 seconds). Blood biochemistry showed normal renal function and serum bilirubin level, but abnormal levels of hepatic enzymes: asparate aminotransferase 71 U/L (reference range, RR, 5–40 U/L), alanine aminotransferase 86 U/L (RR, 5–55 U/L), alkaline-phosphatase 141 U/L (RR, 30–110 U/L), γ-glutamyl transpeptidase 169 U/L (RR, 8–80 U/L), and total bilirubin/direct bilirubin 1/0.6 mg/dL (RR, 0.2–1.4/0–0.4 mg/dL). Urine analysis findings were negative. No hepatic nodules or ascites were detected on abdominal CT, but hepatomegaly was noted. Tests for antinuclear antibody, anti-nDNA, anti-ENA, CA125, and CA199 were negative, indicating no autoimmune or malignant diseases. Thyroid function tests and serum cortisol levels were within reference ranges. Initial echocardiography showed a dilated left atrium with preserved left ventricular function. There was a small amount of pericardial effusion but no vegetation. Chest CT showed pericardial effusion, pleural effusion, and a small nodule in the lower part of the right lung. The initial gallium scan showed hepatomegaly with diffuse uptake in the abdomen (Figure 1), and peritonitis or peritoneum carcinomatosis was suggested. The patient refused laparoscopy or liver biopsy. High fever persisted and, due to his history of animal exposure, Q fever was suggested and doxycycline was administered. The fever did not resolve after 2 weeks of therapy.

Blood bacterial cultures were negative. In addition, antibody survey for HIV-1, acute hepatitis A, B, or C infections, cytomegalovirus, Epstein-Barr virus, and *Rickettsia typhi* was negative, but a high titer of anticardiolipin antibody was detected (IgG 1,168 phospholipid U/L, IgM > 3,000 phospholipid U/L). Serologic survey for *C. burnetii* infection in acute serum revealed no detectable titer of IgG or IgM antibody to phase I antigens, but high titers of IgG and IgM (both ≥ 1:2,560) to phase II antigens. Due to the poor responsiveness of the patient to doxycycline therapy, 500 mg/day of oral levofloxacin was given. Fourteen days later, the symptoms resolved completely without any sequelae. There was resolution of the pericardial effusion, shown by follow-up echocardiography and absence of abdominal uptake in gallium inflammation scan, 1 month after starting doxycycline therapy (Figure 1B).

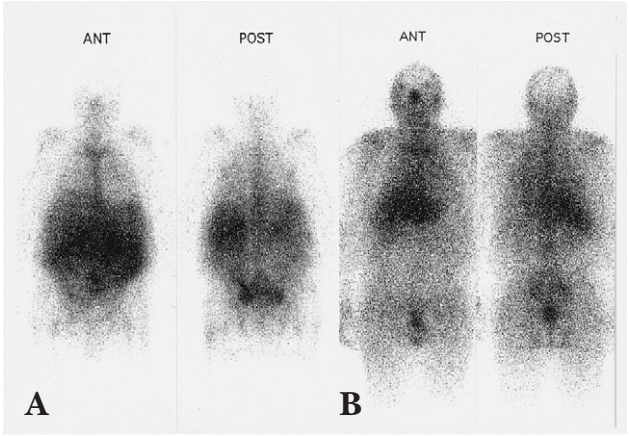

Figure 1. *Gallium scan in a case of acute Q fever. (A) Diffuse increased activity in the abdominal cavity and increasing size of liver; (B) resolution of diffuse uptake in the abdomen 6 weeks after the initial scan.*

Discussion

We present an unusual patient with acute Q fever and diffuse increased abdominal uptake on inflammation scan. A follow-up gallium scan 6 weeks after the initial report showed normalization of uptake in the abdomen. A gallium scan in one patient with Q fever showed diminished hepatic uptake and markedly increased uptake in the myocardium, right breast, kidneys, and knee joints [4]. A follow-up study showed resolution of gallium uptake in the myocardium, right breast, liver, kidneys and knee joints. Our patient had not only liver involvement but an extended area secondary to active inflammation in the peritoneum. These findings show the diverse presentation of acute Q fever on gallium scan.

Gallium citrate scanning is an important diagnostic procedure in the evaluation of fever of unknown origin, and is indicated for patients who may have malignancy or inflammation but have no localized symptoms or signs [5]. It can also provide valuable information in the evaluation of therapeutic responses in such patients. Our patient had a clinical course suggestive of peritoneal involvement in acute Q fever: diffuse uptake on the gallium scan that mimicked tuberculous peritonitis [6], peritoneal carcinomatosis [7], or salmonella infections [8]. Patients with tuberculous peritonitis can present with diffuse or focal abdominal localization and decreased hepatic accumulation of gallium. The symptoms may imitate a host of miscellaneous diseases, including starch peritonitis [9], hypoproteinemia [10], and peritoneal mesothelioma [11]. In addition, tuberculous peritonitis is often associated with elevated CA125.