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ORIGINAL ARTICLE

Splenic abscesses at a tertiary medical center in northern Taiwan

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KEYWORDS
Percutaneous drainage;
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Treatment

Background/Purpose: Splenic abscesses are uncommon. This study aimed at assembling the demographics, clinical features, microbiologic etiologies, imaging, treatments, and outcomes of patients with splenic abscesses at a tertiary medical center in northern Taiwan.
Methods: The diagnosis of splenic abscess was made either by imaging studies associated with clinical symptoms and signs of infection, or by imaging studies associated with microbiological data or pathologic results. The clinical characteristics, isolated pathogens, and treatments diagnosed at a medical center in northern Taiwan between 2000 and 2011 were analyzed retrospectively.
Results: Of 28 patients with splenic abscess, male patients accounted for 46% of the study population. The mean age of the patients at the time of presentation was 46.5 years (range 4 months to 85 years). Common presentations were fever (71.4%, 20 cases), abdominal pain (46.4%, 13 cases), cough or dyspnea (35.7%, 10 cases), splenomegaly (32.1%, 9 cases), and left-sided pleural effusion (32.1%, 9 cases). Leukocytosis was noted in 22 patients (78.5%). Gram-negative bacilli and Gram-positive cocci were cultivated from six patients (21%). No specific pathogen was predominant in patients with splenic abscesses. The overall mortality was 14.3%, while the mortality among the patients treated with antimicrobial therapy alone was 5.6%.
Conclusion: The survival rate was high in patients with splenic abscesses who received antimicrobial therapy alone. Percutaneous drainage can be used as an alternative choice for patients with severe co-morbidities or patients who are critically ill.

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Introduction

Splenic abscesses are uncommon, with a prevalence of 0.14—0.7% in autopsy studies.[1—3] Splenic abscesses generally occur in patients with splenic trauma, malignancies, diabetes mellitus, immunodeficiency disorders, or systemic infections.[4—6] The diagnosed incidence of splenic abscesses has increased over recent decades due to the increasing number of immunocompromised patients and the widespread use of imaging modalities such as computed tomography (CT) and ultrasonography (US).[4,7—9] The management of splenic abscesses includes early diagnosis, medical therapy with antimicrobial or antifungal agents, and surgery or percutaneous drainage. The objective of the current study was to report the clinical features, microbiologic etiologies, treatments, and outcomes of patients with splenic abscesses at a tertiary medical center in northern Taiwan over the previous 12 years.

Materials and methods

Study design and data collection

The diagnosis of splenic abscess was made if one of the following criteria was met: (1) causative pathogens were isolated from a splenic aspirate or blood culture with compatible imaging studies, such as US or CT; (2) histologic examination of resected splenic tissue indicated the presence of an abscess; (3) there were operative findings of a splenic abscess during exploratory laparotomy; and (4) there were clinical manifestations and imaging findings consistent with the condition and an improvement in the patient's clinical condition after antibiotic therapy. Leukocytosis or leukopenia was defined as a peripheral white cell count $>$10,000/μL or $<$4000/μL, respectively. All of the medical charts were reviewed to collect data, including sex, age, clinical manifestations, underlying diseases, imaging studies, treatment course, isolated pathogens, and clinical outcome. The patients were followed up for 6 months as an end-point to determine the outcome.

Statistical analysis

A univariate analysis of prognostic factors for splenic abscess (e.g., age, sex, abscess number, underlying disease, microorganism, and treatment) was performed using Fisher's exact test. The mean age was evaluated using the Wilcoxon rank-sum test.

Results

Between January 2000 and December 2011, 214 patients with a diagnosis of suspected splenic abscess were reviewed, and 28 met the criteria for splenic abscess. The current study comprised 13 males and 15 females, with a mean age of 46.5 years (range 4 months to 85 years). The patients' characteristics, age, sex, predisposing factors, number of splenic abscesses, microbiologic etiologies, treatments, and outcomes are shown in Table 1. Of the 28 patients, 7 (25%) had diabetes mellitus, 5 (17.9%) had undergone previous abdominal surgery, 5 (17.9%) had leukemia, 4 (14.3%) had end-stage kidney disease and were undergoing hemodialysis, 2 (7.1%) had HIV infection, 1 (3.6%) had cervical cancer, 1 (3.6%) had colon cancer, 1 (3.6%) suffered from systemic lupus erythematosus (SLE), and 1 (3.6%) was an intravenous drug user.

Pathogens were not identified in 9 (32.1%) patients with splenic abscesses. A fungal infection was suspected in patient #15 based on the clinical condition and CT images. Four patients were diagnosed with fungal infections clinically, including patient #15, whose clinical condition improved after treatment with antifungal agents. In our study, six patients showed Gram-positive coccal infections (2 streptococci, 1 enterococci, 2 *Staphylococcus aureus*, 1 *Micrococcus*), six had Gram-negative bacillary infections (3 nontyphoidal salmonellosis, 1 *Klebsiella pneumoniae*, 1 *Pseudomonas aeruginosa*), and one had a mixed infection. Patient #27 had a presentation of intermittent fever for 2 weeks, and her family owned a dog and a cat as pets. She usually slept with the cat, and cat scratches had occasionally been noted. *Bartonella henselae* infection was suggested by polymerase chain reaction on abscess fluid.

The patients' clinical symptoms and signs included fever (20 patients, 71.4%), diffuse abdominal pain (13 patients, 46.4%), cough or dyspnea (10 patients, 35.7%), and left upper quadrant pain or tenderness (4 patients, 14.3%). Physical examination revealed splenomegaly in nine (32.1%) patients. Chest radiographs showed left-sided pleural effusions in nine (32.1%) patients. Leukocytosis was noted in 22 (78.5%) patients. Two patients with acute lymphocytic leukemia had febrile neutropenia 1—2 weeks after chemotherapy.

All patients underwent abdominal US and/or CT; Five patients had abdominal US and CT, 11 abdominal US alone, and 12 abdominal CT alone. A single abscess was noted in 14 (50%) patients and multiple abscesses in 14 (50%) patients (Table 1).

The prognostic factors for splenic abscess are shown in Table 2. Antimicrobial therapy was instituted in all patients. Eighteen (64.3%) patients recovered under medical treatment. Four (14.3%) patients underwent splenectomy and were discharged with oral antibiotics, and four (14.3%) patients received percutaneous drainage of their splenic abscess.

The overall mortality rate was 14.3% (4 patients), and the mortality rate in those receiving medical therapy was 5.6% (1 patient) (Table 2). All four patients who received medical treatment and splenectomy survived, but two (40%) of the five patients who had medical treatment and percutaneous drainage died.

Brief summaries of the four patients who died are as followed. Patient #28, who had underlying SLE, initially received antibiotics, but her symptoms persisted. She then twice underwent percutaneous drainage, but due to inadequate drainage a splenectomy was performed. However, she died of massive intraoperative bleeding. Patient #23 with chronic kidney disease, cervical cancer, and methicillin-resistant *Staphylococcus aureus* septicemia was initially treated with teicoplanin, but 22 days later abdominal CT revealed multiple abscesses in the spleen, perianal area, bilateral psoas muscles, and left hip. Despite their drainage, the patient died 15 days later. Liver and splenic abscesses were present in Patient #19, but she died