Persistent fever and left pleural effusion due to occult splenic abscess in a diabetic patient on long-term hemodialysis

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Splenic abscess is relatively rare and may be easily missed. It is mostly replaced with commonly encountered in immunocompromised patients, such as patients with end-stage renal disease (ESRD) on long-term dialysis, particularly those with concomitant diabetes. In these patients, occult infections may have non-specific and atypical presentations. Patients usually present with unexplained fever and are susceptible to infection by unusual organisms which might cause delays in diagnosis and treatment. We present a diabetic patient with ESRD on long-term hemodialysis who developed persistent fever and left pleural effusion. He was eventually found to have splenic abscess due to an unusual pathogen, Serratia marcescens. (Acta Nephrologica 2010; 24: 47-52)

Key words: fever of unknown origin, splenic abscess, diabetes mellitus, hemodialysis

INTRODUCTION

Infection is a common cause of mortality and morbidity in patients on long-term dialysis, particularly those with diabetes mellitus. Fever is the most common clinical manifestation of sepsis in these patients. Splenic abscess is an uncommon but potentially life-threatening condition if left undetected. We present a diabetic patient with end-stage renal disease (ESRD) on long-term hemodialysis who developed prolonged unexplained fever and left-sided pleural effusion. He was eventually found to have occult splenic abscess due to an unusual pathogen.

CASE REPORT

A 64-year-old male diabetic patient with ESRD, who has been on regular long-term hemodialysis for 13 years, was admitted to our hospital because of intermittent mild fever of two-month duration. About 4 months ago, he was admitted to the Otorhinolaryngology (ENT) unit for surgical management of bilateral malignant otitis externa. Subsequently, he was managed as an outpatient. Two months prior to admission, he developed intermittent fever and recurrent purulent discharge was noted in both ears. Local wound debridement was done and antibiotics, both oral and topical, were prescribed. However, he continued to have intermittent mild fever.

On admission, he was afebrile with a temperature of 36.8°C. Heart rate was 110/min, respiratory rate was 18/minute and blood pressure was 110/70 mm Hg. Purulent discharge was noted in both ears. His abdomen was soft and non-tender. He had a native arteriovenous fistula (AVF) on his left upper extremity, with audible bruit, palpable thrill and no signs of inflammation or infection. Laboratory investigations revealed normocytic anemia (hemoglobin 9.4 g/dL, hematocrit 28.2%) and leukocytosis (white cell count 21.6 × 10⁹/L). Platelet count was 126,000/mm³ and C-reactive protein level was elevated at 23 mg/L. Serum sodium was 132 mmol/L; potassium, 4.7 mmol/L; blood urea nitrogen, 70 mg/dL; and creatinine, 3.28 mg/dL. Serum albumin was 2.3 g/dL, blood sugar was 153 mg/dL and glycated hemoglobin was 9.4%. A plain chest film showed only mild left pleural thickening. A provisional diagnosis of complicated otitis media with sepsis was made.

After collection of blood and ear discharge samples for culture and sensitivity testing (C/S), empirical intra-
venous (IV) antibiotic therapy with ampicillin/sulbactam was given. Regular hemodialysis was continued for diabetic nephropathy via his native AVF. Topical (otic) antibiotic solutions were employed to help eliminate secondary bacterial pathogens. Culture of the ear discharge isolated Pseudomonas aeruginosa, and antibiotic therapy was changed to IV piperacillin. Blood culture failed to isolate any microorganism.

Two weeks after admission, he complained of left lower chest pain which was not accompanied by cough or sputum. No active skin lesions were noted and his AV fistula showed no signs of inflammation or infection. White cell count and C-reactive protein remained elevated. Blood, sputum and urine cultures were repeated but no microorganism was isolated. Follow-up chest film revealed a left-sided pleural effusion (Fig. 1). Abdominal ultrasonogram was done (Fig. 2), which confirmed the presence of left-sided pleural effusion as well as infra-diaphragmatic fluid and a splenic cyst. Diagnostic chest tapping yielded serous pleural fluid. Subsequently, abdominal computed tomography (CT, Fig. 3) was done and under CT-scan guided aspiration, pus was drained from the splenic cyst. Thus, splenic abscess was diagnosed and antibiotic therapy was shifted to IV meropenem. Echocardiography was done to rule out heart failure and endocarditis; no abnormalities were noted. The diagnosis was discussed with the patient and his immediate family, and splenectomy was advised which was done on the 17th hospital day. An abscess measuring 4 cm × 3 cm × 1.3 cm with rupture to the surface was noted. (Fig. 4) Histopathology showed an abscess with central hemorrhagic necrosis infiltrated by polymorphonuclear cells (Fig. 5).

His condition gradually improved and he finally became afebrile on the 20th hospital day (3 days post-splenectomy). Aerobic culture of the splenic abscess isolated Serratia marcesens which was sensitive to the IV antibiotics used. Tip culture of a central venous catheter (which was not used for hemodialysis) isolated vancomycin-resistant Enterococcus fecalis (VRE). Stool culture likewise isolated VRE but urine culture failed to isolate any microorganism. Sputum culture isolated Pseudomonas aeruginosa, which was the same organism isolated from the pus in his ears, but he had no signs of pneumonia. Antibiotic therapy with IV meropenem was continued for 2 weeks after splenectomy. He improved and was discharged on the 14th post-operative day.

Fig 1. (A) Chest X-ray at the time of admission; (B) Elevated left hemidiaphragm and left pleural effusion
Fig 2. Hypoechoic ovoid-shaped area in the spleen, with irregular poorly-defined borders and varying internal echogenicity; splenic abscess or infected cyst was suspected.

Fig 3. Homogeneous low-density area; lucent areas within the spleen containing fluid with sub-capsular extension
Discussion

Our patient had poorly controlled diabetes mellitus with ESRD and was on long-term hemodialysis via a native arteriovenous fistula. He also had chronic otitis media (COM), which had been partially treated with antibiotics prior to this admission. Initial IV antibiotic therapy was targeted to control infection related to COM. However, after 2 weeks of such antibiotic therapy, persistent fever accompanied by left-sided chest pain and left pleural effusion prompted further investigation. Abdominal sonogram and computed tomography were done and a splenic cyst was found from which pus was aspirated. Thus, a diagnosis of splenic abscess was established.

Fever of unknown origin (FUO) is a common problem in patients on long-term dialysis due to their immunocompromised status. These patients (especially the elderly) with concomitant diabetes mellitus' and poor
nutritional status are particularly susceptible to septicemia. Although splenic abscess is rare in patients on long-term dialysis, catheter-related staphylococcus and salmonella septicemia and septic embolization from infective endocarditis are common sources of splenic abscess in these patients. Echocardiography in our patient showed preserved systolic function and no evidence of vegetations and the microorganism isolated from a central line catheter (not used for hemodialysis) was VRE, not Serratia marcescens, which was the organism cultured from the splenic abscess.

Clinically, patients with splenic abscess present with fever (> 90%), abdominal pain (> 50%) and LUQ tenderness (> 40%), which usually lasts for 2-4 weeks or longer (subacute in nature). Anorexia and malaise may also be present, and most patients have leukocytosis. The localizing signs of splenic abscess may not be apparent in most patients. Our patient presented with fever and left-sided pleural effusion but no abdominal symptoms were noted.

Although many diseases can cause pleural effusion, more than 90% of all pleural effusions result from one of the five conditions. Among these, congestive heart failure and hypoalbuminemic states (e.g., cirrhosis) typically cause transudative effusions, whereas cancer, infection, and pulmonary embolism typically cause exudative effusions. Diagnostic chest tapping in this patient yielded serous pleural fluid but since he had persistent fever and the pleural effusion was confined to the left side, infection remained the primary consideration in our patient.

The clinical manifestations of occult infections are frequently non-specific in immunocompromised and high-risk patients. Thus, fever and left-sided pleural effusion in such a patient warrant further investigation, using abdominal computed tomography or magnetic resonance imaging, to search for occult infections such as splenic abscess. With CT scanning, splenic abscess may appear as gas, or subcapsular extension with free adjacent fluid. Early empirical parenteral broad-spectrum antibiotic therapy after blood cultures have been drawn is life-saving. Aside from the commonly associated microorganisms, therapy directed against mycobacteria, Candida, fungal abscesses and Aspergillus should also be considered in immunocompromised patients.

The spleen is an uncommon site of abscess formation. Multilocular abscesses are frequently encountered in younger patients who are often immunosuppressed or have problems with drug abuse. In contrast, a unilocular splenic abscess is the most common presentation in patients more than 70 years old, and diabetes mellitus is the most common comorbidity. The mortality rate is high and may be 100% if the splenic abscess is not detected and treated promptly.

Common causes of splenic abscess include metastatic bactereemic spread (e.g., infective endocarditis, otitis, pneumonia), contiguous spread (e.g., pancreatic infection or cancer, gastric ulcer or cancer, perihepatic abscess, subphrenic abscess, diverticulitis), traumatic injury, hematologic disorders (e.g. collagen-vascular diseases, sickle cell anemia), and states of immunodeficiency as in AIDS, chemotherapy, cancer, long-term steroid use, diabetes mellitus, and alcoholism.

The most common organisms isolated from splenic abscesses are Staphylococcus aureus, Streptococci and Enterobacteriaceae. Serratia marcescens is a Gram-negative, rod-shaped bacterium that belongs to the family of Enterobacteriaceae. It is commonly involved in nosocomial infections, particularly catheter-related bacteremia, urinary tract infections, and wound infections. To date, Serratia marcescens is not a well-known cause of splenic abscess in most literature reviews. The only case report of splenic abscess due to Morganella morganii and Serratia marcescens infection has recently been described in a hemodialysis patient who initially presented with unexplained pleural effusion. Our patient had chronic otitis media and concomitant splenic abscess. Serratia marcescens was cultured from the splenic abscess but blood culture was sterile. Blood culture is reported to be positive only in 59.7% of patients and the same microorganism was isolated from both blood and splenic abscess cultures in 74% of patients. We suspect that prior antibiotic treatment for COM may be the reason why blood culture failed to isolate any microorganism in our patient. Vascular access for hemodialysis in our patient was via a native arteriovenous fistula, which showed no signs of inflammation or infection. Culture of a central venous catheter (which was not used for hemodialysis) isolated VRE. Stool culture likewise isolated VRE and urine culture failed to isolate any microorganism. We have not found another focus of infection due to Serratia marcescens in our patient.

Percutaneous drainage is indicated for easily accessed uniloculated or bilocular abscesses and in patients with high surgical risks. Splenectomy is the standard procedure for complete removal of splenic abscesses. Open splenectomy enables removal of the septic source and coexisting septic collections. Laparoscopic splenectomy is safe but patients should be in relatively stable condition. Open splenectomy was chosen for our patient who was relatively high risk and immunocompromised, and after Serratia marcescens was cultured isolated from the splenic abscess, parenteral antibiotic therapy was directed against this pathogen. Tight glycemic control was also implemented.

In conclusion, when patients on long-term dialysis...
present with unexplained fever, there is always the possibility of a systemic (and occult) source of infection. In patients presenting with fever and left-sided pleural effusion, the possibility of an occult splenic abscess should always be kept in mind.

REFERENCES