



Repeated Arthrocentesis in a Cirrhotic Patient: A Rare Case of *Klebsiella Pneumoniae* Septic Arthritis of the Knee

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Klebsiella pneumoniae septic arthritis in elderly patients with liver cirrhosis is rare. We describe a 65-year-old cirrhotic male who suffered initially from bronchopneumonia. However, a painful disability of the left knee developed three days later. *K. pneumoniae* was immediately cultured from the blood and then isolated from the joint fluid two weeks later by repeated arthrocentesis. Arthroscopic irrigation with closed tube drainage was arranged immediately with good recovery. These findings highlight the importance of repeated synovial fluid analyses in cirrhotic patients with septicemia and persistent swollen, painful joints for early diagnosis of septic arthritis. Here, we report a rare case of *K. pneumoniae* septic arthritis of the knee in a cirrhotic patient.

Key words: Septic arthritis, *Klebsiella pneumoniae*, liver cirrhosis, arthrocentesis

INTRODUCTION

Septic arthritis is usually the result of hematogenous spread to the joint and the predisposing factors in adults include old age, diabetes, rheumatoid arthritis, prosthetic joint, recent joint surgery, malignancy, hemodialysis, alcoholism, glucocorticoid therapy, and AIDS.^{1,2} Moreover, investigations of extra-articular infections such as skin, urinary tract, gastrointestinal tract and respiratory system are likely to facilitate the identification of the infection organism.

Gram-negative organisms such as *Klebsiella* spp. are a rare cause of septic arthritis in adult patients. In this report, we describe a case of *K. pneumoniae* septic arthritis in a 65-year-old patient with alcoholic liver cirrhosis and type 2 diabetes mellitus who initially presented with bronchopneumonia and was diagnosed by repeated synovial fluid analyses.

CASE REPORT

A 65-year-old married Taiwanese man with 30-year alcohol consumption, a half-year history of alcoholic liver cirrhosis, a 3-year history of diabetes mellitus and hypertension fairly controlled by oral medications presented at our hospital. Prior to this, he had been admitted to a different hospital due to the following symptoms: productive cough with yellowish sputum, fever of 40.6 °C accompanied by chills and progressive distention of the abdomen. Three days later, he developed a painful swelling and hotness of the left knee. Radiographs of the chest and clinical symptoms led to the diagnosis of bronchopneumonia. The sputum cultures revealed normal pharyngeal flora. Results of blood cultures revealed infection with *K. pneumoniae*, which was sensitive to a first-generation cephalosporin. Thereafter, the patient was administered intravenous cefoxitin and oral erythromycin for 10 days. Owing to persistent fever and painful sensation over the left knee, the patient decided to transfer to our hospital for further management. The temperature at admission was 37.7 °C; pulse rate, 76/min; respiration rate, 18/min; and blood pressure, 149/71 mmHg. Physical examination revealed rales over the bilateral lower lung zone predominantly on the right side, icteric sclera, distended abdomen, pitting edema over bilateral legs with swelling and hotness of the left knee. Abdominal sonography showed coarse and irregular contours of the liver with splenomegaly and moderate ascites, which are

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compatible with liver cirrhosis. Laboratory investigations revealed a hemoglobin level of 14.6 g/dL, a white blood cell (WBC) count of 10800/ μ L with 82.3% polymorphonuclear leukocytes (PMNs), and a platelet count of 146,000/ μ L. The C-reactive protein level was 8.91 mg/dL. The erythrocyte sedimentation rate (ESR) was 60 mm/h. The prothrombin time was 12.8 seconds (1.2 is the international normalized ratio), and the partial thromboplastin time was 30.1 seconds (vs. a control of 28.7 seconds). The hemoglobin A1c (HbA1c) was 7.6%. The blood chemistry results were as follows: aspartate aminotransferase (AST) 125 IU/L, alanine aminotransferase (ALT) 77 IU/L, alkaline phosphatase 153 IU/L, total bilirubin 3.6 mg/dL, direct bilirubin 1.3 mg/dL, albumin 2.2 g/dL, blood urea nitrogen 15 mg/dL, creatinine 0.7 mg/dL, sodium 129 mEq/L, and potassium 4.9 mEq/L. The hepatitis B surface antigen was negative. Anti-hepatitis C viral antibody was negative. Alpha-fetoprotein was 4.89 ng/mL.

Aspiration of the ascites revealed xanthochromic fluid with a total white blood cell (WBC) count of 64/ μ L with 3% PMNs, red blood cell count of 228/ μ L, and albumin < 1.0 g/dL. The serum-ascites albumin gradient exceeded 1.2 g/dL. The ascites fluid total protein level was 470 mg/dL. The Gram stain and culture of ascites were negative. Initially, the aspiration of the left knee joint revealed a WBC count of 2000/ μ L (95% PMNs), no urate crystals and Gram stain, while culture of synovial fluid showed no bacterial infection. *K. pneumoniae* bacteremia was noted from the results of blood culture examinations conducted in the previous hospital. Thereafter, antibiotics therapy with intravenous piperacillin 4 gm q8h and tazobactam 500 mg q8h was prescribed. Methicillin-Resistant *Staphylococcus aureus* (MRSA) was detected in the sputum culture, while *K. pneumoniae* was cultured in the blood sample again. The patient received additional antibiotic with intravenous teicoplanin 400 mg qd. However, the patient still presented with intermittent high-grade fever and persistent swelling, hotness and tenderness over the left knee. We arranged for another arthrocentesis 4 days later after the first one. The second aspiration of the left knee revealed a WBC count of 105000/ μ L (97% PMNs) and Gram stain disclosed Gram-negative bacilli. The patient immediately received arthroscopic irrigation with closed tube drainage. The culture of synovial fluid further showed *K. pneumoniae* that was susceptible to cefazolin, gentamicin, amikacin, ampicillin/sulbactam, piperacillin, ceftazidime, ceftriaxone, cefepime, and ertapenem. Thereafter, intravenous ceftriaxone (1.0 gm every 12 hours) was administered for

two weeks and then changed to oral ceftibuten (200 mg every 12 hours) for an additional one week. Symptoms of fever, swelling, and tenderness over the left knee subsided. The knee strength and motion gradually improved and the patient became ambulatory without limited movement of the knee joint.

DISCUSSION

K. pneumoniae is a Gram-negative, non-motile, encapsulated, rod-shaped bacterium found in the normal flora of the human mouth and intestine. The incidence of *K. pneumoniae* bacteremia increases in individuals with diabetes mellitus or alcoholism.^{3,4} Community-acquired infections of *K. pneumoniae* are less common, but are significantly more common in diabetic patients from East Asia, particularly Taiwan with high incidence of primary liver abscess.⁵ One study of *K. pneumoniae* bacteremia in diabetic patients of northern Taiwan disclosed that the most common infectious sources in the community-acquired group are intra-abdominal infections, including pyogenic liver abscess formation, but there are still some cases of undetectable primary site of infection (12/174; 7%) when the blood culture was positive for *K. pneumoniae*, just as that in our patient.⁶ We present a case of community-acquired *K. pneumoniae* bacteremia with manifestations of bronchopneumonia and newly developed sterile ascites. This represents a rare case, as the patient developed subsequently hematogenous *K. pneumoniae* septic arthritis without a liver abscess or spontaneous bacterial peritonitis.

The patient initially presented with symptoms of respiratory tract infection and no definite pathogen was cultured. He was transferred to our hospital after 10-day hospitalization and then Methicillin-Resistant *Staphylococcus aureus* (MRSA) was detected in the sputum. Since recent antibiotic use and prolonged hospitalization are strongly related to the risk of MRSA colonization and infection,⁷ it is hard to define whether the patient suffered from a MRSA infection or colonization. Even if the patient had a possible concurrent infection of MRSA, it is unusual that the patient suffered from septic arthritis caused by *K. pneumoniae*, which is a rare pathogen, but not from staphylococcus aureus, which is a relatively common pathogen.

Septic arthritis may cause serious immobility due to the destruction of the joint. Early diagnostic arthrocentesis with adequate antibiotic use, surgical joint lavage and adequate drainage should be considered the mainstay of treatment.^{8,9} In our case, septic arthritis was diagnosed at

the second arthrocentesis. The fever and tenderness over the left knee subsided after arthroscopic irrigation with a closed tube drainage. Cases of spontaneous bacterial arthritis in cirrhotic patients with bacteremia have previously been described.^{4,10-12} Therefore, we recommend that repeated synovial fluid analyses should be performed in cirrhotic patients with persistent septicemia and swollen, painful joints.

The frequency of iatrogenic post-arthrocentesis septic arthritis is about 0.037% and the predominant pathogen is still *Staphylococcus aureus* (70%).¹³ Coupling the clinical presentation of joint swelling before the first arthrocentesis and the later synovial culture of *K. pneumoniae*, the possibility of bacterial inoculation during the first arthrocentesis is rare.

In summary, we have described a case of community-acquired *K. pneumoniae* bacteremia in a cirrhotic patient with an initial manifestation of bronchopneumonia and the unusual development of septic arthritis diagnosed by repeated synovial fluid analyses. In our patient, it is noteworthy that the early diagnostic arthrocentesis with immediate arthroscopic irrigation, drainage and adequate antibiotic use are important in controlling the infection and preventing the limitation of movement of the knee joint. Our report highlights the necessity of repeated synovial fluid analyses in cirrhotic patients. We further present a rare case of hematogenous spread of *K. pneumoniae* septic arthritis.

FINANCIAL DISCLOSURE

There was no conflict of interests in this article.

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