Reminder of important clinical lesson

A hot, swollen joint in a cirrhotic patient

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Summary

Septic arthritis in the elderly carries a high mortality. Underlying risk factors, such as diabetes, malignancy, chronic renal failure, rheumatoid arthritis, hepatobiliary disease and AIDS, should be assessed. Rare causative organisms are occasionally encountered. Here, we describe a case of an 80-year-old diabetic patient with liver cirrhosis who developed *Klebsiella pneumoniae* septic arthritis, which is a rare cause of joint infection. We postulate that this case supports the notion that the patient's knee effusion seeded during a primary *K pneumoniae* bacteraemia of intestinal origin and related to liver cirrhosis.

BACKGROUND

A rare causative organism for joint infection in a cirrhotic patient is presented in this report. Pathogenesis is discussed and key principles of management of septic arthritis in general as outlined by the British Society of Rheumatology are highlighted. Septic arthritis continues to be a common and serious problem associated with significant morbidity and mortality. Despite improved antimicrobial agents and hospital care, the mortality and morbidity of septic arthritis have not changed appreciably in the past two to three decades. This is thought to be largely due to the delay in making the correct diagnosis. Thus, this case report serves as a reminder of the management of an important clinical condition and suggests possible pathogenesis of the condition caused by an uncommon causative organism.

CASE PRESENTATION

An 80-year-old gentleman presented with sudden-onset right-sided upper abdominal pain for 1 day. He also had a swollen and tender right leg for the previous 3–4 days following a fall. Additionally, the patient had experienced weight loss and night sweats. Medical history included variceal haemorrhage, type 2 diabetes mellitus, transient ischaemic attack, left knee replacement and chronic liver disease. There was no history of recent alcohol abuse, blood transfusion, intravenous drug abuse or high-risk sexual encounters and no significant travel history.

On admission, he was pyrexial (37.5°C), blood pressure was 114/54 mm Hg, pulse 81 bpm regular, respiratory rate 15 with no icterus and no peripheral lymphadenopathy. Clinical examination revealed minimal right upper quadrant abdominal tenderness on deep palpation but no rebound tenderness. Splenomegaly was not clinically detectable. Normal bowel sounds were audible. The significant finding was a swollen, warm, erythematous right knee joint with tenderness on palpation. A patellar tap was positive indicating a right knee effusion. An x-ray of the right knee revealed no fracture and no chondrocalcinosis but mild osteoarthritic changes.

Laboratory investigations revealed a haemoglobin (Hb) of 11.6 g/dl and a white cell count of $9.5 \times 10^9/l$ with raised neutrophils at $7.6 \times 10^9/l$. The platelet count was depressed at $62 \times 10^9/l$, C reactive protein (CRP) 40, alanine transaminase (ALT) 58 IU/l, alkaline phosphatase (ALP) 113 IU/l, total bilirubin 34, albumin 28, estimated glomerular filtration rate (eGFR) 42, creatinine 141, sodium 130 and potassium 4.6. α -fetoprotein (AFP) was raised at 242 but serum ferritin was in the normal range at 216 $\mu g/l$.

Aspiration of the right knee effusion revealed a turbid, cloudy yellow fluid with leucocytes ++ and a gram stain revealed gram negative rods identified as *Klebsiella pneumoniae*, which was sensitive to co-amoxiclav, ceftriaxone, tazocin and timentin. Culture report confirmed identification of *K pneumoniae* (phenotype unavailable). Unfortunately, no blood cultures were taken, but the results of joint fluid culture were reviewed with a consultant microbiologist who suggested that since gram negative rods were seen on gram stain and a heavy growth of *K pneumoniae* was obtained on direct culture, there is ample evidence to indicate *K pneumoniae* as the causative organism for septic arthritis. However, it is important to stress that in cases of septic arthritis, the causative organism should ideally be isolated from both blood and joint fluid. The patient was commenced on a 5-day course of intravenous timentin 3.2 g three times daily. This was followed up by a course of oral co-amoxiclav following discharge. The patient responded to antibiotic therapy and the temperature, swelling, redness and tenderness improved.

Here, we present a case of septic arthritis due to *K pneumoniae* in a cirrhotic patient, which is an extremely unusual causative organism for joint infection.

INVESTIGATIONS

Laboratory investigations revealed blood test results as outlined above.

An x-ray of the right knee revealed no fracture and no chondrocalcinosis but mild osteoarthritic changes.

As previously mentioned, aspiration of the right knee effusion revealed a turbid, cloudy yellow fluid with leucocytes ++ and a gram stain revealed gram negative rods identified as *K pneumoniae*, which was sensitive to co-amoxiclav, ceftriaxone, tazocin and timentin. No crystals were identified on polarised light microscopy of joint fluid.

The patient's AFP was found to be raised at 242 and a recent CT scan showed cirrhotic changes in the liver with an enlarged spleen and a low-density lesion in the right lobe of the liver suggestive of a possible neoplastic lesion. An abdominal ultrasound showed a single solid lesion in the right lobe of the liver. The liver had a coarse echogenicity consistent with cirrhosis and a solitary gallstone was visible. No intrahepatic biliary dilatation was present. The spleen appeared bulky with a homogeneous appearance and was enlarged measuring 14 cm. No other abnormalities were seen.

DIFFERENTIAL DIAGNOSIS

- ▶ Septic arthritis
- ▶ Fracture
- ▶ Crystal arthropathy, for example, pseudogout
- ▶ Inflammatory arthropathy, for example, rheumatoid arthritis
- ▶ Reactive arthritis.

TREATMENT

The patient was commenced on a 5-day course of intravenous timentin 3.2 g three times daily. This was followed up by a course of oral co-amoxiclav following discharge. The patient responded to antibiotic therapy and the temperature, swelling, redness and tenderness improved.

OUTCOME AND FOLLOW-UP

The patient underwent further investigation of the lesion in the R lobe of his liver and liver biopsy at King's College Hospital; the findings were consistent with hepatocellular carcinoma. The patient re-presented to the hospital on 1 February 2010 with fever and confusion. Blood cultures confirmed MRSA septicaemia. Despite treatment with tazocin and then teicoplanin, the patient remained persistently confused and increasingly drowsy. A Liverpool care pathway was initiated but he unfortunately died on 11 February 2010.

DISCUSSION

Data on the aetiology of septic arthritis indicate that gram-negative rods are uncommon causative organisms (table 1).¹

K pneumoniae septic arthritis in the elderly is particularly uncommon.^{2,3} One should consider whether there are any host risk factors predisposing to this type of infection. It is known that the incidence of septic arthritis is increased in individuals with impaired host defences, for example, in conditions such as diabetes, malignancy, alcoholism, hepatobiliary disease, chronic renal failure, glucocorticoid therapy and AIDS.⁴ One study showed that in a series of 101 patients with *Klebsiella* bacteraemia, 36% had underlying diabetes and 26% had underlying malignancy.⁵ Thus, our patient discussed above with a history of liver cirrhosis, diabetes and chronic renal failure is perhaps a likely candidate for *K pneumoniae* infection.

It is known that spontaneous bacterial arthritis is a rare complication of bacteraemia in cirrhotic patients,⁶ with the knee joint being most commonly affected. It has been postulated that the mode of infection in cirrhotic patients is haematogenous spread following bacteraemia.⁷

Spontaneous bacterial peritonitis is not uncommon in patients with liver cirrhosis and in the majority of cases, the causative organisms are of enteric origin. The three most common isolates from the ascitic fluid of such patients are *Escherichia coli*, *K pneumoniae* and the pneumococci.⁸ In the case presented, we isolated *K pneumoniae* from the joint fluid. We therefore feel that this case supports the notion that the patient's knee effusion seeded during a primary *K pneumoniae* bacteraemia of intestinal origin and related to liver cirrhosis.

Septic arthritis continues to be a common and serious problem associated with significant morbidity and mortality. In a review by García-De la Torre⁹, it is reported that the yearly incidence of native joint bacterial arthritis varies from 2 to 10 per 100 000 in the general population. Irreversible loss of joint function has been postulated to occur in up to 50% of affected patients and the case fatality rate is 11%.¹⁰ Despite improved antimicrobial agents and hospital care, the mortality and morbidity of septic arthritis have not changed appreciably in the past two to three decades. This is thought to be largely due to the delay in making the correct diagnosis.⁹ Important differential diagnosis must initially be considered; for example, our patient had an x-ray of the right knee, which revealed no fracture or chondrocalcinosis, but mild osteoarthritic changes were seen. Additionally, no crystals were identified on polarised light microscopy of joint fluid, making crystal arthropathy unlikely. Rheumatoid arthritis or other inflammatory arthropathy also requires consideration but in the absence of other small joint involvement (especially finger joints) and no symmetrical disease pattern, rheumatoid arthritis is particularly unlikely.

When septic arthritis is suspected, arthrocentesis, culture and gram stain of the synovial fluid are the gold standard before antibiotics are commenced in accordance with guidance from the British Society for Rheumatology.¹⁰

In conclusion, we report a case of septic arthritis caused by *K pneumoniae* in a cirrhotic patient, a rare cause of joint infection. We postulate that this case supports the notion that the patient's knee effusion seeded during a primary *K pneumoniae* bacteraemia of intestinal origin and related to liver cirrhosis. In patients with cirrhosis and fever, a high index of suspicion is required for joint infection to be

Table 1 Organisms isolated in 2407 cases of septic arthritis, no. (%)

Organism	Isolates, no. (%)
<i>Staphylococcus aureus</i>	1066 (44)
<i>Streptococcus pyogenes</i>	183 (8)
<i>Streptococcus pneumoniae</i>	156 (6)
<i>Mycobacterium tuberculosis</i>	101 (4)
<i>Escherichia coli</i>	91 (4)
<i>Neisseria gonorrhoeae</i>	7 (3)
Other gram-negative rods	110 (5)
Polymicrobial	33 (1)
Fungi	4 (<1)
Data adapted from ref. 9.	

considered as a potential cause of fever or deterioration in the cirrhotic patient's general condition. Prompt and adequate treatment improves both mortality and morbidity.

Learning points

- ▶ Septic arthritis in the elderly carries a high morbidity and mortality.
- ▶ A high index of suspicion is required for diagnosis and arthrocentesis, culture and gram stain are crucial.
- ▶ Rare causative organisms are occasionally isolated.
- ▶ Prompt and adequate treatment improves both mortality and morbidity.

Competing interests None.

Patient consent Not obtained.

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