CASE REPORT

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Morganella morganii osteomyelitis complicated by secondary septic knee arthritis: a case report

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Morganella morganii is a gram-negative, facultative anaerobic bacillus whose natural habitat is the gastrointestinal system. While it rarely causes infection alone, it is generally encountered in people with suppressed immunity and in cases of hospital infection. It may also manifest itself as a superinfection. *Morganella morganii* often demonstrates a course characterized by slow-paced progression with occasional attacks and remissions. Osteoarticular pathologies are not commonly observed in *Morganella morganii* infections and it has a high mortality rate. We present a 56-year-old male patient with *Morganella morganii* osteomyelitis in the distal femur and proximal tibia, complicated by septic arthritis in the knee joint.

Key words: Knee; *Morganella morganii;* osteomyelitis; septic arthritis.

Osteomyelitis is a progressive disease caused by damage suffered by the osseous tissue due to infectious and inflammatory processes evoked by a microorganism.[1] Many microorganisms can lead to osteomyelitis, however, the most commonly encountered pathogen is *Staphylococcus aureus.* Rarely, septic arthritis may follow osteomyelitis due to dissemination of the osteomyelitis into the adjacent joint. Septic arthritis is a serious infection caused by pyogenic microorganisms which can lead to critical permanent injuries due to loss of joint function, and it exhibits a varying distribution of pathogens with regard to age groups.[2-4] *Morganella morganii*, an opportunistic infection that particularly affects immunosuppressed patients and localizes in the normal colonic mucosal flora, is not a common pathogen observed both in osteomyelitis and septic arthritis.[5,6]

We present a case of rare chronic osteomyelitis case caused by *Morganella morganii* in the femur and tibia, and subsequent development of septic arthritis secondary to osteomyelitis.

Case report

A 56-year-old male patient presented to our clinic with increasing pain and swelling in the left knee which had begun one week earlier. Physical examination revealed erythema, elevated temperature and effusion in the left knee. There was a limitation of 30 degrees in flexion during full extension. The patient had been followed-up for the previous 2 years due to frequently recurring urinary tract infections, secondary to bilateral nephrolithiasis. He had been hospitalized approximately 6 months earlier and received wound debridement due to a diagnosis of scrotal abscess and Fournier gangrene manifesting with elevated temperature, confusion, and swelling in the scrotal region. The analysis of the abscess material and the urinary culture exhibit-

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Fig. 1. **(a, b)** Cystic and lytic lesions extending towards the diaphysis from the distal metaphysis of the left femur and proximal metaphysis of the left tibia along with an appearance of the medial cortex of distal metaphysis in left femur consistent with periosteal reaction.

ed *Morganella morganii* growth. Radiographic evaluation of the left knee displayed diffuse lytic and cystic lesions consistent with periosteal reaction over the distal femur and proximal tibia (Fig. 1).

The aspirated material was observed to be hemopurulent (Fig. 2) and microscopic examination of the fluid revealed elevated WBC and erythrocyte levels. Complete blood count results were as follows: C-reactive protein (CRP) of 22.2 mg/l; erythrocyte sedimentation rate (ESR) of 107 mm/h, and WBC of 12,400/mm. Arthroscopic drainage and irrigation were applied on the knee. The aspiration material was cultured in blood agar and eosin methylene blue (ESB) and *Morganella morganii* growth was determined on the third day. Antibiotic sensitivity testing revealed that the pathogen was resistant to trimethoprim/sulfamethoxazole, cefuroxime, ciprofloxacin, gentamicin, ampicillin/sulbactam and amoxicillin/clavulanic acid and was sensitive to amikacin, cefotaxime, and cefaperazone/sulbactam. Following culture antibiogram, intravenous therapy with piperacillin/tazobactam (2.25 g at every 6 hours) was begun. Magnetic resonance images of the patient showed signs consistent with osteomyelitis associated with bone infarct over the diaphyso-metaphyseal region in the distal portion of the left femur and the diaphyso-metaphyseal region in the proximal portion of the left tibia (Fig. 3).

Fig. 2. View of the intra-articular aspiration material. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

While the patient was on antibiotherapy, no improvement was observed in the laboratory tests carried out at the end of first week (WBC: 12,000/mm; ESR: 149 mm/h; CRP: 23.6 mg/l). Guttering was planned for the osteomyelitis in the femur and tibia. By performing a longitudinal incision proximal to the left tibia, a gutter was created longitudinally across the proximal metaphysis of the tibia. Materials were acquired from the infection site for histologic and microbiologic analyses, and medullary drainage was performed (Fig. 4). Debridement was applied over the surgical site and then washed with saline. However, the patient's overall condition declined and the operation was ended without any intervention on the femoral

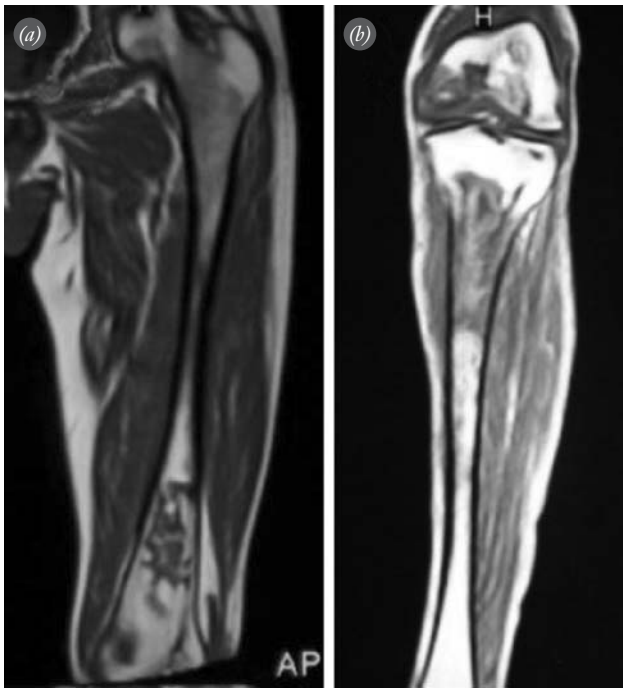

Fig. 3. Coronal T1-weighted MR images displaying **(a)** osseous infarct lesions over the diaphyso-metaphyseal region of the distal portion of the left femur and diffuse bone marrow edema over the medial condyles and **(b)** bone infarct lesions extending across the metaphyso-diaphyseal region of the proximal portion of the left tibia, along with diffuse edematous appearance in the adjacent soft tissues and periosteal elevation in the medial aspect at the metaphyseal level.

lesion. The patient's renal functions further declined (fasting blood sugar: 77 mg/dl; urea: 176 mg/dl; creatinine: 5.4 mg/dl; sodium: 138 mEq/L; potassium: 6.54 mEq/L) during follow-up, along with manifestation of elevated temperature, disorientation, confusion, and agitation. Subsequently, the patient was subjected to dialysis. He developed cardiopulmonary arrest and did not respond to interventions and, as a result, passed away. Microbiologic analysis of the materials (bacterial, fungal, and microbacterial cultures) acquired from the lesion intraoperatively revealed *Morganella morganii* growth which was consistent with the result of the previous culture.

Discussion

Morganella morganii is a gram-negative, facultative, anaerobic, non-lactose fermenting, urease-positive microorganism from *Enterobacteriaceae* family. It is found in the natural flora of the gastrointestinal system. The infection usually shows a slow-paced progression with remissions and attacks.[5-8]

Osteoarticular pathologies caused by *Morganella morganii* are rarely encountered. There have been 7 cases reported in the literature, of which the majority include sporadic septic arthritis without bone involvement in diabetic patients.[8-14]

Immunosuppression, long-term urinary catheterization, diabetes, rheumatoid disease, alcoholism, corticosteroid therapy, malignancy, intravenous drug use, and surgical interventions are predisposing factors for *Morganella morganii* infection.[7,8] Patients with one or more of those risk factors demonstrate high mortality.[7] *Morganella morganii* infection is usually encountered in patients with a history of urinary catheterization and may lead to sepsis, pneumonia, wound site infection, postoperative infection and meningitis.[5]

Factors such as local events in the bone tissue and suppressed systemic immune mechanism play an important role in the formation of bone infection.[1] In our case, we considered that the underlying reason of the osteomyelitis associated with *Morganella morganii* was the history of frequent urinary tract infections.

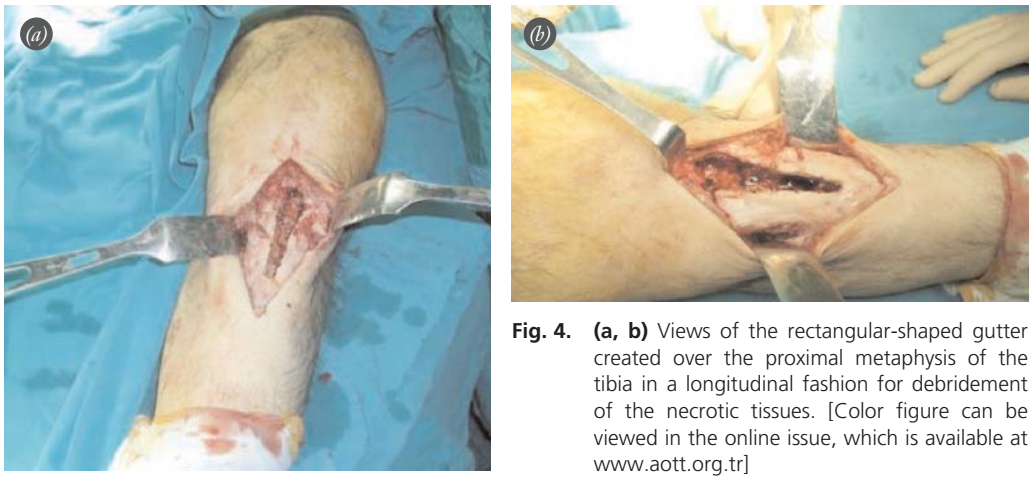

Fig. 4. **(a, b)** Views of the rectangular-shaped gutter created over the proximal metaphysis of the tibia in a longitudinal fashion for debridement of the necrotic tissues. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

The main principles of osteomyelitis treatment are debridement of the necrotic tissues in a radical fashion, filling of the dead space and effective long-term antibiotherapy.[1]

In septic arthritis, bacteria are believed to reach the joint space via hematogenous route. However, as in our case, osteomyelitis affecting a bone adjacent to the joint can also lead to infection of the joint, whereas septic arthritis can as well develop as a result of direct inoculation during surgery or local trauma.[15,16] In non-gonococcal septic arthritis cases the responsible pathogens are often *Staphylococcus aureus* and streptococci; whereas among immunosuppressed patients and intravenous drug addicts, gram-negative bacteria and anaerobes can be seen as pathogens as well.[16] *Morganella morganii* is a rare cause of septic arthritis.

Because the patient passed away, we are unable to provide further information. However, one should bear in mind that in cases of recurring urinary tract infections or nephrolithiasis, *Morganella morganii* may be the responsible pathogen and osteomyelitis or septic arthritis might develop subsequently.

Conflicts of Interest: No conflicts declared.

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