

Osteomyelitis Near the Site of Attachment of the Patellar Tendon to the Tibia Presumably Caused by Cellulitis

Naoto Iura, Takatomo Mine*, Momoko Nakamura, Ryota Sotomaru, Michio Shinohara, Ryutaro Kuriyama, Tetsu Tsubone, Koichiro Ihara and Yuhki Dohi

Department of Orthopaedic Surgery, National Hospital Organization Kanmon Medical Center, Japan

*Corresponding author: Takatomo Mine, Department of Orthopaedic Surgery, National Hospital Organization Kanmon Medical Center, Yamaguchi, Chofusotoura, Shimonoseki, Yamaguchi Japan

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ABSTRACT

Background: Delay in the diagnosis of acute osteomyelitis can result in chronic myelitis, bone deformities, or sepsis. The prompt diagnosis and treatment are crucial.

Case presentation: A 58-year-old man presented with osteomyelitis near the tibial attachment of the patellar tendon, possibly caused by cellulitis. The symptoms were mild inflammatory response. However, imaging studies revealed bone destruction near the patellar tendon attachment of the tibia. Antibiotics were administered intravenously, and hyperbaric oxygen therapy was initiated. Pain was relieved, and C-reactive protein levels normalized. However, 3 weeks later, magnetic resonance imaging revealed enlargement of the high-intensity region near the patellar tendon attachment of the tibia. Therefore, debridement was performed, and an antibiotic-loaded cement was inserted. Antibiotics were administered for approximately 2 months. The symptoms and findings of the right knee disappeared,

Conclusion: Biopsy and bacterial culture should be performed before antibiotic therapy, even if the symptoms are mild, imaging studies can reveal bone destruction.

Keywords: Osteomyelitis; Patellar Tendon; Antibiotic Therapy; Magnetic Resonance Imaging

Abbreviations: CRP: C-Reactive Protein; MRI: Magnetic Resonance Imaging ; MRSA: Methicillin-Resistant Staphylococcus Aureus; MSSA: Methicillin-Sensitive Staphylococcus Aureus; HSS: Knee-Rating Scale Of Hospital For Special Surgery

Introduction

Osteomyelitis is an infectious disease caused by bacteria, mycobacteria, or fungi [1,2]. Infections are complex and have various causes. It can affect individuals of all ages, and care should be taken in cases of diabetes or immunodeficiency [3]. Delays in diagnosis can result in chronic myelitis, bone deformities, skin fistulas and sepsis [1,4]. Therefore, appropriate treatment after diagnosis is important. The most common methods for treating osteomyelitis include antibiotic therapy and surgical intervention. Despite a minor wound above the patella, osteomyelitis can occur near the patellar tendon attachment of the tibia. We present a case of osteomyelitis near the tibial tuberosity associated with a relatively uncommon condition, believed to be cellulitis.

Case Report

A 58-year-old man complained of right knee pain. Two months prior, he was injured slightly in the upper portion of his right knee during fieldwork, which he did not treat seriously. A few days later, he presented with swelling, redness, and pain in the right knee. He underwent slight wound treatment and antibiotic treatment (flemoxin and klavox) for 7 days. Although the symptoms decreased, he still had pain and swelling near the patellar tendon attachment of the tibia, and was referred to our hospital. His medical and family histories were unremarkable. On initial examination, swelling, redness, and localized heat were observed in the left knee joint. The range of motion was full, and there were no signs of damage to the menisci or ligaments. Laboratory tests revealed a hemoglobin level of 14.0 g/dL, white blood cell count of 5500, and C-reactive protein (CRP) lev-

el of 0.32 mg/dL. Plain radiography and computed tomography revealed bone destruction near the patellar tendon attachment of the tibia (Figures 1A & 1B). Magnetic resonance imaging (MRI) revealed a high-intensity region near the patellar tendon attachment of the tibia, and enlargement of the patellar tendon attachment to the tibia on T2-weighted images (Figure 2). Meropenem was administered

intravenously, and hyperbaric oxygen therapy was initiated. However, because of persistent pain, meropenem was changed to daptomycin because of the presence of methicillin-resistant *Staphylococcus aureus* (MRSA). The pain was relieved, and the CRP level normalized. However, 3 weeks later, MRI revealed enlargement of a high-intensity region near the patellar tendon attachment of the tibia (Figure 3).

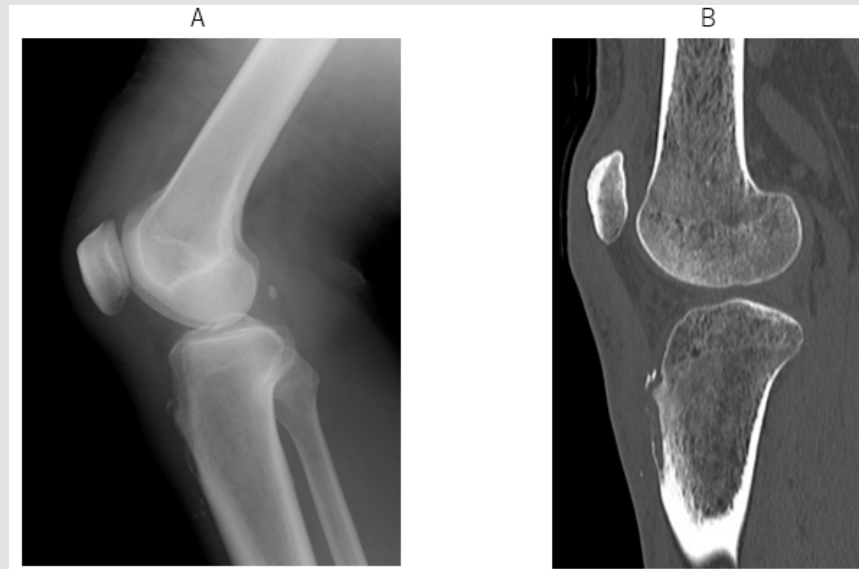


Figure 1:

- A. Preoperative X-ray image
- B. Preoperative CT

The images revealed bone destruction near the patellar tendon attachment of the tibia.

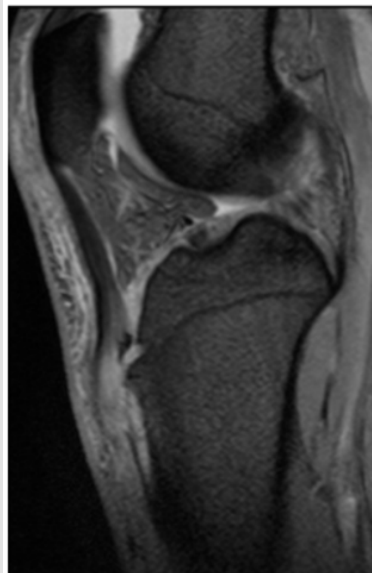


Figure 2: Preoperative MRI (T2-weighted images) MRI revealed a high-intensity region near the patellar tendon attachment of the tibia, and enlargement of the patellar tendon attachment to the tibia.

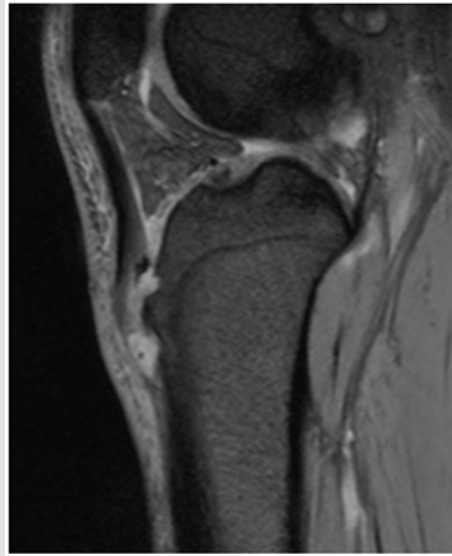


Figure 3: Preoperative MRI (T2-weighted images) after 3 weeks MRI revealed enlargement of a high-intensity region near the patellar tendon attachment of the tibia.

The persistence of the infection was considered. Therefore, debridement and insertion of a vancomycin-containing bone cement were performed (Figure 4). Intraoperative findings showed no abscess formation, but poor granulation tissue in the lesion. Bacterial cultures revealed methicillin-sensitive *Staphylococcus aureus* (MSSA). Intravenous cefazolin was administered for 6 weeks. Two weeks later, the patient reported no pain, and the wound was in good

condition, with no infection. Oral cephalexin was administered for 3 weeks afterwards. After 2.5 months, MRI revealed improvement in a high-intensity region near the patellar tendon attachment of the tibia; however, the patellar tendon attachment enlarged (Figure 5). The symptoms and findings in the right knee disappeared, and the HSS score was 99 points. The patient demonstrated good functioning, and resumed daily activities.



Figure 4: Postoperative X-ray image the image revealed insertion of a vancomycin-containing bone cement.



Figure 5: MRI performed 2.5 months after the operation MRI revealed improvement in a high-intensity region near the patellar tendon attachment of the tibia; however, the patellar tendon attachment enlarged.

Discussion

Osteomyelitis is the inflammation and destruction of bone caused by bacteria, mycobacteria, or fungi [1-3]. It can occur due to various causes, including hematogenous spread, traumatic open fractures, surgical interventions, or contiguous spread from the surrounding soft tissues [1,5]. In the present case, despite a minor wound above the patella, osteomyelitis occurred near the patellar tendon attachment of the tibia. The osteomyelitis region was located away from the wound site. A minor wound on the superior aspect of the right patella has been hypothesized to lead cellulitis, and hematogenous osteomyelitis in the region near the patellar tendon attachment of the tibia. The symptoms of acute osteomyelitis include fever, localized heat, swelling, redness, and tenderness [1,3]. In the present case, the symptoms were mild, probably because the patient was in the subacute stage, and there was no gait disturbance. Laboratory tests revealed that the CRP level was 0.32 mg/dL and the inflammatory response was mild. However, imaging studies revealed bone destruction near the patellar tendon attachment of the tibia. The treatment for acute osteomyelitis involves administering an antibiotic that is effective against both gram-positive and gram-negative bacteria after culture has been performed, until the results of culture and susceptibility testing are available [6,7]. In adults, osteomyelitis often affects the tibia, followed by the femur and knee joint. The most common causative organism is *Staphylococcus aureus* [3-5].

Despite initially receiving the appropriate antibiotics (cephalosporin and levofloxacin), the patient's condition deteriorated between the initial prescription and subsequent follow-up. This process can lead to progressive bone destruction. Meropenem was administered intravenously; however, owing to persistent pain, meropenem was changed to daptomycin, considering the possibility of MRSA. The symptoms decreased, however, an MRI performed 3 weeks after admission revealed enlargement of the osteomyelitis lesion. Intraoperative findings showed no abscess formation, but poor granulation tissue in the lesion. Bacterial cultures revealed MSSA. Even if symptoms are mild, imaging studies reveals bone destruction, and biopsy and bacterial culture should be performed prior to antibiotic therapy, in accordance with the general principles of osteomyelitis treatment. Surgical treatments, such as drainage, debridement and insertion of antibiotic-containing bone cement, coupled with antibiotic administration for 10 days to over 3 months, are common [6,8-10]. This combined approach achieved long-term infection control in 70% - 90% of cases [11]. In this case, the affected area was near the tibial patellar tendon attachment, so there was a possibility that the knee extension mechanism would be impaired during debridement; therefore, care was taken with the location and direction of the debridement. There was no impairment in the knee extension mechanism after the surgery, and the patient demonstrated good functioning, and resumed daily activities.

Conclusion

Early identification of the bacteria causing osteomyelitis and appropriate antibiotic therapy are important for effective treatment. Even if the symptoms are mild, imaging studies can reveal bone destruction, and biopsy and bacterial culture should be performed prior to antibiotic therapy.

Ethics Approval and Consent to Participate

Not applicable.

Human and Animal Rights

No animals/humans were used for studies that are the basis of this research.

Standard Reporting

CARE guidelines have been used for conducting this research.

Acknowledgements

Declared none.

Consent for Publication

We have obtained consent to publish from the patient.

Competing Interests

The authors declare that they have no competing interests.

Availability of Data and Material

Not applicable.

References

- Schmitt SK (2017) Osteomyelitis. *Infect Dis Clin North Am* 31(2): 325-338.
- Kohli R, Hadley S (2005) Fungal arthritis and osteomyelitis. *Infect Dis Clin North Am* 19(4): 831-851.
- Garcia Del Pozo E, Collazos J, Carton JA, Camporro D, Asensi V, et al. (2018) Bacterial osteomyelitis: microbiological, clinical, therapeutic, and evolutionary characteristics of 344 episodes. *Rev Esp Quimioter* 31(3): 2017-2225.
- Kavanagh N, Ryan EJ, Widaa A, Sexton G, Fennell J, et al. (2018) Staphylococcal Osteomyelitis: Disease Progression, Treatment Challenges, and Future Directions. *Clin Microbiol Rev* 31(2): e00084-e00117.
- Sanders J, Mauffrey C (2013) Long bone osteomyelitis in adults: fundamental concepts and current techniques. *Orthopedics* 36(5): 368-375.
- Bury DC, Rogers TS, Dickman MM (2021) Osteomyelitis: Diagnosis and Treatment 104(4): 395-402.
- Mikus JR, Worsham J, Aung H (2013) The role of bone biopsy in osteomyelitis-utility or fatality? *J Vasc Interv Radiol* 24(4): S31-S32.
- Haidar R, Der Boghossian A, Atiyeh B (2010) Duration of post-surgical antibiotics in chronic osteomyelitis: empiric or evidence-based? *Int J Infect Dis* 14(9): e752-e758.
- Spellberg B, Lipsky BA (2012) Systemic antibiotic therapy for chronic osteomyelitis in adults. *Clin Infect Dis* 54(3): 393-407.
- Ciorny G (2011) Surgical treatment of osteomyelitis. *Plast Reconstr Surg* 127 Suppl 1: 190S-204S.
- Walter G, Kemmerrer M, Kappier C, Hoffmann R (2012) Treatment Algorithms for Chronic Osteomyelitis. *Dtsch Arztebl Int* 109(14): 257-264.

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Takatomo Mine. Biomed J Sci & Tech Res



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