



Case Report

Melioidosis-induced septic arthritis of the knee joint after total knee arthroplasty

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A B S T R A C T

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Melioidosis-induced septic arthritis of the knee joint is a rare condition. To date, no study has reported a case of melioidosis-induced septic arthritis of the knee joint after a total knee arthroplasty (TKA). We report a case of a 68-year-old man who presented with pain and swelling in the right knee for 1 week. He had undergone a TKA because of osteoarthritis in his right knee approximately 6 years ago. Radiographs of the right knee joint showed only soft tissue swelling. Fluid aspirated from the affected knee joint was turbid and yellow, suggesting septic arthritis. An arthroscopy with joint debridement was performed, and a pus culture identified *Burkholderia pseudomallei*. The symptoms and signs persisted after the arthroscopic debridement and antibiotic treatment. Consequently, the knee prosthesis was removed. The infection was controlled, and a revision TKA was performed. He was followed up for 1 year, and no symptoms of recurrent infection were observed. We report a rare case of melioidosis-induced septic arthritis of the knee joint after a TKA. Surgical debridement and removal of the prosthesis, followed by antibiotic treatment and a revision TKA, promoted recovery. Melioidosis should be included in the differential diagnosis of a septic knee.

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1. Introduction

Melioidosis is an endemic infectious disease in tropical areas, but it rarely occurs in developed countries.¹ It is caused by the gram-negative bacterium *Burkholderia pseudomallei*. This organism exists in the soil and water in Southeast Asia, northern Australia, and Central America.¹ In melioidosis, abscesses are usually formed in the lung, spleen, and liver. The occurrence of melioidosis-induced septic arthritis is very rare,² particularly in healthy humans who do not have associated risk factors, such as diabetes mellitus or thalassemia.³ We report a case of melioidosis-induced septic arthritis in the knee joint after a total knee arthroplasty (TKA).

2. Case report

A 68-year-old farmer visited our outpatient department (OPD) because he had been experiencing pain and swelling in his right knee for 1 week. The patient did not have any specific medical illness, such as diabetes mellitus or thalassemia. Six years ago, he underwent a TKA of the right knee because of osteoarthritis. The postoperative course was smooth until 2 weeks before his

admission. He had received a superficial laceration over the left lower leg after being kicked by a calf. The wound was treated and sutured at local medical clinics and healed smoothly. Unfortunately, painful swelling in the right knee developed 1 week later. The symptom persisted and progressively worsened.

The patient visited our OPD, where radiographs revealed that the TKA prosthesis was both well aligned and well fixed, but there was soft tissue swelling (Fig. 1). Aspiration of the knee joint fluid produced turbid, purulent pus. The patient was admitted to our hospital. Physical examination of the right knee joint revealed a midline surgical scar, marked tenderness on palpation, local heat, effusion, and erythematous changes. Laboratory tests revealed that the white blood cell count was 12,110/μL and the C-reactive protein (CRP) was 24.7 mg/dL (normal value, <0.8 mg/dL). A pus culture showed the presence of *B. pseudomallei*. Arthroscopic debridement and continuous suction drainage were performed. The patient was treated with intravenous Tatumcef (Ceftazidime) 2 g every 8 hours, oral Bakter (Trimethoprim-sulfamethoxazole 160/800 mg) every 12 hours, and doxycycline 100 mg every 12 hours. After 5 weeks, the CRP level reduced to 8.7 mg/dL, but pus continued to drain through the suction tube. A second operation was performed to remove the prosthesis and insert an antibiotic (ceftazidime)-loaded cement spacer (Fig. 2) into the joint. After 4 weeks, the clinical symptoms improved, and the patient was discharged with prescriptions for oral ciproxin (ciprofloxacin) (500 mg two times a day (b.i.d.)), trimethoprim-sulfamethoxazole (160/800 mg b.i.d.), and Doxymycin

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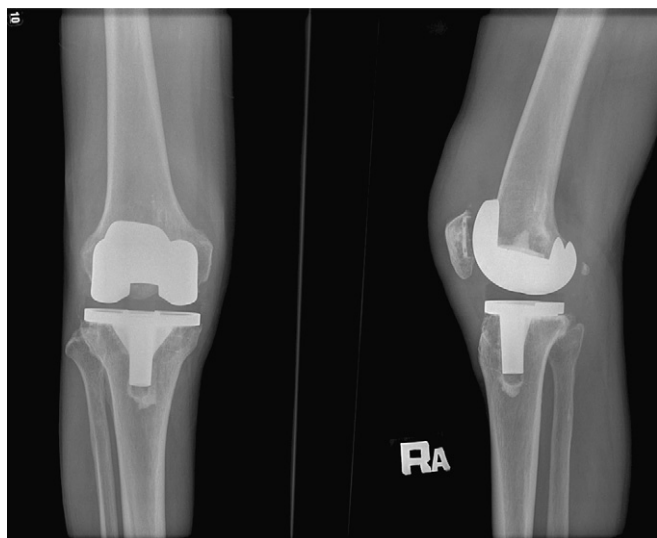


Fig. 1. Radiographs showing good alignment and rigid fixation of the total knee arthroplasty prosthesis on admission.

(doxycycline) (100 mg b.i.d.), to be used for 12 weeks till the local signs of infection had completely subsided and the CRP value was within normal range.

He was readmitted to undergo a revision TKA 2 months after the oral antibiotics were stopped. After this operation, he was treated with intravenous ceftazidime 2 g every 8 hours for 1 week; then, the oral antibiotics listed earlier were used for 8 weeks. The patient was followed up in our OPD every 2 months for 1 year (Fig. 3). There was no sign of recurrent infection, and the knee functioned well.

3. Discussion

Melioidosis is endemic to Southeast Asia and northern Australia.⁴ It is caused by the gram-negative bacterium *B. pseudomallei*. This disease was first reported in Burma by Whitmore and Krishnaswami⁵ in 1912. In Taiwan, the first case of melioidosis was reported in 1985 by Ning Lee.⁶ The patient had contacted the disease through aspiration of river water in a near-drowning incident in Manila and had subsequently developed sepsis. Between 2000 and 2005, 118 cases of melioidosis were reported to the



Fig. 2. Radiographs showing the placement of a cement spacer after removal of the total knee arthroplasty prosthesis.



Fig. 3. Radiographs showing the revision total knee arthroplasty 1 year later.

Taiwan Centers for Disease Control,⁷ with most cases (88%) occurring in southern Taiwan. Among these cases, only two cases of septic arthritis were found. The bacterium *B. pseudomallei* is present in soil and contaminated water; it is transmitted to humans by means of direct skin contact or inhalation.^{8–10} Kosuwon et al¹ reported that diabetes mellitus and thalassemia are the two most significant risk factors for melioidosis. They also reported that the shoulder joint was the most commonly affected. However, cases of melioidosis involving other joints, including the elbow, wrist, hip, knee, ankle, and spine, have also been reported.^{1,3,11–14} This disease affects individuals of all ages, but the peak infection rate is in the 40- to 60-year age group. The incidence is higher in males than in females.¹⁵

In the present case, the patient was a farmer living in Pingtung, southern Taiwan. He did not have the risk factors for melioidosis. He contacted the disease after he was kicked by a calf, receiving a laceration on his left leg. We feel that the right knee joint was infected through hematogenous dissemination, as reported by Raja.¹⁶ To our knowledge, this is the first study to report a case of melioidosis-induced septic arthritis affecting a joint after a TKA. The treatment of musculoskeletal melioidosis usually consists of operative debridement and drainage along with the administration of intravenous antibiotics.^{1,3,15,16} For antibiotic therapy, intravenous administration of ceftazidime is the first choice, followed by oral administration of trimethoprim–sulfamethoxazole and doxycycline.^{5,17,18} However, even after the administration of the appropriate antibiotics, improvement in clinical symptoms is slow.^{17,18} Some studies have suggested that intravenous therapy should continue for at least 10 days.⁵ We believe that the total duration of antibiotic treatment should be 12–20 weeks, and the patients would require life-long follow-up.^{5,18}

In the present case, arthroscopic debridement and continuous suction drainage were performed; intravenous ceftazidime in combination with oral trimethoprim–sulfamethoxazole and doxycycline was administered. If this relatively simple procedure combined with the optimization of antibiotics had worked, we probably could have saved the knee prosthesis. Unfortunately, the signs of infection still had not completely subsided 5 weeks later; hence, the prosthesis was removed, and an antibiotic-loaded cement spacer was placed in the joint. Because this bacterium is so hard to eliminate completely, we decided to perform a two-stage revision procedure instead of a one-stage revision procedure. After the initial operation to remove the prosthesis, the CRP level was examined every week. When the local signs of infection had completely subsided and the CRP value was within normal range, we performed the revision TKA. After this surgery, the patient was

treated with intravenous ceftazidime 2 g every 8 hours for 1 week, and then, the oral antibiotics listed earlier were used for 8 weeks. The CRP value was examined regularly every 2 weeks during follow-up at the OPD. A good clinical outcome was observed during the 1-year follow-up.

Melioidosis-induced septic arthritis is a very rare condition, especially in a knee joint after a TKA, which can only be confirmed by performing a culture of the fluid aspirated from the infection site before or during surgical intervention. A high index of suspicion can help clinicians accurately diagnose this condition in patients presenting with the clinical features of the disease. A two-stage operation may be required in such cases.

References

1. W. Kosuwon, T. Taimlang, W. Sirichativapee, P. Jeeravipoolvarn. Melioidotic septic arthritis and its risk factor. *J Bone Joint Surg Am* 85 (2003) 1058–1061.
2. S. Saengnipanthkul, W. Laupattarakasem, W. Kosuwon, B. Mahaisavariya. Isolated articular melioidosis. *Clin Orthop* 267 (1991) 182–185.
3. J. Thomas, N.V. Jayachandran, P.K. Shenoy Chandrasekhara, V. Lakshmi, G. Narsimulu. Melioidosis—an unusual cause of septic arthritis. *Clin Rheum* 27 (Suppl 2) (2008) 59–61.
4. A. Whitmore, C.S. Krishnaswami. An account of the discovery of a hitherto undescribed infective disease occurring among the population of Rangoon. *Indian Med Gaz* 47 (1912) 262–267.
5. N.J. White. Melioidosis. *Lancet* 361 (2003) 1715–1722.
6. N. Lee, J.L. Wu, C.H. Lee, W.C. Tsai. *Pseudomonas pseudomallei* infection from drowning: the first reported case in Taiwan. *J Clin Microbiol* 23 (1985) 352–354.
7. H.I. Shih, Y.C. Chuang, B.M. Cheung, J.J. Yan, C.M. Chang, K. Chang, N.Y. Lee, et al. Sporadic and outbreak cases of melioidosis in Southern Taiwan: clinical features and antimicrobial susceptibility. *Infection* 37 (2009) 9–15.
8. J.Z. Biegeleisen Jr., M.R. Mosquera, W.B. Cherry. A case of human melioidosis: clinical, epidemiological and laboratory findings. *Am J Trop Med Hyg* 13 (1964) 89–99.
9. E.B. Cooper. Melioidosis. *JAMA* 200 (1967) 452–453.
10. C. Ertug. Melioidosis. *Dis Chest* 40 (1961) 693–697.
11. S.N. Hoque, M. Minassian, S. Clipstone, S.J. Lloyd-Owen, E. Sheridan, M.P. Lessing. Melioidosis presenting as septic arthritis in Bengali men in east London. *Rheumatology* 38 (1999) 1029–1031.
12. W. Kosuwon, S. Saengnipanthkul, B. Mahaisavariya, W. Laupattarakasem, K. Kaen. Musculoskeletal melioidosis. *J Bone Joint Surg Am* 75 (1993) 1811–1815.
13. M.H. Pui, A.P. Tan. Musculoskeletal melioidosis: clinical and imaging feature. *Skeletal Radiol* 24 (1995) 499–503.
14. A.P. Tan, M.H. Pui, L.K. Tan. Imaging patterns in melioidosis. *Australas Radiol* 39 (1995) 260–264.
15. R. Karuppal, A. Marthya, S. Justus, C.M. Kumaran, G. Padinjareyil. *Burkholderia pseudomallei* rare cause for septic arthritis. *Joint Bone Spine* 74 (2007) 659–660.
16. N.S. Raja. Melioidotic septic arthritis: a case report and literature review. *J Microbiol Immunol Infect* 40 (2007) 178–182.
17. D.M. Livemore, P.Y. Chua, A.I. Wong, Y.K. Leung. Beta-lactamase of *Pseudomonas pseudomallei* and its contribution to antibiotic resistance. *J Antimicrob Chemother* 20 (1987) 313–321.
18. N.S. Raja, M.Z. Ahmed, N.N. Singh. Melioidosis: an emerging infectious disease. *J Postgrad Med* 51 (2005) 140–145.