Successful Two Stage Revision for Prosthetic Joint Infection Due to *Candida albicans*: Case Report

Candida albicans'a Bağlı Protez Enfeksiyonunda Başarılı İki Aşamalı Revizyon

Ş. Sarper GÜRSU,[a]
Timur YILDIRIM,[a]
M. Nursu ŞAHİN,[a]
Hakan SOFU,[b]
Vedat ŞAHİN[a]

[a]Clinic of Orthopedics and Traumatology, Metin Sabancı Baltalimanı Bone Diseases Training and Research Hospital, İstanbul,
[b]Clinic of Orthopedics and Traumatology, Amasya Suluova State Hospital, Amasya

Geliş Tarihi/*Received:* 21.05.2013
Kabul Tarihi/*Accepted:* 20.01.2014

This case report was presented at 21th National Congress of Orthopaedics and Traumatology, November, 3-8, 2009, İzmir.

Yazışma Adresi/*Correspondence:*
Ş. Sarper GÜRSU
Metin Sabancı Baltalimanı Bone Diseases Training and Research Hospital, Clinic of Orthopedics and Traumatology, İstanbul, TÜRKİYE/TURKEY
sarper154@yahoo.com

ABSTRACT Fungal periprosthetic infections are known to be a very rare entity but when encountered it is almost always a devastating complication. As the number of total arthroplasty procedures, performed each year, is growing reports about fungal periprosthetic infections are also increasing. In this paper, we are reporting a patient in his late 60s years old with fungal infection of knee prosthesis due to *Candida albicans*. Fungal periprosthetic infections often have poor outcomes but in our case we had satisfying results. Our choice of treatment was removal of the prosthetic components, extensive debridement, appropriate antifungal treatment for an adequate duration and revision arthroplasty procedure. It has been 5 years since the revision surgery and he is completely free of any symptoms with no signs of recurrence. In cases with immune deficiency or other predisposing factors, obtaining good results seems to be difficult. We consider that the success of the treatment, we have performed, was mostly due to the intact immune system of the patient.

Key Words: Arthroplasty, replacement, knee; *Candida albicans*; reoperation; fluconazole

ÖZET Fungal protez enfeksiyonları; her ne kadar nadir görülen enfeksiyonlardan olsa da görüldüğünde çok ciddi sorunlara yol açabilen bir durumdur. Her geçen yıl total protez uygulamalarının sayısı artmakta olup, bu da görülen mantar enfeksiyonlarının sıklığında artışa yol açmaktadır. Bu çalışmamızda, 60'lı yaşlarının sonunda olup, *Candida albicans*'a bağlı fungal diz protezi enfeksiyonu olan bir hastamızla ilgili tecrübemizi paylaşmaktayız. Fungal protez enfeksiyonlarında tedavi sonuçları genellikle çok başarılı olmasa da, vakamızda oldukça başarılı sonuçlar elde etmiş bulunmaktayız. Vakamız için tedavi yaklaşımımız protez komponentlerinin sökülmesi, geniş bir debridman, yeterli süre ile uygun antifungal tedavi ve revizyon protez uygulaması yapılması oldu. Takibin 5. yılında hastada herhangi bir sorun ya da nüks bulgusu saptanmadı. İmmün yetmezlik veya benzer predispozan faktörlerin olduğu hastalarda tedavinin daha zor olduğu görülmektedir. Kendi vakamızda uyguladığımız tedavinin başarısının en önemli nedeninin hastanın immün sisteminin sağlam olması olduğunu düşünmekteyiz.

Anahtar Kelimeler: Artroplasti, replasman, diz; *Candida albicans*; reoperasyon; flukonazol

Turkiye Klinikleri J Case Rep 2015;23(1):69-72

As the number of total arthroplasty procedures are increasing, the frequency of prosthetic joint infections are also becoming more common. However the primary agents isolated in periprosthetic infections are of bacterial origin in almost all cases, still there are some very limited papers in the literature reporting infection with various fungal agents.[1-3] Among these agents infections due to *Candida albicans* have been reported a few times.[4-6] In most of these cases treatment modalities were

doi: 10.5336/caserep.2013-36234

less functional methods such as arthrodesis or excision arthroplasty.[4-6] In this paper, we are describing the two stage revision knee arthroplasty we have performed for a patient with periprosthetic fungal infection due to *Candida albicans*. We have obtained written and informed consent of the patient.

CASE REPORT

A 67 years old male presented with pain and swelling in his right knee. 5 months prior to his admittance he undergone total knee replacement for severe gonarthrosis (Figure 1a, b). A thorough physical examination of the patient revealed that he had severe pain arising with the movements of the knee. His knee was swollen, warm and erythematous. There was no significant efusion within his knee. The standart x-rays of the knee revealed severe loosening of both the femoral and the tibial components of the prosthesis (Figure 2a). Erytrocyte sedimentation rate was 47 mm and C-reactive protein level was 32 mg/L and both were over the highest limits. A Tc-99m scan was performed and the findings were in favour of a septic loosening (Figure 2b and 2c). The patient did not have any history of an immundeficiency syndrome and human immundeficiency virus test was negative. The diagnosis was infected total knee arthroplasty and the choice of treatment was a two stage revision.

In the first stage, the prosthetic components were removed and extensive debridement was performed. An antibiotic spacer containing Teicoplanin was placed to replace the implants, thinking that the aetiological agent would be a bacteria (Figure 3a and 3b). The intraoperative specimens were sent for microbiological analysis. Ampiric antibiotherapy was initiated until the results of the cultures were obtained. The tissue and fluid cultures were positive for *Candida albicans*. In order to eliminate the possibility of a contamination 2 more aspirations and microbiological analyses were made and both were positive for *Candida albicans*. Systemic amphotericin B treatment was initiated but the patient could not tolerate the drug and had hypertension, flushing and tachycardia. Amphotericin B was replaced by oral

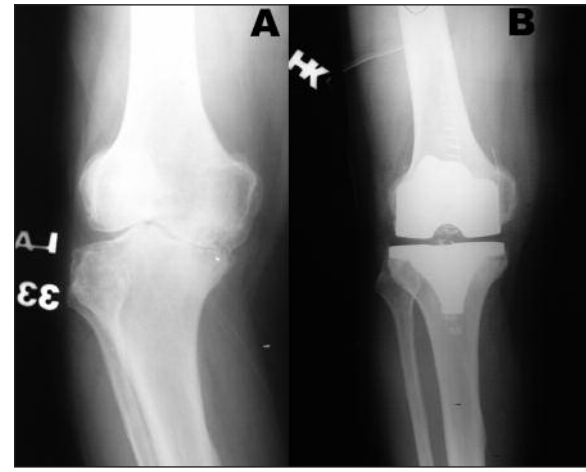

FIGURE 1: A-The initial x-ray of the patient before primary arthroplasty, **B-** Early postoperative x-ray of the patient.

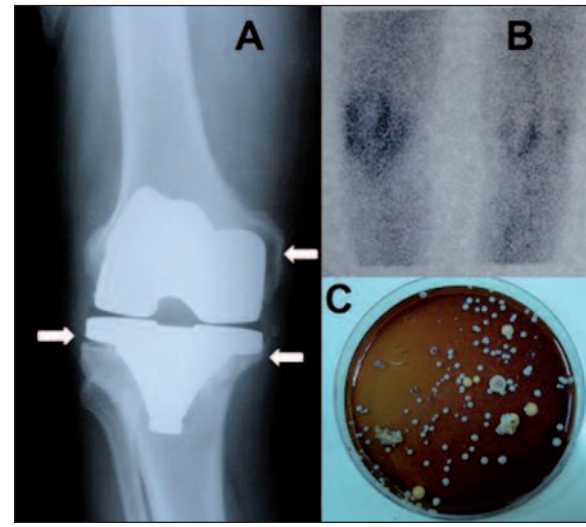

FIGURE 2: A- The x-ray at the presentation of the patient. The arrows demonstrate the osteolysis due to infection, **B-** The Tc-99m scan in favour of septic loosening, **C-** Proliferation of fungal colonies

fluconazole and it was administered for 4 months. At the end of this period all serological tests including sedimentation rate and C-reactive protein were within normal ranges. Cultures and BACTEC results were free of a fungal infection.

6 months after the first stage operation, the patient undergone revision surgery. The spacer was removed, another debridement was made and a revisional prosthesis was implanted. After the operation oral fluconazole was administered for another 4 weeks. During the follow-ups there was no clin-

ical evidence of a recurrence and the serological tests were also within normal ranges. It has been 5 years since the last operation and the patient is free of any symptoms (Figure 4a and 4b). He can flex his knee to 80-85 degrees without any pain and can walk without crutches.

DISCUSSION

Prosthetic joint infection due to fungal agents is a devastating complication of joint replacement surgery. However periprosthetic fungal infections are rare in the literature, there is an increasing number of reports about mostly sporadic cases.[4-10] The reason for this could be both the growing number of total arthroplasty procedures per year and also the increasing incidence of immunocompromised hosts.

Majority of these infections are seen in immunosuppressed patients with risk factors.[4,7,8,11] Intravenous catheters, prolonged antibiotic usage, intensive care unit stays, rheumatoid arthritis and use of corticosteroids are known to be predisposing factors for periprosthetic fungal infections.[6,8] On the other hand, some patients have no predisposing factors other than existence of the prosthesis itself.[6] Our patient also didn't have any of these risk factors.

Among the reported cases of periprosthetic fungal infection, Candida species are known to be the most common, *Candida albicans* being the cause of majority of these cases. There are also reports of fungal infection due to *C. glabrata*, *C. parapsilosis, C. tropicalis* and non-Candidal agents.[8-10,12]

Infection is a troublesome complication of total joint replacements. The primary cause of majority of these infections are Gram positive bacterias, followed by Gram negative organisms. Fungal agents accounts for only a very small portion of these cases. That's why it's not surprising for an orthopaedic surgeon to suspect a bacteria as the primary cause of an infected prosthesis. This opinion probably causes delays in understanding the real underlying agent, which is a fungus. The diagnosis of a fungal periprosthetic infection is not easy. Suspicion is necessary to make the necessary investigations for a fungal infection as these tests are not routinely performed for infected cases. Positive cultures are required to set a diagnosis. The possibility of contamination should be kept in mind and if there is suspicion, consecutive aspirations and further cultures should be considered.

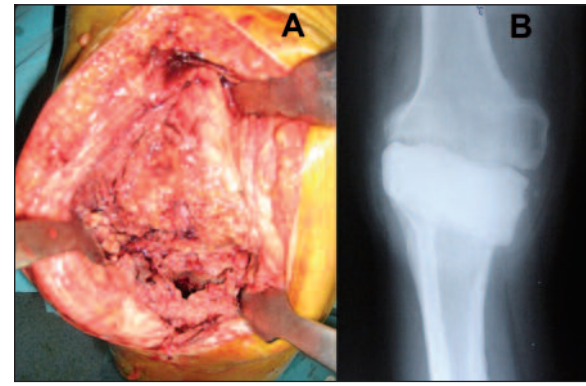

FIGURE 3: A- Intraoperative photo taken after removal of the prosthetic components and debridement, **B-** x-ray showing the cement spacer.

FIGURE 4: A-B-AP and lateral x-rays 5 years after revision surgery.
(See color figure at
http://www.turkiyeklinikleri.com/journal/journal-of-medical-research-case-reports/1300-0284/)

Though, in the previously reported cases the interval between the initial surgery and the onset of the infection is often long for our case it was rather short and the infection became apparent in 5 months.[6,8,13] The infection had an incidious onset and periprosthetic osteolysis was extensive. In 1998 Wada et al. reported a fungal prosthetic knee in-

fection with an even faster onset. The authors noted efusion in their patient's knee only 2 weeks after surgery and on the 4th postoperative week cultures were positive for *Candida parapsilosis*.[14]

Levine et al. reported successful results for Amphotericin B in eradication of *Candida albicans*.[4] However, use of systemic Amphotericin B has important side-effects such as nephrotoxicity and some patients may have difficulty in tolerating the drug, as it was in our case. If the patient's general performance is considered not to be suitable for systemic Amphotericin B administration, oral Fluconazole can be an appropriate alternative. In cases where the existence of the fungal infection can be determined prior to initial surgical intervention, an Amphotericin B cement spacer can be used after necessary debridement and removal of the prosthetic components. Intra-articular use of Amphotericin B has also been praised in some previous reports.[8]

Whenever a fungal periprosthetic infection in the knee is suspected removal of the prosthetic components and extensive debridement is almost accepted as the first stage of treatment. One exception of this is the unique case presented by Simonian. The patient, who didn't have any predisposing problems, was treated medically without any surgical interventions.[15] In the previously reported cases, arthrodesis, excision arthroplasty, amputation and for some patients rarely revision arthroplasty were used as treatment options.[4,5,8,9,11,16,17] Recurrence was reported oftenly.[5,8] Whichever method is used, results are often poor and in patients with immune deficiency even poorer. In our case, after adequate anti-fungal therapy eradication of the infection could be achieved and a revision procedure could be successfuly performed. We consider that the success of the treatment we have performed was mostly due to the intact immune system of the patient.

In conclusion, it is possible to say that prosthetic joint infection due to fungal agents is a devastating complication of arthroplasty. Still, in appropriate patients removal of the prosthesis, extensive debridement and revision arthroplasty can lead to successful functional results.

REFERENCES

1. Sharma D, Douglas J, Coulter C, Weinrauch P, Crawford R. Microbiology of infected arthroplasty: implications for empiric peri-operative antibiotics. J Orthop Surg (Hong Kong) 2008; 16(3):339-42.
2. Parvizi J, Bender B, Saleh KJ, Brown TE, Schmalzried TP, Mihalko WM. Resistant organisms in infected total knee arthroplasty: occurrence, prevention, and treatment regimens. Instr Course Lect 2009;58:271-8.
3. Andrews HJ, Arden GP, Hart GM, Owen JW. Deep infection after total hip replacement. J Bone Joint Surg Br 1981;63-B(1):53-7.
4. Levine M, Rehm SJ, Wilde AH. Infection with Candida albicans of a total knee arthroplasty. Case report and review of the literature. Clin Orthop Relat Res 1988;226:235-9.
5. Badrul B, Ruslan G. Candida albicans infection of a prosthetic knee replacement: a case report. Med J Malaysia 2000;55(Suppl C):93-6.
6. Lerch K, Kalteis T, Schubert T, Lehn N, Grifka J. Prosthetic joint infections with osteomyelitis due to Candida albicans. Mycoses 2003; 46(11-12):462-6.
7. Fabry K, Verheyden F, Nelen G. Infection of a total knee prosthesis by Candida glabrata: a case report. Acta Orthop Belg 2005;71(1):119-21.
8. Gaston G, Ogden J. Candida glabrata periprosthetic infection: a case report and literature review. J Arthroplasty 2004;19(7):927-30.
9. Wyman J, McGough R, Limbird R. Fungal infection of a total knee prosthesis: successful treatment using articulating cement spacers and staged reimplantation. Orthopedics 2002;25(12):1391-4; discussion 1394.
10. Açikgöz ZC, Sayli U, Avci S, Doğruel H, Gamberzade S. An extremely uncommon infection: Candida glabrata arthritis after total knee arthroplasty. Scand J Infect Dis 2002;34(5): 394-6.
11. Koch AE. Candida albicans infection of a prosthetic knee replacement: a report and review of the literature. J Rheumatol 1988;15(2):362-5.
12. Brooks DH, Pupparo F. Successful salvage of a primary total knee arthroplasty infected with Candida parapsilosis. J Arthroplasty 1998; 13(6):707-12.
13. Cushing RD, Fulgenzi WR. Synovial fluid levels of fluconazole in a patient with Candida parapsilosis prosthetic joint infection who had an excellent clinical response. J Arthroplasty 1997;12(8):950.
14. Wada M, Baba H, Imura S. Prosthetic knee Candida parapsilosis infection. J Arthroplasty 1998;13(4):479-82.
15. Simonian PT, Brause BD, Wickiewicz TL. Candida infection after total knee arthroplasty. Management without resection or amphotericin B. J Arthroplasty 1997;12(7): 825-9.
16. Hennessy MJ. Infection of a total knee arthroplasty by Candida parapsilosis. A case report of successful treatment by joint reimplantation with a literature review. Am J Knee Surg 1996; 9(3):133-6.
17. Yang SH, Pao JL, Hang YS. Staged reimplantation of total knee arthroplasty after Candida infection. J Arthroplasty 2001;16(4): 529-32.