

Authors: Paul M. Courtney, Thanainit Chotanaphuti, Sébastien Lustig

QUESTION 4: How should infected bilateral hip or knee arthroplasties be managed?

RECOMMENDATION: The optimal surgical treatment for infected bilateral hip or knee arthroplasties is unknown. While revising the components likely provides improved outcomes over limited debridement with component retention, data does not preferentially support either a single-stage or two-stage exchange revision arthroplasty

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 83%, Disagree: 11%, Abstain: 6% (Super Majority, Strong Consensus)

RATIONALE

Infected bilateral hip or knee arthroplasties present a rare treatment dilemma for both the patient and surgeon. The literature on this topic is limited, however, with only two small case series and at least nine case reports describing multiple simultaneous periprosthetic joint infections (PJIs) [1-17]. Treatment options include debridement with component retention, single-stage revision and two-stage revision surgery. The largest study by Wolff et al. on infected bilateral total knee arthroplasty demonstrated improved outcomes with a simultaneous two-staged revision when compared with irrigation, debridement and prosthetic salvage [6]. Concerns exist about the morbidity of a two-stage revision and the immobility and restricted weight bearing on both extremities during the antibiotic spacer period. A series of 16 bilateral infected arthroplasty patients by Zeller et al. noted good results with single-stage exchange and another center reported two cases of successful treatment of bilateral infected THA with a simultaneous single-stage revision [7,17].

Surgical treatment of bilateral infected arthroplasties should consider factors such as the virulence of the organism, medical comorbidities, patient age and functional status. For bilateral acute hematogenous infection, some authors performed an irrigation, debridement and exchange of modular bearing surfaces followed by targeted antibiotic therapy, but these results were limited to case reports [5,8-13,15,16]. For chronic bilateral periprosthetic infections, these case reports described the same therapeutic management as is commonly favored for unilateral infection: two-stage revision with placement of an antibiotic impregnated cement spacer for a period of at least 6-8 weeks before reimplantation [9,14,15]. An interval of several days occurred between each side undergoing surgery in these series, while others performed simultaneous bilateral revision surgery. The decision whether to perform simultaneous bilateral revision surgery for PJI should also consider the patient's medical comorbidities and functional status. With only small retrospective case series in the literature, we can issue a limited recommendation that revising the components likely results in improved outcomes, however we do not have the data to recommend a single-stage or two-stage revision procedure over the other.

We do, however, feel that performing resection arthroplasty of two joints under the same anesthesia represents immense physiological insult to the patient and all efforts should be made to minimize the operative time and blood loss in these patients if bilateral

surgery is contemplated. The use of two expert teams to operate at the same time has been suggested by some investigators.

REFERENCES

- [1] Wilson MG, Kelley K, Thornhill TS. Infection as a complication of total knee-replacement arthroplasty. Risk factors and treatment in sixty-seven cases. *J Bone Joint Surg Am.* 1990;72:878-883.
- [2] Murray RP, Bourne MH, Fitzgerald RH. Metachronous infections in patients who have had more than one total joint arthroplasty. *J Bone Joint Surg Am.* 1991;73:1469-1474.
- [3] Luessenhop CP, Higgins LD, Brause BD, Ranawat CS. Multiple prosthetic infections after total joint arthroplasty. Risk factor analysis. *J Arthroplasty.* 1996;11:862-868.
- [4] Wigren A, Karlstrom G, Kaufer H. Hematogenous infection of total joint implants: a report of multiple joint infections in three patients. *Clin Orthop Relat Res.* 1980;288-291.
- [5] Jafari SM, Casper DS, Restrepo C, Zmistowski B, Parvizi J, Sharkey PF. Periprosthetic joint infection: are patients with multiple prosthetic joints at risk? *J Arthroplasty.* 2012;27:877-80. doi:10.1016/j.arth.2012.01.002.
- [6] Wolff LH, Parvizi J, Trousdale RT, Pagnano MW, Osmon DR, Hanssen AD, et al. Results of treatment of infection in both knees after bilateral total knee arthroplasty. *J Bone Joint Surg Am.* 2003;85-A:1952-1955.
- [7] Zeller V, Dedome D, Lhotellier L, Graff W, Desplaces N, Marmor S. Concomitant multiple joint arthroplasty infections: report on 16 cases. *J Arthroplasty.* 2016;31:2564-2568. doi:10.1016/j.arth.2016.02.012.
- [8] Porat MD, Austin MS. Bilateral knee periprosthetic infection with *Mycobacterium fortuitum*. *J Arthroplasty.* 2008;23:787-789. doi:10.1016/j.arth.2007.07.010.
- [9] Dauty M, Dubois C, Coisy M. Bilateral knee arthroplasty infection due to *Brucella melitensis*: a rare pathology? *Joint Bone Spine.* 2009;76:215-216. doi:10.1016/j.jbspin.2008.08.005.
- [10] Roerdink RL, Douw CM, Leenders AC a. P, Dekker RS, Dietvorst M, Oosterbos CJM, et al. Bilateral periprosthetic joint infection with *Ureaplasma urealyticum* in an immunocompromised patient. *Infection.* 2016;44:807-810. doi:10.1007/s15101-016-0912-0.
- [11] Nemoto T, Yamasaki Y, Torikai K, Ishii O, Fujitani S, Matsuda T. [A case of MRSA infection in multiple artificial joints successfully treated with conservative medical treatment]. *Kansenshogaku Zasshi.* 2012;86:411-414.
- [12] Volpin A, Kini SG, Berizzi A. Psoas muscle pyogenic abscess in association with infected hip arthroplasty: a rare case of simultaneous bilateral presentation. *BMJ Case Rep.* 2015;2015. doi:10.1136/bcr-2015-209711.
- [13] Gunaratne GDR, Khan RJK, Tan C, Golledge C. Bilateral prosthetic hip joint infections associated with a Psoas abscess. A Case Report. *J Orthop Case Rep.* 2016;6:3-6. doi:10.13107/jocr.2250-0685.472.
- [14] David J, Nasser RM, Goldberg JW, Reed KD, Earll MD. Bilateral prosthetic knee infection by *Campylobacter fetus*. *J Arthroplasty.* 2005;20:401-405.
- [15] Rajgopal A, Panda I, Gupta A. Unusual *Salmonella typhi* periprosthetic joint infection involving bilateral knees: management options and literature review. *BMJ Case Rep.* 2017;2017. doi:10.1136/bcr-2017-221221.
- [16] Kibbler CC, Jackson AM, Grüneberg RN. Successful antibiotic therapy of clostridial septic arthritis in a patient with bilateral total hip prostheses. *J Infect.* 1991;23:293-295.
- [17] Pommepuy T, Lons A, Benad K, Beltrand E, Senneville E, Migaud H. Bilateral one-stage revision of infected total hip arthroplasties: report of two cases and management of antibiotic therapy. *Case Rep Orthop.* 2016;2016. doi:10.1155/2016/3621749.

