For the past 2 decades, the implantation of antibiotic-impregnated cement spacers has been an established method in the treatment of periprosthetic hip joint infections. Several advantages are attributed to this procedure, such as immediate treatment of the infection source by locally reaching high antibiotic levels, maintenance of joint mobility, limitation of scar formation, absence of soft tissue contraction (usually resulting in a leg length discrepancy), and facility for prosthesis reimplantation.¹

Although this surgical technique is widely used in the United States and Europe, several unclear parameters exist. What is the optimal technique for intraoperative hip spacer production? What is the ideal antibiotic impregnation of hip spacers? Which is the ideal dose for antibiotic impregnation? Are there differences in the rate of infection control between manufactured spacers vs surgeon-made articulating spacers? Are there differences in functional outcome between manufactured spacers vs surgeon-made articulating spacers? What is the optimal time for hip spacer implantation? Do any contraindications exist regarding hip spacer implantation?

On review of the current literature, it is obvious that only some of these topics have been partially investigated. Regarding the antibiotic impregnation, the combination of an aminoglycoside (tobramycin or gentamicin) and a glycopeptide (vancomycin) is used in the great majority of clinical studies due to the broader antimicrobial spectrum covered by this combination as well as the synergistic effect regarding the released antibiotic amounts.¹⁻³

To the current author’s knowledge, no experimental or clinical study has investigated which dose and for which antibiotic is ideal. In vitro data have demonstrated that various antibiotic-loaded spacers show a different antibacterial effect⁴; however, no study has investigated whether this effect is also evident in clinical cases.

Similarly, hard scientific data are lacking regarding the clinical function as well as the infection control rate of differently manufactured spacers. The ideal time between stages is unknown. The ideal duration of antibiotic therapy depending on the pathogen organism is also unclear. No one can state whether contraindications exist regarding hip spacer implantations. The current author and a colleague administered a questionnaire among German and Austrian university orthopedic departments about hip joint infections.⁵ Fifteen contraindications were subjectively identified by various colleagues, but it cannot be stated with certainty whether these are “true” contraindications or just “difficult” surgical situations to be solved at the site of an infected hip arthroplasty.

Another unsolved problem involves the complications following hip spacer implantation, such as spacer fractures or dislocations. For prevention of spacer fractures, several orthopedic surgeons insert a metallic endoskeleton into the spacer for enhancement of mechanical stability. However, experimental data have shown that the insertion of a metallic endoskeleton has a negative impact on the elution kinetics of additional antibiotics incorporated into the bone cement.⁶ The question that evolves is does the surgeon prefer a spacer that is stable but with poorer elution properties or one with good pharmacokinetic properties but a higher risk of fracture? This topic has not been investigated in clinical studies.
Spacer dislocations are a frequent complication after hip spacer implantation. The possible causes of a spacer dislocation have been well described. Bony defects of the acetabulum and/or proximal femur, an insufficient femoral fixation of the spacer, and a nonintact articulation are perhaps the most important ones. Although the development of new surgical techniques for enhancement of the femoral fixation as well as the articulation of hip spacers is important, such reports are scarce in the literature.

Finally, the ideal duration of the systemic antibiotic therapy is also unknown. Most studies report antibiotic therapy for 6 weeks with different intervals of intravenous and oral antibiotics. However, recent studies have demonstrated that equally good infection eradication rates can also be achieved after short-term antibiotic therapy. Prospective, randomized studies are necessary to identify the ideal period of systemic antibiotics.

Due to the aforementioned unclear points, efforts have recently been made to shed some light on bone and joint infections. The increasing importance of the correct diagnosis, prevention, and therapy for periprosthetic joint infections (PJIs) became evident when an international consensus meeting took place in Philadelphia at the end of July 2013. Fifteen groups covered topics that ranged from comorbidities, skin preparation, perioperative antibiotics, and operative environment to the diagnosis of PJI, antibiotic treatment, single-stage vs 2-stage exchange arthroplasty, and prevention of late prosthetic infections. The working groups were composed of 400 experts from 51 countries who—during 10 months—summarized, evaluated, and commented on more than 3,500 relevant publications. Two hundred and seven consensus statements were distributed and evaluated via electronic voting by more than 300 delegates all over the world. There was a unanimous vote (100% agreement) for 1 question, 202 questions received strong consensus (66% to 99% agreement), 2 questions had weak consensus (60% to 65%), and only 2 questions did not achieve consensus (less than 60%). Of course, one must keep in mind that these consensus statements can only be considered expert opinion and not clinical guidelines.

One group dealt solely with the topic of spacers. Nine of 15 statements were about hip spacers. Although the panel agreed in the great majority of the cases regarding expert opinions, no statement could be justified by hard scientific data and evidence-based studies.

The current author is not sure whether a surgical technique with as many unanswered questions as the implantation of hip spacers would be used as often in other fields of medicine. Only one thing is certain: the implantation of cement spacers is a successful method in the management of hip PJIs, with high infection eradication rates. However, further scientific research is necessary regarding this issue. Based on the author’s experience, such research is time-consuming and expensive. Also, several clinical questions can only be answered by large multicenter studies, which are not always feasible. However, the author hopes that orthopedic surgeons will try to answer at least some, if not most, of these questions.

REFERENCES