Antibiotic-loaded cement spacers deliver antibiotics for only a few days, and can harbor resistant bacteria on the surface. Kuechle et al. reported that no commercially available bone cement will elute more than 15% of the antibiotics contained within the cement.

Direct infusion of antibiotics into the joint using Hickman catheters was done to achieve extremely high levels of intra-articular antibiotics for a full six weeks. Single-stage treatment was compared with two-stage cementless reconstruction. All revisions were done for infected revision total knee arthroplasty.

**Patients and Methods**

In the single-stage group (31 knees), the components were removed, the joint was debrided, and new porous-coated components were implanted without cement or bone graft. Two indwelling Hickman catheters were placed and the patient received organism-specific intra-articular antibiotics for 6 weeks.

In the two-stage group (32 knees), debridement and cement spacer were followed by 6 weeks intra-articular antibiotics through Hickman catheters, then revision arthroplasty was done using porous-coated implants 3-6 months after debridement.

In an earlier study, intra-articular and serum levels of vancomycin were measured. Intra-articular vancomycin levels were 896±250µg/ml at one week and 942±211µg/ml at 6 weeks postoperative. Serum vancomycin levels were 8±3µg/ml at one week and 7±4µg/ml at 6 weeks. Serum levels are comparable to those achieved by intravenous routes. Intraarticular levels are hundreds of times higher than can be achieved with intravenous antibiotics.

**CASE STUDY**

A 56-year old man had revision total knee arthroplasty for infection with Enterococcus faecium.
Results

Wound complication was significantly (p<0.02) more common in the two-stage group (6) than in the one-stage group (1). Cardiovascular complications were significantly (p<0.05) more common in the two-stage group (10) than in the one-stage group (2). Knee score at 2 years was significantly (p<0.04) better in the one-stage group (89±5) than in the two-stage group (74±6).

Each group had two failures for reinfection. Three of the four were treated successfully with re-revision and treatment with intra-articular antibiotics. One patient in the two-stage group had amputation for chronic osteomyelitis and overwhelming sepsis.

Conclusions

Direct intra-articular infusion achieved very high antibiotic levels in the joint and therapeutic levels in the serum. Intraarticular antibiotic infusion and noncemented revision arthroplasty effectively treated chronically-infected TKA. Single-stage revision total knee arthroplasty was as effective in eradicating infection as was two-stage arthroplasty using this technique.

The single-stage procedure had fewer wound and cardiovascular complications.

Bone stock is improved by this procedure, and single-stage revision is a simple procedure because cement and bone graft are not present.

Directly infusing antibiotics into the infected area maintains a high local concentration while minimizing systemic toxicity.3,4 This method avoids the use of antibiotic-loaded cement and the potential for growth of antibiotic resistant strains of bacteria.5

These findings support using single-stage revision in cases treated with cementless revision and intraarticular antibiotics.

REFERENCES