

COATING OF CEMENTLESS STEMS WITH COMMERCIALLY PURE ANTIBIOTIC-LOADED CALCIUM SULFATE REDUCES INFECTION RATE IN REVISION TOTAL HIP ARTHROPLASTY

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Aim

Infection rates after revision THA vary widely, up to 12%. In countries that use antibiotic-loaded cemented stems in combination with perioperative IV antibiotics, infection rates in registry studies are lower. In many countries, however, cementless revision implants are preferred. Our aim was to apply an antibiotic-loaded calcium sulfate coating to cementless revision stems to reduce periprosthetic joint infection (PJI). This study sought to answer two questions: 1) Does the coating of cementless revision stems with calcium sulfate inhibit osteointegration in THA? 2) Does the antibiotic-loaded calcium sulfate coating of revision stems reduce the incidence of PJI?

Method

From Dec. 2010 to Dec. 2015, 111 consecutive revision femoral stems were coated with commercially pure calcium sulfate. 10cc of calcium sulfate was mixed with 1g of vancomycin powder and 240mg of tobramycin liquid and applied to the stem in a semi-firm liquid state immediately prior to stem insertion. The results are compared to a designated control cohort (N=104) performed across the previous 5 years. The surgical methods were comparable, but for the stem coating. All patients were staged preoperatively using the Musculoskeletal Infection Society Staging System and followed for at least 1 year.

Results

In the study group of coated stems, there were 46 A hosts, 56 B hosts, and 9 C hosts. In the control group, there were 45 A hosts, 52 B hosts, and 7 C hosts. Both cohorts had 0 cases of aseptic loosening.

The overall rate of PJI in the study cohort was 2.7%. Of the 111 revisions, 69 were aseptic (PJI=1.4%) and 42 were second stage revisions for infection (PJI=4.8%). PJI occurred in 2.2% of A hosts, 1.8% of B hosts, and 11.1% of C hosts. In the control cohort, the overall rate of PJI was 7.7%. Of the 104 revisions, 74 were aseptic (PJI=1.4%) and 30 were second stage revisions for infection (PJI=23.3%). PJI occurred in 6.7% of A hosts, 5.8% of B hosts, and 28.6% of C hosts.

The results show a reduction in PJI from 7.7% in the control group to 2.7% in the study group and were found to be statistically significant at $p\text{-value} < 0.1$ ($p=0.09$).

Conclusions

The application of antibiotic-loaded calcium sulfate to cementless revision femoral stems does reduce PJI. Importantly, this coating did not inhibit osteointegration of the femoral stem. The reduced infection rate in this study supports the concept that bacteria frequently contaminate and reside within the femoral canal.