The Cost-effectiveness of Antibiotic Cement vs Plain Cement Following Total and Partial Knee and Hip Arthroplasty

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Background

As the number of total joint arthroplasties performed in the United States increases, so do the number of periprosthetic infections and their associated complications. With the bundled payment initiative, hospitals are trying to reduce costs while simultaneously trying to improve outcomes and decrease complications/readmission rates. Over the past couple of decades surgeons have opted to use antibiotic loaded bone cement (ALBC) over plain cement due to its potential to lower infection rates. However, there are still some concerns raised about the routine use of ALBC as a prophylactic intervention in decreasing infection rates and the economic burden it may impose. At our institution the average cost of one bag of ALBC is nearly five times the cost of one bag of plain cement.

The purpose of this study was to explore the incidence rate of deep prosthetic joint infections (PJIs) in patients treated at Morristown Medical Center for either a primary total or partial hip and knee arthroplasty between 2016 to 2018. We hypothesized that antibiotic loaded bone cement would not significantly reduce the PJIs between the two cohorts, and thus serve as a potential financial burden to our healthcare system.

Methods

We performed a review of 4,116 hip or knee arthroplasty cases between 2016 to 2018 at Morristown Medical Center. Demographics, complications, and any readmissions due to deep infection were collected retrospectively. Data for patients who were readmitted to outside facilities for a PJI was also collected. During that time period there were a total of 3968 knee cases (526 antibiotic cement, 3,442 plain cement) and 148 hip cases (77 antibiotic cement, 71 plain cement). The cost for 1 bag of plain cement for hip and knee arthroplasty was $73.98 and $72.16, respectively. The cost for 1 bag of antibiotic cement for hip and knee arthroplasty was $363.23 and $335.96, respectively.

Inclusion criteria: Patients treated at our facility for a primary hip and knee arthroplasty and received either plain or ALBC during their procedure

Exclusion criteria: Patients treated at our facility for a primary hip and knee arthroplasty but did not receive either plain or ALBC during their procedure

A statistical analysis was performed using Fisher's exact test and the National Healthcare Safety Network (NHSN) surgical site infection guidelines.

Results

Thirteen patients were readmitted due to deep infection, all of which who had undergone total knee arthroplasty. Of those cases reported, plain cement was used for the index procedure in 10 instances (0.29%), and antibiotic cement in 3 (0.57%), p=0.486. There was no statistically significant difference in infection rates between the two groups. A total of 989 bags of antibiotic cement were used in 526 knee surgeries, and 130 bags in 77 hip cases. Total cost for antibiotic cement in knee and hip procedures was $332,264.44 and $47,219.90, respectively. Using plain cement at all index procedures, would have resulted in a total savings of $298,500.70.

Conclusions

Between 2016 to 2018 there was no statistically significant difference between the rate of infection and need for revision surgeries for patients with primary joint replacements who were treated with antibiotic cement over plain cement. The use of antibiotic cement may add an unnecessary hospital expense in this setting. As hospital systems continue to transition towards a bundled payment model, it becomes imperative for providers to reduce any unnecessary costs in order to increase quality/efficiency. We estimate that our hospital could have saved nearly $150,000/y by using plain cement over antibiotic cement. However, a larger sample size and a randomized controlled trial would help confirm our findings and further evaluate the cost-effectiveness of antibiotic cement over plain cement.

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