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CORR Insights®: Length of Endoprosthetic Reconstruction in Revision Knee Arthroplasty Is Associated With Complications and Reoperations

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Where Are We Now?

In this sobering report, Barry and colleagues share their results for distal femoral endoprosthetic reconstructions performed for failed TKAs. As might be expected, longer reconstructions are associated with more complications and reoperations; what

was perhaps not expected was just how many reoperations and complications occurred after these salvage procedures. The outcomes were quite poor in these patients, and I applaud the authors for their candor. For distal reconstructions, the 5-year infection-free, implant-retention survivorship was 70%; for diaphyseal reconstructions it was only

20%. While the study numbers are limited (further so by loss to followup), and the timeframe quite broad due to the fortunate rarity of these reconstructions, their results provide a sobering snapshot of “where we are now.” To prevent the reader from dismissing these findings as “just one retrospective study,” I would highlight the authors’ point that infection rates as high as 35% and reoperation rates as high as 59% have been reported by others following similar procedures [1, 5].

This CORR Insights® is a commentary on the article “Length of Endoprosthetic Reconstruction in Revision Knee Arthroplasty Is Associated With Complications and Reoperations” by Barry and colleagues available at: DOI: 10.1007/s11999-016-4836-x

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Where Do We Need To Go?

Patients with multiple total knee replacement revisions will always pose

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challenges distinct from oncologic patients undergoing ostensibly similar reconstructions. The remaining viable bone may be damaged by prior reconstruction attempts, and the soft-tissue envelope likely has been compromised by the previous procedures. This is in contrast to the single (though often-massive) resections associated with most tumor reconstructions. Despite the requisite tissue sacrifice to achieve adequate margins, unless the patient has had a great deal of radiation, these tumor procedures also typically go through more forgiving soft-tissue envelopes. As a result, both the functional results and implant longevity are generally better following oncologic reconstructions [7].

What we need, therefore, are better, more predictable and sustainable results for these challenging patients, results that more closely approach those following tumor reconstructions. Avoiding infection is paramount to this effort, and the answer is not simple. Barry and colleagues already performed two-stage exchanges—the current “gold standard”—for all patients with proven infections.

How Do We Get There?

The road to lower infection rates and improved outcomes for these patients is unlikely to be smooth or easy.

However, I believe there are potentially fruitful avenues to explore.

First, we need better means of diagnosing occult infections in these patients; knowing is half the battle. Preexisting infections at some point in their treatment course existed in 11 of 22 patients in the series by Barry and colleagues, but postoperative infections occurred in five of six diaphyseal reconstructions without history of prior infection. I do not believe that all of these patients truly had aseptic failure prior their megaprosthesis implantation. The recent development of clinically-available tests for synovial alpha defensin and C-reactive protein provide one means of more clearly and reliably screening for occult infection in patients such as this with high-risk histories or elevated preoperative inflammatory markers [3]. Polymerase chain reaction-based techniques offer further promise, but additional work is needed to limit false-positives due to either contamination or coincidental findings [4].

Next, we need better means of limiting infection risk and septic failure in these patients after surgery. Long-term or lifelong antibiotic prophylaxis, as advocated by the authors of the current study for diaphyseal reconstructions, represents one means of achieving a decrease in risk of infection. Berend and colleagues [2] reported only a 14% infection rate with

this approach following nononcologic total femur replacement; additional study is necessary to demonstrate efficacy and, furthermore, safety of this approach. Implant coatings—silver, betadine, antibiotic—represent another opportunity, but none are currently in broad clinical use [8].

Last, we can endeavor to mitigate the problem by reducing the risk of infection following primary procedures. Estimates suggest that nearly 3.5 million TKAs will be performed annually in the United States by the year 2030 [6]. If we assume a 1% risk of infection for that cohort, reducing that by only 0.1% could massively reduce the population of patients that might ultimately come to distal femoral replacement, which already represented only 2.4% of revision arthroplasties in the paper by Barry and colleagues.

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