

## Editor's Choice/Take 5

# Editor's Spotlight/Take 5: Have Bilateral Total Knee Arthroplasties Become Safer? A Population-Based Trend Analysis (DOI: 10.1007/s11999-012-2608-9)

Seth S. Leopold MD

It has been nearly 40 years since John Insall helped usher in the modern era of TKA with his preliminary report in *CORR*® on total

condylar knee arthroplasty [2], yet we still don't know if we should perform this operation singly or in pairs.

Same-day bilateral TKA appears to offer a shorter recovery period and, perhaps, decreases in costs or charges [6]. But these benefits may come at a serious cost to patient safety, as well-designed studies have identified greater likelihoods of serious complications occurring in patients having same-day, bilateral surgeries compared to those having staged, bilateral surgeries [4, 5].

The topic itself, like so many others in medicine and surgery, is a moving target, so studying this subject is a challenge. Knee arthroplasty patients are getting younger [3], and hospitalists and preoperative screening protocols are making these interventions safer [1]. Offsetting this, though, are large decreases in postoperative lengths of stay, leaving open the questions of if we even know how many complications exist and in which patients they are occurring.

In light of this, we welcome new ways of looking at the problem. In their study, "Have Bilateral Total Knee Arthroplasties Become Safer? A Population-Based Trend Analysis" (DOI: 10.1007/s11999-012-2608-9), Memtsoudis and colleagues looked at

the largest all-payer database available of hospital discharges to try to draw some inferences.

From their work, we learned that the frequencies of many severe complications after same-day, bilateral TKA actually increased over the 10-year study period when adjusted for length of stay. By contrast, the risk of death appeared to have gone down over time. Although the literature remains conflicted about the safety of same-day, bilateral TKA, Memtsoudis and colleagues found that surgeons use this approach more frequently now than ever before.

Again, this is a hard subject to study; no single study design (and certainly no single study) can answer all the questions surgeons have. For example, studies such as this one that use large administrative databases cannot tell us much about complications that occur after hospital discharge, even when risk is adjusted for length of stay. Because of this, we most likely are seeing a "safest-case scenario" here, with the actual morbidity of the procedure probably being higher than the observed morbidity.

The authors shed some light on a procedure that is done tens of

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*Note from the Editor-in-Chief: In "Editor's Spotlight," one of our editors provides brief commentary on a paper we believe is especially important and worthy of general interest. Following the explanation of our choice, we present "Take Five," in which the editor goes behind the discovery with a one-on-one interview with an author of the article featured in "Editor's Spotlight."*

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S. S. Leopold (✉)  
1600 Spruce Street, Philadelphia,  
PA 19013, USA  
e-mail: sleopold@clinorthop.org

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thousands of times per year, even though we don't know whether it benefits patients or puts them at increased risk. As specialists, we should consider ourselves under some pressure to sort this out. The work of Memtsoudis and colleagues represents a good step in that direction.

## Take Five with Stavros G. Memtsoudis MD, PhD

**Lead author of "Have Bilateral Total Knee Arthroplasties Become Safer? A Population-Based Trend Analysis"** (DOI: [10.1007/s11999-012-2608-9](https://doi.org/10.1007/s11999-012-2608-9))

**Seth S. Leopold MD:** *Do your results make you more enthusiastic about same-day bilateral knee replacements, less enthusiastic, or neither? Why?*

**Stavros G. Memtsoudis MD, PhD:** Same-day bilateral total knee arthroplasty has been reported to have advantages over the staged approach in terms of cost and overall hospitalization time, but the decision to proceed with this option needs to be carefully balanced against the increased risk of perioperative complications compared to unilateral procedures. As it is unlikely that we will ever see adequately powered, prospective, randomized studies comparing perioperative outcomes of same-day bilateral procedures to those

performed during different hospitalizations, I think that we are well-advised to take a conservative approach to patient selection and appropriate perioperative management in order to strike a balance between benefits of the procedure and the goal to maximize patient safety. Previous studies suggest that indeed patients selected for same-day bilateral procedures tend to be younger and healthier compared to unilateral and staged-bilateral candidates. This selection bias, from a safety perspective, is encouraging and in-line with a more conservative approach, although data regarding the effectiveness of such a practice are lacking.

Our data also highlight the dynamic nature of this population's demographics and show that the comorbidity burden is increasing. This observation parallels that seen in other orthopedic patient populations and in our society in general. These competing trends demand that we remain conservative and highly selective when choosing appropriate candidates for same-day bilateral knee arthroplasties, and make sure that our patients understand the associated risks and alternatives available to them. We need to be willing to adjust our practice as new data become available.

**Dr. Leopold:** *After adjusting for length of stay, you found that the risk of major complications after same-day,*

*bilateral TKA increased, but mortality risk decreased during the study period. What should CORR® readers make of this?*

**Dr. Memtsoudis:** At first impression these opposing trends may be viewed as counterintuitive; however, this perceived discrepancy in outcomes may be explained by improvements in perioperative strategies to monitor for and treat acute, life-threatening events that may, in the past, have led to a patient's demise. Interventions, such as increased use of telemetry or observation of patients in intensive care and step down units, may, thus, have reduced the extreme outcome of mortality without necessarily affecting the incidence of complications in an increasingly morbid patient population.

**Dr. Leopold:** *In the population you studied, you found more comorbidities at the end of the study period than at the beginning, even though the average age of the patients was lower. Are our patients getting sicker, are hospitals responding to the financial incentives to code comorbidities more aggressively, or is there some other explanation for this unusual finding?*

**Dr. Memtsoudis:** Both proposed explanations are plausible; however, as no causal relationships can be established with the use of data from administrative databases, this question cannot be answered with certainty.

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Nevertheless, many publications have shown that morbid conditions in our population in general are becoming more common. The rise in the prevalence of the metabolic syndrome, especially, is of major concern. Specifically, the increases in the rates of obesity have not only a direct effect in the pathogenesis of osteoarthritis but are associated with comorbidities, including sleep apnea and cardiac disease, which have been shown to negatively impact perioperative outcomes.

**Dr. Leopold:** *I understand you recently chaired a consensus meeting on this subject. What were some of the take-home points from the meeting that you would want to share with readers of your paper?*

**Dr. Memtsoudis:** After a year-long consensus process that involved 40 interdisciplinary experts representing the specialties of orthopaedic surgery, anesthesiology, critical care, and various internal medicine subspecialties, a final meeting was held in New York on September 8<sup>th</sup> and 9<sup>th</sup>, 2011. This group's goals were to reach consensus on a number of major questions surrounding the practice of bilateral total knee arthroplasty, provide initial guidelines for practitioners, and start a wider discussion on the issue on a national level.

One of the most important take-home points was that bilateral total knee arthroplasties should be considered

higher-risk operations, and appropriate preoperative work-ups and perioperative management approaches need to be considered. Further, consensus was reached around selection criteria for same-day procedures that, in essence, support the performance of this approach in otherwise healthy patients and caution against its use in patients with significant comorbidities. The panel also agreed that if same-stage surgery is not considered feasible, staging of the two procedures should not occur during the same hospitalization or within 3 months of the first joint operation. Finally, although some surgical indications, such as extensive bilateral deformities, may favor same-stage surgery in order to facilitate successful rehabilitation, the members of the group reached consensus that these considerations should not trump medical concerns. The experts attending this meeting agreed that, given the lack of data on many of the topics discussed, further research is needed. We plan to publish a summary of the consensus process and the results of this meeting shortly.

**Dr. Leopold:** *What kind of study would answer definitively for you whether surgeons should or should not perform same-day, bilateral TKA surgery?*

**Dr. Memtsoudis:** The major limitations associated with available studies on the topic of the safety of same-day, bilateral surgery compared to a staged

approach include either their small sample sizes, or, in the case of large database studies, their retrospective natures and lack of clinical details. It is important to point out that when utilizing already-existing data, from either national databases or single institutions, patients analyzed in the same-day TKA group represent an already-preselected group; in particular, as a group they usually are younger and healthier than the patients whose procedures are staged over two hospitalizations. This, however, is not the only potential bias introduced in these kinds of analyses. For example, patients scheduled for staged procedures, who experience major complications, may never go on to receive second knee operations and are, therefore, not included in the staged group. Thus, comparing perioperative outcomes between the two groups using existing data sources is bound to be affected by biases that are difficult to control, even with advanced statistical methods and modeling.

Only a large, prospective, randomized, controlled trial would be able to definitively answer the question about the differential risks associated with one-stage and two-stage, bilateral total knee arthroplasties. Unfortunately, this kind of study does not seem feasible. Therefore, a multicenter registry, which includes a large number of clinically relevant variables, may provide large enough numbers and help

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answer some of the questions that existing databases cannot.

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