

# Incidence of NSAID-Induced Acute Kidney Injury in Total Joint Arthroplasty When Using Multimodal Pain Management

## Purpose

The purpose of this study was to define the rate of acute kidney injury after total hip and total knee arthroplasty in a 179-bed hospital when implementing multimodal pain management consisting of NSAIDs including twice-daily scheduled celecoxib and as needed ketorolac in addition to opioids and acetaminophen.

## Methods

After approval was obtained by the Institutional Review Board at our institution, a retrospective electronic medical record review of patients who received total knee or hip arthroplasty was obtained. Patients who were admitted to the hospital and underwent a TKA or THA from one of two surgeons at this institution between the beginning of May 2019 through the end of July 2019 and received multimodal pain management consisting of both ketorolac and celecoxib in addition to opioids and acetaminophen during recovery were selected for this study. Patients with chronic kidney disease and those with a pre-operative serum creatinine level greater than 1.5mg/dL were excluded from the study. To identify cases of AKI in this population, we compared pre-operative baseline SCr levels with the most elevated SCr obtained within the first 48 hours postoperatively. AKI was defined as a post-operative increase in SCr of greater than or equal to 0.3mg/dL. This definition of an AKI is a previously described definition by the Acute Kidney Injury Network staging criteria. Comorbid and demographic variables were included as well such as age, gender, body mass index, diabetes mellitus, and smoking status. Statistical evaluation was performed using a student t-test, and odds ratio was calculated to evaluate the relationship between multimodal pain management and AKI occurrence.

## Results

Of the 68 patients who received a total hip or total knee replacement between the months of May 2019 and July 2019, 3 patients had chronic kidney disease, and 2 patients had baseline serum creatinine levels of greater than or equal to 1.5mg/dL. These patients were excluded, leaving 63 patients with appropriate SCr documentation for study inclusion (92.6%). Of 63 total joint replacements, 7 patients had an AKI, making the overall rate of AKI 11.1%. In this study, the average age was 66.3 and the average BMI was 30.8. It was found that of those patients that experienced an AKI, their average BMI was 30.5 and their average age was 69.1. The odds ratio (OR) of developing an AKI when comparing those who received multimodal pain management during recovery those who did not is 1.35. This can be interpreted to say that the odds of having an AKI when receiving multimodal pain management is approximately 1.35 times more likely than the odds of having an AKI when not receiving multimodal pain management.

## Conclusion

NSAIDs are among many different drugs that can cause kidney injury. Other contributing factors include BMI, diabetes, and age. The results showed that AKI did occur more frequently in those who received multimodal pain management during post-operative recovery. However, this study was limited by a small sample size and possibly other contributing factors that weren't well controlled such as other renally eliminated drugs. It cannot be concluded from this study that NSAIDs are the sole contributing factor causing AKIs in this patient population. Further studies should be done in order to obtain a more definite conclusion.