Outcomes following Surgical Fixation of Distal Radius Fractures in Patients with Chronic Kidney Disease

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INTRODUCTION:
Moderate to severe chronic kidney disease (CKD stages 3-5) and end stage renal disease (ESRD) are known to be independent risk factors for fragility fracture. Altered bone and mineral metabolism contributes to greater complications and mortality rates in the setting of fractures, though most existing literature is limited to hip fractures. The manifestations of CKD among patients with upper extremity fractures is less understood. We hypothesized that patients with moderate to severe CKD would have greater complication rates after surgical treatment of distal radius fractures compared to those without CKD.
METHODS:
We retrospectively identified all patients at an academic Level 1 trauma center between 2008-2018 who had a diagnosis of stage 3-5 CKD at the time of surgical fixation of a distal radius fracture. Those with acute kidney injury or renal transplant were excluded. We recorded demographic data, comorbidities, and surgical complications (including deep infection, malunion/nonunion, loss of fixation). Data for readmissions (within 90 days) and 1-year mortality were collected. A 2:1 gender-matched control group without CKD who underwent distal radius fixation was selected for comparison, with age-adjusted analysis.
RESULTS: A total of 32 patients with CKD (78.1% CKD stage 3/4, 21.9% CKD stage 5) and 62 without CKD were identified. The mean age was 67+/-12 years in the CKD group and 55+/-15 years in the control group. The CKD group had a higher Charlson Comorbidity Index (CCI) (5.7 vs. 2.0, $p<0.0001$). Surgical complication rate in the CKD group was 12.5% (12.0% CKD 3 and 4, 14.3% CKD 5). Complications included fixation failure, loss of reduction, malunion, and pressure related wound. Neither early nor late surgical complication rates were statistically different from the non-CKD patients ($p=0.2$). Repeat surgery as well as 30- and 90-day readmission were similar between groups. Overall 1-year mortality was greater in the CKD group (9.4% vs. 0%, $p=0.016$). Among the CKD stage 5 group (n=7), all had arteriovenous (AV) fistulas in the upper extremity with 5 ipsilateral to the fracture. A tourniquet was utilized in 4 of these patients and no dialysis access complications were reported.
DISCUSSION AND CONCLUSION:
Following distal radius fracture fixation, surgical complications and readmission rates are similar between those with and without CKD. Mortality within 1-year postoperative is significantly higher among those with moderate or severe CKD. A tourniquet ipsilateral to an AV fistula can be utilized without subsequent dialysis access complications.