

Title: Normal-Range Sodium Variability Is Not Associated With Skilled Nursing Facility Discharge After Total Hip and Knee Arthroplasty in Elderly Patients

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Introduction:

As total hip and knee arthroplasty volumes increase among older adults, identifying predictors of non-home discharge is increasingly important for optimizing recovery and controlling healthcare costs. Discharge to a skilled nursing facility (SNF) is associated with higher costs and slower functional recovery. Although sodium abnormalities are associated with adverse surgical outcomes, most studies rely on binary thresholds ($\text{Na} < 135 \text{ mEq/L}$), potentially overlooking subtler physiologic variation. However, the clinical significance of normal-range serum sodium fluctuations remains unclear. This study evaluated whether normal-range sodium variability during hospitalization is associated with SNF discharge following arthroplasty in elderly patients.

Methods:

A retrospective cohort study was conducted using the MIMIC-IV database. Patients ≥ 65 years undergoing hip or knee arthroplasty were identified using ICD-10 procedure codes. Serum sodium values during hospitalization were extracted, and sodium variability was defined as the difference between maximum and minimum values within the normal range (135–145 mEq/L). Patients with fewer than two qualifying measurements were excluded. The primary outcome was discharge to SNF versus home. Multivariable logistic regression adjusted for age, postoperative hemoglobin, creatinine, ICU admission, length of stay, and number of sodium measurements.

Results:

Among 594 arthroplasty admissions, mean sodium fluctuation was similar between patients discharged home and those discharged to a SNF (2.47 ± 1.65 vs $2.35 \pm 1.63 \text{ mEq/L}$). Sodium variability was not associated with SNF discharge (OR 1.02, 95% CI 0.92–1.12, $p = 0.742$). Increasing age (OR 1.11 per year, $p < 0.001$) and lower postoperative hemoglobin (OR 0.81 per g/dL, $p = 0.002$) independently predicted SNF discharge.

Conclusion:

Normal-range sodium fluctuations were not associated with SNF discharge after arthroplasty in elderly patients. Increasing age and lower postoperative hemoglobin independently predicted discharge disposition, suggesting physiologic reserve and perioperative recovery are stronger determinants than electrolyte variability.