Impact of Preoperative Malnutrition on Medical and Implant Complications Following Ankle ORIF: A Multi-Institutional Retrospective Study

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Purpose: This study evaluated the relationship between malnutrition and postoperative complications in patients undergoing ankle open reduction and internal fixation (ORIF).

Methods: Patients who underwent ankle ORIF from 2004 to 2022 with preoperative lab values available for analysis and with a record for a minimum of 2 years of follow up were identified using CPT, ICD-9, and ICD-10 codes. Patients were stratified according to those with and without a preoperative lab value for nutrition defined as any transferrin <204 mg/dL or total leukocyte count <1500/µL within 3 months of surgery, between October 8, 2004, and October 8, 2022. Follow-up data were assessed up to October 8, 2024. Complication rates included 90-day readmissions, infection, hardware removal, nonunion, amputation, infection from the hardware, myocardial infarction (MI), pulmonary embolism (PE), deep vein thrombosis (DVT), transfusion, and stroke.

Patients were additionally compared with a 1:1 matched analysis that controlled for demographics and comorbidities.

Results: In total, 46,843 patients with preoperative lab values and ankle fractures were identified and propensity matched. At 90 days, patients with malnutrition had higher rates of hardware removal, infection around the device, MI, PE, DVT, and transfusion compared to the control group ($P< 0.05$). Notably, the risk ratio (RR) for hardware removal was 1.680 (95% CI: 1.322–2.134, $P< 0.001$) and for transfusion, it was 3.212 (95% CI: 2.179– 4.734, $P< 0.001$). Malnutrition was associated with a higher risk of amputation at 90 days [RR: 2.106, 95% CI: 0.993–4.466, $P = 0.047$] and at 2 years [RR: 4.089, 95% CI: 2.233–7.486, $P<0.001$].

Conclusion: Malnutrition significantly increased the risk of postoperative complications in patients undergoing ankle ORIF, including hardware removal, infections around the device, MI, PE, DVT, and transfusion. These trends were consistent across both the 90-day and 2-year follow-up periods. The findings suggest that malnutrition is a critical risk factor for both short- and long-term adverse outcomes, including higher rates of amputation. Surgeons should carefully consider malnutrition as part of preoperative risk stratification and provide patients with tailored counseling regarding the increased risk of complications following ankle ORIF.