Is Malnutrition a Risk Factor for Septic Failure and Acute Postoperative Infection Following Revision Total Joint Arthroplasty?

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Introduction: Malnutrition has been hypothesized to increase the risk of periprosthetic joint infection (PJI), however strong evidence linking the two is lacking. The purpose of this study was to assess the prevalence of malnutrition in patients undergoing revision knee and hip arthroplasty. We hypothesized that 1) patients undergoing revision for chronic PJI would have a higher rate of malnutrition than revisions performed for other causes and 2) malnutrition would increase the risk of acute postoperative infection in those patients undergoing aseptic revision.

Methods: A consecutive series of 501 revisions (375 aseptic, 126 septic) were screened for malnutrition (defined as total lymphocyte count < 1500/mm3, serum albumin < 3.5 g/dL, or serum transferrin less than 200 mg/dL). Age, sex, insurance type, race, Charlson Comorbidity Index (CCI), and body mass index (BMI) were compared between aseptic and septic groups using Fisher’s Exact Test and Student’s t-test, as appropriate. The 375 aseptic revision cases were then assessed for the incidence of acute postoperative infection (within the first 90 days postoperatively). Multivariate regression analysis was performed to identify independent risk factors for 1) septic as opposed to an aseptic mode of failure, and 2) acute postoperative infection following an aseptic revision.

Results: 67 of 126 Patients (53.2%) undergoing revision for PJI were malnourished compared to 123 of 375 (32.8%) undergoing revision for a non-infectious etiology (p < 0.0001). Patients undergoing septic revision were also significantly more likely to be male (65% vs. 53%, p = 0.03) and to have non-private insurance (81.4% vs. 65.6%, p = 0.03). Normal weight patients had the highest prevalence of malnutrition (50.6%), although malnutrition was common in obese patients (31.9%). Of the 375 aseptic revisions, 12 developed an acute postoperative infection (3.2%). The prevalence of infection was 9 of 123 in the malnourished group and 3 of 252 in the adequately nourished group (7.3% vs 1.2%; p = 0.003). Multivariate regression revealed that malnutrition is both an independent risk factor for septic revision (p=0.0030, Odds Ratio = 2.1) and for acute post-operative infection following aseptic revision arthroplasty (p = 0.02, Odds Ratio=5.9).

Discussion: Pre-operative malnutrition is extremely common among patients undergoing revision arthroplasty and is an independent risk factor for both chronic septic failure and acute post-operative infection following revisions performed for a non-infectious etiology. Malnutrition was paradoxically more common in normal weight patients. Surgeons should consider screening patients preoperatively for malnutrition, even if they appear to be of normal weight.

Significance: Given the tremendous impact of PJI on patients, their caregivers, and the healthcare system, optimizing patient-related risk factors for PJI is of paramount importance. This study is the first to establish malnutrition as an independent risk factor for both chronic septic failure and acute post-operative infection following revisions performed for a non-infectious etiology.

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