Nutrition Deficiencies are Associated with Decreased Wound Healing in Patients with Peripheral Arterial Disease (PAD)

Muskaan Ramchandani[1], Rohan Basu[2], Mackenzie Madison[2], Gregory Westin[2]

[1]Indiana University School of Medicine; [2]Division of Vascular Surgery, Indiana University School of Medicine

Background: Chronic limb threatening ischemia (CLTI) represents end-stage peripheral arterial disease (PAD) and is associated with a 30% annual risk of amputation, often due to non-healing wounds. Wound healing in PAD is multifactorial, but the role of nutritional deficiencies in healing arterial wounds is not well-studied. We sought to delineate the role of macro- and micronutrient malnutrition in healing ischemic wounds in PAD patients.

Methods: This was a retrospective chart review of all adult patients with non-invasive vascular laboratory evidence of PAD and distal lower extremity arterial wounds seen at the Comprehensive Wound Center at Indiana University Health from January 2020-May 2024. Primary endpoints were percent of wound healed by area and volume. Statistical analysis was performed with Stata18 (StataCorp LP, College Station, Tex). Chi-square analysis was conducted for categorical variables, with Fisher's exact test where appropriate. Continuous variables were compared using t-tests. A significance level of 0.05 was used for all analyses.

Results: Eighty-three patients met our inclusion criteria. Initial Vitamins B12 and C deficiency were associated with less wound healed by volume (p=.0005) and area (p=0.038), respectively. Fewer patients with hyperlipidemia had wound area decrease by at least 50% (p=0.049). There were no other significant differences in wound area or volume based on other macro- or micronutrients or demographic factors. Positive screening for food insecurity was not associated with macro- or micro-nutrient deficiencies (p=0.673).

Conclusions: Vitamin C and Vitamin B12 deficiencies were associated with significantly less wound area and volume healed by the end of the treatment, respectively. Patients with dyslipidemia were less likely to heal 50% of their wounds by area. Nutrient deficiencies were less common than expected from screening. Improved screening methods may help identify at risk patients. Patients with vitamin B12 or C deficiency and dyslipidemia should these deficiencies corrected as part of their comprehensive wound care plan.