Location of Activation on Ankle SPECT CT Scan is Prognostic for a Successful Supramalleolar Osteotomy in Patients with Asymmetric Ankle Arthritis

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Introduction/Purpose: Combined single-photon emission computed tomography and conventional computed tomography (SPECT/CT) is a hybrid imaging modality that shows a combination of metabolic and structural information about the ankle. Recently, its use has expanded for pre-operative evaluation of supramalleolar osteotomies (SMO) for asymmetric ankle arthritis. It is unclear if the location of bone scan activation is related the success of the operation. We hypothesize that uptake in specific locations within the ankle joint can be associated a failure of the supramalleolar osteotomy.

Methods: 85 pre-operative SMO patients with varus (37), valgus (41), or neutral (7) alignment of the hindfoot were assessed using SPECT/CT. The level of activation on SPECT/CT scans was measured. Activation was assessed on both the tibia and talus including 18 locations on axial scans, 8 locations sagittally, and 12 locations coronally on SPECT/CT imaging. Failure (conversion to total ankle arthroplasty (TAR) or arthrodesis) was recorded for each patient at an average of 3.7 years post-operatively. We compared the patients who had failures with those who did not with a chi-square analysis to look for any prognostic factors.

Results: Ten patients (11.8%) had a treatment failure. Six patients were successfully converted to a TAR and another four to an arthrodesis. Pre or post-operative alignment did not correlate to a treatment failure. It was noted that the failures were more likely to have cystic lesions (20%), bipolar lesions (50%) anterocentral activation on tibia (30%), or anterocentral/media/dome activation on the talus (20%). 90% of the failure patients had post-traumatic lesions. The only statistically significant (p=.036) poor prognostic indicator was a bipolar lesion.

Conclusion: Pre-operative SPECT/CT evaluation of an ankle before a SMO can be used to prognosticate on the success of the procedure. We caution against performing a SMO in patients with bipolar activation on a pre-operative SPECT-CT scan.

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