Using Neutrophil to Lymphocyte ratio (NLR) as a Screening Tool for Deep Tissue Infection in Charcot Foot and Ankle Reconstruction

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INTRODUCTION: Deep infection or chronic osteomyelitis in Charcot foot and ankle reconstruction can result in devastating complications, including systemic illness, repeat surgery, and amputation. The neutrophil-to-lymphocyte ratio (NLR) is an inexpensive tool used to assess inflammation that may help identify deep tissue infection at the time of surgery. This study compares NLR between patients with and without confirmed deep infection and evaluates NLR's predictive utility.

METHODS: This retrospective cohort study included 227 patients who underwent Charcot foot and/or ankle reconstruction at a single tertiary academic center from June 1, 2008 to December 31, 2023. 95 patients with confirmed deep infection were compared to 132 patients without infection at the time of surgery. Infected patients were identified by having a deep wound at the time of surgery. Preoperative NLR was calculated from serum neutrophil and lymphocyte counts. Additional preoperative labs—white blood cells (WBC), platelets, and glucose—were analyzed. Unpaired t-tests were used to assess differences between groups. Predictive performance was evaluated using receiver operating characteristic (ROC) curves and area under the curve (AUC).

RESULTS: Preoperative NLR, WBC, and platelets were significantly higher in infected patients (p < 0.001, 0.001, and < 0.001, respectively). NLR demonstrated the highest predictive value (AUC = 0.68), followed by platelets (AUC = 0.64) and WBC (AUC = 0.62). Glucose was least predictive (AUC = 0.52). An NLR ≥ 2.5 had a sensitivity of 75.6%, while NLR ≥ 1.75 achieved 94.2% sensitivity.

DISCUSSION AND CONCLUSION: NLR is a simple, cost-effective screening tool that may aid in identifying deep tissue infection in patients undergoing Charcot foot and ankle reconstruction.
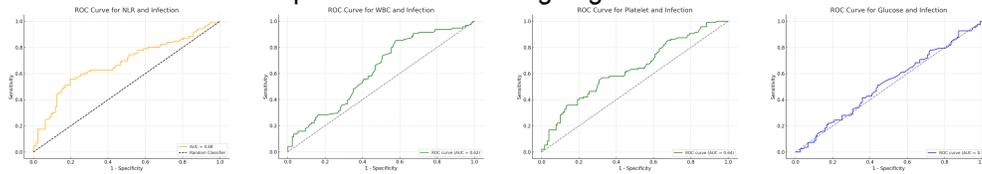
	Infection	No Infection
NLR ≥ 1.75	81 (true positive)	115 (false positive)
NLR < 1.75	5 (false negative)	12 (true negative)

	Infection	No Infection
NLR ≥ 2.5	65 (true positive)	71 (false positive)
NLR ≥ 2.5	21 (false negative)	56 (true negative)