



Comparison Between Duplex Ultrasonography And Digital Subtraction Angiography In The Evaluation Of Tibial Vessel Disease

Ruben H. Neris Jaquez, MD.¹ Kimyaghalam Ali, M.D.², Kuldeep Singh, M.D.³, Peter DeVito, M.D.⁴
Western Reserve Health Education Program - NEOMED | Warren, Ohio, United States of America



Objectives

Duplex ultrasonography (DUS) is readily available and often used as the first diagnostic test for patients with peripheral vessel diseases (PVD).

PVD is a disease that affects the general population but more commonly affects diabetics. To date, the role of DUS in the assessment of tibial vessels disease is inconclusive at best. The goal of our study is to assess the validity of DUS in characterizing the presence and severity of tibial diseases, via comparison with digital subtraction angiography (DSA) findings.

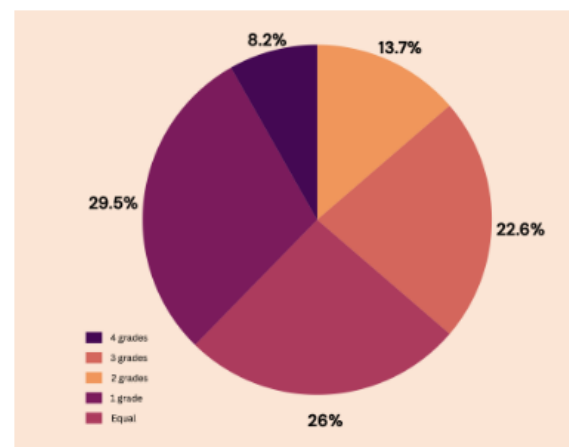
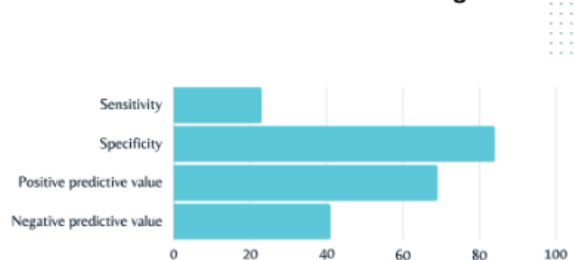
Methods

This is a single-center retrospective cohort study analyzing three arterial segments (anterior tibial, posterior tibial and fibular arteries) in patients who received a duplex study followed by DSA within a 30-day period. All arterial segments were graded from normal (Grade 0) to occluded (Grade 4), complying with the GLASS classification, based on duplex interpretation, and directly compared to direct visualization findings from DSA. Using statistical methods, the sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of DUS were determined.

Results

A total of 171 tibial vessels segments from 57 enrolled subjects with critical limb ischemia symptoms were analyzed in this study. The agreement between both modalities were poor (Kappa=0.19, $p < 0.05$), with DUS demonstrating significant underestimation of vessel pathologies. This is also reflected by the overall sub-optimal sensitivity (23%), specificity (84%), positive predictive value (69%) and negative predictive value (41%) in DUS, when compared to DSA results as the gold standard.

DUS statistical values as a screening test



Conclusions

Significant disagreements were noted in this study between DUS and DSA findings. Caution is advised in the clinical application of DUS in patients with CLTI symptoms and multi-segment tibial vessels due to its demonstrated limitations in this study.