

Effectiveness of Doppler Ultrasonography as a Predictor of Wound Healing after Below-Knee Amputation for Peripheral Arterial Disease

Fachrul Junaidi¹, Akhmadu Muradi^{1*}, Dedy Pratama¹, Raden Suhartono¹, Aria Kekalih²

¹Division of Vascular and Endovascular Surgery, Department of Surgery, Dr. Cipto Mangunkusumo General Hospital, Faculty of Medicine Universitas Indonesia, Jakarta, Indonesia

²Department of Community Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

Abstract

Background: A tool is needed to predict how wound following below-knee amputation (BKA) surgery will heal in patient with peripheral artery disease (PAD). Ultrasonography is an alternative to evaluate the condition of the arteries. We conducted a study to investigate the association between doppler ultrasonography as pre-amputation assessment with primary wound healing following BKA surgery.

Methods: A case-control study was conducted to investigate the effectiveness of ultrasonography as a predictor of the wound healing. Bivariate and multivariate analysis were performed to explore association between ultrasonography indicators including peak systolic velocity, volume flow, arterial diameter, and distal artery spectral waveform with wound healing following BKA. Ultrasonography assessments were conducted on the popliteal artery, anterior tibial artery, and posterior tibial artery.

Results: Based on the multivariate analysis on all arteries, there were statistically significant associations of peak systolic velocity (adjusted odd ratio [OR]= 5.584, 95% confidence interval [CI]= 1.291 – 24.157, p= 0.021), volume flow (adjusted OR= 4.760, 95% CI= 1.200 – 18.876, p= 0.026), and arterial diameter (adjusted OR= 6.507, 95% CI= 1.510 - 28.033, p= 0.012) with wound healing after BKA.

Conclusion: Doppler ultrasonography of PAD can be used as a predictive pre-amputation testing modality to predict wound healing after BKA.

Key words: ultrasonography, peripheral arterial disease, below-knee amputation, pre-amputation assessment