

Skin perfusion pressure: an important predictor of lower limb ischemia in the renal failure population. N.J Jones¹, I Mathieson², K Morris², S.G Riley¹

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The Skin Perfusion Pressure Device (SPP) is a non-invasive tool used to assess the healing potential of chronic foot ulceration and to diagnose small vessel peripheral arterial disease in high risk populations. The aim of the present study was to investigate if renal function (eGFR \leq 30) influenced the skin perfusion in the lower limbs of participants with Stage 4 Chronic Kidney Disease (CKD). Castronuovo et al (1997) reported that skin perfusion pressures are not affected by diffuse vascular calcification, which is particularly prevalent in the end stage renal failure (CKD Stage 5). Furthermore, studies by Tsai (2000) demonstrated that skin perfusion pressures were superior in the diagnosis of peripheral arterial disease in comparison to ankle and toe brachial pressure index measures. One hundred and seventy two participants were recruited between March-December 2011 at the Nephrology Outpatients Department at the University Hospital of Wales. The cohort consisted of (n=53) diabetic CKD Stage 4 patients (DM), (n=73) non-diabetic CKD Stage 4 patients (NDM) and a control group (n=46). Bilateral limb measurements were taken from the plantar aspect of the hallux in each participant using the Vasamed Sensilase System (PAD 3000). Skin perfusion pressures (SPP \leq 50 mmHg) were significantly reduced in the lower limbs of the CKD Stage 4 group in contrast to the control group. Twenty eight (22%) participants (DM n=15 v NDM n=13) demonstrated significant decrease in skin perfusion in the left limb, and thirty three (26%) respectively in the right limb (DM n=18 v NDM n=15). Twenty six participants (21%) (DM n=14 v NDM n=12) had SPP \leq 50 mmHg in both lower limbs compared to one (2%) participant from the control group. The hand held Doppler was used to assess the patency of the pedal arteries, and was a poor predictor of skin perfusion pressure in the renal failure population. Seventeen (63%) participants had at least one biphasic arterial signal and a significantly reduced SPP (\leq 50 mmHg) in both limbs. The micro-circulation is often overlooked in favour of macro-arterial patency during routine foot screening; however these findings support the need to consider skin perfusion as an important predictor of lower limb ischemia in this high risk population.

Castronuovo J. J., Adera, H. M., Smiell J. M., Price, R. (1997) Skin perfusion pressure measurement is valuable in the diagnosis of critical limb ischemia. *Journal of Vascular Surgery*, 26(4), pp 629-637. Tsai
F. W., Tulsyan N., Jones D. N., Abdel-Al N., Castronuovo J. J., Carter S. A. (2000) Skin perfusion pressure of the foot is a good substitute for toe pressure in the assessment of limb ischemia. *Journal of Vascular Surgery*, 32(1), pp 32-36.