

In vitro evaluation of finger's hemodynamics for vein graft surveillance using electrical bio-impedance method

ABSTRACT

Electrical bio-impedance measurement has great potential in many biomedical applications including vein graft surveillance. Studies have shown that thrombosis was the major cause of the vein graft failure. The meticulous skills of the surgeon and effective postoperative surveillance of vein graft remain the cornerstones of clinical success in the current surgical management of vein graft survival. Vascular blood flow is the key clinical indicators for the evaluation of patency of the vein graft and ensuring the patient's quality of life. In this work, electrical bio-impedance method has been proposed as an alternative to the existing surveillance method as it is non-invasive, portable, easy applicable in practice, fast response, radiation free, and required only low-cost instrumentation. It was employed to measure pulsatile changes in longitudinal bio-impedance to quantify arterial blood flow and blood volume. We expect that by measuring the changes in tissue bio-impedance which can be used to evaluate important peripheral hemodynamic, it allows the detection of early stage stenosis within vascular and vein graft as well as estimate its severity with predetermined normative data provided.

Keyword: Electrical bioimpedance; Non-invasive; Vein graft surveillance; Finger; Hemodynamic