

Fibrinolytic effects of peroneal nerve stimulation in patients with lower limb vascular disease

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Abstract

Patients with lower limb vascular disease are at an increased risk of thrombotic events. Tissue plasminogen activator (t-PA) and plasminogen activator inhibitor 1 (PAI-1) are important components of the fibrinolytic system, responsible for clot lysis. This study aimed to establish whether peroneal nerve stimulation (PNS) could promote fibrinolysis within a cohort of vascular patients. Ethical approval was obtained for this prospective case-controlled study. Patients were randomly assigned to active stimulation or control groups. Arterial flow measurements and venous blood samples were taken bilaterally at baseline and following 45min of PNS. ELISA analysis for plasma t-PA and PAI-1 was performed utilizing commercially available kits. Statistical analysis evaluated the changes in t-PA and PAI-1 levels from baseline for the active (device active), passive (contralateral limb) and control limbs (inactive device applied). Seventy-seven participants were recruited: 30 claudicants (25 active and five controls), 25 patients postoperative infra-inguinal bypass grafts (19 active and six controls) and 22 patients with varicose veins (17 active and five controls) t-PA levels reduced significantly in all groups; however, intergroup analysis demonstrated no statistically significant difference when comparing the active, passive and control limbs ($P=0.079$). PAI-1 levels decreased by 16.2% (34.0ng/ml, SD 52.2) in the active limbs but only 3.6% (11.4ng/ml, SD 47.4) and 2.6% (2.7ng/ml, SD 21.3) in the passive and control limbs, respectively (intergroup analysis $P<0.001$). No relationship between changes in flow and plasma of t-PA and PAI-1 were demonstrated. Peroneal nerve stimulation may augment fibrinolysis by decreasing plasma levels of PAI-1 levels in patients with lower limb arterial and venous disease.