Introduction

Venous thromboembolism (VTE) is a preventable complication that causes morbidity and mortality not only in hospitalised patients, but also healthy individuals. Pharmacological and mechanical methods are the most commonly used, however they are associated with inconsistent use and adverse events [1]. OnPulse™ is a novel technique developed, that activates venous muscle pumps in the calf, via transcutaneous electrical nerve stimulation to the common peroneal nerve located in the popliteal fossa. [2, 3]

Aims

The study investigates the efficacy and tolerability of this novel technology (OnPulse™) in enhancing lower limb circulatory dynamics. It also explores its potential for preventing DVT and other vascular disorders.

Methodology

1. Clinical Pharmacology, William Harvey Research Institute, Barts and The London School of Medicine and Dentistry, Charterhouse Square, London EC1M 6BQ
2. The Ernest Cooke Vascular & Microvascular Unit St Bartholomew’s Hospital, Barts and The London NHS Trust, London EC1A 7BE

I. US Measurements

Results

Highly significant increase following stimulation compared to baseline, (p ≤ 0.001)

II. Laser Doppler Flowmetry

Significant increase (p ≤ 0.001) in stimulated leg by ~ 73 flux units

III. Blood Coagulation

Highly significant reduction (p ≤ 0.001) in mean IPA.Ag concentration in left leg only

IV. BP and Oxygen Saturation

Highly significant reduction in blood pressure (p ≤ 0.001) with stable tissue oxygen saturation throughout the study

V. Discomfort Questionnaire

Minimal Discomfort was reported following stimulation using Visual Analogue and Verbal Rating Scores

Conclusion

OnPulse™ is significantly effective in increasing lower limb blood perfusion. The enhancement of venous return, together with arterial and microcirculatory blood velocity observed may be of importance in the management of heart failure. The significant decrease in tissue plasminogen activator antigen concentrations may suggest increased systemic fibrinolysis. OnPulse™ is also well tolerated and therefore might be of beneficial use in and out of hospital settings.

References