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JOURNAL OF THE AMERICAN SOCIETY OF HEMATOLOGY

Blood 2002; 100 (11 Suppl): 3950

Abstract# 3950

Effects of a Novel Venous-Return Assist Device ("Venowave") on Lower Limb Venous Flow in Patients with Post-Thrombotic Syndrome.

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Introduction: Post-thrombotic syndrome (PTS) is a chronic, often debilitating, complication of deep vein thrombosis that is characterized by swelling, pain and varicose eczema of the affected limb. Venous hypertension and valvular incompetence are believed to be the main factors responsible for the development of PTS. To date, evaluated therapies have primarily focused on countering increased venous hydrostatic pressure using intermittent compression pumps and/or graduated compression stockings (GCS). Although compression pumps provide symptomatic relief in most patients, they are expensive and inconvenient. GCS are convenient but are effective in only a minority of patients. There is a clinical need for a device that can be used in ambulatory patients for the long term management of PTS. The "*Venowave*" may be such a device. **Objective**: To determine if the *Venowave* increases peak venous flow in patients with PTS and/or chronic lymphedema. **Device**: The *Venowave* consists of a flexible planar sheet which is placed longitudinally on the posterior aspect of the calf and attached firmly about the leg with an adjustable support cuff. A battery operated mechanism generates a peristaltic wave-form motion on the flexible planar sheet. It is designed to increase venous flow by upward volumetric displacement. It may be used with GCS and may be worn when mobile. **Methods**: The effect of *Venowave* on peak venous flow (PVF) in the common femoral and popliteal veins was evaluated in 6 patients with PTS and 3 with chronic lymphedema. PVF was calculated from ultrasound measurements of peak venous velocity and vein diameter. We estimated PVF at 1) baseline; 2) after 2 minutes of *Venowave* use; and 3) after 50 minutes of *Venowave* use. Analysis was performed using repeated measures ANOVA on the log transformed data (data distribution was skewed). **Results**: Baseline mean PVF was 0.33 l/min at popliteal vein and 0.99 l/min at common femoral vein. *Venowave* resulted in a 64% increase in popliteal PVF after 2 minutes of use ($p=0.001$) which was maintained at 50 minutes. There was no significant increase in common femoral PVF after 2 minutes of *Venowave* use but there was an 88% increase ($p=0.029$) after 50 minutes of use. **Conclusions**: *Venowave* increased PVF in patients with PTS and/or chronic lymphedema and has potential as a treatment for these conditions.