Introduction: To date, conventional venography remains the gold standard for morphologically assessing the veins of the lower extremities. The required administration of iodinated contrast is associated with complications including anaphylaxis, nephrotoxicity as well as venous thrombosis. MR-venography based on TOF techniques has thus been advocated as an attractive non-invasive alternative particularly for those patients with known allergies or renal insufficiency. Based on the acquisition of multiple axial images, conventional MR-Venography can be time-consuming and often fails to delineate small superficial and perforating veins.

Purpose
To assess the performance of 3D MR-venography (MR-V) of pelvis and lower extremities based on a 2-station protocol combining a lower extremity vascular coil with bipedal injections of paramagnetic contrast agent.

Patients and Methods
Both conventional and 3D MR-V were performed in 25 patients (mean age 51 years) referred for evaluation of varicose changes (n = 8), acute deep venous thrombosis (n = 3), postthrombotic changes (n = 4) or depiction of the greater saphenous veins prior to bypass surgery (n = 10). Following placement of the dedicated lower extremity coil (Medical Advances), 80 ml of diluted Gd-DTPA (Magnevist) (1:20; 4 ml Gd-DTPA and 76 ml NaCl) were manually injected into both feet at a rate of 1 ml/sec. After injecting 40 ml into each foot, two 3D GRE data sets (TR/TE/flip 5.2/1.5/30°, 48 x 2.4mm sections), each extending over 48 cm, were collected of the lower and upper veins, respectively. Conventional and MR-V were prospectively analyzed by separate, blinded observers.

Results
3D MR-V image quality was rated comparable to conventional venography in all evaluated patients. Overcoming vessel superimposition, rotated and targeted MIPs surpassed conventional venography in defining the morphology of perforating veins. Varicose changes of the greater and lesser saphenous veins were reliably assessed. Similarly, the pre-bypass status of the saphenous veins was reliably determined with 3D MR-V. Two patients referred to exclude deep venous thrombosis showed normal venograms, while the other patient displayed postthrombotic changes.

Discussion
Contrast-enhanced 3D MR-V provides a comprehensive display of the venous system in the lower extremities. The technique is fast and displays the superficial veins as reliably as the deep venous system. It represents an attractive alternative to conventional venography in patients with complex venous anatomy or allergies to iodinated contrast.