Background: Effect of peripheral arterial disease (PAD) on lower extremity (LE) venous system is unknown. We evaluated the association of LE venous volumes as measured by magnetic resonance imaging (MRI) with walking impairment questionnaire (WIQ) and ankle brachial index (ABI) in PAD patients.

Methods: Proton-density weighted MRI (GE Excite, 3.0T, 6cm phased array coil) of 30 LE of 15 patients with PAD were studied. VesselMASS (Univ. Leiden) software was used by a single blinded reader to quantify total, lumen and vessel wall volumes of superficial femoral veins at the distal thigh region by averaging 40 two mm thick sections. Patient-reported WIQ were used to obtain percentage scores for distance, speed and stair climbing. ABI was calculated for each LE by dividing the lowest of the posterior tibial and dorsalis pedis systolic pressure by the brachial systolic pressure.

Results: Lower ABI tertile was non significantly associated with lower total venous (5.7±1.6 vs. 5.8±1.9 ml, p=0.4) and lumen (2.5±0.9 vs. 2.9±1.1 ml, p=0.1) volumes, but higher venous wall volume (3.2±0.7 vs. 2.9±0.8 ml, p=0.2) when compared to upper ABI tertile. While ABI was significantly associated with WIQ scores for distance (p=0.05), speed (p=0.03) and stair climbing (p=0.02), venous volume parameters did not show a similar association in general linear models, with or without adjustment for ABI.

Conclusions: A non significant trend towards a narrower lumen with thicker venous walls was seen with lower ABI in PAD patients. However, unlike arterial indices, venous volumes did not correlate with functional impairment as measured by a standardized questionnaire.