Popliteal Artery Volume Flow Measurement: A New and Reliable Predictor of Early Patency After Infrainguinal Balloon Angioplasty and Subintimal Dissection

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Objective: We have investigated whether popliteal artery volume flow (PAVF) measured immediately after balloon angioplasties of the superficial femoral artery-popliteal segments (SFA/POP) was predictive of early (30 days) and mid-term (6 months) arterial thrombosis.

Methods: During the last 24 months, 203 patients (56% men) with a mean age of 73 ± 9 years had 268 duplex-guided balloon angioplasties of the SFA/POP. Critical ischemia was the indication in 36%. Group I included 176 (66%) with stenoses, and group II had 92 (34%) with occlusions. All patients had completion duplex examinations that included three measurements of PAVF of below-the-knee popliteal artery.

Results: Early (30 days) thrombosis of the treated femoropopliteal arterial segment developed in 10 patients (3.7%), three in group I (1.7%) and seven in group II (7.6%; P < .04). All 10 cases of early thrombosis were in patients with TransAtlantic Inter-Society Consensus (TASC) class C (6/185, 3.2%) and D (4/26, 15%) lesions. Moreover, the 19% incidence (n = 4) of early thrombosis in patients with PAVF <100 mL/min (mean, 73 ± 24 mL/min; range, 20 to 99 mL/min) was higher compared with the 2.4% rate for patients with higher flows (mean, 176 ± 60 mL/min; range, 100 to 450 mL/min; P< .01. At 6 months of follow-up, femoropopliteal occlusions had developed in nine more patients, and it became apparent that low PAVE measurements were still predictive of thrombosis (29%) when compared with higher FAVF cases (6%; P < .002). Log-rank comparison of survival curves for cumulative primary stenosis-free patency in group I and group II demonstrated a statistically significant difference (P < .02). PAVF < 100 mL/min and TASC classification were significant predictors of early (30 days) and midterm (6 months) arterial thrombosis after femoropopliteal angioplasties. PAVF was the most powerful predictor of arterial thrombosis. The respective 6-month and 12-month limb salvage rates were 98% and 94% for patients with claudication and 88% and 85% for those with limb-threatening ischemia (P < .0001).

Conclusions: Our results demonstrate that low PAVF is the most powerful predictor of early (30 days) and mid-term (6 months) arterial thrombosis after femoropopliteal interventions. In the presence of a low postprocedure PAVF (< 100 mL/min), one may consider not reversing the heparin or using intermittent calf compression, or both, to augment the arterial flow.