Publication Brief

Change in access blood flow over time predicts vascular access thrombosis.

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BACKGROUND
Vascular access thrombosis accounts for at least $1 billion dollars in annual expenses and 25% of hospitalizations for chronic hemodialysis patients in the U.S. Low vascular access blood flow (less than 800 mL/min) has been shown to modestly increase the relative risk for thrombosis in the subsequent three months. This study hypothesized that a time-dependent decrease in vascular access blood flow may be more predictive of subsequent thrombosis especially in vascular accesses with flows more than 800 mL/min, since it would indicate the development of a critical outlet stenosis in a graft.

METHOD
• Ninety-five permanent vascular accesses (76% PTFE grafts) at least four weeks old or native arteriovenous fistulas (24% AVF) at least 12 weeks old in 91 chronic hemodialysis patients were prospectively followed over 18 months. At first vascular access blood flow measurement, less than 800 mL/min, was found in 27 patients.
• Baseline characteristics for all accesses included vascular access type (AVF vs. PTFE), anatomic location (left or right arm, upper or lower arm) and configuration of PTFE grafts (loop vs. straight).
• During this period 58 accesses were evaluated three times at six months apart; 27 accesses twice. Four patients had two vascular accesses evaluated during the total follow-up period of the study.
• 10 accesses with irreversible thrombosis after first measurement were not included in the analysis.
• Thrombotic events were recorded during the three study periods.

RESULTS
• 34 thrombotic events in 95 accesses (88% PTFE grafts) and 4 (12% AVFs);
• Thrombosed accesses: 22% decrease in access flow during the first observation period and a further 41% decrease during the second observation period; Non-thromboses accesses: 4% drop and 15% increase during the first and second observation periods, respectively;
• There was an estimated 13.6-fold increase in the relative risk of thrombosis for accesses with more than a 35% decrease in vascular access blood flow (VABF) compared to those accesses with no change in blood flow.
• There was no statistical difference in the average vascular access flow of all patients over the study period.

CONCLUSIONS
• Accesses that show a large (>15%) decrement in VABF are associated with a high risk of thrombosis.
• Serial measurements of vascular access blood flow predict access thrombosis.

TAKE HOME
• Study has prospectively determined that measurement of vascular access blood flow plays an important role in the evaluation & detection of PTFE grafts at higher risk of thrombosis, through the detection of low VABF and through serial measurements, by detecting decrements in VABF over time.
• These tests provide another tool to diagnose access malfunction and support the possibility that early detection and timely correction of underlying problems prior to thrombosis may play a central role in maintaining patency of the vascular access and delivering adequate dialysis therapy.

Reference: