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The utility of post-angioplasty brachial artery flow rates to predict clinically significant AVF stenosis.

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Objectives : Maintaining the functional patency of arteriovenous fistula (AVF) has been difficult. In particular, the optimum timing for pre-emptive intervention to prevent thrombosis is unknown. We aim to study if brachial artery access flow rate (Qa) within 12-months following AVF angioplasty can be used to predict AVF dysfunction, and to determine threshold of Qa for pre-emptive intervention.
Methods : This is a prospective multi-center study involving three hospitals in Singapore. Patients who underwent successful percutaneous transluminal angioplasty (PTA) for AVF stenosis were followed up for 12 months. Doppler ultrasonography (DUS) assessment of AVF by trained vascular technologists at 0-, 3-, and 6-months or until development of AVF dysfunction requiring re-intervention. AVF dysfunction is defined as clinically significant stenosis within the AVF circuit resulting in abnormal examination findings, low Kt/V, or persistently inadequate blood flow rates to support prescribed dialysis; and hence indicated for intervention as recommended by KDOQI guidelines. Receiver operating curves (ROC) were plotted for brachial artery flow rates at 0-, 3-, and 6-months post-intervention to predict access circuit primary patency at 3-, 6-, and 12-months.
Results : Of the 174 patients recruited. 131 (75.3%) patients developed AVF dysfunction, and 43 (24.7%) patients' AVF remained clinically patent at 12-month follow-up. ROC curves plotted for brachial artery flow at 3-month post-intervention against AVF patency at 6-month and 12-month post-intervention had significant AUC of 0.710 (95% CI: 0.618-0.802), and 0.678 (95% CI: 0.585-0.771) respectively. At 3-months, Qa of more than 300ml/min, 400ml/min, and 600ml/min predicted 6-month AVF patency at sensitivity of 98.9%, 95.5% and 80.7%; and specificity of 18.2%, 32.7% and 56.4% respectively.
Conclusions : Brachial artery flow rate at 3-month post-intervention is associated with AVF patency 3 months after. 3-monthly post-intervention DUS assessment of brachial artery flow rates may be useful in predicting risk of AVF dysfunction.