

THE RELATIONSHIP BETWEEN ENDOTHELIAL FUNCTION AND ARTERIAL-VENOUS FISTULA MATURATION IN SUBJECTS WITH END STAGE RENAL DISEASE (ESRD)

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Objective: In order for an arterio-venous fistula (AVF) to mature sufficiently to permit high quality dialysis, remodeling of the arterial and venous limbs must occur. Factors involved in the remodeling of AVF are poorly understood. We hypothesized that brachial artery endothelial function would be positively correlated with AVF remodeling.

Methods: Prospective, single-center, cohort study of patients (N=21) undergoing autologous AVF formation. All subjects had brachial artery vasoreactivity studies performed preoperatively to assess endothelium-dependent, flow mediated vasodilation (FMD) in the resting, fasting state. High-resolution ultrasound was used to assess venous and arterial diameters 1 cm from the anastomosis intraoperatively, and at 3 months. Remodeling was defined as change in lumen diameter divided by baseline diameter and expressed as a percent change. Student's T test was used to compare means and Spearman's coefficient to determine correlation.

Results: The mean age was 63.5 ± 13.6 years. Ten subjects (47.6%) had diabetes. The mean FMD for the entire cohort was (mean \pm SEM.) $5.79 \pm 1.1\%$, (range) 0-17.3%. The vein increased in size $3.29 \pm .33$ to $6.14 \pm .48$ mm, $109.4 \pm 20.2\%$, $P=.0001$, while the artery increased from $3.30 \pm .27$ to $4.46 \pm .35$ mm, $20.47 \pm 12.8\%$, $P=.013$. There was a significant positive correlation between the degree of arterial and venous remodeling, $R=.52$, $P=.023$. Brachial artery FMD most strongly correlated with arterial remodeling, $R=.47$, $P=.042$. Patients with diabetes failed to undergo venous remodeling to the same extent as did those without diabetes, $59.2 \pm 24.4\%$ vs. $141.5 \pm 25.4\%$, $P=.04$.

Conclusion: The degree of endothelial function is heterogeneous in ESRD patients. Impairment of endothelial function is associated with decreased arterial remodeling while diabetes is associated with decreased venous enlargement. Further investigation is in progress examining whether FMD can be utilized preoperatively to predict clinical success when considering autologous AVF placement.