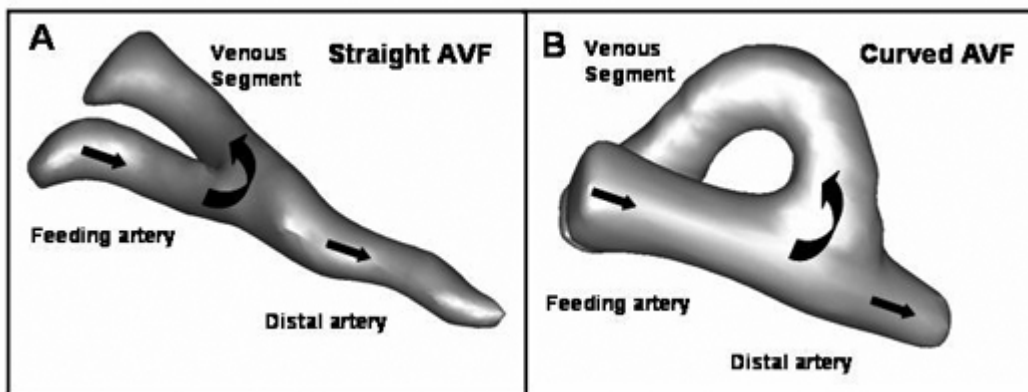


[F-PO745] Generation of a Complete Wall Shear Stress Profile in AV Fistulae Using 64 Slice CT Angiography.

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Early arteriovenous fistula (AVF) failure (characterized by neointimal hyperplasia and a lack of venous dilatation) is an increasingly important clinical problem. Although the pathogenesis of early AVF failure is unclear, alterations in wall shear stress (WSS) profiles are likely to play an important role. The AIM of this study was to develop a clinically applicable methodology for the accurate measurement of WSS within different regions of the AVF. AVF in straight and curved configurations were created between the femoral artery and vein of Yorkshire Cross pigs. 64 slice CT angiography (with a standard peripheral IV injection) was used to define the anatomical configuration of the AVF following which, volume blood flow was measured at specified points within the feeding and distal artery and the venous segment (see Figure) using transcutaneous color doppler ultrasonography (ATL HDI 5000). A single pressure measurement was then performed through a direct arterial puncture. DICOM images from the CT angiography studies were then processed into 3D models using image segmentation and region growing algorithms (see Figure). The incorporation of flow and pressure measurements into this model, using Fluent software allowed us to develop a detailed WSS profile for different regions of the AVF and also identifies differences in WSS profiles between the curved and straight configurations. We believe that this technology could be used in the future, to identify linkages between anatomical configuration, WSS profiles and vascular stenosis in clinical AVF. This could allow us to (i) define optimal anatomical configurations for AVF (ii) identify those AVF at increased risk of failure due to a suboptimal WSS profile.



Friday, November 2, 2007, 10:00 AM

Poster Session: Hemodialysis: Vascular Access (10:00 AM-12:00 PM) Poster Board Number: F-PO745

Halls A/B/C

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