

Abstract Submitted
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In Vivo Quantification of Flow Dynamics in Intracranial Aneurysms Using Intra-Operative Contrast-Specific Ultrasound and PIV Techniques GÁDOR CANTÓN¹, JAVIER RODRIGUEZ-RODRIGUEZ, THILO HÖELSCHER², JUAN C. LASHERAS, University of California, San Diego —

The goal of this study is to assess in vivo the hemodynamics of intracranial aneurysms using ultrasound and Digital Particle Imaging Velocimetry (DPIV) techniques. An ultrasound machine, equipped with an intra-operative transducer, was used to visualize the flow features inside an aneurysm with the aid of microbubbles as ultrasound contrast agent. The ultrasound studies were done using a Phase Inversion technique. Operating in the Doppler mode, the flow velocities in the afferent and the downstream vascular segments as well as inside the aneurysm were recorded and assessed. We analyzed the ultrasound data sets with a DPIV technique using backscattered signals from the microbubbles. The spatial and temporal distribution of velocity, vorticity, and stress fields was measured. These quantities were also measured in an in vitro aneurysmal model using the DPIV system. Our study shows that an advanced contrast-specific ultrasound technique in combination with a DPIV technique can be used to quantify in real time the flow-mechanical patterns inside the aneurysm.

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