Abstract Submitted
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Phase-locking MRV: time-resolved pulsatile flow in carotid arteries phantom[1] DON-GWAN AN, Dept. of Mechanical Engineering, Hanyang University, DOOSANG KIM, Dept. of Thoracic and Cardio-vascular Surgery, Veterans Health Service Medical Center, SANG HYUNG LEE, Dept. of Neurosurgery, SMG-SNU Boramae Medical Center, SIMON SONG, Dept. of Mechanical Engineering, Hanyang University — MRV has been used not only in medical field but in engineering field last decades. In most engineering studies, mean velocities for a steady turbulent flow have been measured by MRV, but a time-resolved velocity measurements are also possible for a periodic flow by utilizing phase-locking technique. We generated a pulsatile flow in a patient-specific carotid artery phantom and successfully obtained time-resolved 3D 3C velocity vectors. The overall experimental setup was designed to reproduce the patient's blood flow measured by US Doppler probe. The blood mimicking glycerin aqueous solution was used as a working fluid. The carotid phantom was constructed with a 3D printer based on the CT image of patient and the actual pulsatile flow. To synchronize the MRV measurement with the pulsatile flow, a digital pulse was transmitted to the MR scanner as trigger when the velocity waveform started. As a result, a time-resolved 3D 3C pulsatile flow with a high spatiotemporal resolution (350 um iso and 25 ms) was obtained.

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Don-Gwan An
Dept. of Mechanical Engineering, Hanyang University

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