

Abstract Submitted
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Optimization of saline flushing of the coronary artery via two-lumen catheter for visualization of chronic total occlusions SYED FAISAL, ERIC SEIBEL, ALBERTO ALISEDA, University of Washington, Seattle, WA, USA — A Chronic Total Occlusion (CTO) is caused by atherosclerotic plaque that occludes blood flow in a coronary artery. To improve treatment outcomes, visualization of the occlusion and surrounding coronary artery wall supports diagnosis and guides treatment. We investigate fluid interaction between blood and saline from different catheter designs, to understand the dynamics of blood displacement and low-Reynolds number mixing, and to optimize the catheter operating parameters involved in flushing of blood from the arterial lumen between the catheter tip and the CTO. The pressures develop during the flushing process and the time to obtain optical transparency in the lumen are measured. Suction is introduced to influence the flushing process. The incorporates changes to the artery size, as well as the arterial pulsatile blood flow, along with changes in the relative position of the fluid injection and suction lumens. The plaque morphology is varied to mimic its build up in arteries, testing the viability of the catheter uses under a wide range of physiological and anatomical conditions. A novel method of saline injection, suction and control, which helps reduce risk of the catheter failure and avoids injury to the patient, is developed.

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