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Experimental Comparison of the Hemodynamic Effects of Bifurcating Coronary Stent Implantation Techniques MELISSA BRINDISE, PAVLOS VLACHOS, Purdue Univ, AETHER LAB TEAM — Stent implantation in coronary bifurcations imposes unique effects to the blood flow patterns and currently there is no universally accepted stent deployment approach. Despite the fact that stent-induced changes can greatly alter clinical outcomes, no concrete understanding exists regarding the hemodynamic effects of each implantation method. This work presents an experimental evaluation of the hemodynamic differences between implantation techniques. We used four common stent implantation methods including the currently preferred one-stent provisional side branch (PSB) technique and the crush (CRU), Culotte (CUL), and T-stenting (T-PR) two-stent techniques, all deployed by a cardiologist in coronary models. Particle image velocimetry was used to obtain velocity and pressure fields. Wall shear stress (WSS), oscillatory shear index, residence times, and drag and compliance metrics were evaluated and compared against an un-stented case. The results of this study demonstrate that while PSB is preferred, both it and T-PR yielded detrimental hemodynamic effects such as low WSS values. CRU provided polarizing and unbalanced results. CUL demonstrated a symmetric flow field, balanced WSS distribution, and ultimately the most favorable hemodynamic environment.

Melissa Brindise
Purdue Univ

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