Abstract Submitted
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Effects of incomplete stent apposition on the changes in hemodynamics inside a curved and calcified coronary artery[1] ERIC POON, ANDREW OOI, University of Melbourne, Australia, PETER BARLIS, UMAIR HAYAT, Northern Health, Australia, STEPHEN MOORE, VLSCI, Australia — Percutaneous coronary intervention (PCI) is the modern gold standard for treatment of coronary artery disease. Stenting (a common PCI procedure) of simple lesion inside a relatively straight segment of coronary artery has proven to be highly successful. However, incomplete stent apposition (ISA) where there is a lack of contact between the stent struts and lumen wall is not uncommon in curved and calcified coronary arteries. Computational fluid dynamics simulations are carried out to study the changes in hemodynamics as a result of ISA inside a curved and calcified coronary artery. For a 3mm coronary artery, we simulate a resting condition at 80 mL/min and a range of hyperemic conditions with coronary flow reserve in between 1 and 2. The heartbeat is fixed at 75 BPM. Five different curvatures of the coronary artery are considered. Negative effects on hemodynamic variables, such as low wall shear stress (<0.5 Pa); high wall shear stress gradient (>5,000 Pa/m) and oscillation shear index ($0 \leq \text{OSI} \leq 0.5$), are employed to identify locations with high possibilities of adverse clinical events. This study will lead to better understandings of ISA in curved and calcified coronary arteries and help improve future coronary stent deployment.

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