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Simulation to Detect Virtual Fractional Flow Reserve in Coronary Artery Idealized Models

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Abstract : Coronary artery disease (CAD) is one of the most lethal diseases of the cardiovascular diseases. Coronary arteries stenosis and bifurcation angles closely interact for myocardial infarction. We want to use computer-aided design model coupled with computational hemodynamics (CHD) simulation for detecting several types of coronary artery stenosis with different locations in an idealized model for identifying virtual fractional flow reserve (vFFR). The vFFR provides us the information about the severity of stenosis in the computational models. Another goal is that we want to imitate patient-specific computed tomography coronary artery angiography model for constructing our idealized models with different left anterior descending (LAD) and left circumflex (LCx) bifurcation angles. Further, we want to analyze whether the bifurcation angles has an impact on the creation of narrowness in coronary arteries or not. The numerical simulation provides the CHD parameters such as wall shear stress (WSS), velocity magnitude and pressure gradient (PGD) that allow us the information of stenosis condition in the computational domain.

Keywords : CAD, CHD, vFFR, bifurcation angles, coronary stenosis
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