Virtual Assessment of Measurement Error in the Fractional Flow Reserve

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Abstract : Due to a lack of standardization during the invasive fractional flow reserve (FFR) procedure, the index is subject to many sources of uncertainties. In this paper, we investigate -through simulation- the effect of the (FFR) device position and configuration on the obtained value of the (FFR) fraction. For this purpose, we use computational fluid dynamics (CFD) in a 3D domain corresponding to a diseased arterial portion. The (FFR) pressure captor is introduced inside it with a given length and coefficient of bending to capture the (FFR) value. To get over the computational limitations, basically, the time of the simulation is about 2h 15min for one (FFR) value; we generate a Gaussian Process (GP) model for (FFR) prediction. The (GP) model indicates good accuracy and demonstrates the effective error in the measurement created by the random configuration of the pressure captor.