**The Evolution of a Virtual Physiologic Assessment and Virtual Coronary Intervention to Optimize Revascularization**

**Background:**

Physiologic assessment of coronary lesion significance has become a cornerstone of decision making for revascularization (1). The gold standard for assessing functional significance is fractional flow reserve (FFR) and its contemporary, instantaneous wave-free ratio (iFR). Despite societal recommendations, they are utilized in less than six percent of catheterization laboratories due the requirement for an invasive procedure and adverse effects with adenosine based FFR (2). This review highlights the novel technology of virtual fractional flow reserve (vFFR) and compares vFFR with similar computer-based FFR measurements (Table 1).

**Methods:**

In the vFFR analysis, a computational fluid dynamic model utilizing averaged steady state inlet and outlet boundaries from the aortic root and coronary microvasculature is combined with two coronary angiographic views to virtually construct a coronary vessel and then estimate the physiologic significance of coronary lesions (3-5).

**Results:**

Utilizing vFFR, lesions requiring intervention were distinguished with 97% accuracy in comparison to invasive FFR >0.08; vFFR predicted invasive FFR within ±0.06 (3). Virtual coronary intervention (VCI) capitalizes on this technology utilizing pre- and post-vFFR assessments to predict the physiologic response to stenting (6).

**Conclusions:**

Virtual physiologic assessments address the shortcomings of FFR and iFR with comparable accuracy for predicting coronary lesion significance. Building on this technology, VCI simulation has the potential to revolutionize our approach to percutaneous revascularization.

**References:**

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**Table 1.** Summary of a modern approach to the physiologic assessment of coronary stenosis.