
To the Editor:

We read with great interest the study by Kang et al1 that explored the relationship between intravascular ultrasound parameters and fractional flow reserve (FFR) in the assessment of intermediate coronary stenoses.1 We congratulate the authors, who concluded that lesions with a mean luminal area of <2.4 mm² had a high sensitivity and negative predictive value to predict FFR <0.8, but this was with a poor specificity and positive predictive value. These findings are not unexpected, given that lesion severity is only one of the features that determine the hemodynamic significance of a lesion. The Hagen-Poiseuille equation states that flow in a tube is determined by \((\Delta P \pi r^4)/(8\eta l))\), where \(l\) and \(r\) are length and radius of the tube, respectively, and \(\eta\) the viscosity and \(\Delta P\) the pressure gradient across the tube. Thus there are other factors that may affect coronary blood flow other than intravascular derived severity of a lesion.

Although FFR has been validated in patients studied late after ST-elevation–myocardial infarction,2 Tamita et al3 demonstrated that FFR may underestimate the significance of culprit lesions early after ST-elevation–myocardial infarction. Kang et al4 included patients with non–ST-elevation–myocardial infarction, and there is a paucity of data validating FFR in this population. Microvascular resistance is assumed to be minimal and constant in the simplified FFR calculation. Clinical syndromes that may increase microvascular resistance such as non–ST-elevation–myocardial infarction can affect FFR by altering distal pressure.5

The impact of increased lesion length on coronary flow and microvascular resistance on the assessment of FFR require further investigation to better understand the relationship between intravascular ultrasound and FFR parameters.

References

Letter by Layland et al Regarding Article, "Validation of Intravascular Ultrasound–Derived Parameters With Fractional Flow Reserve for Assessment of Coronary Stenosis Severity"

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