Different impact of lesion length on fractional flow reserve in intermediate coronary lesions between each coronary artery

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Topic(s):
Fractional Flow Reserve

Citation:
Background: Previous studies reported that lesion length was an important geometric parameter in addition to the degree of stenosis in the determinant of functional significance of coronary artery stenosis. Nevertheless, the optimal cutoff value of lesion length for predicting functional significance for each coronary artery has not yet been evaluated, though previous studies revealed that the cutoff value of minimum lumen diameter measured on coronary angiography (CAG) to predict fractional flow reserve (FFR) <0.80 is different for each coronary artery.

Purpose: This study evaluated whether the impact of lesion length on functional significance is similar between each coronary artery for lesions with intermediate stenosis.

Methods: Patients with suspected coronary artery disease who had at least one intermediate coronary lesion (luminal diameter stenosis of 70 to 80% by visual estimation on CAG) and underwent FFR measurement for the evaluation of myocardial ischemia were evaluated. Quantitative coronary angiography analysis including percent diameter stenosis and lesion length was performed. FFR was measured as the ratio of the mean distal coronary artery pressure to the mean aortic pressure during maximal hyperemia induced by intravenous infusion of adenosine triphosphate (150 µg/kg/min). The area under the receiver operating characteristics (ROC) curve was estimated for the best cutoff value as a predictor of FFR value of 0.80 for each coronary artery.

Results: A total of 221 de novo lesions that underwent FFR measurement were enrolled. The average FFR value was 0.81 ± 0.07. Although lesion length was similar among the lesions with an FFR >0.80 at different locations, the mean lesion length was significantly longer for lesions in the right coronary artery (RCA) with an FFR =0.80 than for those in the left anterior descending artery (LAD) and left circumflex artery (13.4±3.4 versus 8.6±3.1 versus 12.0±3.7 mm, p<0.001). ROC analysis demonstrated that the optimal cutoff value of lesion length for predicting an FFR =0.80 was 10.0 mm in the LAD (0.56 area under the curve, 48% sensitivity, 76% specificity), whereas 13.1 mm in the RCA (0.84 area under the curve, 67% sensitivity, 93% specificity) (Figure).

Conclusions: A longer lesion length is required to achieve FFR<0.80 in the RCA than in the other arteries. This may suggest the low possibility of an FFR =0.80 when stenosis is focal and short in the RCA with stenosis of 70 to 80% by visual estimation on CAG.
Abstract:

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