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Fractional Flow Reserve versus
Angiography for Guiding Percutaneous
Coronary Intervention

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Abstract

Background:

In patients with multivessel coronary artery disease who are undergoing percutaneous coronary intervention (PCI), coronary angiography is the standard method for guiding the placement of the stent. It is unclear whether routine measurement of fractional flow reserve (FFR; the ratio of maximal blood flow in a stenotic artery to normal maximal flow), in addition to angiography, improves outcomes.

Methods:

In 20 medical centers in the United States and Europe, we randomly assigned 1005 patients with multivessel coronary artery disease to undergo PCI with implantation of drug-eluting stents guided by angiography alone or guided by FFR measurements in addition to angiography. Before randomization, lesions requiring PCI were identified on the basis of their angiographic appearance. Patients assigned to angiography-guided PCI underwent stenting of all indicated lesions, whereas those assigned to FFR-guided PCI underwent stenting of indicated lesions only if the FFR was 0.80 or

less. The primary end point was the rate of death, nonfatal myocardial infarction, and repeat revascularization at 1 year.

Results:

The mean (\pm SD) number of indicated lesions per patient was 2.7 ± 0.9 in the angiography group and 2.8 ± 1.0 in the FFR group ($P=0.34$). The number of stents used per patient was 2.7 ± 1.2 and 1.9 ± 1.3 , respectively ($P<0.001$). The 1-year event rate was 18.3% (91 patients) in the angiography group and 13.2% (67 patients) in the FFR group ($P=0.02$). Seventy-eight percent of the patients in the angiography group were free from angina at 1 year, as compared with 81% of patients in the FFR group ($P=0.20$).

Conclusions:

Routine measurement of FFR in patients with multivessel coronary artery disease who are undergoing PCI with drug-eluting stents significantly reduces the rate of the composite end point of death, nonfatal myocardial infarction, and repeat revascularization at 1 year.

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Randomized Controlled Trial

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