A real-world comparison of outcomes between fractional flow reserve-guided versus angiography-guided percutaneous coronary intervention

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Topic(s):
Coronary Circulation, Flow, and Flow Reserve

Background
Fractional flow reserve (FFR)-guided percutaneous coronary intervention (PCI) has been shown to be superior to angiography-guided PCI in randomized controlled studies. However, real-world data on the use and outcomes of FFR-guided PCI remain limited.

Purpose
To investigate the outcomes of patients undergoing FFR-guided PCI compared to angiography-guided PCI in a large, state-wide unselected cohort.

Methods
All patients undergoing PCI between June 2017 and June 2018 recorded by the Centre for Health Record Linkage (CHeReL) were included in the study. The CHeReL database is one of the largest data linkage systems in Australia, capturing health data from ≥ 97% of all healthcare facilities in the state of New South Wales, which has a population of 7.5 million people. The PCI cohort was stratified into the FFR-guided group when a concomitant FFR procedure was performed, and the angiography-guided group when no FFR was performed. The primary endpoint was a combined endpoint of death or myocardial infarction (MI). Secondary endpoints included all-cause death, cardiovascular (CV) death, and MI.

Results
The cohort comprised 10,304 patients, of which 542 (5%) underwent FFR-guided PCI. There were no significant differences in age, gender, or comorbidities between the two groups. During a mean follow-up of 12±4 months, the FFR-guided PCI group had reduced occurrence of the primary endpoint (3% vs 8%, P<0.001), all-cause death (1% vs 4%, P=0.001), CV death (1% vs 3%, P=0.01), and MI (2% vs 4%, P=0.01) (Figure). Multivariable Cox regression analysis demonstrated FFR-guidance to be an independent predictor of the primary endpoint (hazard ratio [HR] 0.47, 95% confidence interval [CI] 0.28 – 0.78, P=0.004), after adjusting for age, clinical presentation, comorbidities, and multi-vessel PCI. A sensitivity analysis was performed excluding patients that presented with acute MI, leading to a smaller cohort of 5,850 patients, of which 448 (8%) underwent FFR-guided PCI. FFR-guidance remained an independent predictor of the primary endpoint in this cohort of stable patients (HR 0.36, 95% CI 0.17 – 0.77, P=0.01).

Conclusion
In this real-world study of patients undergoing PCI, FFR-guidance was associated with improved clinical outcomes, driven by the lower hard endpoint of death or MI. The use of FFR-guided PCI remains limited worldwide, and efforts should be directed to increase adoption of this technique in future.
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