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Diagnostic Coronary Angiography: Functional Flow Reserve Changes Decisions in 25% of Cases

Routinely measuring fractional flow reserve (FFR) with pressure wire assessment during coronary angiography for diagnosis of chest pain leads to significant changes in the management of one in four patients, according to results from a study reported at EuroPCR 2013.

The RIPCORD (Does routine pressure wire assessment influence management strategy at coronary angiography for diagnosis of chest pain) study was designed to assess whether routine assessment of FFR in all the main coronary branches would significantly change the management strategy derived from diagnostic angiography alone.

“Angiographic assessment of chest pain is flawed because it doesn’t assess the functional significance of coronary artery disease,” said the lead author of the study Nick Curzen, Professor of Interventional Cardiology, University Hospital Southampton NHS Foundation Trust and Faculty of Medicine, University of Southampton, Southampton, UK.

He explained that ischaemia is the most important determinant of clinical outcome in coronary artery disease. FFR provides an accurate and reproducible method for detection of ischaemia by measuring the pressure drop across a lesion and previous studies have shown better clinical outcomes of FFR-guided treatment compared to angiography alone. “But, despite this, most patients with chest pain are assessed by angiogram alone,” he told the conference.

RIPCORD recruited 200 patients being investigated for chest pain at 10 UK centres. They all underwent diagnostic coronary angiography carried out by one cardiologist who used the results to develop a treatment plan (plan 1) giving recommendations for medical treatment, percutaneous coronary intervention (PCI), coronary artery bypass grafting (CABG) or to request more information.

The first cardiologist then left the room and each patient in the study had FFR measured in all patent vessels of stentable (>2.25mm) diameter by a second cardiologist. The FFR results were shown to the first cardiologist, who used them to develop a second treatment plan (plan 2) for that patient. The primary endpoint of the study was the difference between plan 1 and plan 2 for each patient.

“Routine use of FFR at diagnostic coronary angiography resulted in a significant change in management in 26 percent of patients,” Curzen reported. FFR led to a change in the judgement of whether a coronary artery had a ‘significant’ lesion in 64 patients (32 percent) compared to angiogram alone. “These results have potentially important implications for clinical practice,” he concluded. “Management of patients with stable angina alone is flawed and would be improved by routine use of FFR at the diagnostic stage.” He suggested that RIPCORD has provided proof of principle and that a large-scale randomised trial comparing angiographic- with FFR-guided assessment and management of patients with stable angina undergoing diagnostic angiography is now warranted.

Commenting on the implications of the study findings, Kari Niemela, Medical Director and founder of the Heart Center Co., Tampere University Hospital, Tampere, Finland, said, “The RIPCORD trial demonstrated that routine measurement of FFR in patients with stable angina pectoris changes treatment plan in one out of four patients as compared to visual evaluation with coronary angiography alone.” He added, “As the number of patients in this highly interesting multicentre trial was relatively small (200 patients), a large-scale randomised controlled trial including a health economic assessment of both diagnostic options for routine use is justified.”

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