DIAGNOSTIC TESTING FOR CORONARY MICRO-VASCULAR DYSFUNCTION

INOCA

Emphasis on **myocardial ischaemia,** as opposed to coronary atheroma

Relevance of **coronary microvascular dysfunction**

Circulation 2018

IN DEPTH

Reappraisal of Ischemic Heart Disease

Fundamental Role of Coronary Microvascular Dysfunction in the Pathogenesis of Angina Pectoris

ABSTRACT: In recent years, it has become apparent that coronary microvascular dysfunction plays a pivotal pathogenic role in angina pectoris. Functional and structural mechanisms can affect the physiological function of the coronary microvasculature and lead to myocardial ischemia in people without coronary atheromatous disease and also in individuals with obstructive coronary artery disease. Abnormal dilatory responses of the coronary microvessels, coronary microvascular spasm, and extravascular compressive forces have been identified as pathogenic mechanisms in both chronic and acute forms of ischemic heart disease. The condition

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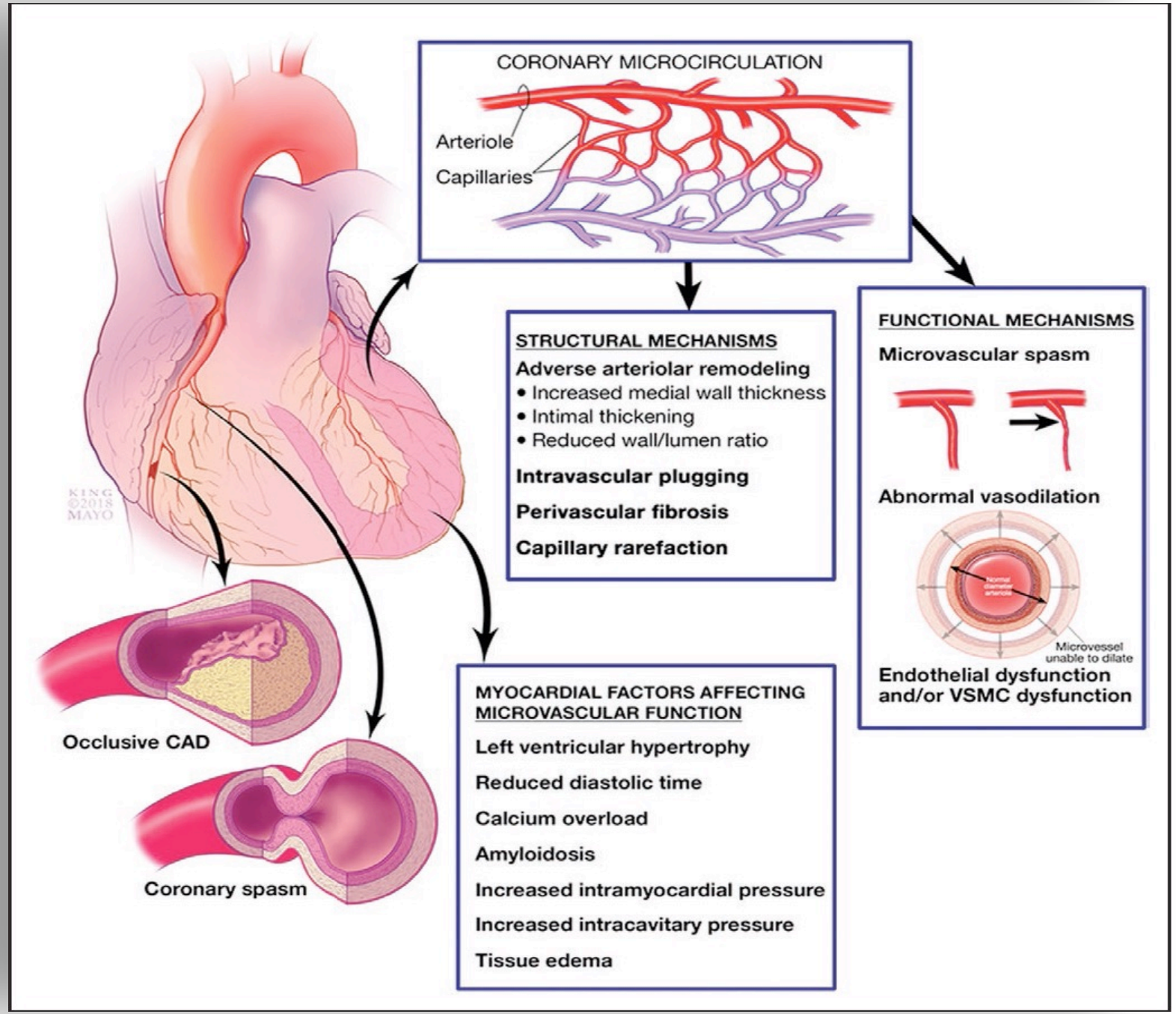


Kaski JC, Crea F, Gersh B, Camici P. **Reappraisal of IHD. The fundamental role of coronary microvascular dysfunction.** ***Circulation 2018***

London, 5th May 2019

Dear Professor Kaski,

We are looking for some advice on this as my husband has repeatedly been to many cardiologists, with no ease in symptoms or diagnosis.

He is 36 years old and has been suffering from severe chest pain that occurs only at rest and mostly at night, since his mid 20s. He knows this is not indigestion because he gets that too, and this pain is very different. He gets this type of chest pain randomly, and every few weeks, sometimes after a couple of months. It is always at rest.

He has undergone investigations, including a stress test and a CT Angiogram. These both came back normal. His cholesterol was very high initially (around 8) but is now controlled (5mmol/dL) with the use of Statins.

He was discharged from hospital after this, but re referred this year for follow up as he continues to get the chest pain at rest.

"The cardiologist he saw recently said he does not believe in the validity of Microvascular or Prinzmetal's angina, and just doesn't think it really exists.

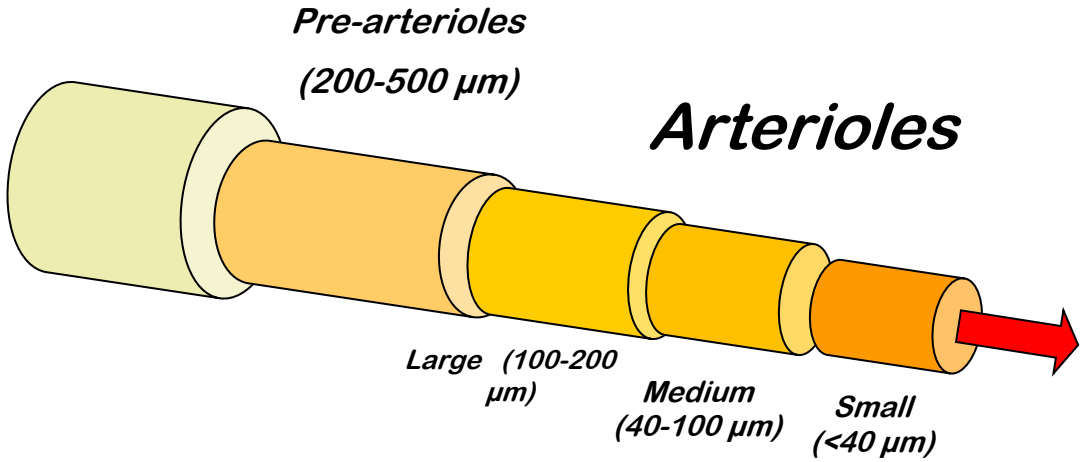
So again, my husband will be discharged.

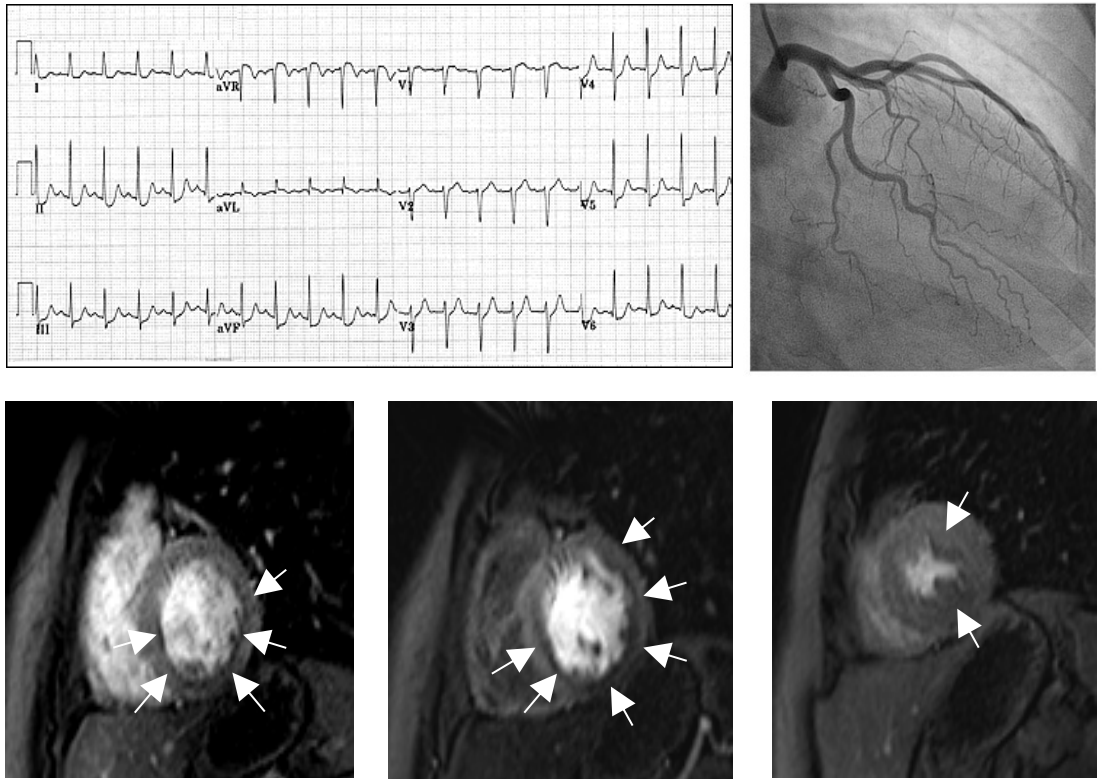
We are concerned as he is continuing to get the pain".

Microvascular Angina

Markedly increased resistance to coronary blood flow at the site of the coronary microvasculature can trigger myocardial ischaemia, as shown by ECG shifts, myocardial perfusion defects and LV dysfunction in patients who otherwise have patent epicardial coronary arteries.

Hermann J, Kaski JC, Lerman A. Eur Heart J 2012.





TESTS OF CORONARY FUNCTION IN CLINICAL PRACTICE

In patients with INOCA, vasomotion disorders i.e MVA and vasospastic angina, are common and associated with impaired clinical outcomes.

Identifying coronary microvascular dysfunction and/or epicardial coronary artery spasm using functional diagnostic tests should allow cardiologists to diagnose and treat these conditions rationally and patients to gain insight into the cause of their symptoms.

Despite emerging clinical trial evidence supporting their use, tests of coronary function are rarely carried out in daily clinical practice.

Ford T et al. Heart 2018;104:284-92 and J Am Coll Cardiol. 2018;72:2841-55.

CHALLENGES IMPOSED BY CURRENT GUIDELINES ON ANGINA MANAGEMENT

European guidelines for the management of symptomatic patients with a high (>85%) pre-test probability of obstructive CAD recommend direct referral for invasive coronary angiography ± FFR.

In the UK, NICE guidelines recommend CTCA as the first line diagnostic technique for patients with chest pain and no history of CAD. Thus an increasing proportion of patients undergoing coronary angiography have no info regarding myocardial ischaemia. This presents major challenges for decision making.

Reflecting a lack of clinical evidence, guidelines do not recommend invasive testing of coronary vascular function. This means that clinicians do not assess for causes of ischemia other than CAD when FFR or NHPR are normal or obstructive CAD is absent.

INOCA (ISCHEMIA WITH NO OBSTRUCTIVE CAD) - FACTS

Approximately 50% of patients undergoing coronary angiography for suspected angina are found to have non obstructed epicardial coronary arteries and coronary microvascular dysfunction (CMD) and/or vasospastic angina are often present.

CMD - whether epicardial or microvascular - can cause myocardial ischemia in patients with or without obstructive CAD.

INOCA is typically a chronic health problem that affects mostly women and is associated with impaired clinical outcomes and poor quality of life.

When assessed using specific tests, microvascular angina and vasospastic angina can be found in up to 60-80% of INOCA patients.

THE CORONARY MICROVASCULAR ANGINA (CORMICA) TRIAL

Randomized, sham-controlled, blinded clinical trial of "stratified" medical therapy versus standard care in patients with angina undergoing coronary angiography.

Patients in whom angiography ± FFR excluded obstructive CAD were randomized 1:1 to the intervention group (stratified medical therapy, interventional/FDP – results disclosed) or the control group (standard care, FDP performed, results not disclosed (sham)).

The FDP included a guidewire-based assessment of a major coronary artery followed by acetylcholine testing.

Ford T et al . J Am Coll Cardiol. 2018;72:2841-2855

CORMICA - A DIAGNOSTIC STRATEGY LINKED TO THERAPY IMPROVES PATIENT WELL-BEING

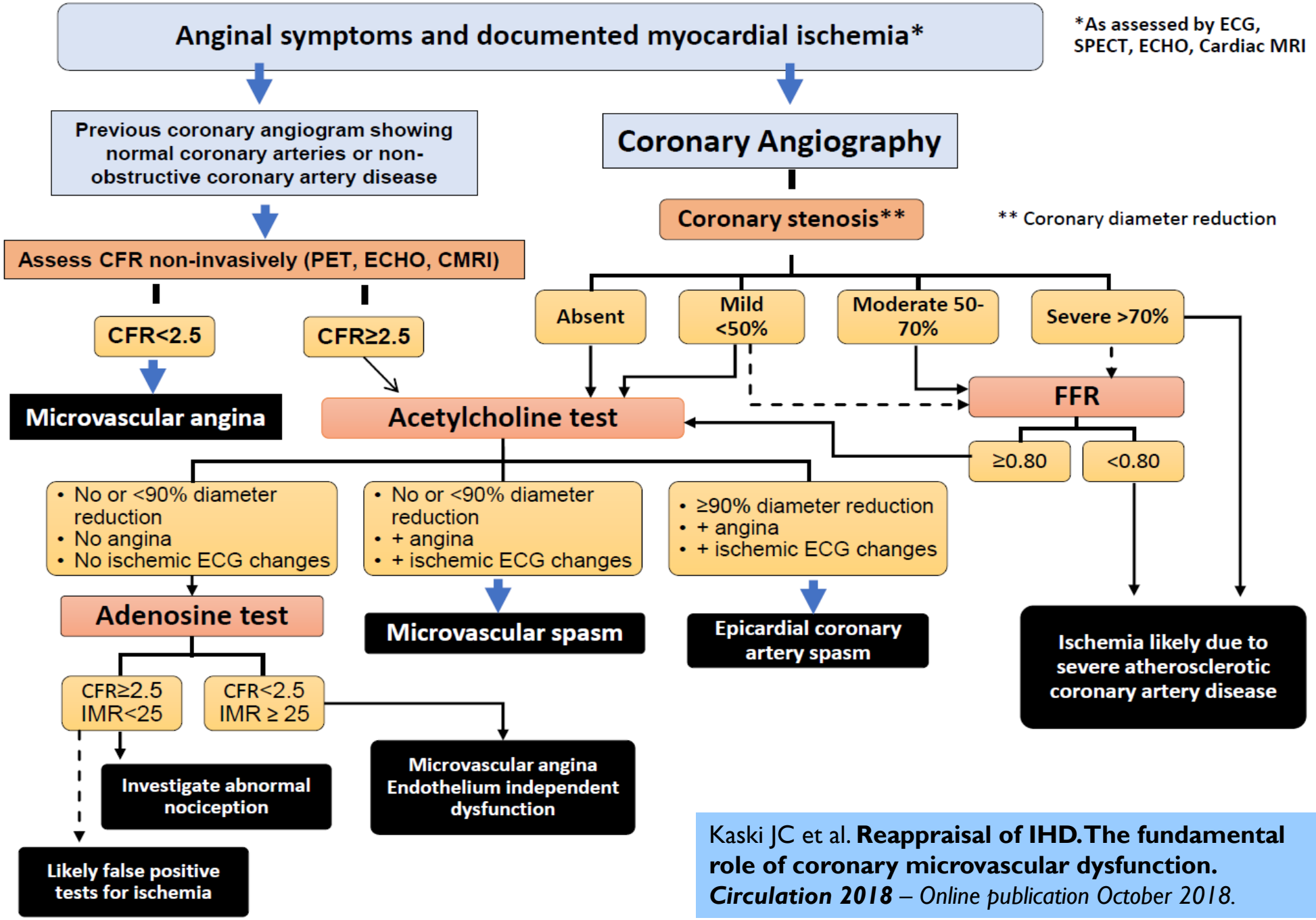
In 151 patients: MVA 78 (51.7%), vasospastic angina 25 (16.6%), both 31 (20.5%), and “non-cardiac” chest pain 17 (11.3%). The diagnosis of a clinical endotype was linked to ESC guideline-based management [Eur Heart J. 2013;34:2949-3003].

The intervention was associated with a mean improvement of 11.7 units in the SAQ Summary Score at 6 months (95% CI: 5.0 - 18.4; p=0.001) (primary endpoint) and improvements in the mean QOL score (p=0.024) and visual analogue score (p<0.001).

After disclosure of the FDP result, over half of treating clinicians changed the initial diagnosis and treatment based on angiography alone.

INOCA- THE RATIONALE FOR ADJUNCTIVE TESTING OF CORONARY VASCULAR FUNCTION

1. A normal angiogram does not exclude ischaemia caused by coronary vascular dysfunction. Hence angiography is an "incomplete" study without adjunctive diagnostic tests of coronary vascular dysfunction
2. Functional testing in INOCA patients allows the cardiologist to make the correct diagnosis and offer appropriate therapy that can improve QOL.
3. Diagnosing CMD as a mechanism or a cause of the symptoms provides prognostic information
4. Functional testing providing a diagnosis empowers the patient who is often in "limbo" regarding the cause of their symptoms.



Kaski JC et al. **Reappraisal of IHD. The fundamental role of coronary microvascular dysfunction.** ***Circulation 2018*** *– Online publication October 2018.*