

## CT fractional flow reserve: an alternative to stress ECHO for gatekeeping to invasive coronary angiography

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**Introduction:** Stress echocardiography (SE) can assess the significance of moderate/severe stenoses found on CT coronary angiography (CTCA), as a gatekeeper to invasive coronary angiography (ICA). In 2017, the UK National Institute for Health and Care Excellence (NICE), recommended CT fractional flow reserve (CTFFR) on all patients with coronary stenoses on CTCA to reduce downstream ICA and reduce costs.

**Aim**

We describe our experience of using CTFFR and compare this with previously accepted practice of judicious use of SE in patients with moderate/severe CTCA stenosis, and subsequent rate of ICA.

**Method:** An electronic patient record identified patients undergoing CTFFR between January 2019 and March 2020, and CTCA between January 2017 and June 2018, at our centre. We assessed downstream testing following CT evidence of moderate/severe stenoses and undertook a cost analysis per patient (PP) with the following NHS tariffs; CTCA=£220, CTFFR=£530, SE=£177, ICA=£1000.

**Results:** 140 patients were referred for CTFFR with 125 analysed (rejection rate 11%) of which 81 had moderate/severe stenoses. The baseline audit comprised 652 patients undergoing CTCA of which 92 had moderate/severe stenoses.

**Moderate CTCA stenosis: Baseline audit:** 58 had moderate stenosis, 18 (31%) underwent SE, with 1 positive and subsequent ICA. 36 (62%) were referred directly for ICA. In total 17 (46%) were revascularised. Cost of £1224 PP.

**CTFFR audit:** 44 had moderate stenosis, with 35 negative and 9 positive CTFFR. 9 (26%) and 7 (78%) following negative and positive CTFFR respectively, were subsequently referred for ICA. In total 16 (36%) were referred for ICA, and 44% revascularised. Cost of £1425 PP.

**Severe CTCA stenosis: Baseline audit:** 34 had severe stenosis, 1 (3%) underwent SE. 33 (97%) were referred directly for ICA. In total 18 (60%) were revascularised. Cost of £1418 PP.

**CTFFR audit:** 37 had severe stenoses, with 10 negative CTFFR and 27 positive CTFFR. 5 (50%) and 22 (81%) following negative and positive CTFFR respectively were referred for ICA. In total 27 (73%) were referred for ICA and 70% revascularised. Cost of £1719 PP.

Importantly 14 patients underwent ICA following negative CTFFR with 29% revascularised.

**Conclusion:** CTFFR use in all patients with moderate/severe stenosis reduced the rate of downstream ICA compared with previous judicious use of SE, albeit at greater cost and similar revascularisation rates. A small number of patients underwent ICA despite negative CTFFR due to clinical concerns.

The NICE guidance recommending CTFFR on all patients with moderate/severe CTCA stenosis reduces ICA. However, assuming equal efficacy, based on the non-invasive arm of the Platform trial<sup>1</sup>, SE would achieve this at lower cost. Notably, CTFFR benefits from completing assessment within a single visit, which is pertinent in the COVID-19 era and negates inherent delays between multiple tests.