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HIGH DEFINITION CT CORONARY ANGIOGRAPHY FOR THE PRIMARY INVESTIGATION OF CHEST PAIN AFTER REVASCULARISATION

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Background NICE Diagnostics Guidance DG3 recommends 'new generation' cardiac CT scanners 'for first-line evaluation of disease progression, to establish the need for revascularisation, in people with known coronary artery disease in whom imaging with earlier generation CT scanners is difficult'. This has previously been challenging due to artefact from stent metal and heavy calcification in the native vessels of patients who have undergone coronary artery bypass grafting (CABG). High-definition CT coronary angiography (HD-CTCA) aims to address the shortcoming of conventional technology by improving spatial resolution and reducing calcium blooming artefact. We evaluated the accuracy of HD-CTCA in patients presenting with chest pain after previous coronary revascularisation as part of an HD-CTCA accuracy trial.

Methods Patients with high pre-test probability and established coronary artery disease were prospectively enrolled into our HD-CTCA accuracy trial. We present the interim results of 64 consecutive, previously revascularised patients (40 PCI, 24 CABG) who underwent HD-CTCA within 30 days following invasive coronary angiography (ICA). Anonymised ICA and HD-CTCA studies were evaluated separately and results compared with ICA as the reference standard. Grafts were not assessed.

Results HD-CTCA studies were acquired using prospective gating, 100 kV tube voltage and optimum radiation reduction strategies. The male: female ratio was 3.9:1 and the median age and BMI of patients at the time of scanning were 68 years, 26.4 kg/m^2 respectively. The median calcium score of patients without stents was 1715 (53–5389). The median radiation dose was 190 mGy cm (36–350) representing effective doses of 5.3 mSv (1–8.4) using a cardiac specific conversion factor (0.028). Compared to ICA, the per-coronary segment sensitivity and specificity of HD-CTCA for 70% stenosis were 99.0% and 97.7% respectively. The negative predictive value was 99.5% and positive predictive value 95.1%. The κ statistic was 0.95 implying very good agreement between imaging methods.

Discussion Interventional cardiologists with direct access to HD-CTCA increasingly use this modality for first-line investigation of patients re-presenting following revascularisation. There has previously been little data to justify this trend although conventional CTCA is well established for the evaluation of coronary bypass grafts. The NICE Guidance supports this trend and this study defines the level of accuracy that can be anticipated with a non-invasive approach to coronary angiography for these patients.

Conclusions In expert hands, HD-CTCA is highly accurate with remarkably similar angiographic findings to ICA for the assessment of the native coronary arteries in patients with prior revascularisation. These findings have significant implications for how sophisticated CTCA is integrated into the diagnostic algorithms of those re-presenting with IHD and previous revascularisation.

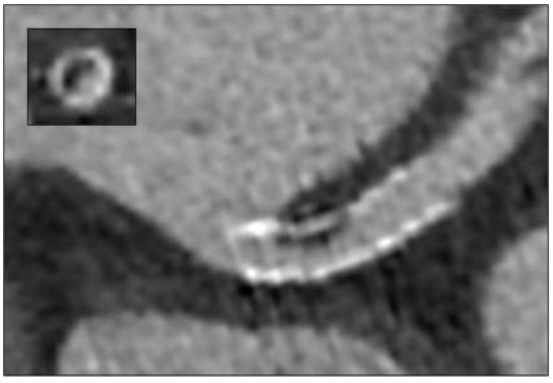

Figure 1

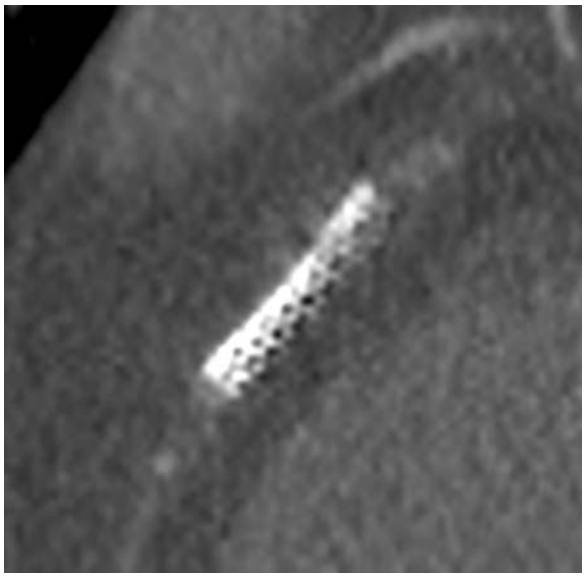

Figure 2