safety of stress MPS with a physiologist-led protocol using Regadenoson as the primary vasodilator agent, compared with an earlier physician-led protocol.

Methods Our centre prefers dynamic stress and will combine it with vasodilator stress as required. Earlier local audit data suggested Regadenoson was safer than other pharmacological stressors in keeping with published data. This resulted in the introduction of physiologist-led stress MPS in September 2011 and replacement of the previous physician-led protocol. Data were prospectively stored on a database. We reviewed all documented serious adverse events (AE) (*VF/VT, cardiac arrest, unplanned admission, death*) associated with dynamic and vasodilator stress MPS between 1 September 2008 and 30 August 2014. Outcome data between the two periods were analysed: physician-led (September 2008 to August 2011) and physiologist-led (September 2011 to August 2014).

Results In all, 11297 patients underwent stress MPS (physician-led, 5321; physiologist-led, 5976). Compared to the physician-led period, there were fewer patients in sinus rhythm in the physiologist-led period (86.4% vs 91.4%, P < 0.01) and more patients deemed to have a high prognostic cardiovascular risk post-scan (11.7% vs 9.2%, P < 0.01) (Table 1). Vasodilator stress was used more often in the physiologist-led period (43.9% vs 27.9%, P < 0.01). Regadenoson was the main vasodilator in physiologist-led period (64.9%); Dipyridamole in physician-led period (83.9%) (Table 1). There were 8 cases of serious AE (4 in each period) (0.07%): VF/VT (1 and 3 cases in physician and physiologist-led periods respectively), cardiac arrest (2, 2), admission (2, 3) and one death (1, 0). Relative risk of serious AE was 0.89 (95% CI: 0.2–3.6) for patients in the physiologist-led period, relative to those in the physician-led period (Table 2).

Conclusions This retrospective study compared physiologist-led stress MPS using regadenoson as the primary vasodilator agent with a previous physician-led protocol. Physiologist-led stress MPS was not associated with an increased rate of serious AE, with no deaths. Regadenoson stress MPS may be used safely in a physiologist-led setting without immediate physician presence.

Abstract 116 Table 2 Serious adverse events

	Physician-led	Physiologist-led	
Total cases	4 (0.1%)	4 (0.1%)	0.9 (0.2–3.6)†
VF/VT	1	3	
Cardiac arrest	2	2	
Emergency admission	2	3	
Death	1	0	

† 95% confidence interval

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Background 18F-Fluoride positron emission tomography (PET) and computed tomography (CT) can measure disease activity and progression in aortic stenosis. We aimed to optimise imaging methodology, analysis and scan-rescan reproducibility.

Methods Fifteen patients with aortic stenosis underwent 18F-fluoride PET-CT twice within 1 month. We compared non-gated PET and non-contrast CT, with a modified approach that incorporated contrast CT and ECG-gated PET. We explored a range of image analysis techniques including estimation of blood pool activity at differing vascular sites and a most-diseased segment (MDS) approach.

Results Contrast-enhanced ECG-gated PET-CT provided superior spatial localisation of 18F-fluoride uptake that permitted localisation to individual valve leaflets (Figure). Scan-rescan reproducibility was markedly improved using enhanced analysis techniques leading to a reduction in variability from 25% to <10% (tissue-to-background MDS: mean value 1.55, difference 0.05, limits of agreement -0·10 to 0·20).

Conclusion Optimised 18F-fluoride PET-CT provides excellent spatial resolution and scan-rescan reproducibility. It holds major promise as a marker of disease activity in aortic stenosis and has major potential as a biomarker end-point of trials of novel therapies in aortic stenosis.

Abstract 116 Table 1 Demographics and Stress mechanism

	Physician-led	Physiologist-led	P-Value
Demographics			
N	5321	5976	
Male	56.6%	60.1%	<0.01
Age (median)	66	66	NS
Sinus rhythm	91.4%	86.4%	<0.01
Prognostic risk post-MPS high‡	9.2%	11.7%	<0.01
Prognostic risk post-MPS low‡	73.0%	68.8%	<0.01
Stress mechanism			
Physical (treadmill/bicycle)	72.1%	56.1%	<0.01
Pharmacological (all)	27.9%	43.9%	<0.01
Dobutamine	10.6%	1.1%	<0.01
Dipyridamole	83.9%	29.8%	<0.01
Adenosine	5.4%	4.2%	<0.01
Regadenoson	0.2%	64.9%	<0.01

‡ prognostic risk calculated post-MPS - high: >3% estimated annualised risk of major adverse cardiovascular event, low: <1%

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Introduction Arterial calcification can limit the visualisation of vessel lumen at CT coronary angiography (CTCA). Dual energy CT (DECT) using two x-ray spectra of differing energy, either from distinct sources or using novel detectors and a single source, offers novel approaches to this problem. It allows the generation of images depicting objects as if they have been subjected to a specific photon energy (keV) rather than a polychromatic beam (virtual monochromatic images). With improved material identification, based on its attenuation coefficient at each keV and transformation into a linear combination of the two basis materials (material decomposition), it
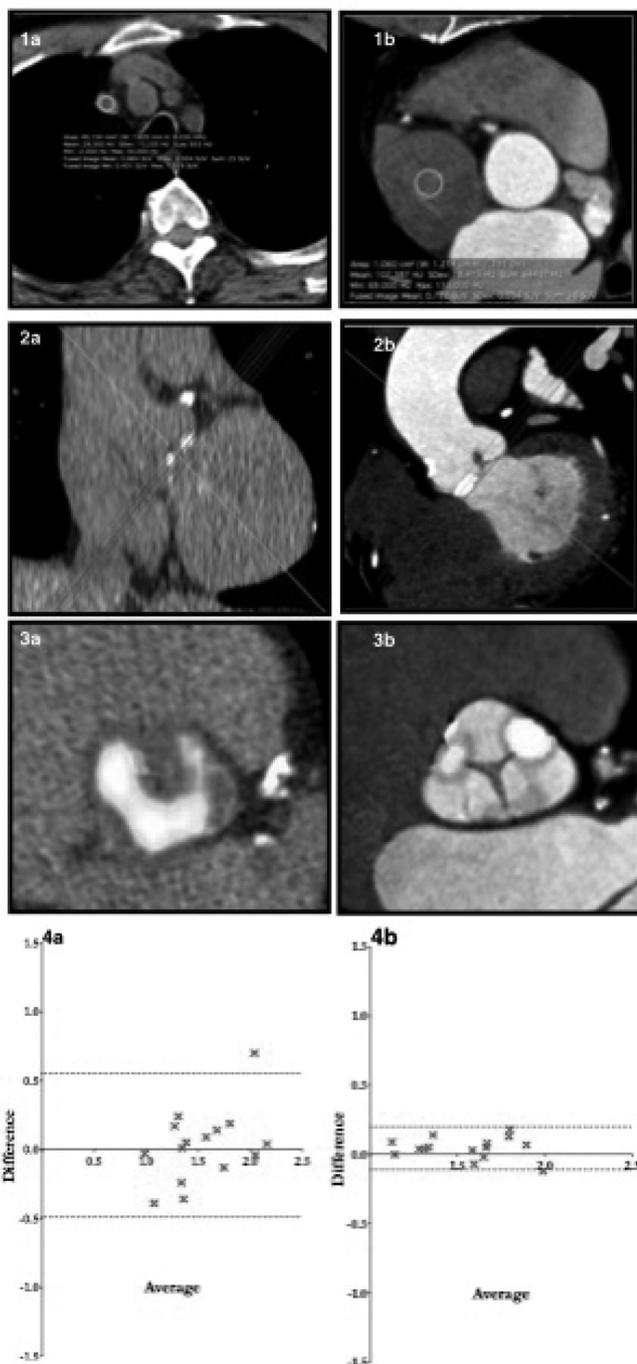
Abstract 117 Figure 1 Blood pool correction was performed by sampling from the right atrium instedad of the brachio-cephalic vein. 2. The most diseased segment method was used to quantify the PET signal within 2 hottest slices rather than the whole valve/ 3. Contrase CT fused with ECG-gated PET gacilitated better localization to leaflets compared to the original approach 4. Bland-Altmanplots emonstrated superior sacn-rescan reproducibility for the modified technique (2b) compared to the previous approach (2a)

may also be possible to subtract materials from each other, such as calcium from iodine.

Single source DECT, using two energy spectra from a single anode almost simultaneously using rapid tube voltage switching, requires novel detector technology capable of distinguishing signals 0.25 ms apart without artefact from detector artefact. To date, this has not been evaluated in patients with coronary calcification. This feasibility study examined potential benefits and limitations of virtual monochromatic and material decomposition images for assessing calcified coronary arteries, and their potential diagnostic accuracy compared to invasive angiography.

Methods The study was approved by the National Research Ethics Service. Patients gave informed, written consent. Thirty patients undergoing invasive angiography on clinical grounds, with evidence of coronary calcification, underwent CTCA with a single-source DECT scanner. The results of each test were assessed by experienced, independent, blinded readers and compared in per-segment, per-vessel and per-patient analyses.

Results 403 segments in 86 vessels were analysed. The median Agatston score was 964. The accuracy of virtual monochromatic imaging is outlined in Table 1. Overall the accuracy for the identification of moderate and severe stenosis was 0.88 and 0.88 on a per-segment basis, 0.84 and 0.86 per vessel, and 0.93 and 0.97 per-patient. The weighted kappa score between invasive and CT angiography was 0.71 suggesting good agreement.

The per-segment sensitivity, specificity, PPV and NPV (and 95% confidence intervals) of the material decomposition images were 0.67 (0.57–0.76), 0.82 (0.77–0.86), 0.54 (0.45–0.63) and 0.88 (0.84–0.92) respectively for moderate stenosis, and 0.70 (0.57–0.80), 0.79 (0.75–0.83), 0.40 (0.31–0.49) and 0.93 (0.89–0.96) respectively for severe stenosis. Overall accuracy was 0.78 for both moderate and severe stenosis. Calcium subtraction was highly inconsistent, mainly due to image noise with resultant misidentification of calcium and excessive subtraction.

Conclusions The study suggests that single source DECT is feasible in patients with severe coronary calcification, and virtual monochromatic imaging may improve accuracy compared to conventional CT. A larger study comparing standard and DECT is merited.

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THE EFFECT OF PRELOAD REDUCTION USING HEAD-UP TILT TESTING: AN EXPLORATORY STUDY USING LEFT VENTRICULAR LONGITUDINAL AND TRANSVERSE STRAIN-VOLUME LOOPS

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Introduction Left ventricular (LV) function is dependent on intrinsic contractility and relaxation as well as the prevailing loading conditions. The Frank-Starling mechanism states that

Abstract 118 Table 1

		Per segment	Per vessel	Per patient
>50% stenosis	Sensitivity	0.76 (0.66–0.84)	0.78 (0.64–0.89)	0.93 (0.76–0.99)
	Specificity	0.92 (0.89–0.95)	0.93 (0.80–0.98)	1.00 (0.19–1.00)
	PPV	0.76 (0.66–0.84)	0.92 (0.79–0.98)	1.00 (0.86–1.00)
	NPV	0.92 (0.89–0.95)	0.79 (0.65–0.90)	0.50 (0.08–0.92)
>70% stenosis	Sensitivity	0.73 (0.60–0.83)	0.78 (0.61–0.90)	1.00 (0.85–1.00)
	Specificity	0.91 (0.87–0.93)	0.94 (0.84–0.98)	0.83 (0.36–0.97)
	PPV	0.58 (0.47–0.70)	0.90 (0.74–0.98)	0.96 (0.79–0.99)
	NPV	0.95 (0.92–0.97)	0.86 (0.74–0.94)	1.00 (0.48–1.00)