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## Abstract 15: Calcific Plaque Versus Non-calcific Plaque: A CAD-RADS And FFRct Study



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**Introduction:** The coronary computed tomography angiography (CCTA) Coronary Artery Disease Reporting and Data System (CAD-RADS) can predict adverse outcomes. Traditionally, dense coronary calcification has left to stenosis severity overestimation. We hypothesised that where CAD-RADS category is assigned due to a predominantly calcified maximal stenosis, the chance of flow-limiting stenosis by CCTA-derived fractional flow reserve (FFRct) would be lower compared to predominantly non-calcified maximal stenoses of the same CAD-RADS grade.

**Methods:** Consecutive patients undergoing routine clinical CCTA (09-11/2018) with  $\geq 1$  stenosis  $\geq 30\%$  and with FFRct correlation (acquired as part of the NHS Innovation and Technology Payment programme 2018-2019, were included. A sharp reconstruction kernel for calcification was employed. CCTAs were stratified by CAD-RADS category and then subdivided into: + (predominantly calcified maximal stenosis) and - (predominantly non-calcified maximal stenosis). FFRct was measured 2cm distal to the maximal stenosis and also at the distal aspect of the left anterior descending (LAD), left circumflex (LCx) and right coronary artery (RCA). FFRct  $< 0.8$  was defined as potentially flow-limiting.

**Results:** 49 patients (51% men,  $65 \pm 11$  years) were included. Predominantly calcified maximal stenoses were present in 45%, 25% and 50% of CAD-RADS 2, 3 and 4 categories respectively. Potentially flow-limiting stenoses were present in 0%, 25% and 50% of CAD-RADS 2,3 and 4 respectively. There was no difference in prevalence of FFRct values  $< 0.8$  between predominantly calcified and predominantly non-calcified maximal stenoses for any CAD-RADS category. There was a step-wise decrease in mean lowest FFRct from CAD-RADS 2 to CAD-RADS 4 (CAD-RADS 2:  $0.90 \pm 0.05$  vs CAD-RADS 4:  $0.79 \pm 0.11$ ,  $p=0.08$ ) but no significant change in distal FFRct value for LAD, LCx or RCA between CAD-RADS groups.

**Conclusions:** A similar prevalence of potentially flow-limiting stenoses was found amongst CAD-RADS categories subdivided by predominantly calcified and predominantly non-calcified maximal stenosis, implying calcification blooming artefact may be less relevant with modern sharp reconstruction kernels. Our data also support the use of contemporaneous FFRct in case of CAD-RADS 3 and 4 but this warrants further evaluation in larger studies. CAD-RADS 'future cardiac investigation' section may need updating in the FFRct era.

	CAD-RADS								
	2 (n=11)	2- (n=6)	2+ (n=5)	3 (n=16)	3- (n=12)	3+ (n=4)	4 (n=22)	4- (n=11)	4+ (n=11)
FFRct $< 0.8$ (n)	0	0	0	4	3	1	11	5	6
FFRct $< 0.8$ (%)	0	0	0	25	25	25	50	45	55
Mean lowest FFRct	$0.90 \pm 0.05^{*1}$	$0.87 \pm 0.04$	$0.92 \pm 0.05$	$0.86 \pm 0.10$	$0.86 \pm 0.11$	$0.85 \pm 0.06$	$0.79 \pm 0.11$	$0.78 \pm 0.11$	$0.79 \pm 0.10$
Distal LAD FFRct	$0.86 \pm 0.04$			$0.81 \pm 0.09$			$0.79 \pm 0.11$		
Distal LCx FFRct	$0.81 \pm 0.10$			$0.90 \pm 0.05^{*2}$			$0.84 \pm 0.07$		
Distal RCA FFRct	$0.91 \pm 0.05$			$0.90 \pm 0.03$			$0.88 \pm 0.08$		

+ predominantly calcified maximal stenosis - predominantly non-calcified maximal stenosis

\*<sup>1</sup> CAD-RADS 2 vs CAD-RADS 4,  $p = 0.08$  (One-way ANOVA with Bonferroni post-hoc)

\*<sup>2</sup> CAD-RADS 3 vs CAD-RADS 4,  $p = 0.01$  (One-way ANOVA with Bonferroni post-hoc)

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