female patients; a subgroup severely underrepresented in atherectomy trials.

Table 1a: **Baseline characteristics**-Unadjusted Analysis

Variable Name	Orbital atherectomy (n=107)	Rotational atherectomy (n=140)	p value
Age (Years)	74.91±10.70	74.92±9.46	0.993
BMI (kg/m²)	28.33±6.39	27.83±6.78	0.556
Smoker (n)	14 (13.08%)	13 (9.28%)	0.355
Hypertension (n)	103 (96.26%)	135 (96.42%)	0.945
Dyslipidemia (n)	95 (88.78%)	130 (92.85%)	0.267
Premature CAD (n)	4 (3.73%)	8 (5.79%)	0.476
Prior MI (n)	37 (34.57%)	41 (29.28%)	0.377
Prior Heart Failure (n)	28 (26.16%)	35 (25%)	0.835
Prior Valve Surgery (n)	2 (1.86%)	5 (3.57%)	0.426
Prior PCI (n)	44 (41.12%)	60 (42.85%)	0.785
Prior CABG (n)	10 (9.34%)	27 (19.28%)	**0.030**
Dialysis (n)	11 (10.28%)	11 (7.85%)	0.510
Cerebrovascular Disease (n)	21 (19.26%)	34 (24.28%)	0.385
Peripheral Vascular Disease (n)	23 (21.49%)	25 (17.85%)	0.476
Chronic Lung Disease (n)	9 (8.41%)	17 (12.14%)	0.346
Diabetes Mellitus (n)	62 (57.94%)	84 (60%)	0.746

Table 1b: **Procedural Information**

	Orbital atherectomy(n=107)	Rotational atherectomy (n=140)	p value
Lesion length (mm)	23.08±10.48	21.25±10.72	0.289
Lesion Diameter (mm)	2.82±0.69	2.72±0.54	0.295
Bifurcation Lesion (n)	13 (12.14%)	6 (4.28%)	**0.015**
Pre PCI LVEF (%)	52.55±14.18	52.52±12.81	0.989
Femoral Artery Access (n)	66 (61.68%)	104 (74.28%)	**0.001**
Bivalirudin use (n)	63 (58.87%)	74 (52.85%)	0.347
Fluoroscopy Time (mins)	21.31±9.77	27.59±16.52	**0.001**
Contrast Volume (ml)	156.72±60.80	151.44±75.33	0.563

Table 1c: **Adverse Events**

	Orbital atherectomy (n=107)	Rotational atherectomy (n=140)	p value
Death on Discharge (n)	0 (0%)	1 (0.79%)	0.383
Myocardial Infarction (n)	21 (19.62%)	27 (16.28%)	0.908
Stroke (n)	0 (0%)	0 (0%)	N/A
Significant Dissection (n)	2 (1.86%)	2 (1.42%)	0.728
Perforation (n)	0 (0%)	2 (1.42%)	0.234
Tamponade (n)	0 (0%)	2 (1.42%)	0.205
Heart failure (n)	2 (1.86%)	4 (2.84%)	0.579
Cardiogenic Shock (n)	3 (2.80%)	2 (1.42%)	0.483
RBC transfusion (n)	8 (7.47%)	13 (9.28%)	0.539

CRT-100.54

Insights Into The Mechanisms Of Action Of The Rotational Atherectomy: An OCT Study

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OBJECTIVE The aim of our study is to characterize, using OCT, the morphologic features of calcific plaques after rotational atherectomy, adjunctive balloon angioplasty and stenting.

METHODS AND RESULTS A total of 57 consecutive patients who had undergone angioplasty using rotational atherectomy were included. The 67 lesions treated were classified according to the indication of rotational atherectomy as massive calcification (n=26), calcific nodule (n=23), uncrossable (n=11) or non-dilatable lesions (n=7). An OCT study was done before atherectomy in 14 lesions, after a rotational atherectomy in all 67 lesions, after a balloon dilatation in 6 lesions and post stenting with post dilatation in all lesions. The treated lesions were located in the left anterior descending (n=30), in the right coronary artery (n=28), and the left circumflex artery (n=9). The OCT appearance of the lesions after atherectomy is very specific of the substrate encountered by the burr: sharp cuts with smooth surface in presence of calcifications and irregular boundaries and less delimitated cuts in presence of fibrotic lesions. Peeling of the intima at the beginning of the burr action is constant regardless of the type of lesion. Mean calcium arc was 318 degrees, mean calcium thickness was 1.03mm. Mean diameter of the ablation as measured by OCT was 1.57 mm and mean burr size was 1.54. Mean burr to artery ratio was 0.51. Twenty-three lesions required 2 burrs. Dissections were unusual (13% of lesions) and observed mainly in uncrossable lesions (80%). After stenting, deep medial dissections are frequent especially in heavy calcified lesions and calcific nodules and contribute significantly to lumen enlargement while the area of ablation in the calcified part of the plaque remained unaltered. After systematic post dilatation, incomplete stent apposition was encountered in 6 lesions (9%).

CONCLUSION OCT represents a unique opportunity for studying in vivo the mechanism of action of rotational atherectomy in different types of lesions. Insights from this study allowed us to tailor our approach to treat calcific lesions.

CRT-100.55

Effect of Orbital Atherectomy and Adjunctive Stenting on Coronary Blood Flow

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BACKGROUND Reduced flow and no reflow are known complications associated with rotational atherectomy and attributed to dysfunction of the microcirculation. Coronary microcirculation dysfunction post-PCI can cause myocardial ischemia. Previous coronary artery flow reserve (CFR) studies on rotational atherectomy (RA) have shown a failure to normalize CFR post-procedure, likely due to the embolization of debris post atherectomy or to platelet activation. The impact of *orbital* atherectomy (OA) on CFR, however, is currently unknown.

METHODS The purpose of this prospective, multi-center clinical study was to evaluate the coronary microcirculation function by measuring CFR following successful treatment of *de novo* severely calcified coronary lesions with the Diamondback 360° Coronary Orbital Atherectomy System (OAS; CSI, St. Paul, MN) and stenting. Fifteen consecutive subjects with coronary calcification > 15 mm, vessel diameter > 2.5 mm and who had successful coronary stent placement with no procedural complication, were enrolled at 3 U.S. sites. After each successful procedure, the CFR was measured 1-2 cm distal to the distal end of the stent using the Volcano Doppler FloWire and intracoronary adenosine (40-100 mcg). Images were analyzed by a core lab (MetroHealth Medical Center & Technology Solutions Group, Moreland Hills, OH).

RESULTS The average CFR post-procedure (OAS and successful stent placement) was 2.23±.33, signifying a normalization of CFR. Baseline and hyperemic velocities were 16 and 36, respectively, with no Major Adverse Cardiac Events (MACE; cardiac death, acute myocardial infarction—Q wave or non-Q wave, and target vessel revascularization). Complete study design, patient demographics, CFR core-lab analysis, and post-procedural data will be presented.

CONCLUSION The use of OA does not have a negative effect on CFR and seems to preserve the function of the microcirculation during the treatment of severely calcified coronary lesions. This has significant clinical implications in that it may minimize arrhythmias and the need for pacemaker placement/activation during OAS treatment and can be used on patients with reduced ejection fraction with minimal risk. This is likely attributed to the orbital action of the device that allows for continuous flow during treatment - minimizing a bolus embolization effect, slow-flow/no-reflow, and reduced CFR.

CRT-100.56

Evaluation of Heparin Based Rota-Flush Solution in Patients Undergoing Rotational Atherectomy

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BACKGROUND The efficacy of a heparin based solution in rotational atherectomy (RA) has not been validated. Recently, a single center study demonstrated the feasibility of an alternative solution with 10,000 U of unfractionated heparin (UFH) in 1 L of normal saline. We aimed to evaluate the safety and effectiveness of an alternative solution routinely utilized at our institution.

METHODS We retrospectively identified 133 patients undergoing RA over a two year period. Eight Five cases utilized an alternative solution containing 10,000U UFH, 400mcg nitroglycerin, and 10mg verapamil in 1L normal saline and 48 cases utilized Rotaglide Lubricant Mixture (Boston Scientific, Marlborough, MA). The primary end point was to compare procedural success, including stent delivery, between the two groups. Secondary endpoint was to report procedural characteristics including the incidence of periprocedural complications within 30 days of intervention.

RESULTS Procedural success was achieved in 100% of cases and there were no limitations to stent delivery. Procedural characteristics are reported in Table 1. Major periprocedural complications occurred in 7 (8.2%) and 2 (4.2%) cases (P = 0.129) in the heparin based and Rotaglide groups, respectively. Major periprocedural complications included: bradycardia requiring transvenous pacing, hypotension requiring vasopressors, and