“Rotatripsy” Risk and Rewards:

Findings From A Real-World Registry Of Patients Undergoing Combined Rotational Atherectomy And Intravascular Lithotripsy

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Disclosure

- I have no conflicts of interest

Introduction

- Coronary artery calcification is associated with **incomplete revascularization** and increased risk for **major adverse clinical events** (MACE)
- Severely calcified lesions may require **combination therapy** to achieve sufficient lesion preparation
- **”RotaTripsy”** combines rotational atherectomy and intravascular lithotripsy

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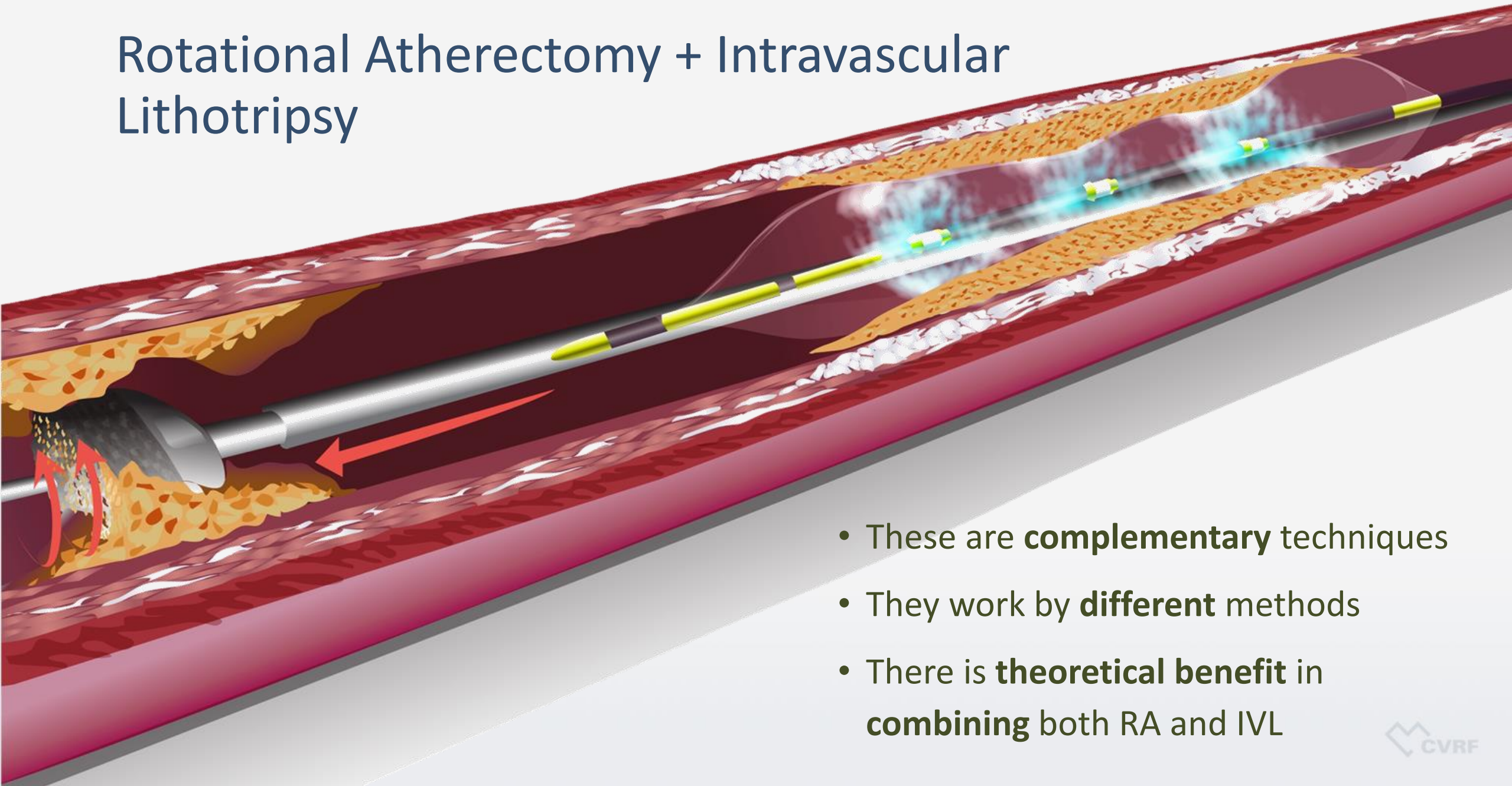
2. Kobayashi Y et al. Impact of target lesion coronary calcification on stent expansion. Circ J. 2014;78:2209–2214.
3. Mori S et al. Significant association of coronary artery calcification in stent delivery route with restenosis after sirolimus-eluting stent implantation. Circ J. 2009;73:1856–1863.

Rotational Atherectomy + Intravascular Lithotripsy



- These are **complementary** techniques
- They work by **different** methods
- There is **theoretical benefit** in **combining** both RA and IVL

Questions

- Large trials have only focused on **one calcium modification modality at a time**
  - ROTAXUS, PREPARE-CALC, DISRUPT CAD III
- Published data and outcomes thus far on patients treated with “RotaTripsy” are confined to **small case series**
- Previous trials **excluded patients** who would commonly be candidates for “Rotatripsy” – e.g. acute coronary syndrome, acute heart failure, left main disease, dialysis-dependent patients

How does a RA + IVL strategy fare in a “real world” cohort?

Methods

- Single-centre, registry based, retrospective study
- May 2020 – Dec 2022
- IVL indications: severe calcification as defined as ≥ 270-degree arc on intravascular imaging, or angiographic evidence (drawing from DISRUPT III and ORBIT II definitions)
- RA indications: as deemed suitable by primary operator
- Use of intravascular imaging not mandatory
- Shockwave IVL catheter (Shockwave C2; Shockwave Medical) and Rotablator (Boston Scientific, Marlborough, MA, USA)

Outcome Measures

Primary Outcome: 30-day MACE

- All-cause mortality, myocardial infarction, target vessel revascularisation, stroke

Secondary Outcomes:

- Procedural success: successful stent delivery + <30% residual angiographic stenosis + no in-hospital MACE (as per DISRUPT-CAD III)
- In-stent thrombosis
- Intraprocedural perforation
- Slow / no-reflow

Patient Characteristics

	N = 57
Age (years)	72 (63,80)
Sex	19 (33%)
BMI **(Missing)**	23.2 (21.6,27.7) (1)
Diabetes Mellitus	41 (72%)
Hypertension	51 (89%)
Dyslipidemia	48 (84%)
Current Smoker	13 (23%)
Prior MI	20 (35%)
Prior PCI	33 (58%)
Current Dialysis	10 (18%)
Prior CABG	3 (5.3%)
Prior Stroke or TIA	7 (12%)
Peripheral Arterial Disease	4 (7.0%)

	N = 57
Acute Coronary Syndrome (ACS) **Unstable Angina** **Non-ST elevation ACS** **ST elevation ACS**	23 (40%) 5 (8.8%) 15 (26%) 3 (5.3%)
Acute Heart Failure	7 (12%)
Unprotected LMCA Disease / LMCA Equivalent	20 (35%)
LV Ejection Fraction (%) **(Missing)**	43 (33, 55) (6)
Estimated Glomerular Filtration Rate	61 (37, 77)
Vessel Involvement **Single** **Double** **Triple**	 3 (5.3%) 11 (19%) 43 (75%)
In-Stent Restenosis **(Missing)**	14 (25%) (1)

Procedural Details

		N = 57
Fluoroscopy time (minutes)		39 (29, 56)
(Missing)		(3)
Total Contrast (ml)		196 (155, 250)
(Missing)		(1)
Procedural Success		51 (89.5%)
Use of IVUS		29(51%)
Use of OCT		2 (3.5%)
Use of Cutting/Scoring Balloon		40 (70%)
Number of IVL Balloons Used	**1**	32 (56%)
	2	16 (28%)
	3	9 (16%)
Number of RA Burrs Used	**1**	35 (61%)
	2	16 (28%)
	3	3 (5.3%)
	4	2 (3.5%)
	5	1 (1.8%)
IVL Used Before RA		3 (5.3%)
IVL Used as Bailout Strategy		38 (67%)
IABP Deployed During Procedure		9 (16%)

Outcomes Comparison

	Our Cohort	DISRUPT CAD III [3] (IVL only)	ROTAXUS [17] (RA only)	PREPARE-CALC [18] (RA only)
Total N	**N=57**	**N=431**	**N=120**	**N=100**
Perforation	0 (0%)	0.3%	1.7%	2%
Slow/No-reflow	6 (10.5%)	0%	0%	0%
In-hospital MACE *	6 (10.5%)	7%	4.2%	N.A.
In-hospital MI	3 (5.3%)	6.8%	1.7%	1%
In-hospital TVR	0 (0%)	0.5%	0.8%	0%
In-hospital mortality	3 (5.3%)	0.3%	1.7%	0%
In-hospital stroke	3 (5.3%)	N.A.	N.A.	N.A.
In-hospital stent thrombosis	0 (0%)	N.A.	0%	0%
30-day MACE *	7 (12.3%)	7.8%	N.A.	N.A.
30-day MI	3 (5.3%)	7.35	N.A.	N.A.
30-day TVR	1 (1.8%)	1.6%	N.A.	N.A.
30-day mortality	4 (7.0%)	0.5%	N.A.	N.A.
30-day stroke	3 (5.3%)	0%	N.A.	N.A.
30-day stent thrombosis	0 (0%)	0.8%	N.A.	N.A.

Discussion Points

- **Higher mortality and MACE** in our cohort than in the RA-only or IVL-only cohorts
  - Patients with heavily calcified coronaries tend to have complex disease
  - Real-world cohort with sicker patients vs selected trial cohort
- **Intra-procedural slow / no-reflow** (11%) and **procedure-related cerebrovascular events** (5.3%) are important complications to note
- Regression analysis suggests in-hospital MACE is **significantly associated** with a) increased number of burrs and b) female sex
- Able to achieve **procedural success in 89.5%** as defined angiographically

Limitations

- **Single-centre** study
- **Non-randomized, retrospective** data
- Study period coincided with initial local experience, where operators **may have been gaining experience** with the techniques
- **Small sample sizes** and **differences in baseline population** limits comparison with other registries
- **Intravascular imaging** only used in half of the patients

Conclusion

- ”RotaTripsy” is an **effective strategy**, even in a **real-world cohort**
- Patients who require complex calcium modification strategies are generally sick and may suffer from **high complication rates**
- **Stroke and slow / no-reflow** are important complications
- More data needed – **can we do better?**