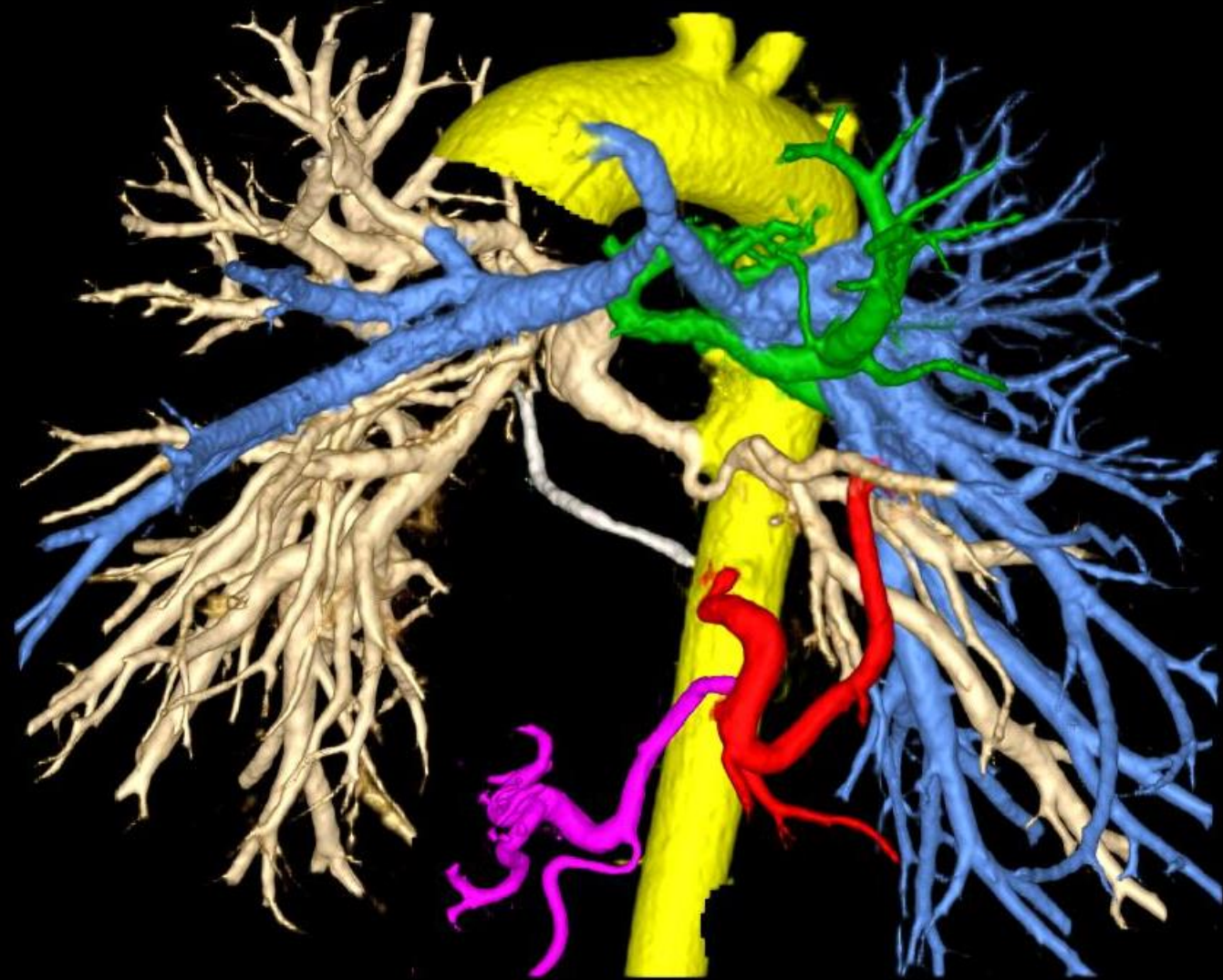


3D Rotational Angiography Improves Assessment Of Coronary Arteries In Melody Valve Implantation: Introducing A Technique That May Improve Outcomes

Charissa R. Pockett, MD, John W. Moore, MD, MPH, Howaida G. El-Said, MD, PhD

Howaida El-Said, MD, PhD
Professor Pediatric Cardiology
Director of Cardiac Cath Lab
University of California San Diego
Rady Children's Hospital





OBJECTIVE:

To evaluate the value of 3DRA of the aortic root (3DRAA) in the assessment of Melody valve candidacy and to demonstrate that it may improve outcomes

METHODS:

- Reviewed all patients who underwent cardiac catheterization for Melody valve implantation at Rady Children's Hospital (May 2010 to June 2016)
- Those who underwent implantation with 3DRAA were compared to those implanted with out 3DRAA

TECH FOR 3DRAA

- Pulmonary angio → 3DRAA with simultaneous balloon sizing (Amplatzer sizing balloon) in the RVOT over a Lunderquest wire
- RV or Trans-esophageal pacing at 180-200/min with breath hold
- Aortogram with 16-18 cc/second for 6 seconds of a 60:40 contrast to saline mix
- Toshiba machine with rendering and post processing on a Vitrea Workstation

Total (121)

NO 3D(48)

**3DRAA
(73)**

**Not Eligible
(5)**

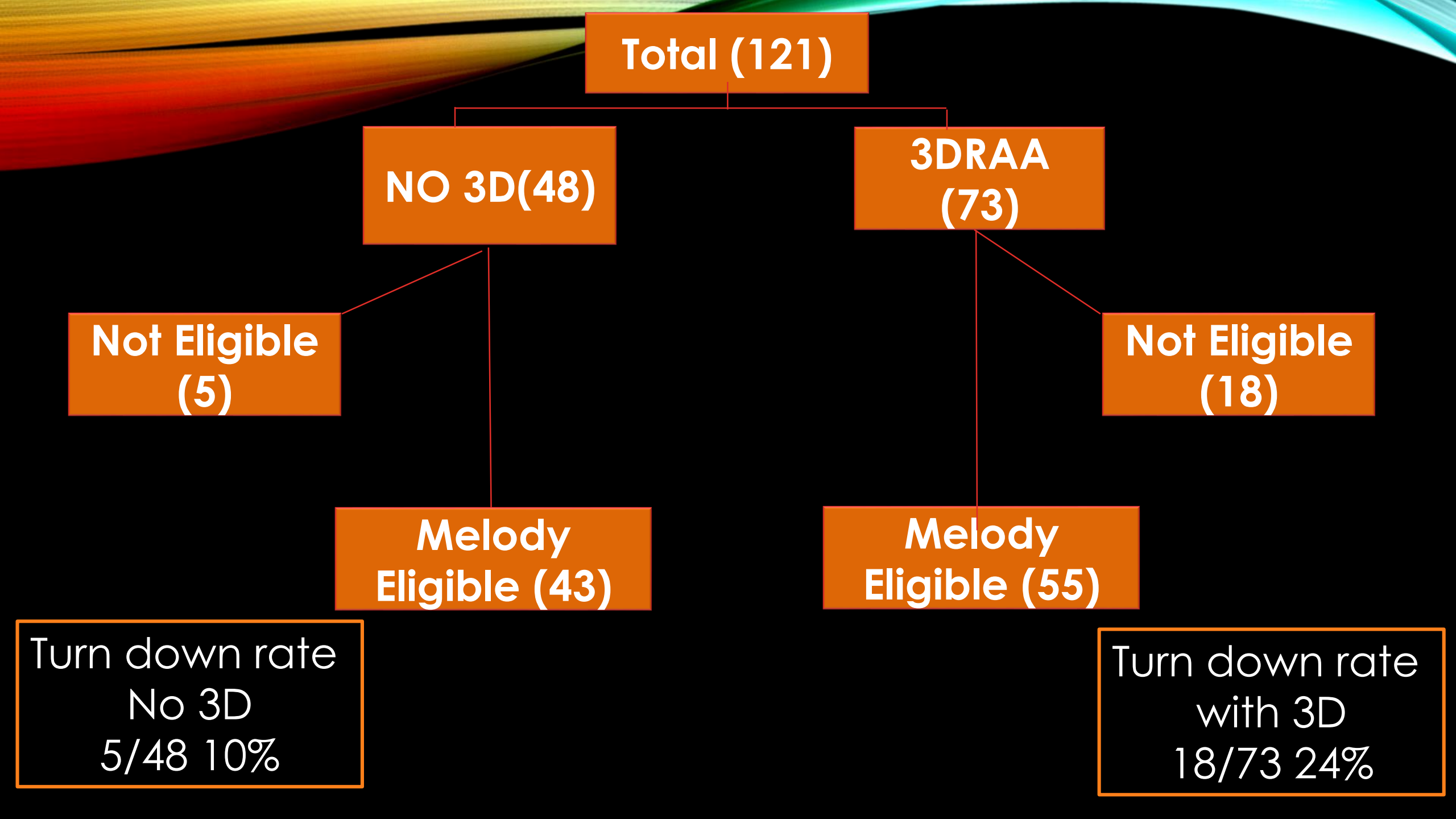
**Not Eligible
(18)**

**Melody
Eligible (43)**

**Melody
Eligible (55)**

Turn down rate
No 3D
5/48 10%

Turn down rate
with 3D
18/73 24%



Total (121)

**MELODY Not ELIGIBLE
(18)**

**MELODY ELIGIBLE
(103)**

9

0

9

Conduit (77)

Prosthetic valve (21)

RVOT Patch (23)

68

21

14

**Melody Not Eligible
(23)**

**Not Eligible
No 3D
(5)**

**Not Eligible
with 3D
(18)**

1

CA compression (9)

8

3

Ao root distortion (3)

3

1

Too Large (9)

6

Short MPA (2)

1

**Melody Eligible
(98)**

**MELODY ELIGIBLE
No 3D
(43)**

**MELODY ELIGIBLE
with 3D
(55)**

5

2

0

1

Fracture (5)

Endocarditis (2)

**Pseudo
Aneurism (1)**

Pulm odema(1)

0

0

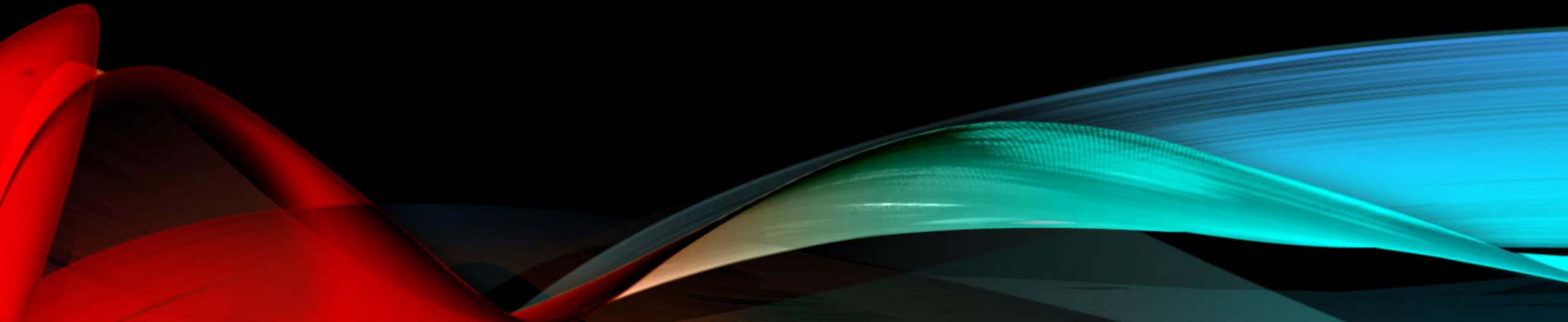
1

0

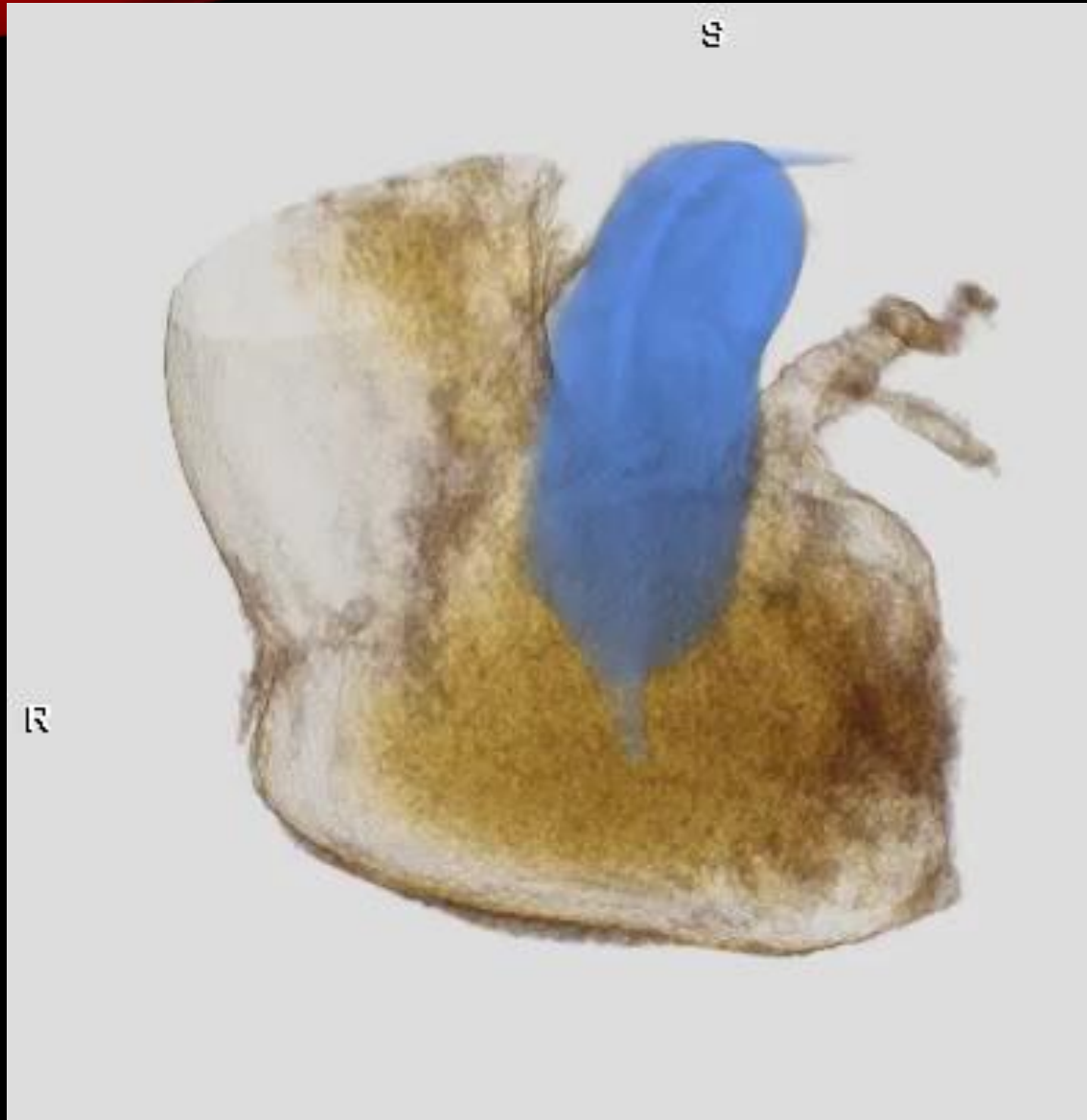
**Complication
with 3D
1/55 2%**

**Complication
No 3D
8/43 19%**

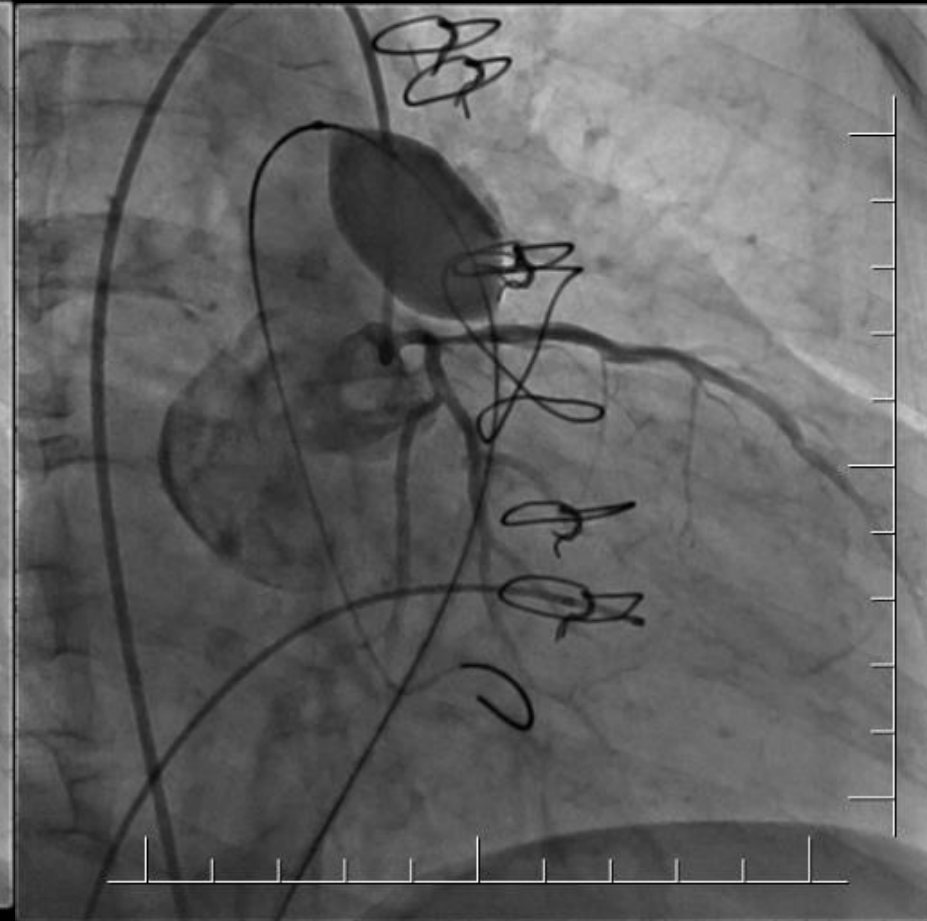
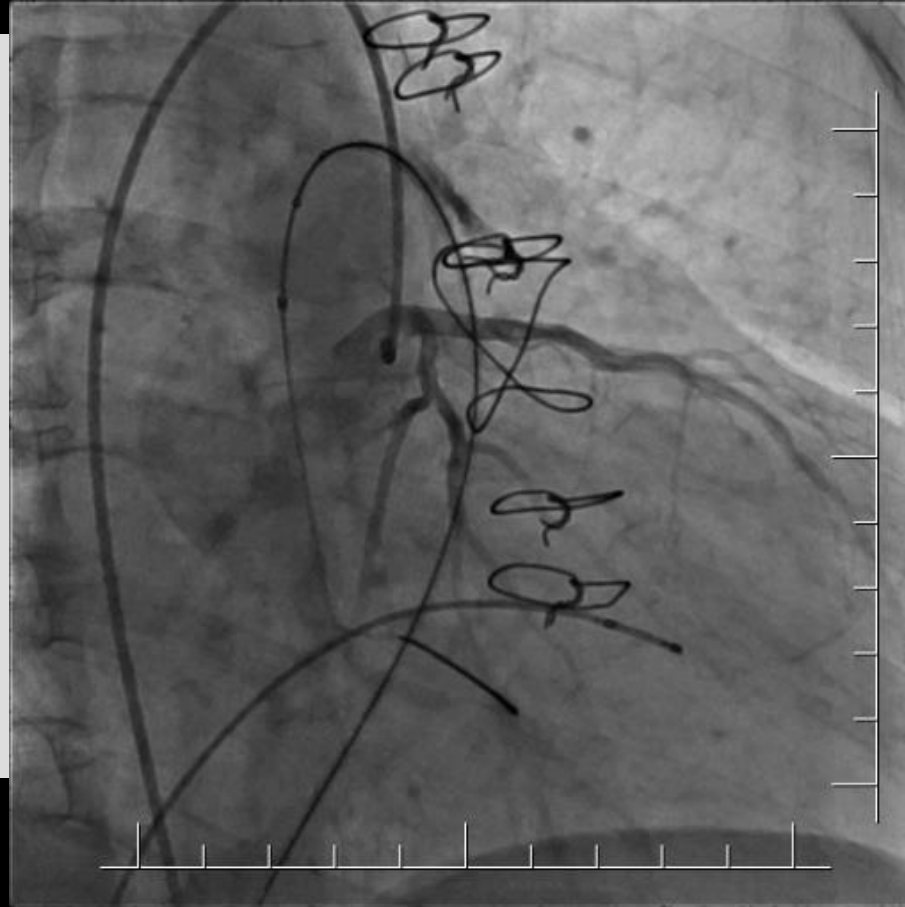
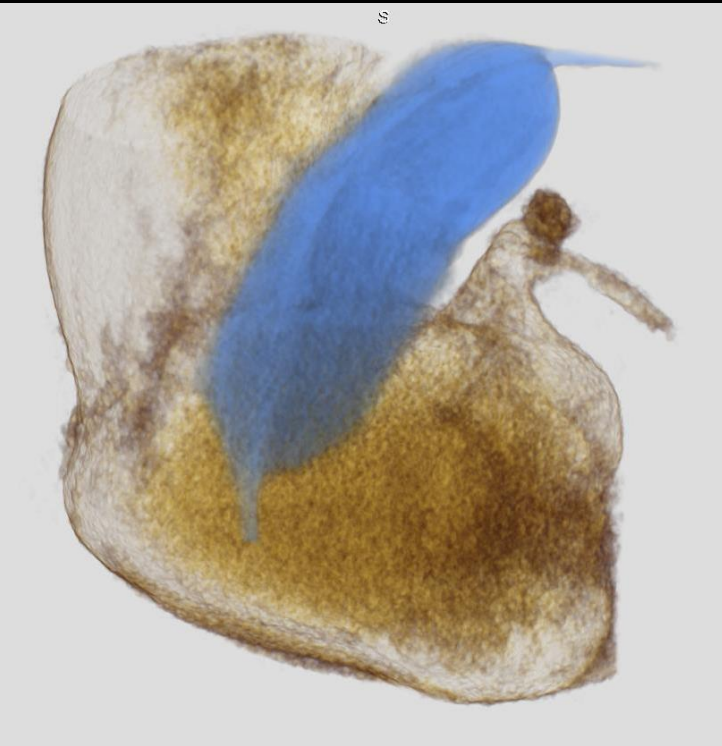
CORONARY COMPRESSION?



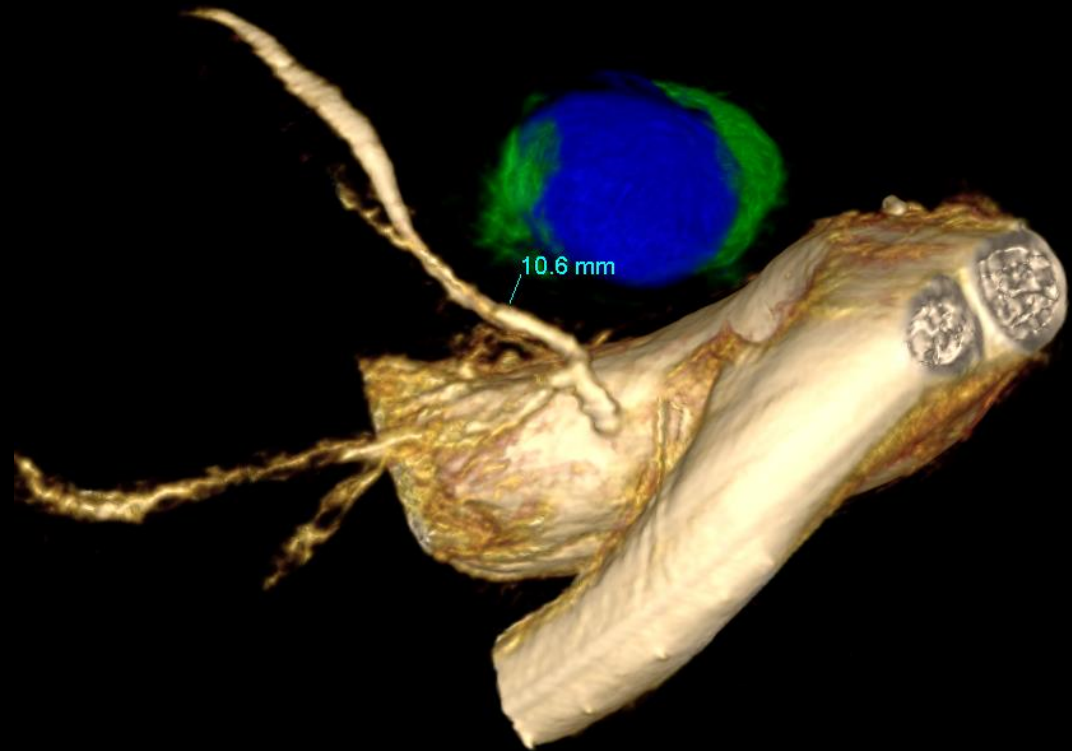
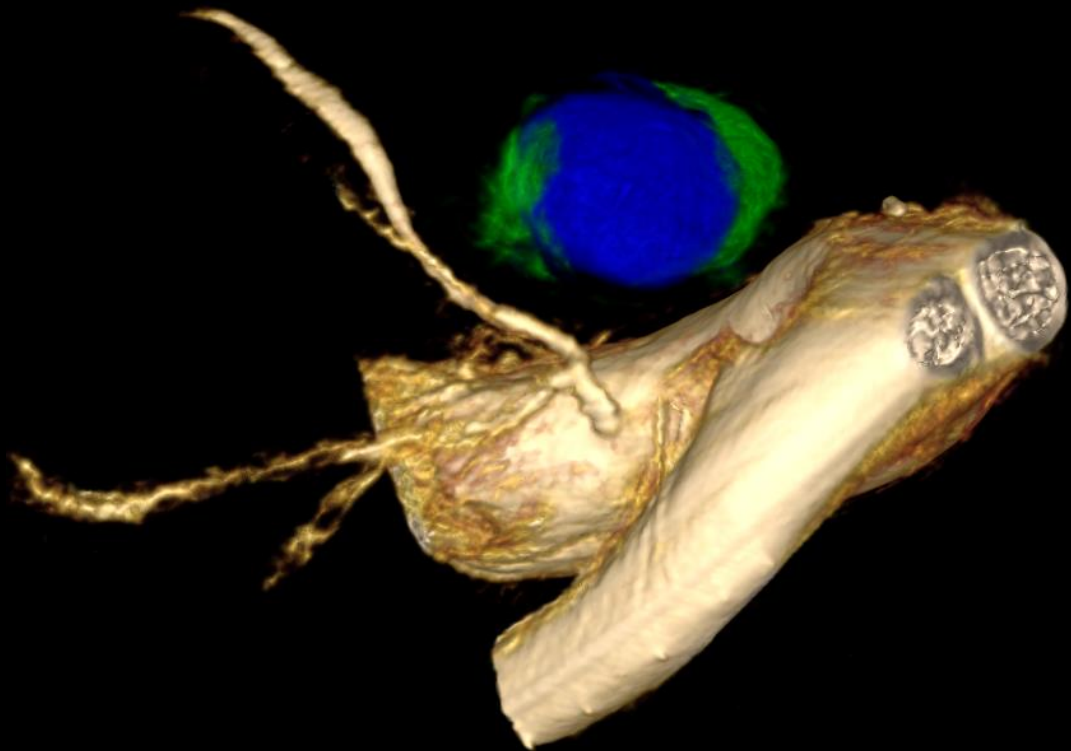
DISTANCE TO CORONARY



CORONARY TOO CLOSE



DISTANCE TO CORONARY



WOULD YOU REPAIR ANOMALOUS LMCA
FROM THE RIGHT WITHOUT VISIBLE
COMPRESSION ON ANGIO?

1. Yes
2. No

REPORTS OF LATE CORONARY COMPRESSION

Coronary Artery Compression Three Months After Transcatheter Pulmonary Valve Implantation

Payam Dehghani,^{1*} MD, FRCPC, FACC, FSCAI, Greg Kraushaar,² MD, FRCPC, and
Dylan A. Taylor,³ MD, FRCPC, FACC, CHE

We report a case of a 29-year-old man who developed exercised-induced myocardial infarction 3 months post Melody valve implantation. We introduce the concept of ruling out dynamic coronary artery compression by simulating transcatheter pulmonary valve implant while increasing cardiac output and thus aortic dimensions in the catheterization laboratory. © 2014 Wiley Periodicals, Inc.

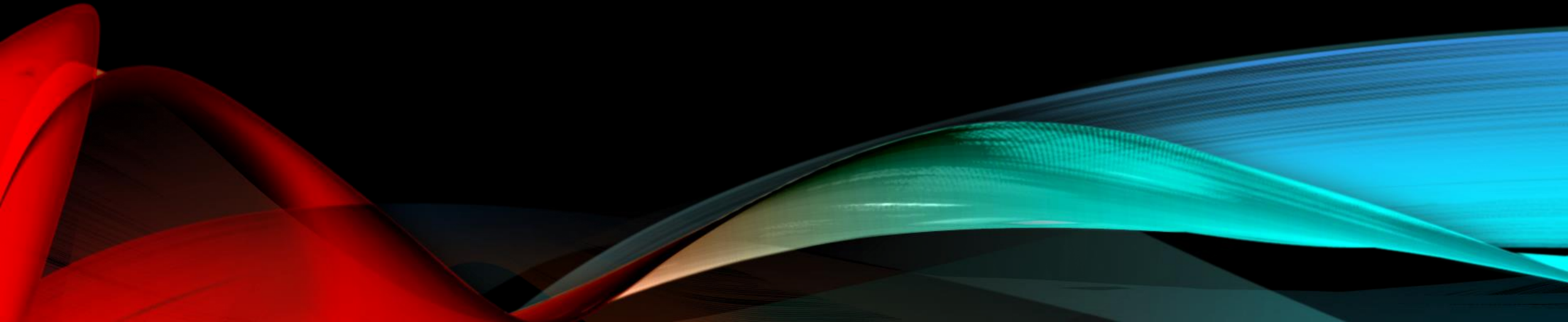
REPORTS OF LATE CORONARY COMPRESSION

TABLE I. Reported Cases of Coronary Arterial Compression After Transcatheter Pulmonary Valve Deployment

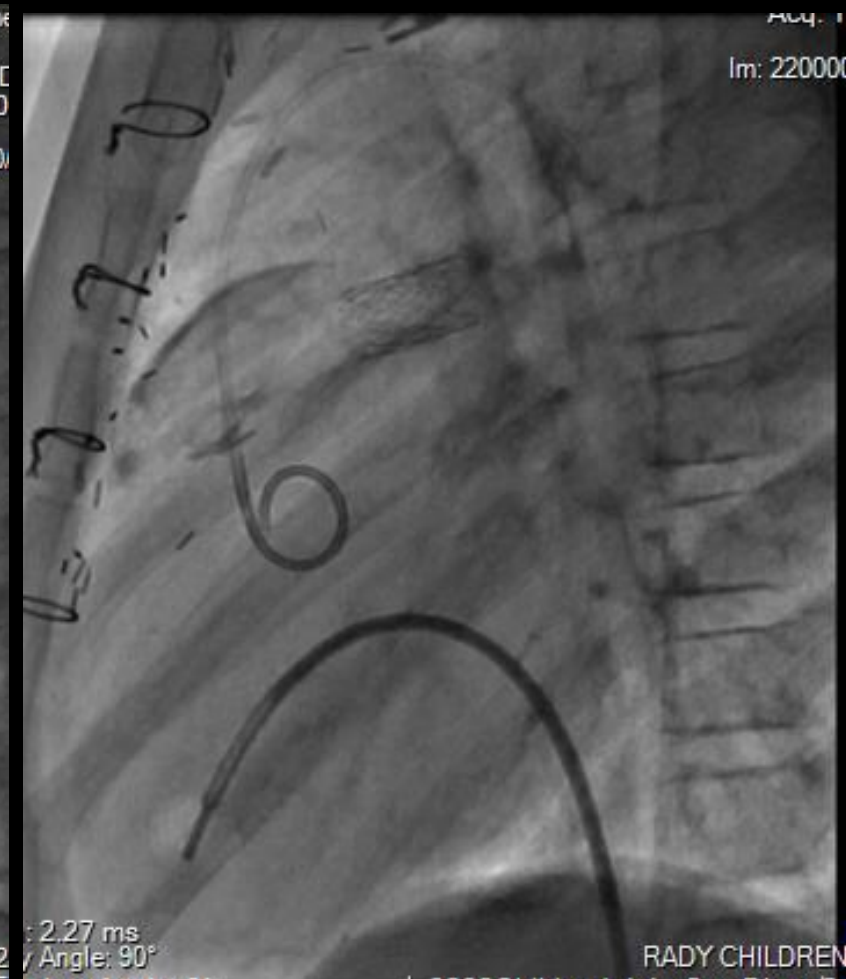
Reference	Congenital lesion and repair	Age (years)	Balloon simulation testing	Patient presentation	Time from TPV to presentation	Affected coronary artery	Intervention/findings	Outcome
Eicken et al. [3]	TGA; Rastelli procedure	N/A	N/A	Cardiac arrest	4 hr	LMCA	Emergency surgery, direct CAC	Death
Kostolny et al. [6]	Dextrocardia, CCTGA, DORV, pulmonary stenosis, VSD; mustard procedure	9	NA	Cardiac arrest	Immediate	LMCA	Emergency surgery, direct CAC	Alive and well
Biemann et al. [7]	TGA; arterial switch procedure, RV to PA conduit	26	performed, felt to be safe	Acute coronary syndrome	4 days	LAD	Emergency surgery, direct CAC	Alive and well
Mauri et al. [8]	Bicuspid aortic valve/Ross procedure	14	Performed, felt to be safe	Acute coronary syndrome	1 hr	LAD	Emergency surgery, tear of homograft with thrombus causing CAC	Alive and well
Divekar et al. [9]	Tetralogy of Fallot/	10	Not performed	Cardiac arrest	9 days	LMCA	Bail-out PCI	Alive and well

CAC, coronary artery compression; CCTGA, congenitally corrected transposition of the great arteries; DORV, double outlet right ventricle; Hr, hours; LAD, left anterior descending; LM, left main; yrs, years; N/A, not available; PCI, percutaneous coronary intervention; TGA, Transposition of the Great Arteries; TPV, trans-pulmonary valve.

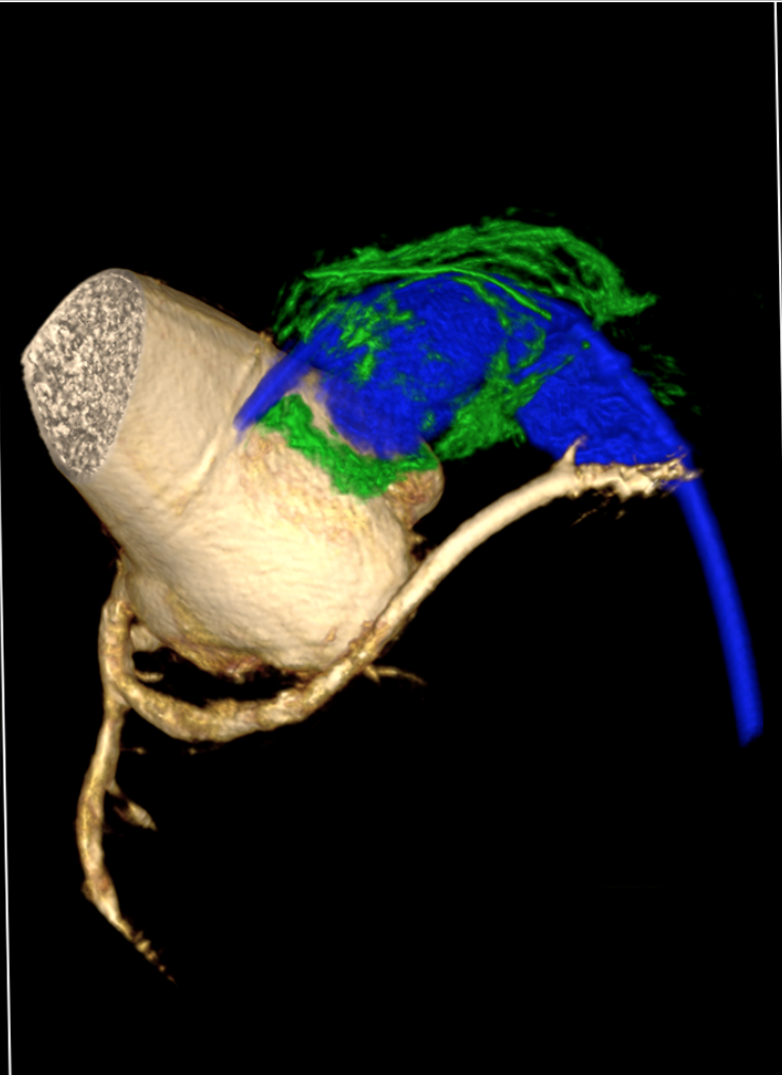
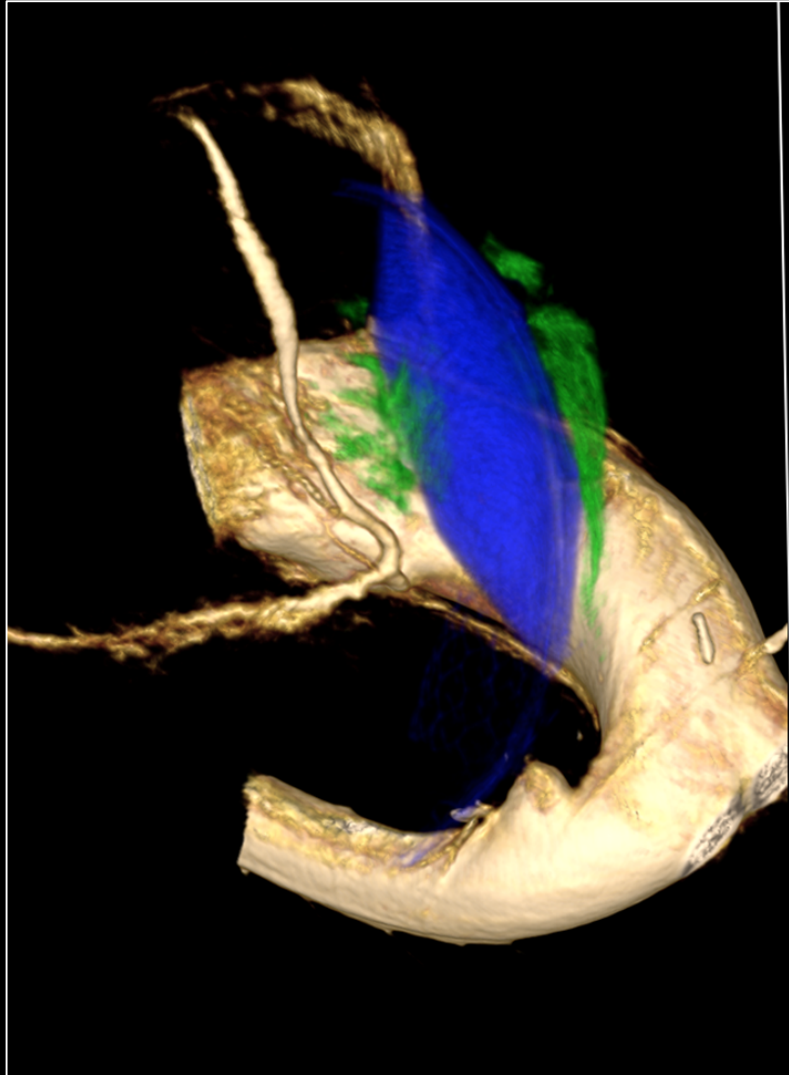
CALCIUM IS OUR WORST ENEMY?



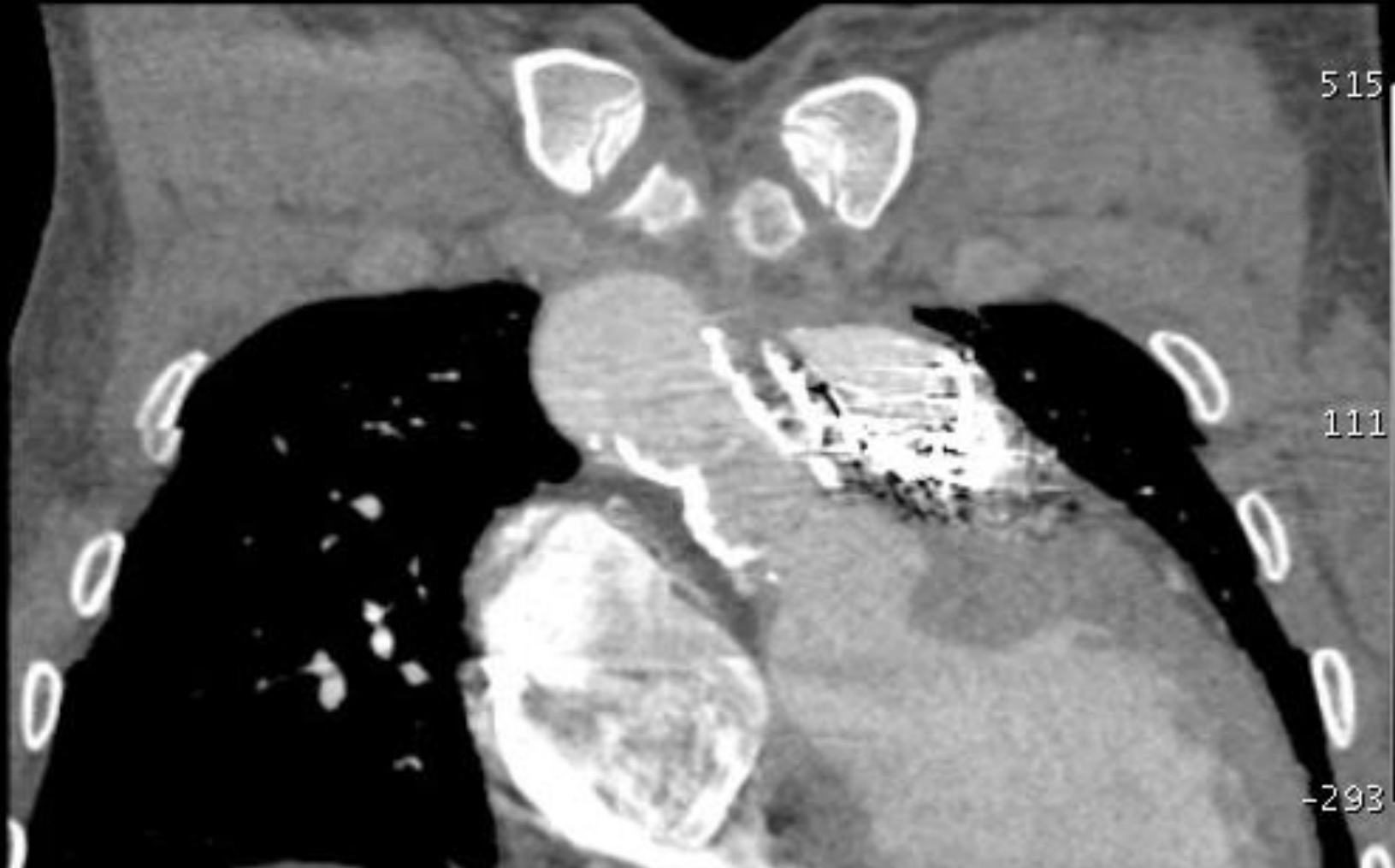
CALCIUM IS OUR WORST ENEMY!



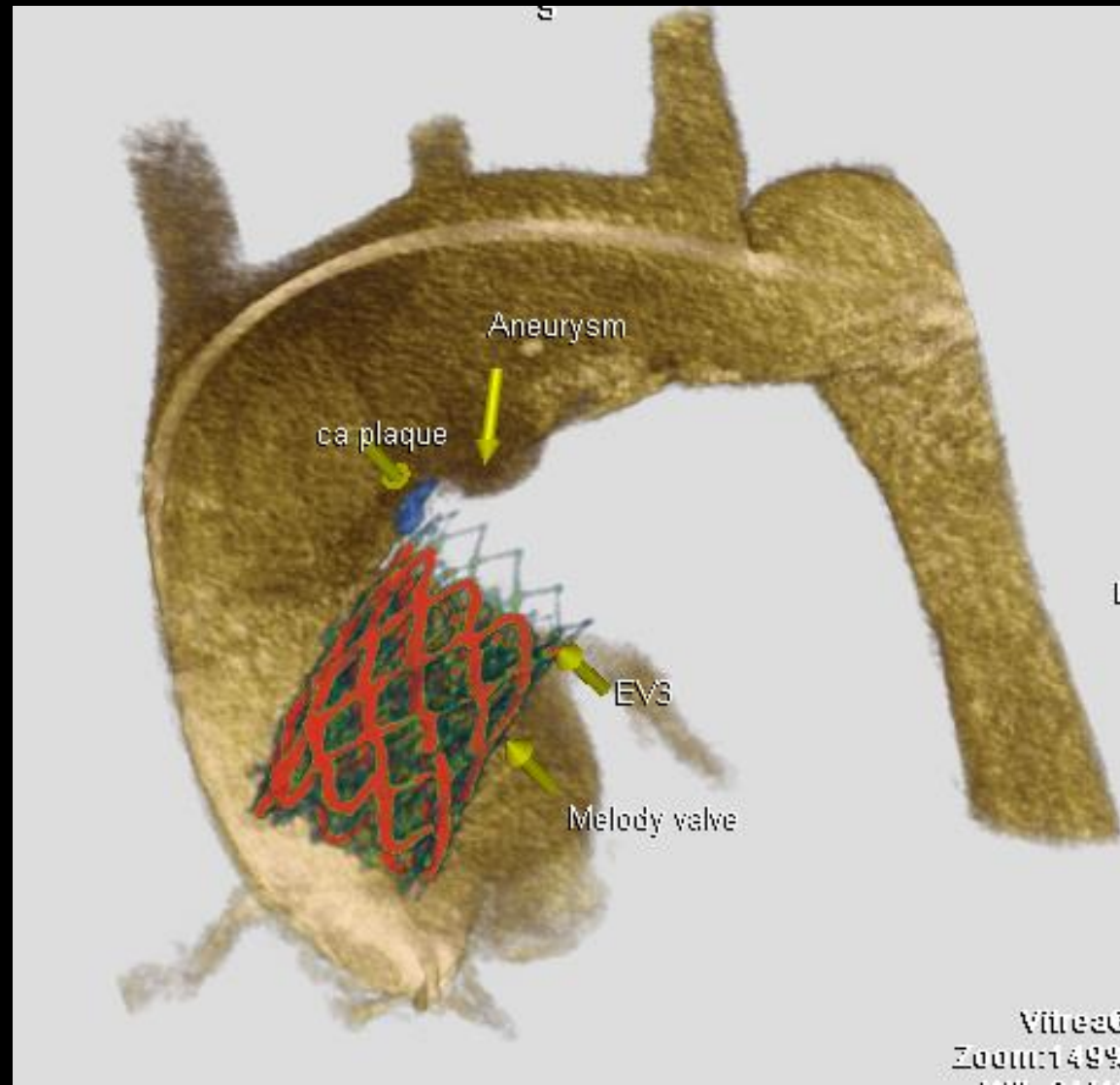
CALCIUM IS OUR WORST ENEMY!



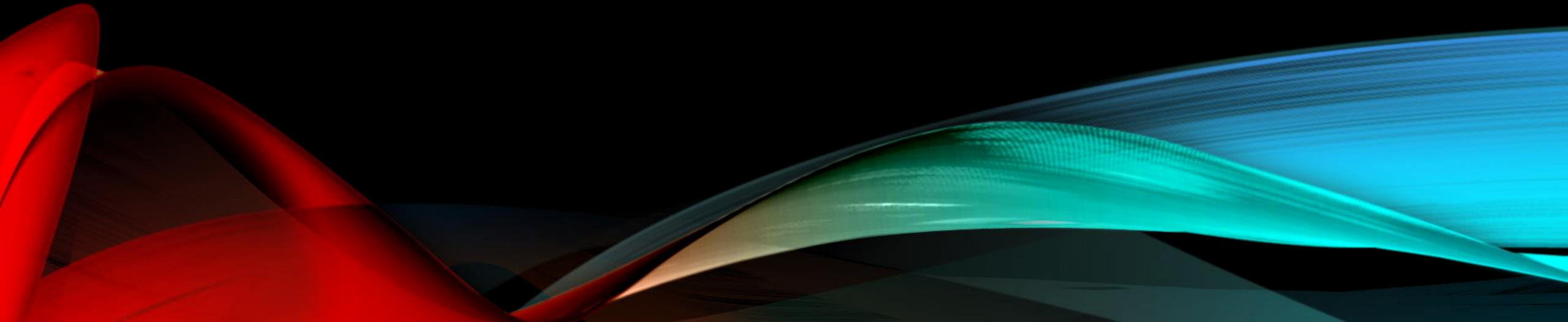
CALCIUM IS OUR WORST ENEMY!



CALCIUM IS OUR WORST ENEMY!



HOW WOULD YOU PRE STENT A CALCIFIED
STENOTIC CONDUIT?



WHAT IS SAFER WHEN DILATING A TIGHT COA?

1. Balloon dilate first, then stent
2. Balloon dilate with a bare metal stent in the lesion

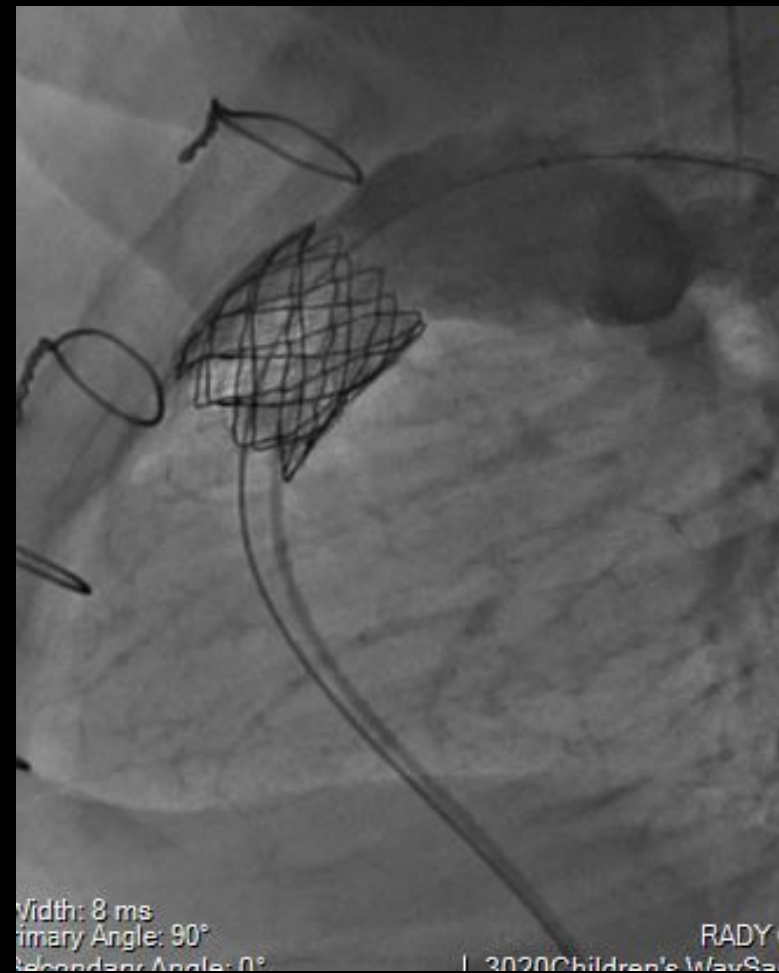
HOW WOULD YOU PRE STENT A CALCIFIED STENOTIC CONDUIT?

1. Balloon dilate the conduit with a high pressure balloon at the size you want directly, then stent
2. Serial balloon dilation of the conduit with high pressure balloons until you reach the size you want, then stent
3. Stent the conduit first, then serial balloon dilate with high pressure balloon

HOW WOULD YOU PRE STENT A CALCIFIED STENOTIC CONDUIT?

1. Balloon dilate the conduit with a high pressure balloon at the size you want directly then stent
2. Serial balloon dilation of the conduit with high pressure balloons until you reach the size you want then stent
3. Stent the conduit first, then serial balloon dilate with high pressure balloon !!!!!!! Are you crazy!!!!

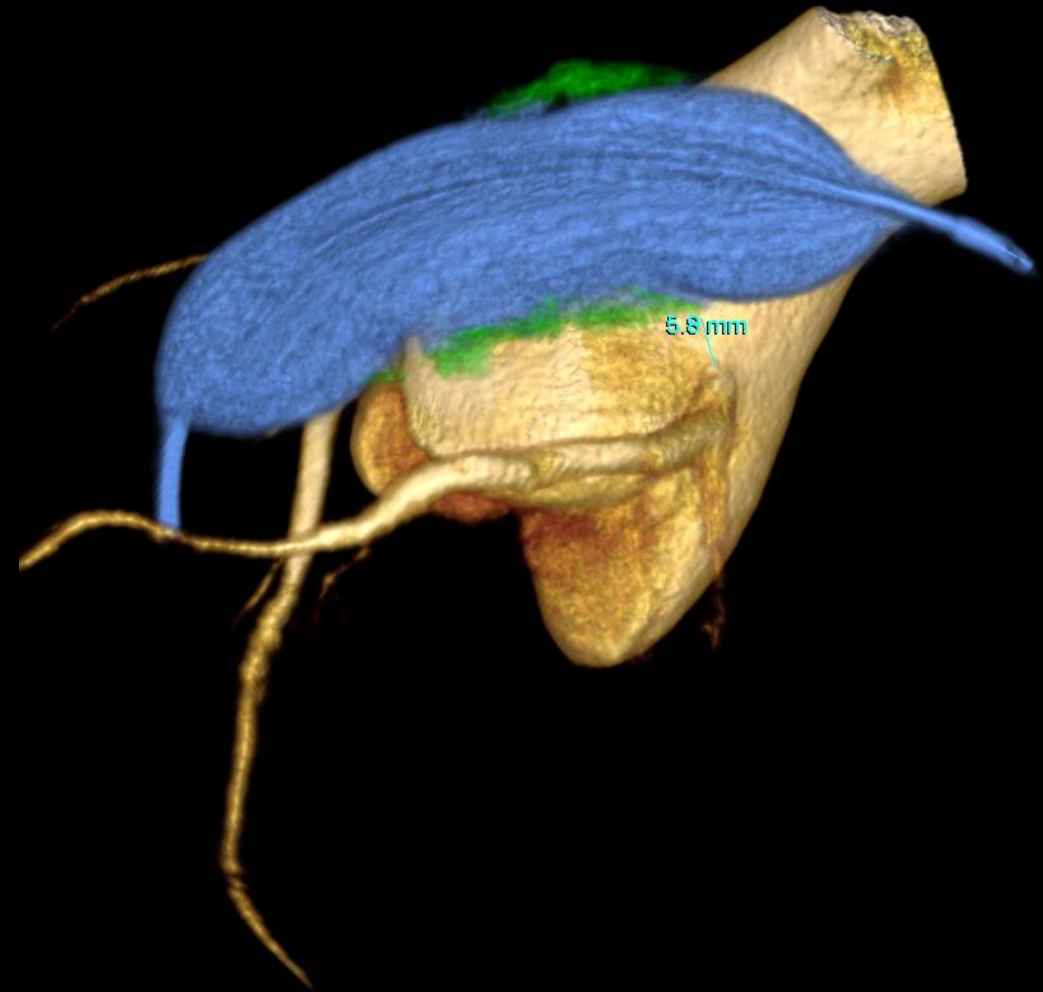
TRADITIONAL: CRACK THEN STENT!



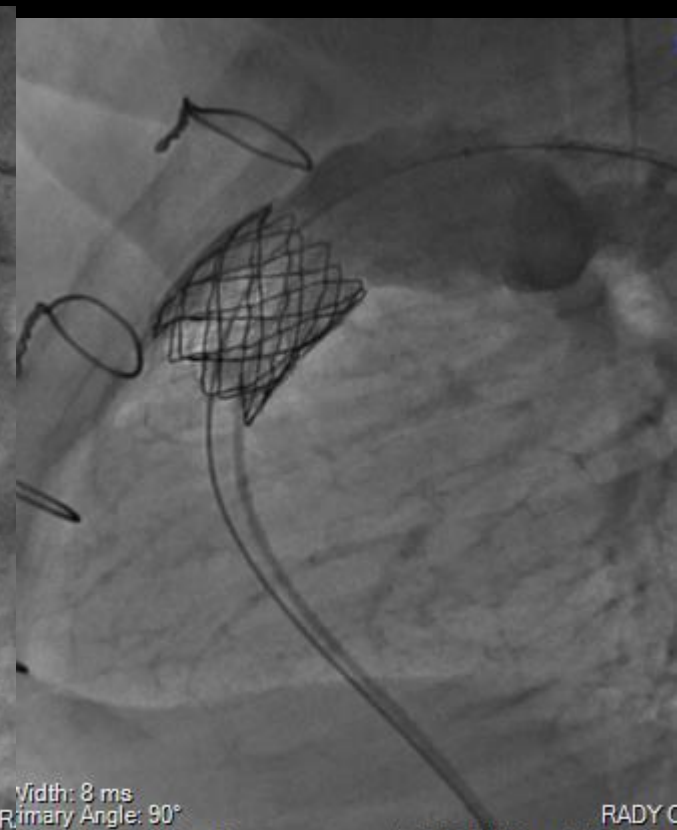
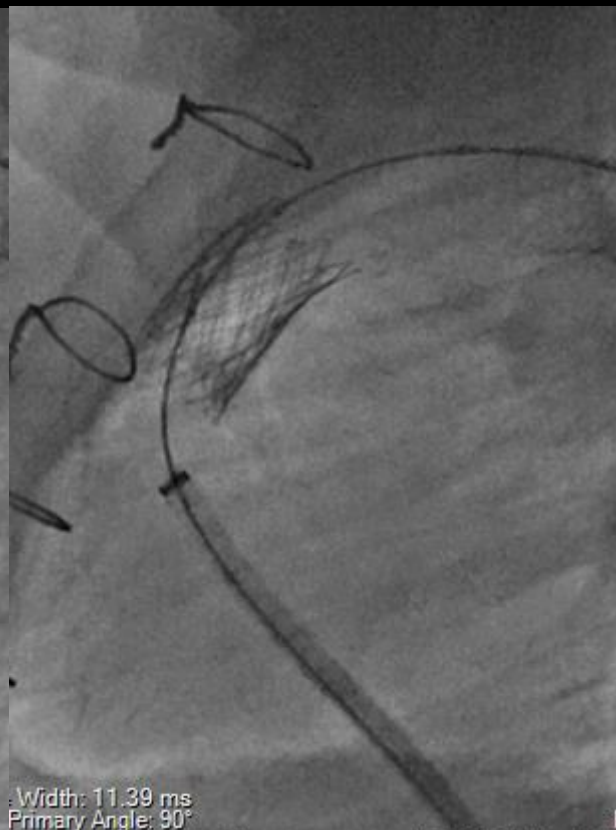
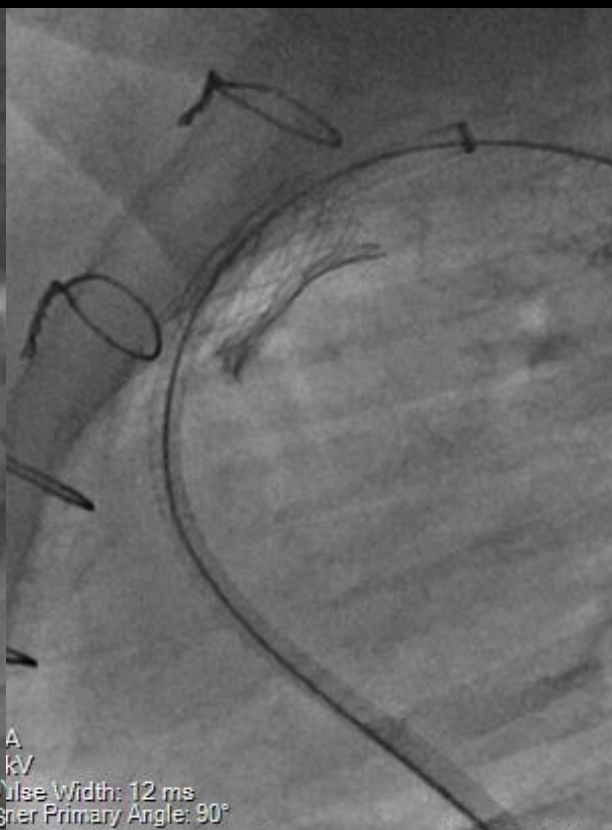


OUR APPROACH:
STENT THEN CRACK

DISTANCE TO CORONARY



STENT AND THEN CRACK!

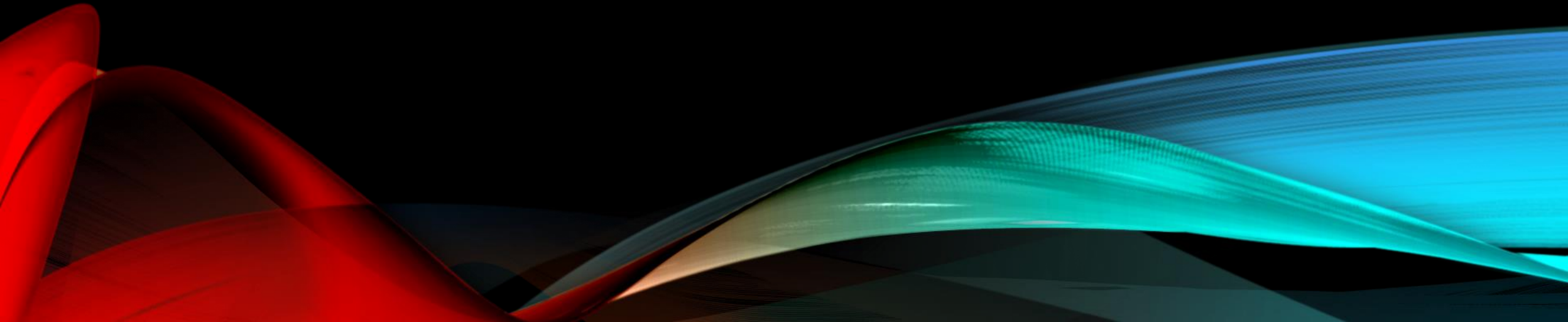


STENT AND THEN CRACK

- Conduit tears are reported up to 1.4-2.7% of patients in other case series.*
- We believe that our approach maximizes the structural integrity of the conduit and minimizes the risk of major conduit tears/rupture
- 1/98 contained tear (no additional intervention needed)

*Peng LF, et al. Circulation. 2006
Mahgerefteh J, et al. Catheter Cardiovasc Interv. 2013
Cardoso R, et al Catheter Cardiovasc Interv. 2016.

AORTIC CUSP COMPRESSION?



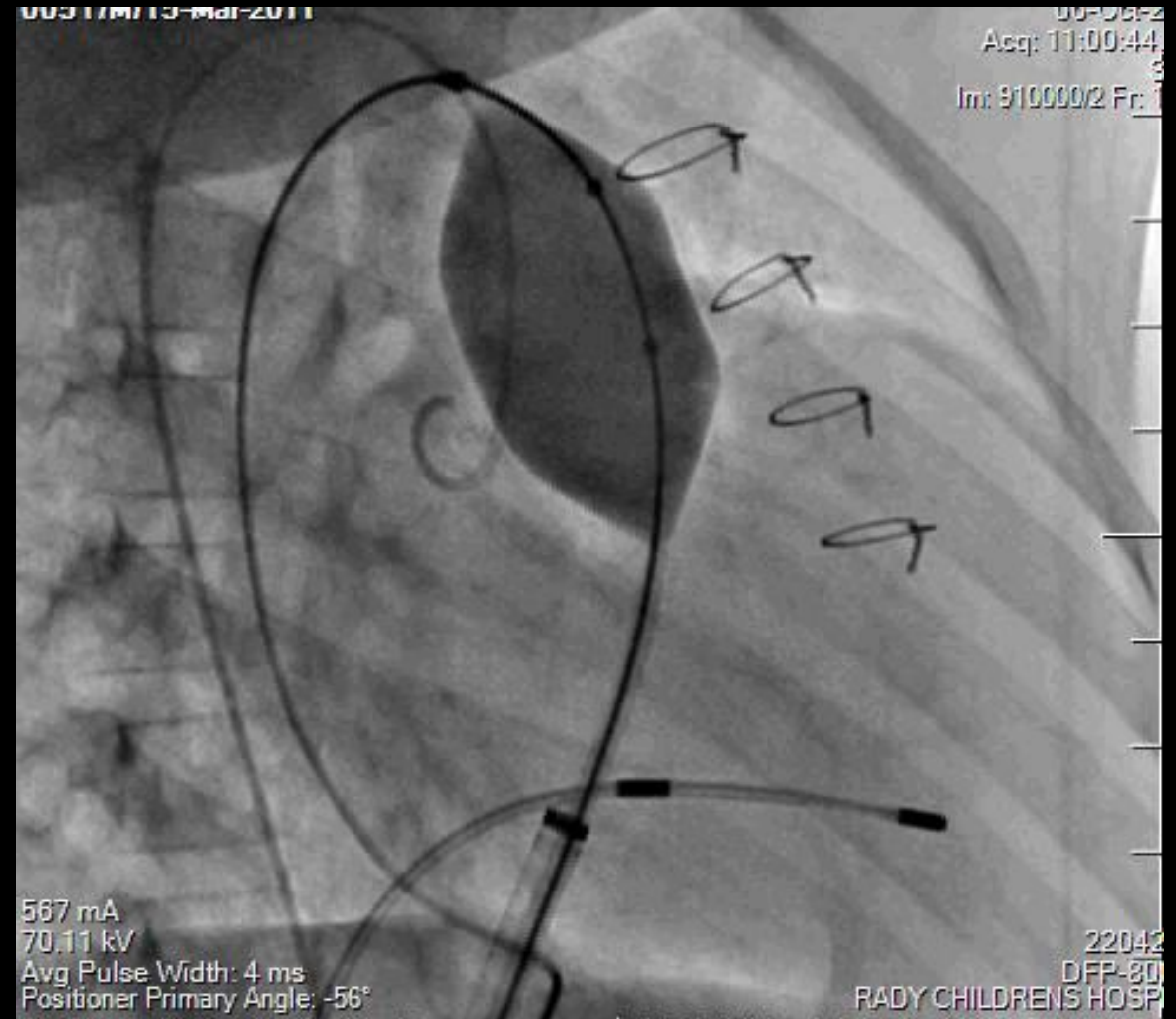
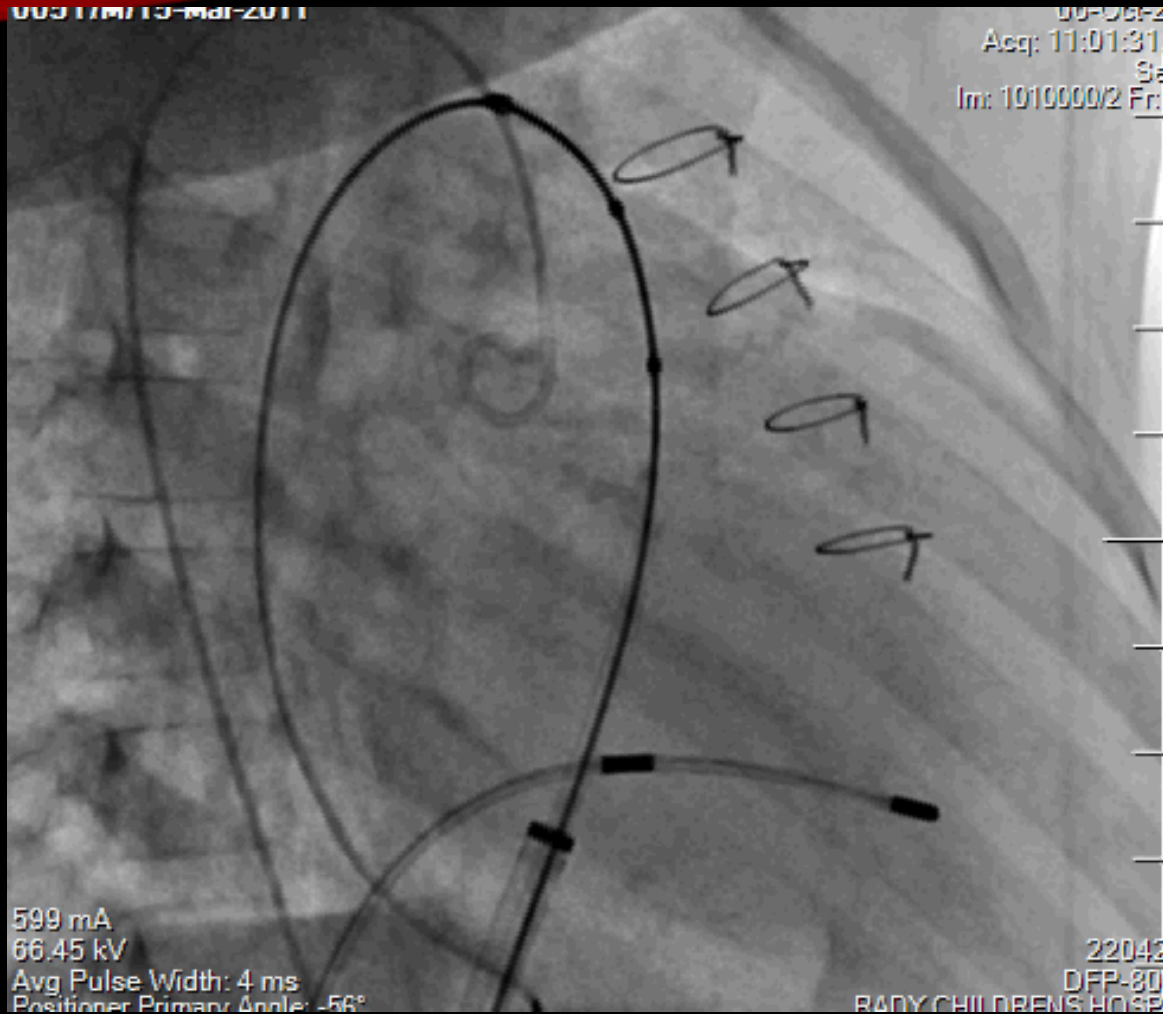
AORTIC CUSP COMPRESSION!



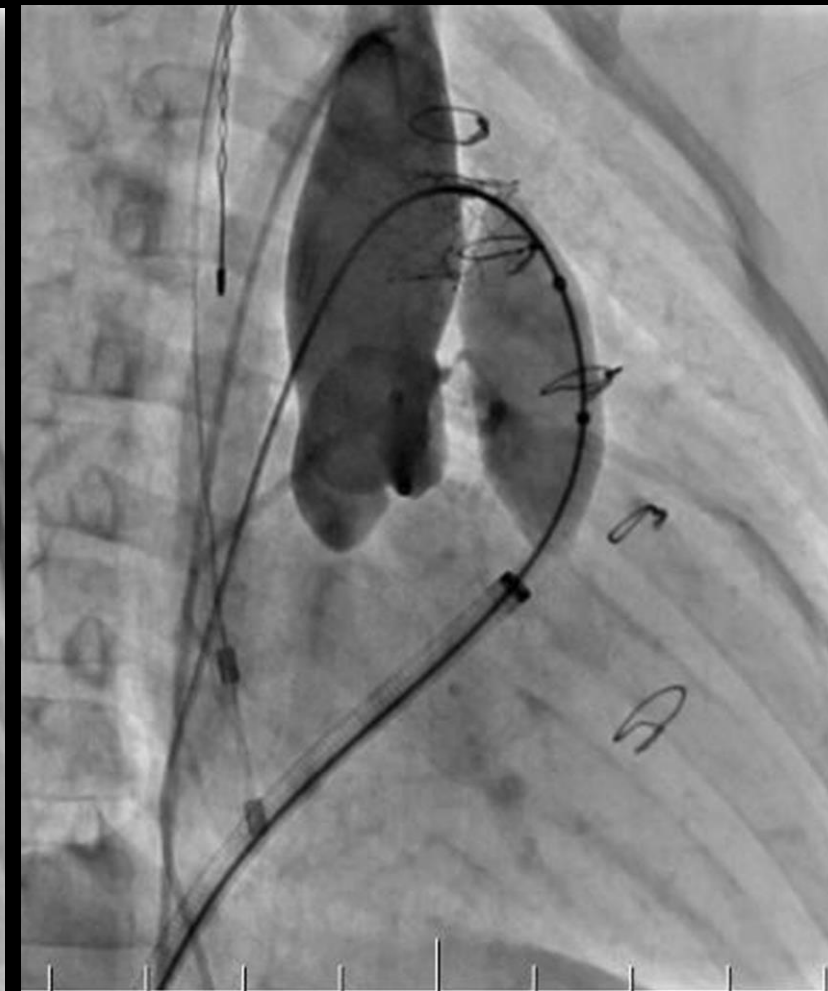
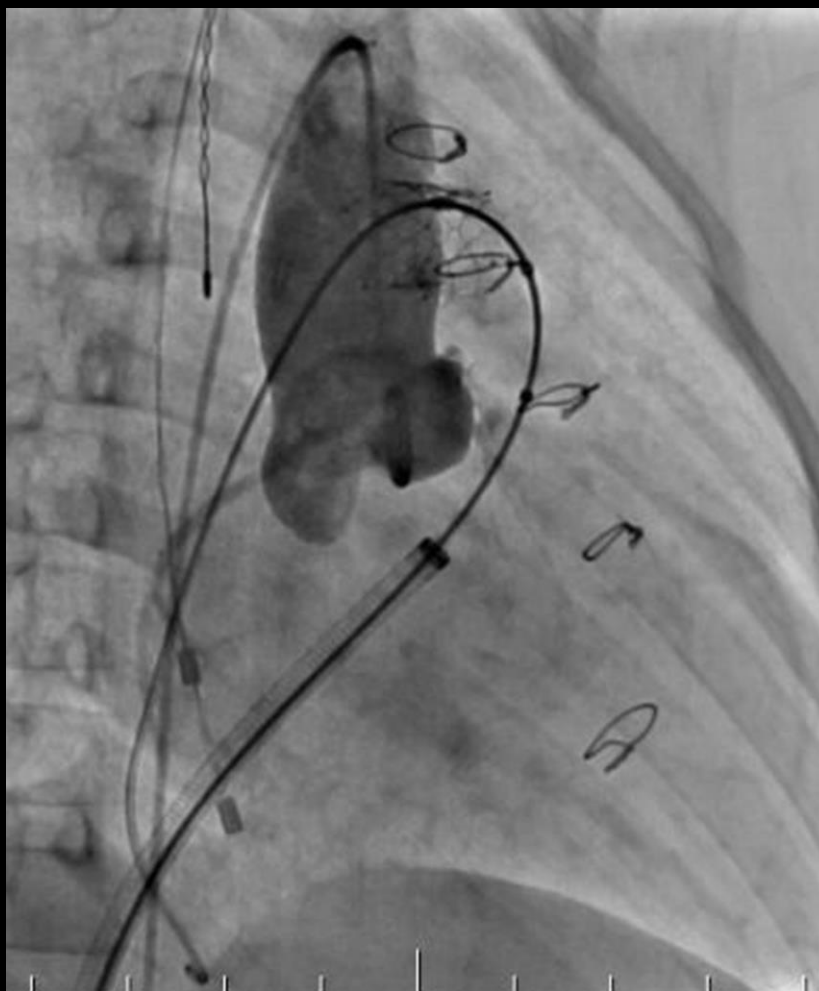
AORTIC CUSP COMPRESSION!



AORTIC CUSP COMPRESSION!



AORTIC CUSP COMPRESSION!





WOULD YOU ABORT MELODY IMPLANTATION
IF YOU HAVE CUSP FLATTENING WITHOUT
CORONARY COMPRESSION?

1. Yes
2. No

REPORTS OF AORTIC CUSP COMPRESSION

STRUCTURAL HEART DISEASE

Aortic Root Distortion and Aortic Insufficiency During Balloon Angioplasty of the Right Ventricular Outflow Tract Prior to Transcatheter Pulmonary Valve Replacement

ALEJANDRO J. TORRES, M.D.,¹ DOFF B. MCELHINNEY, M.D.,²
BRETT R. ANDERSON, M.D.,¹ MARIEL E. TURNER, M.D.,¹
MATTHEW A. CRYSTAL, M.D.,¹ DONNA M. TIMCHAK, M.D.,¹
and JULIE A. VINCENT, M.D.¹

REPORTS OF AORTIC CUSP COMPRESSION

- Aortography was performed in 18/43 pts
- Ao Distortion/A regurge noted in 6/18 (33%); (2 D-TGA, 2 TOF, 1 Truncus and 1 Ross).
- Procedure was aborted in the 2 who developed severe AD/AI.
- TPV was implanted in 3/4 patients with mild AD/AI.

REPORTS OF AORTIC CUSP COMPRESSION

Aortic Root Compression During Transcatheter Pulmonary Valve Replacement

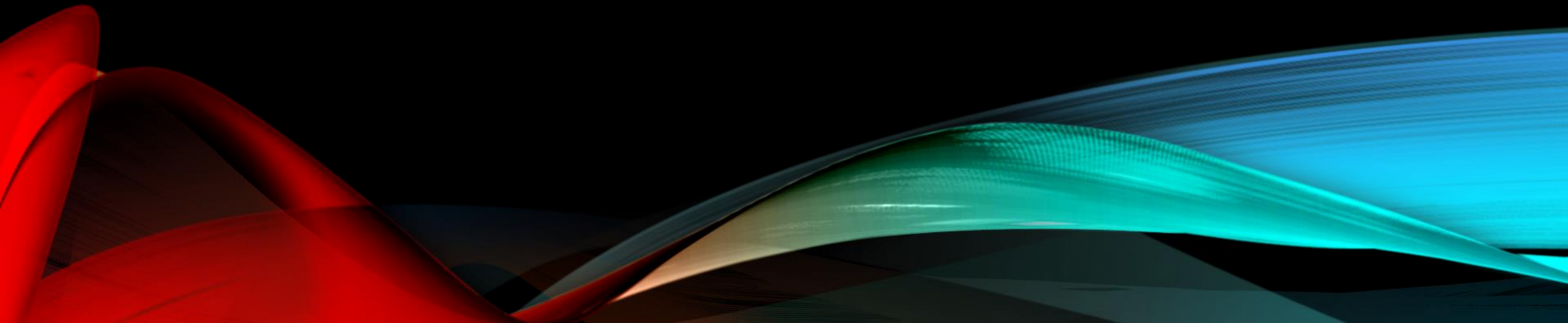
Ian Lindsay,^{1,2} MD, Jamil Aboulhosn,^{1,2} MD, Morris Salem,³ MD, and Daniel Levi,^{1,2*} MD

Catheterization and Cardiovascular Interventions 00:00–00 (2016)

REPORTS OF AORTIC CUSP COMPRESSION

- ARC occurred in 16/174 patients (9%) (mostly in native/TAP).
- 9/16 ARC isolated ARC, 5/16 had concomitant coronary artery compression.
- Two pts underwent successful TPVR despite ARC
- One pt required surgical valve explanation after TPVR caused severe ARC.

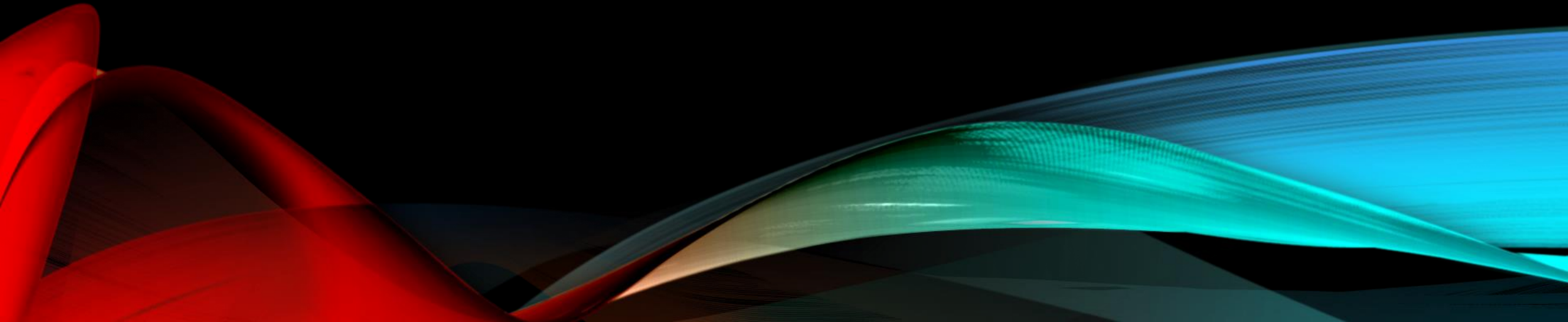
RESULTS?



RESULTS:

- 98/121 were deemed eligible
- Turn down rate was higher in the 3DRAA group
 - 25% 3DRAA
 - 10% no 3DRAA
- 98/98 valve were successfully implanted
- Complication rate lower in the 3DRAA group
 - 2% 3DRAA
 - 18% no 3DRAA
- In the 55/98 cases that had 3DRAA
 - 1 contained tear (no additional intervention needed)
 - 0 fractures
 - 0 endocarditis

CONCLUSION



CONCLUSION

- 3D Rotational angiography is a valuable tool for case selection among Melody Valve candidates
- May allow a higher procedural success and decreased risk of serious adverse events.
- 3D Rotational angiography allows stenting the conduit prior to dilation, which may prevent tears and possibly endocarditis.
- Further larger studies are needed to confirm our findings.

Thank You!



Thank You!

