Your most challenging TAVI cases – Achieving precision and control w/ Evolut platform

Thomas CUISSET, marseille, FR

Statement of Financial Interest

Speaker's name: Thomas Cuisset, MD, PhD

I have the following potential conflicts of interest to report:

Consulting and lecture fees: Abbott Vascular, Boston Scientific, Edwards, Europa Organisation, Medtronic, Terumo, Sanofi

Stockholder of a healthcare company: CERC

Learning Objectives

To learn how to achieve optimal patient outcomes with Evolut platform in challenging anatomies

To uncover practical tips and techniques to achieve implant precision and control

To become familiar with technical considerations and procedural execution of TAVI

The Team

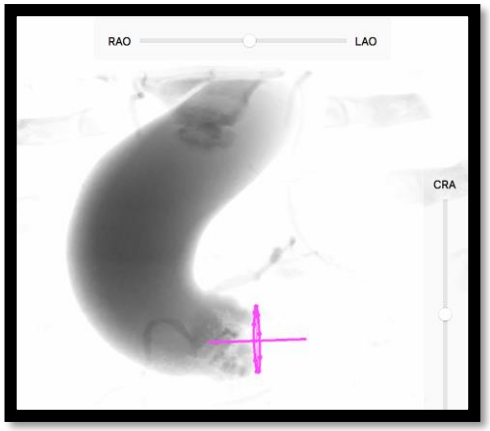
Chairs: Thomas Cuisset and Darren Mylotte

Discussants and case presenter:
Ole de Backer
Derk Frank
Daniel Blackman

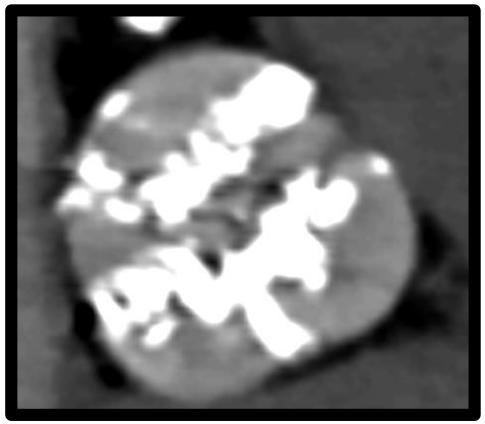
Chatmaster: Joelle Kefer

Challenging Anatomies

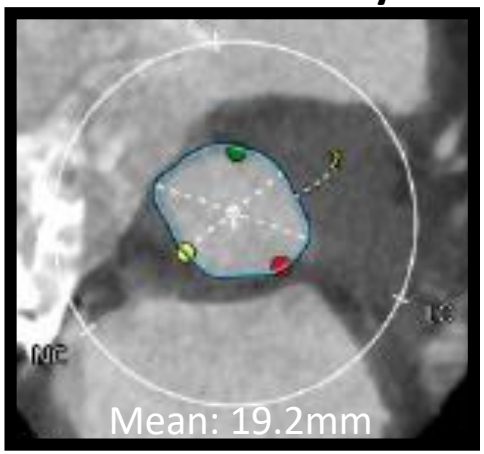
Horizontal Annulus



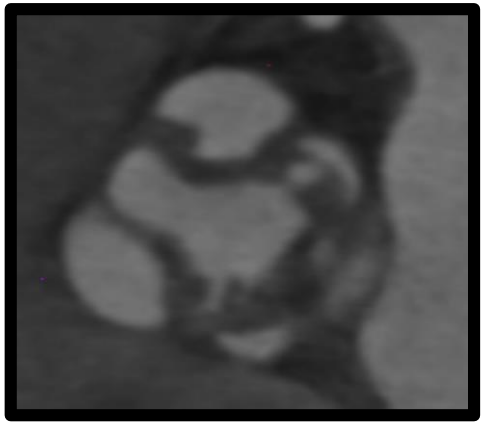
Bicuspid



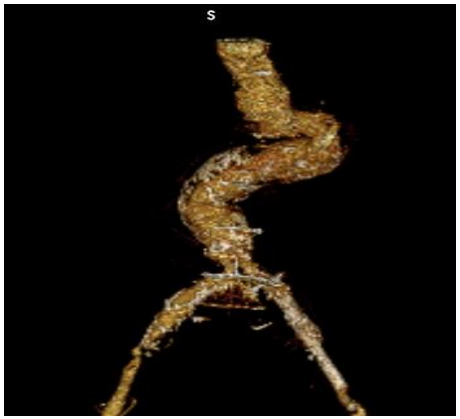
Small Anatomy



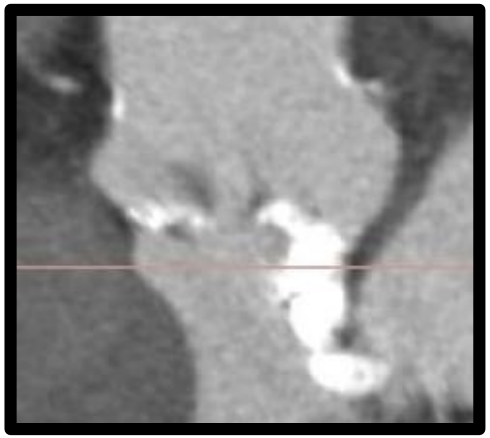
Acalcific Valves



Hostile Access



LVOT Calcium



Case in Point:
A case with horizontal aorta and severe excentric calcification treated with the Evolut Pro+ 34 mm

Derk Frank, MD

UKSH Campus Kiel

Germany

Potential conflicts of interest

Speaker's name : Derk Frank

☑ I have the following potential conflicts of interest to declare:

Receipt of grants / research support: Edwards Lifesciences

Receipt of honoraria or consultation fees: Abbott, Edwards Lifesciences, Medtronic

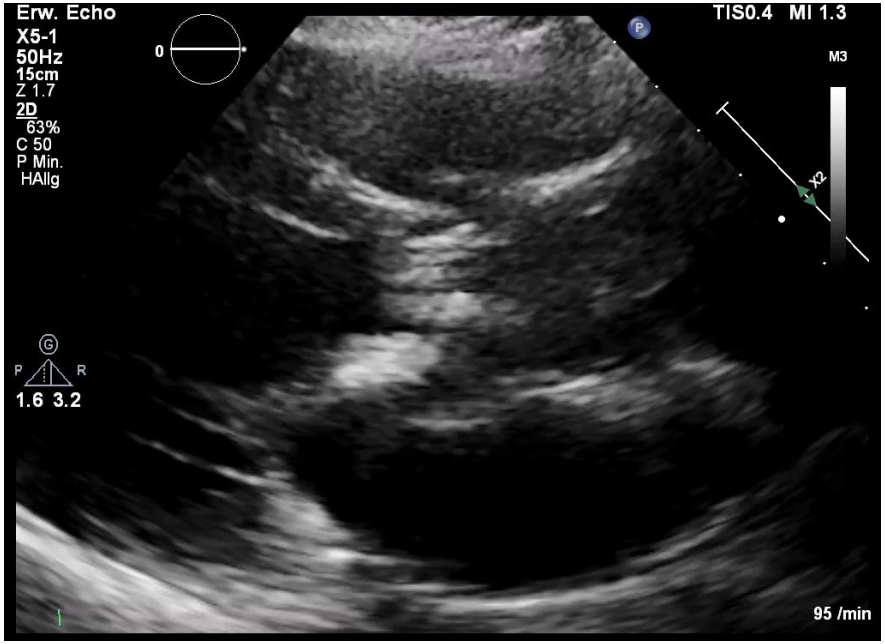
Case outline

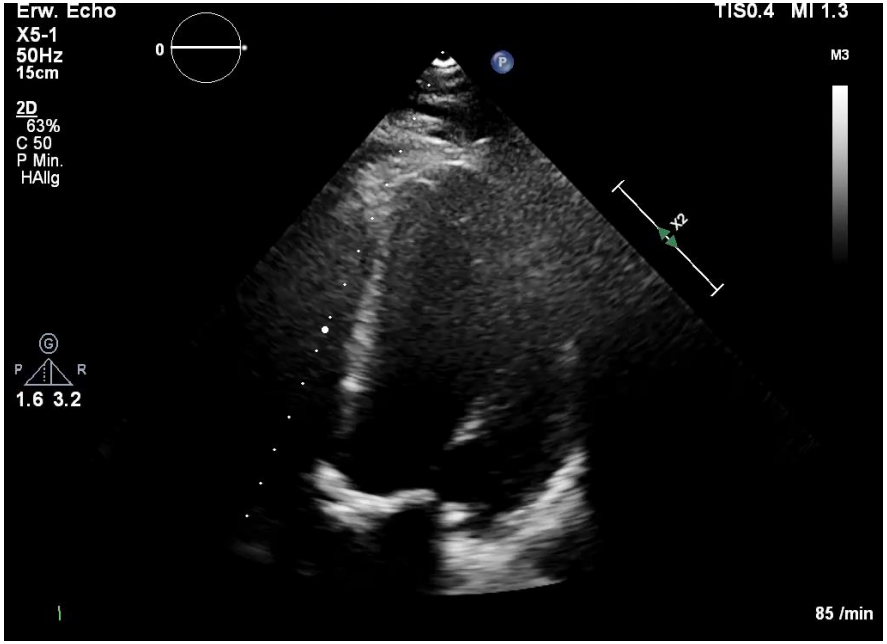
- 79 y male patient
  - EF 40%
  - Severe 3-vessel disease, s/p multiple interventions in 2016
  - s/p NSTEMI 12/2021
  - Major stroke 2004 with residual hemiparesis, cerebral multi-infarct syndrome
  - Significant cerebrovascular disease

  - Severe symptomatic aortic stenosis (MPG 50 mmHg)
  - NYHA III

  - EuroSCORE 2: 7.28%

Preprocedural echo

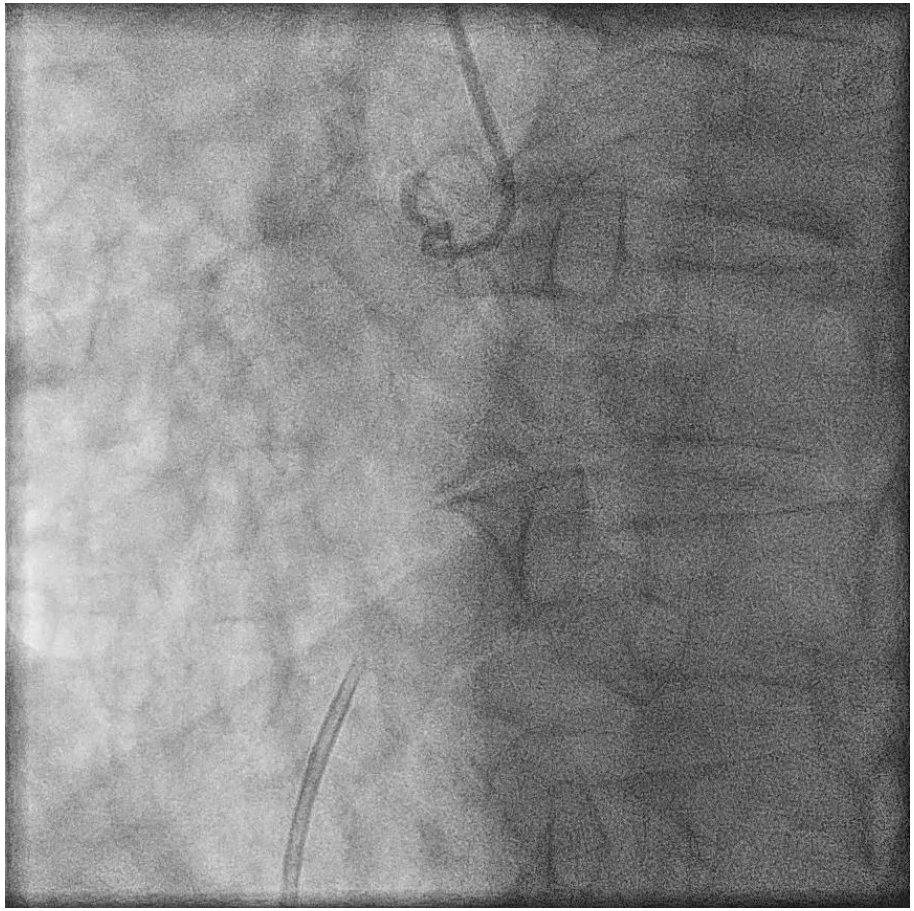




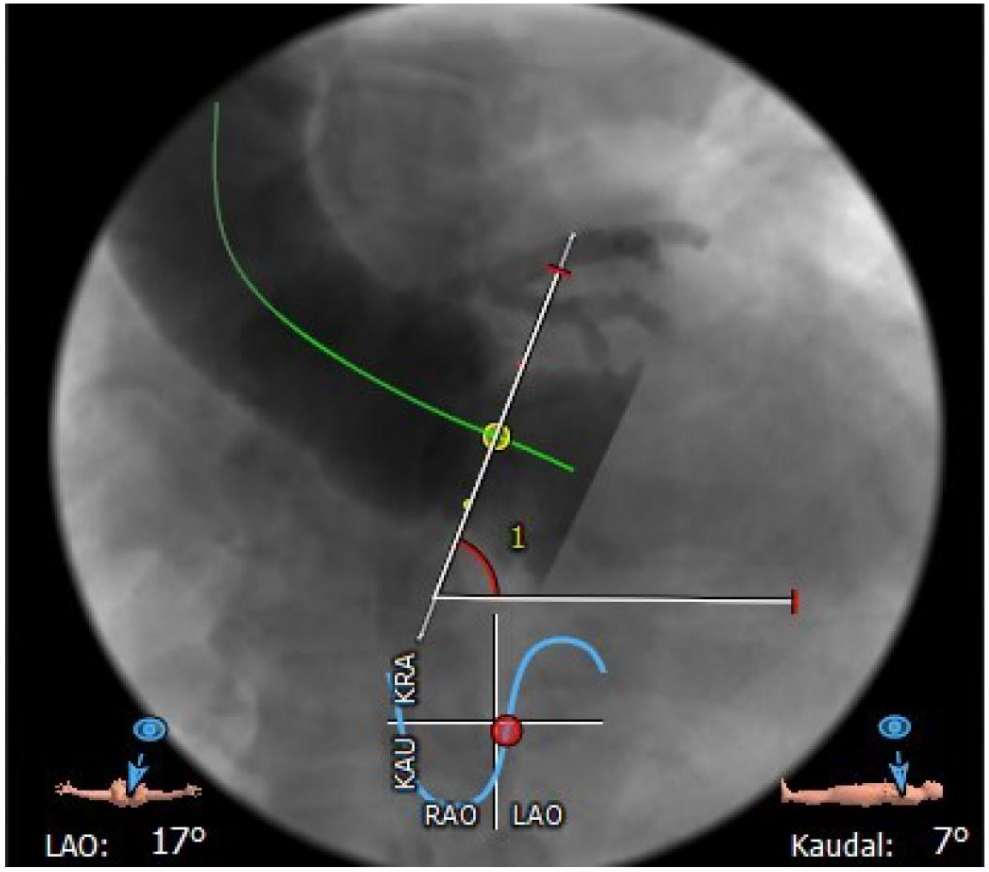
Coronary angiography

LCA

RCA (CTO)

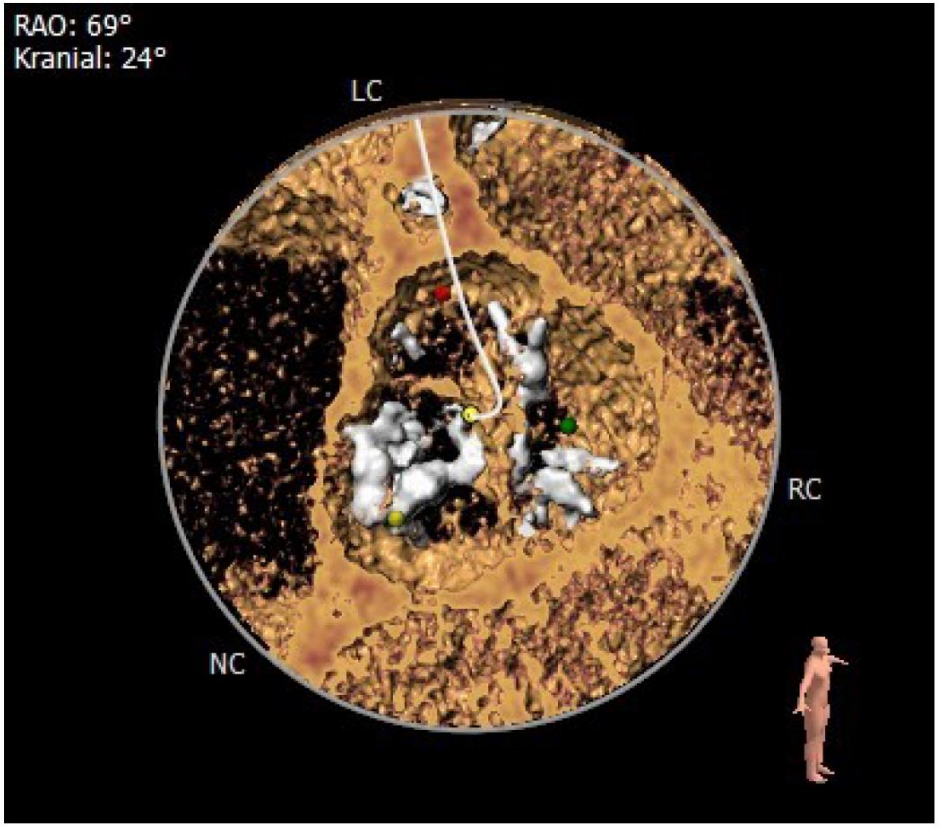


Horizontal aorta

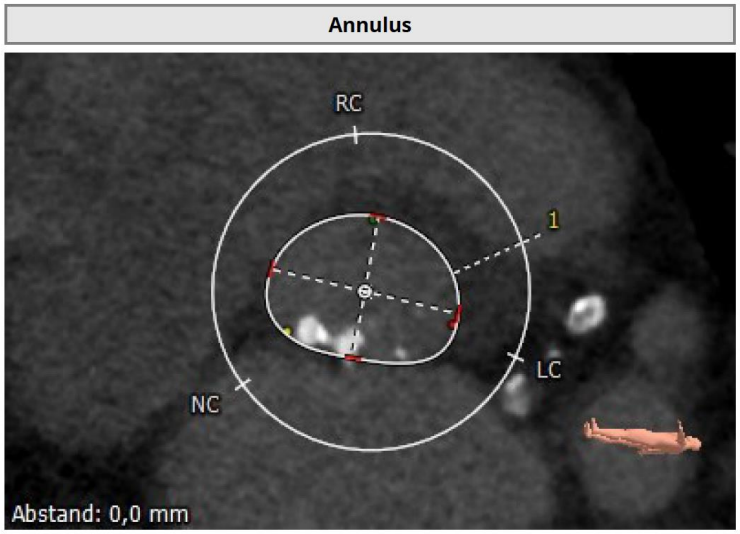


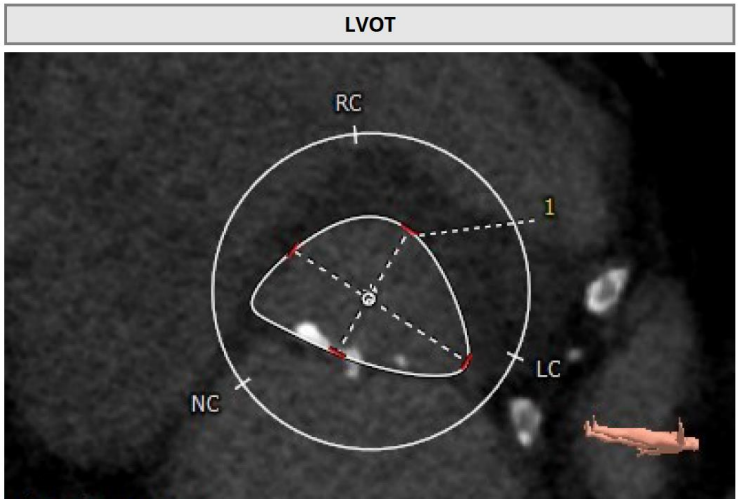
ID	Type	Label	Value
1	Winkel	Angle	70 °

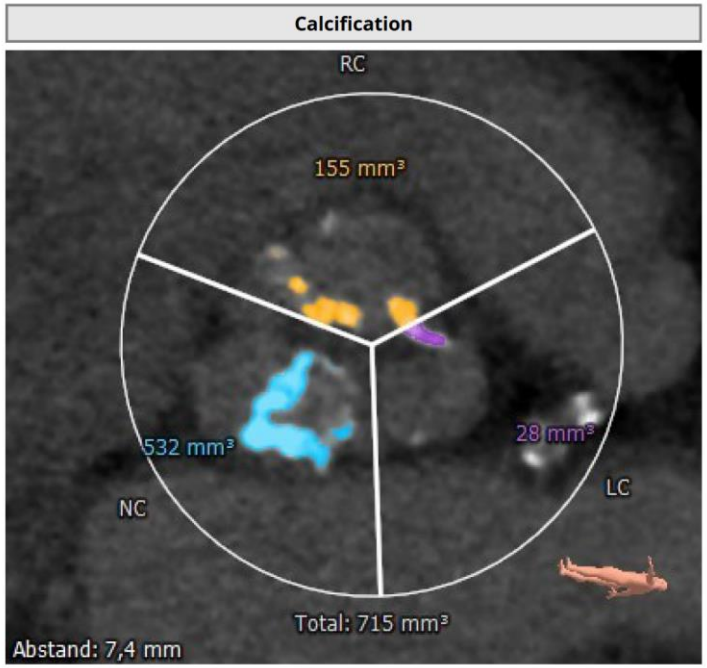
Severe excentric calcification of the NCC and LVOT



Severe excentric calcification of the NCC and LVOT

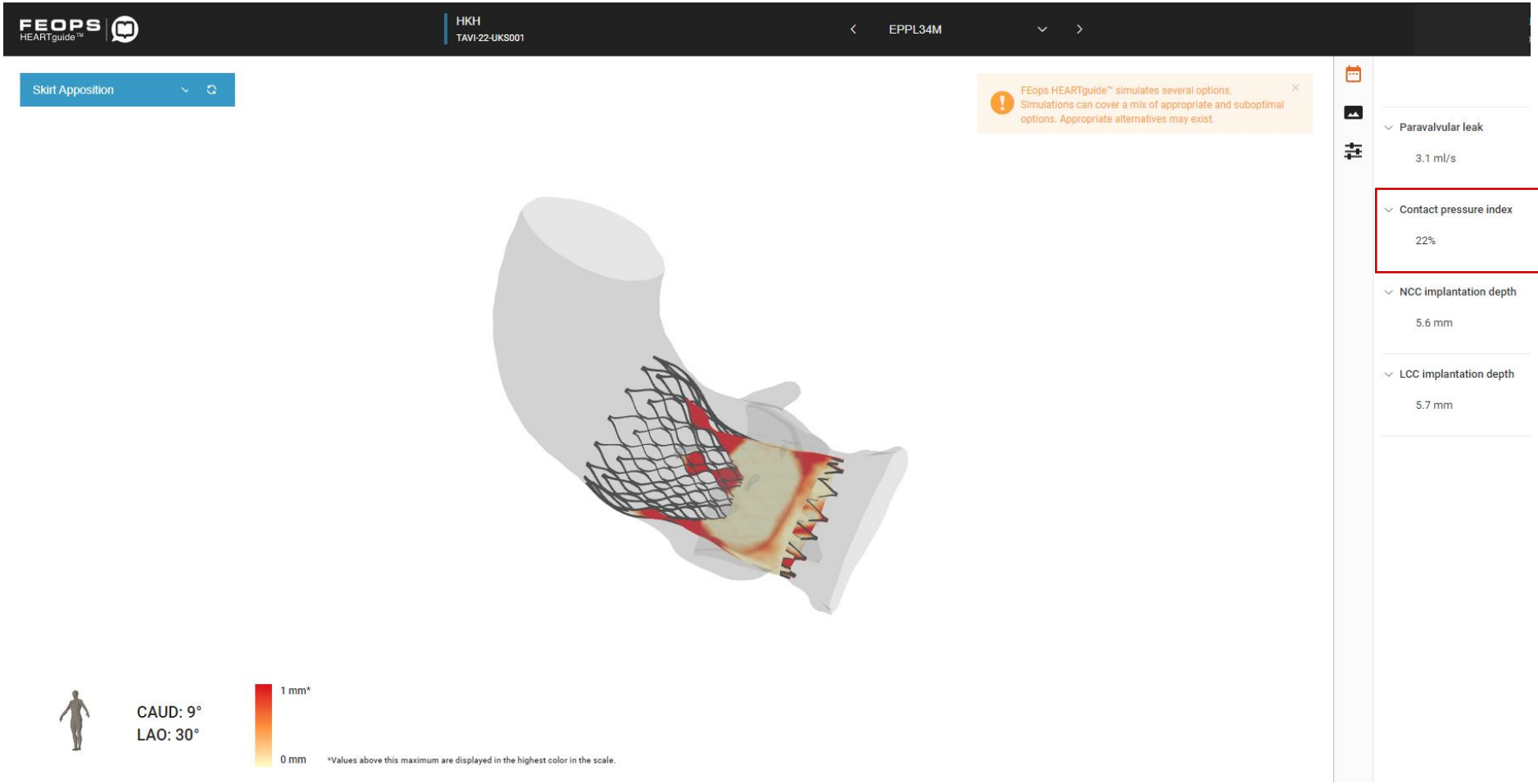






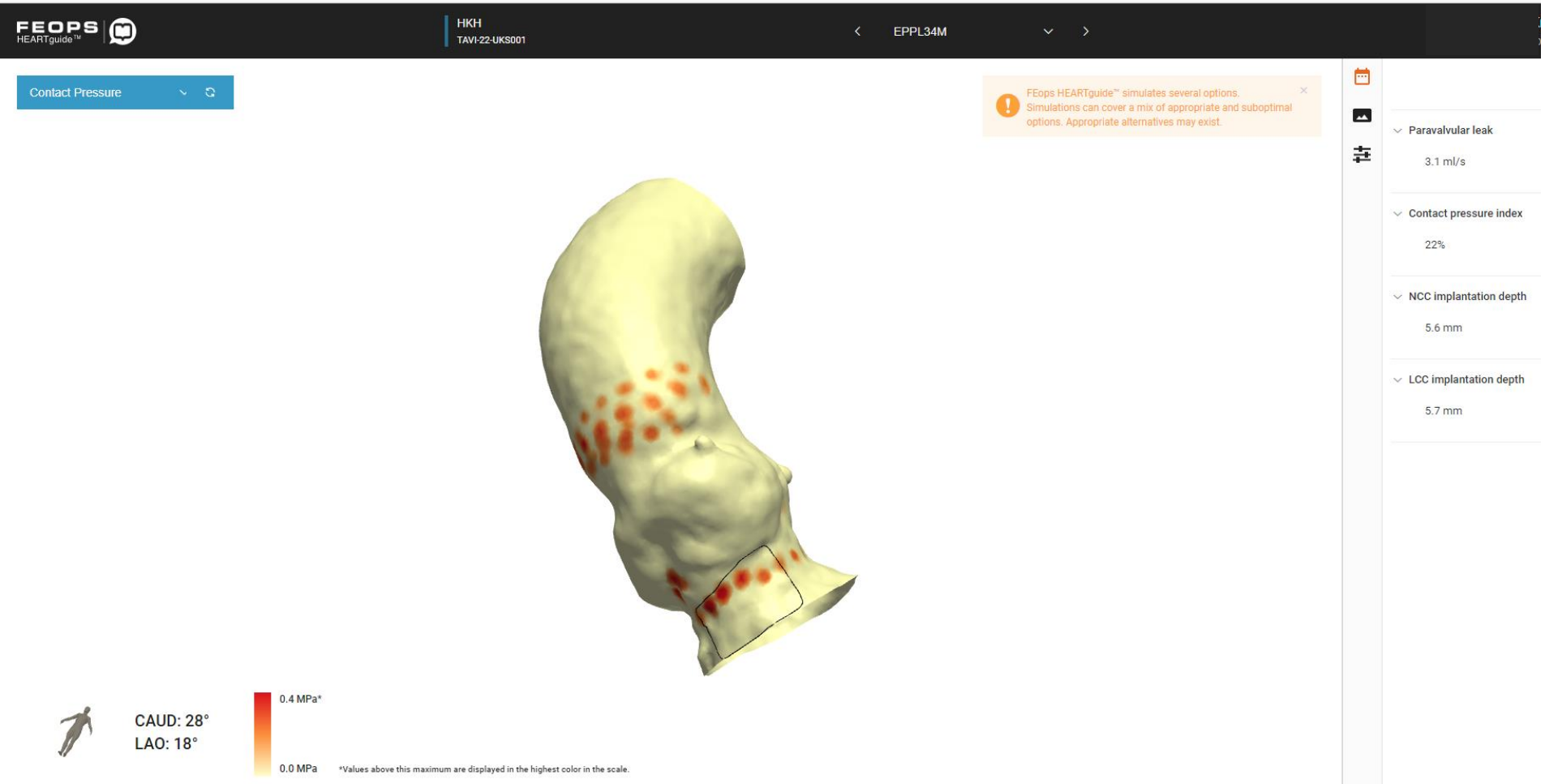
Transfemoral access

FEOPS modeling (5.6 mm NCC depth)

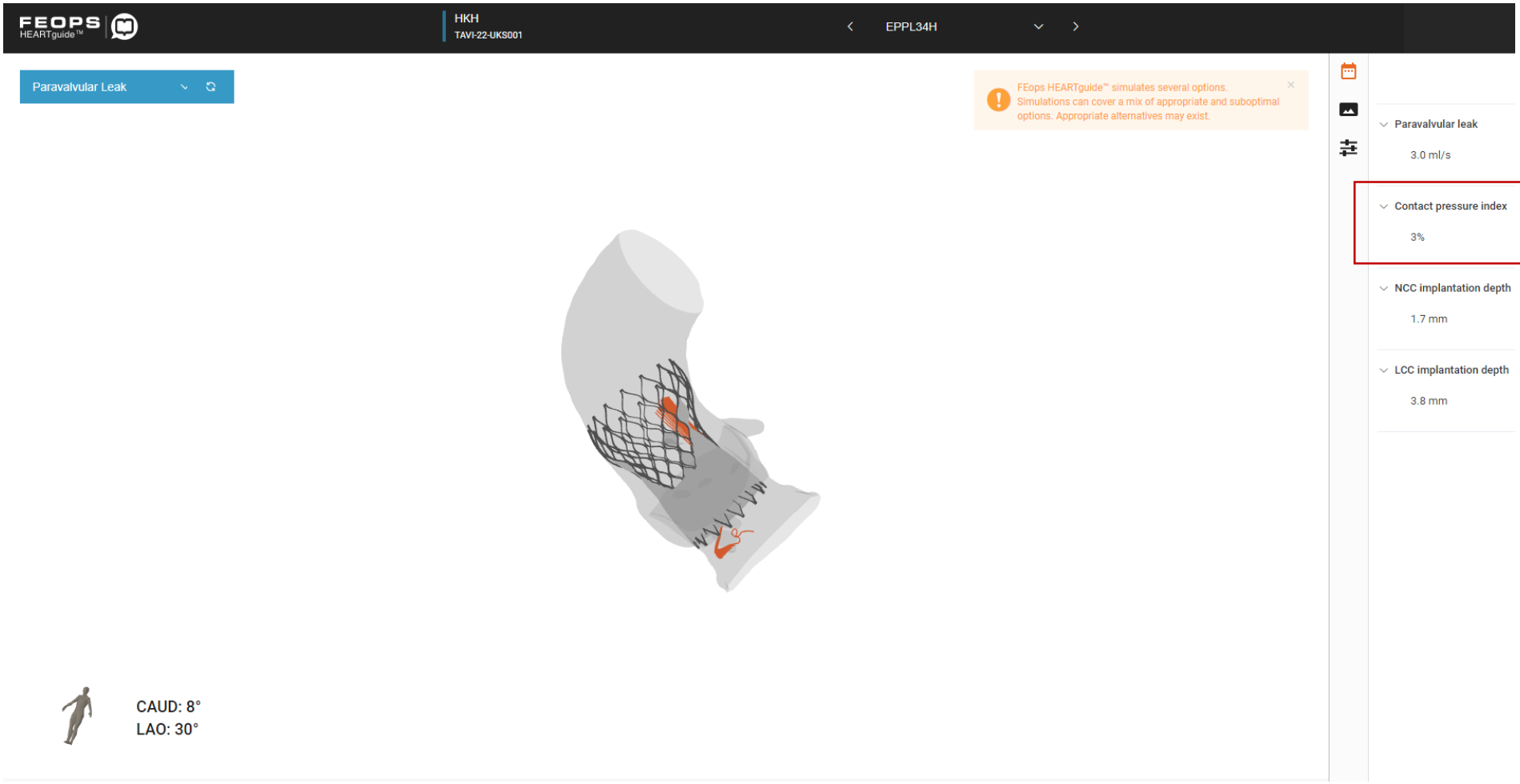


Three-cusp view

FEOPS modeling (5.6 mm NCC depth)

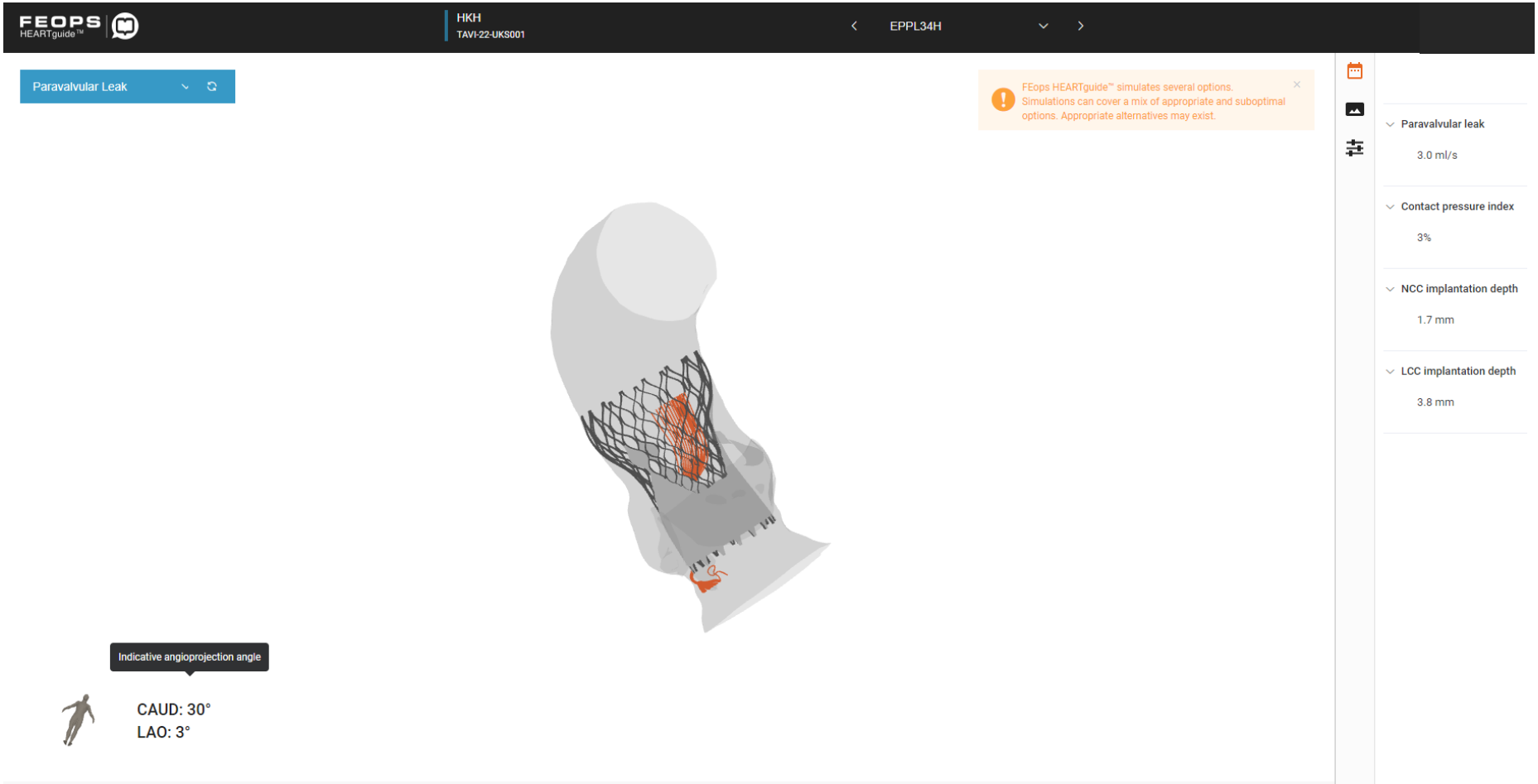


FEOPS modeling (1.7 mm NCC depth)



Three-cusp view

FEOPS modeling (1.7 mm NCC depth)



Case outline

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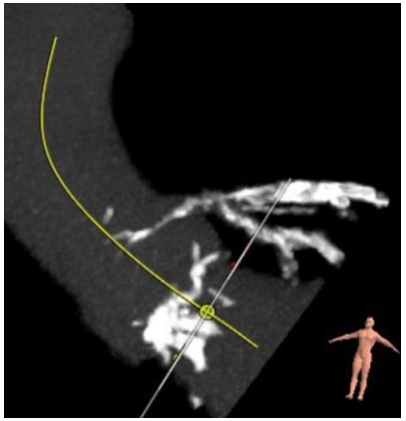
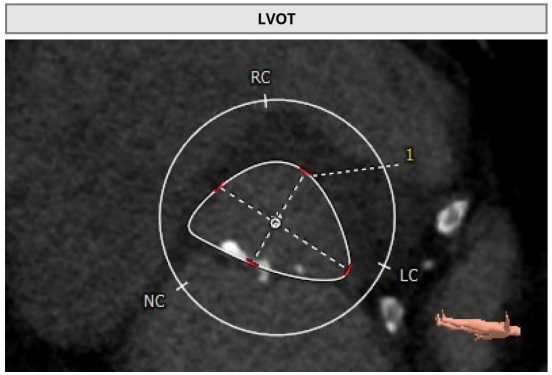
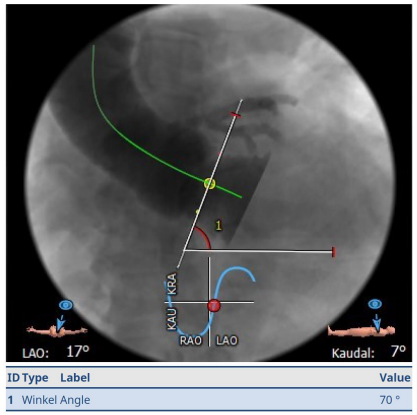
  - EF 40%
  - Severe 3-vessel diasease, s/p multiple interventions in 2016
  - NSTEMI 12/2021
  - Major stroke 2004 with residual hemiparesis, cerebral multi-infarct syndrome
  - Significant cerebrovascular disease

  - Severe symptomatic aortic stenosis MPG 50 mm Hg
  - NYHA III

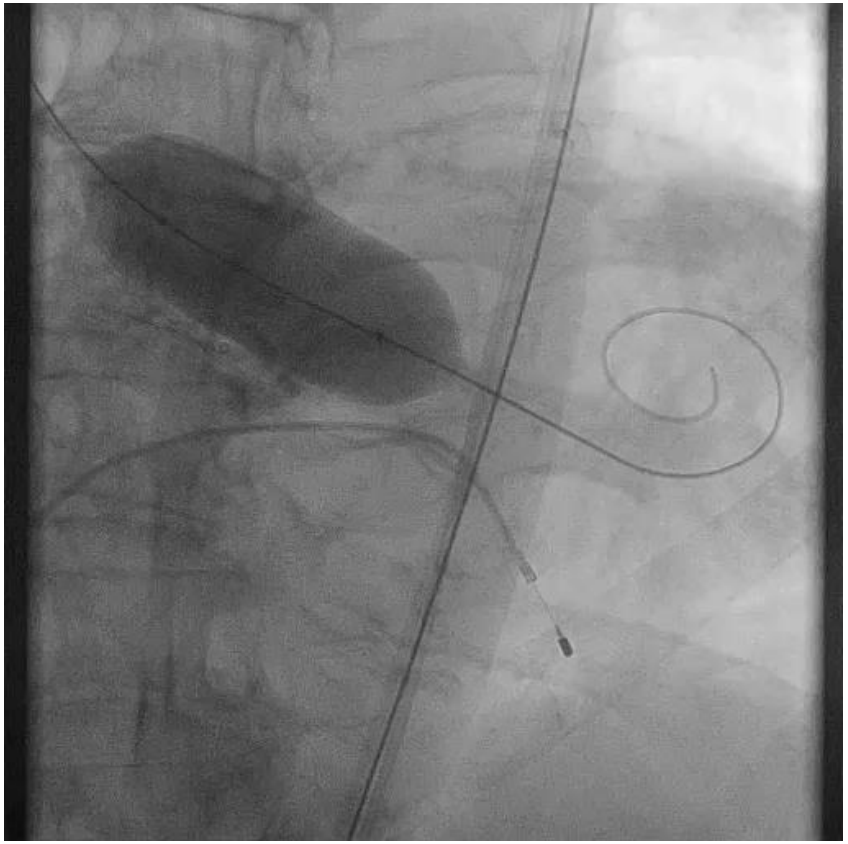
  - EuroSCORE 2: 7.28%
- Deemed « clinically inoperable » in the Heart team decision
- Treatment decision: TF-TAVI with the Evolut Pro+ 34 mm device



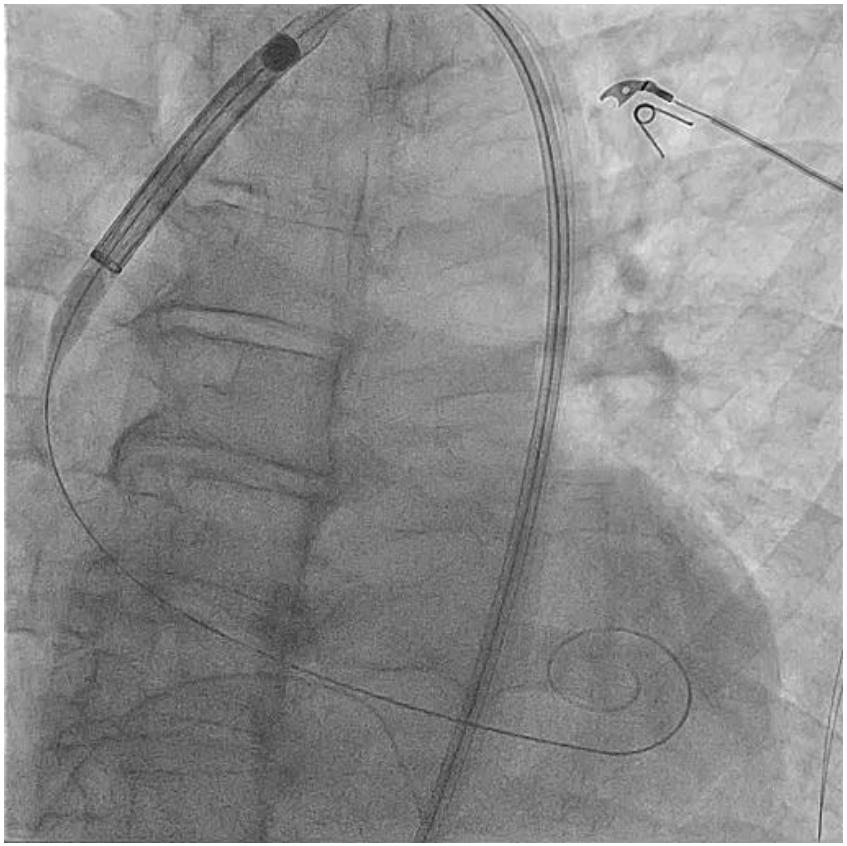


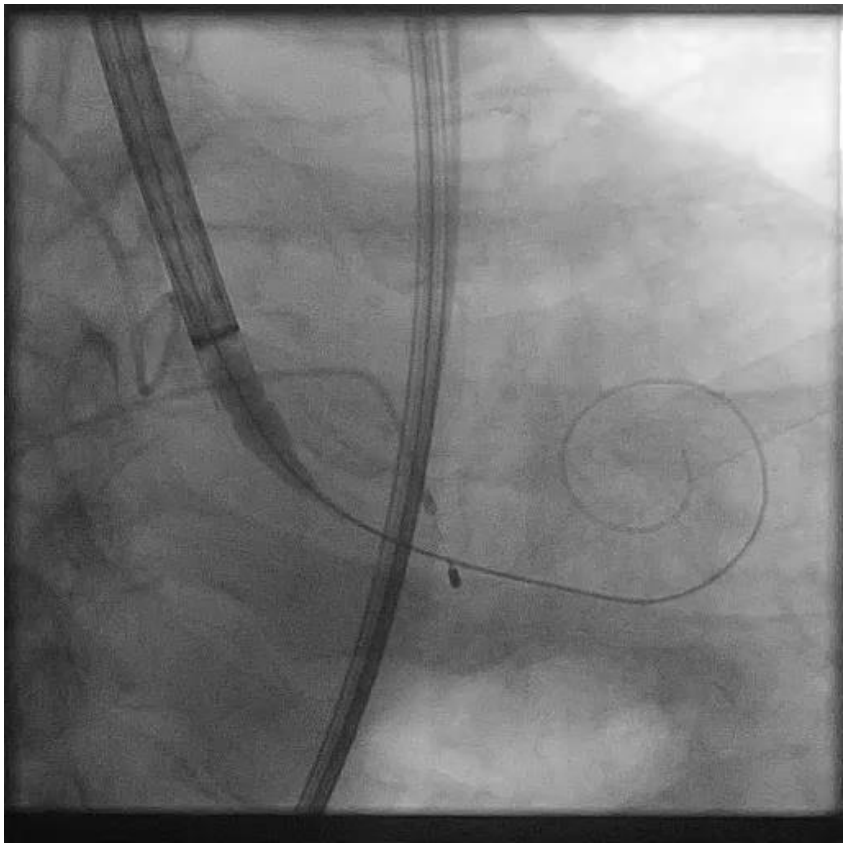


Predilatation with a 24 mm semi-compliant balloon



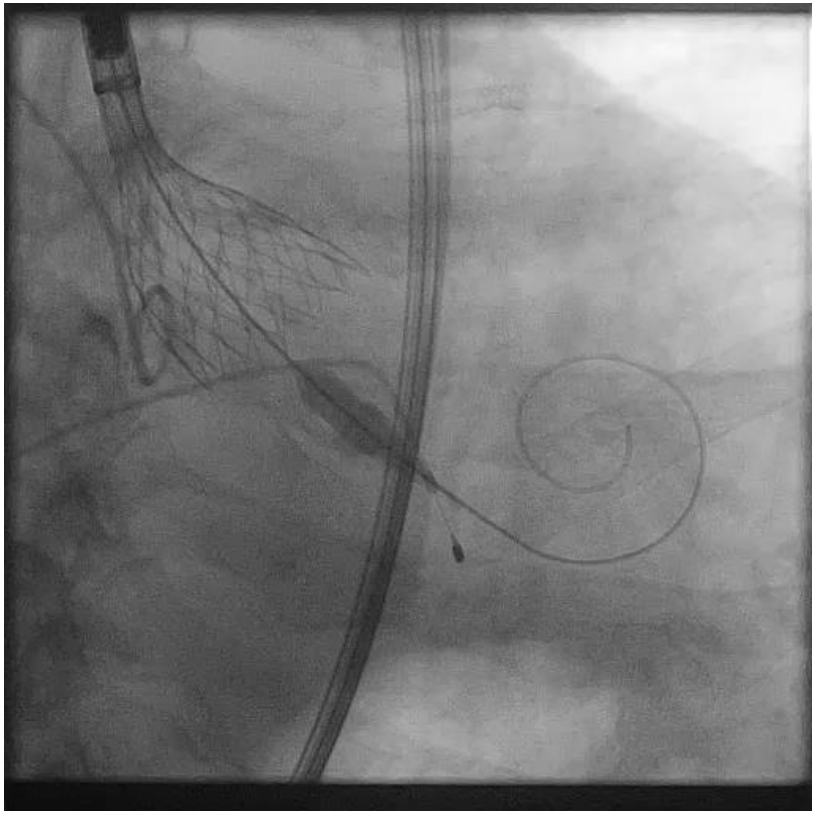
Valve positioning in „near cusp overlap position“



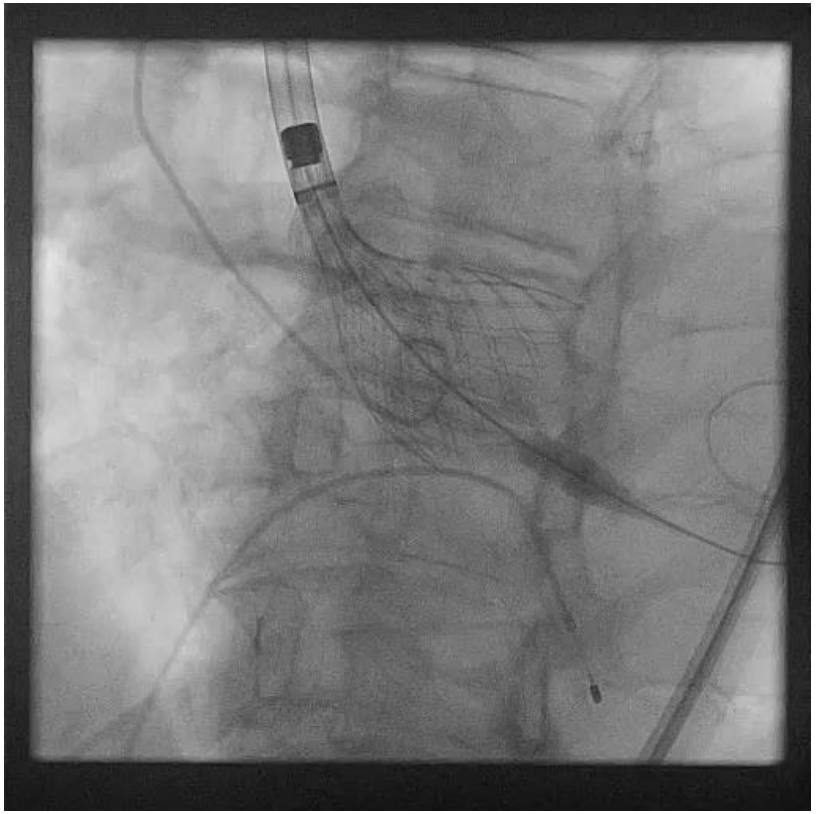


Near-cusp-overlap view

Positioning

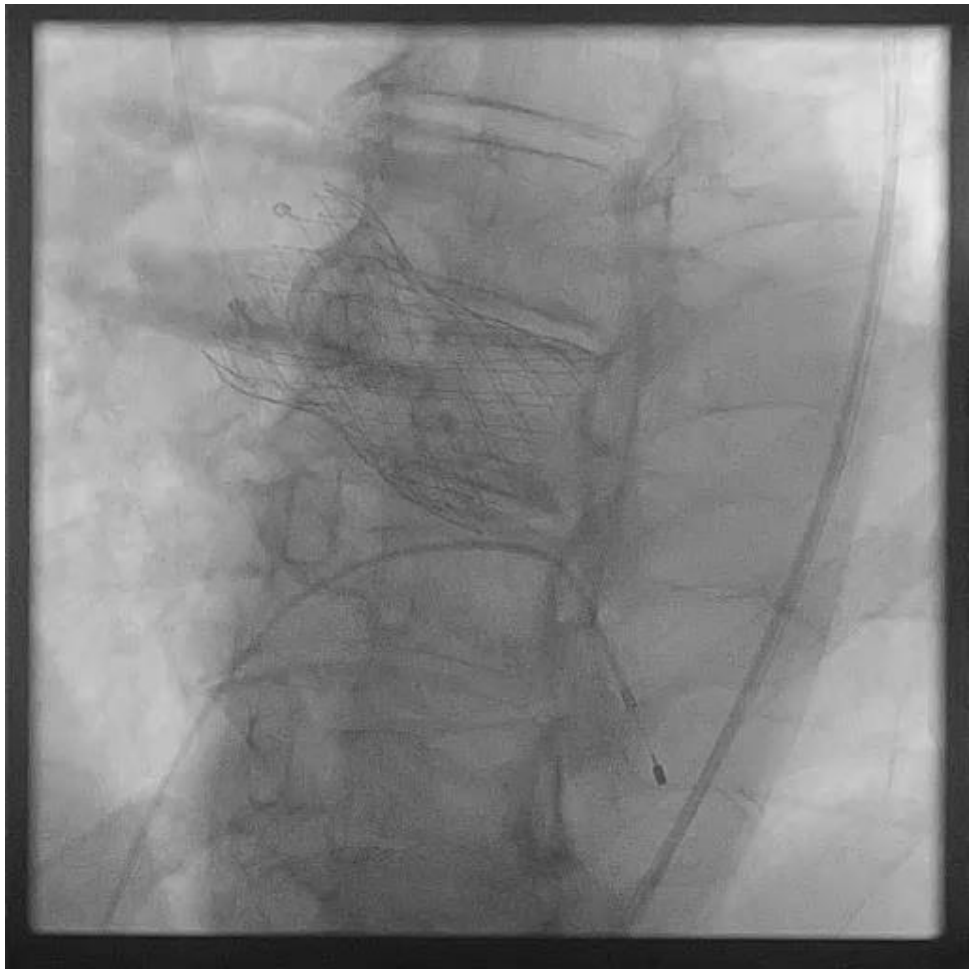


Near-cusp-overlap view



Three-cusp view

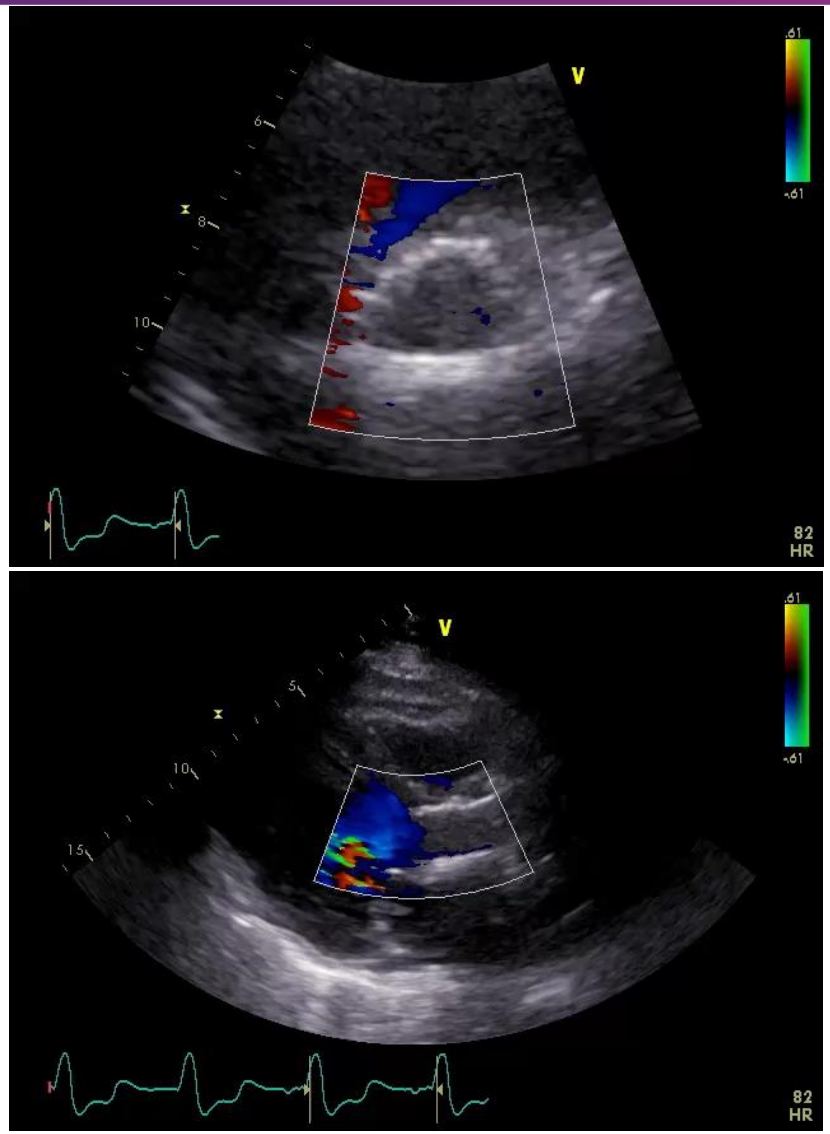
Result after release



Three-cusp view

Echo follow-up

- LV-EF 55%
- Aortic valve:
  - no paravalvular leak
  - Max flow velocity: 2,1 m/s
  - MPG 10 mm Hg

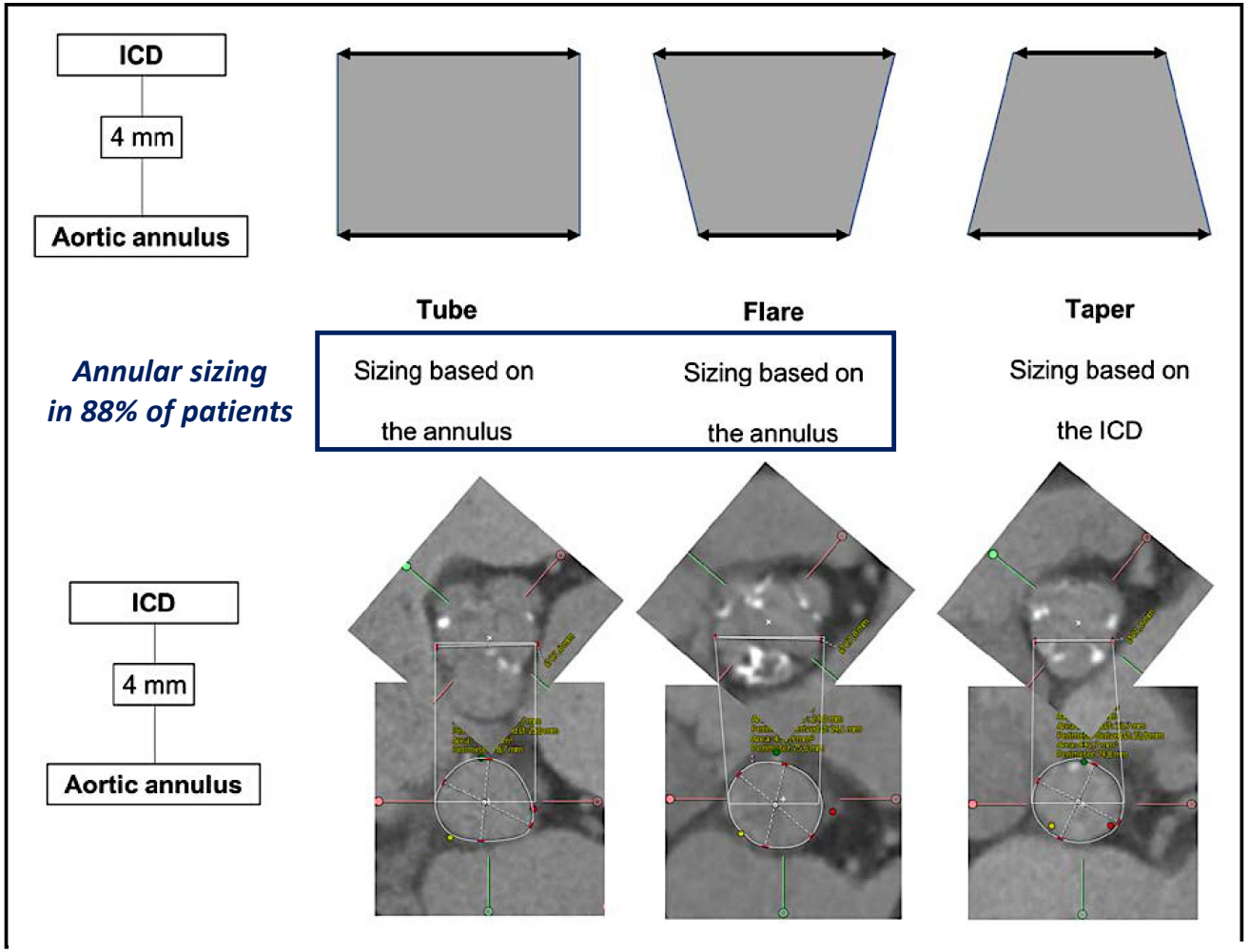


Conclusions

- The Evolut Pro+ 34 mm achieves a hemodynamically optimal result despite:
  - Horizontal aorta
  - Severe, excentric calcification involving the LVOT

PCRonline.com

BAVARD sizing strategy – landing zone configuration



Various configuration of the landing zone in bicuspid patients and simplified sizing algorithm.

Tchetche et al. CCI 2019.

2022 euro PCR

Case-in-Point
Challenging bicuspid AS for TAVI treatment

Prof. Dr. Ole De Backer

The Heart Center – Rigshospitalet, Copenhagen, Denmark

EAPCI
European Society of Cardiology

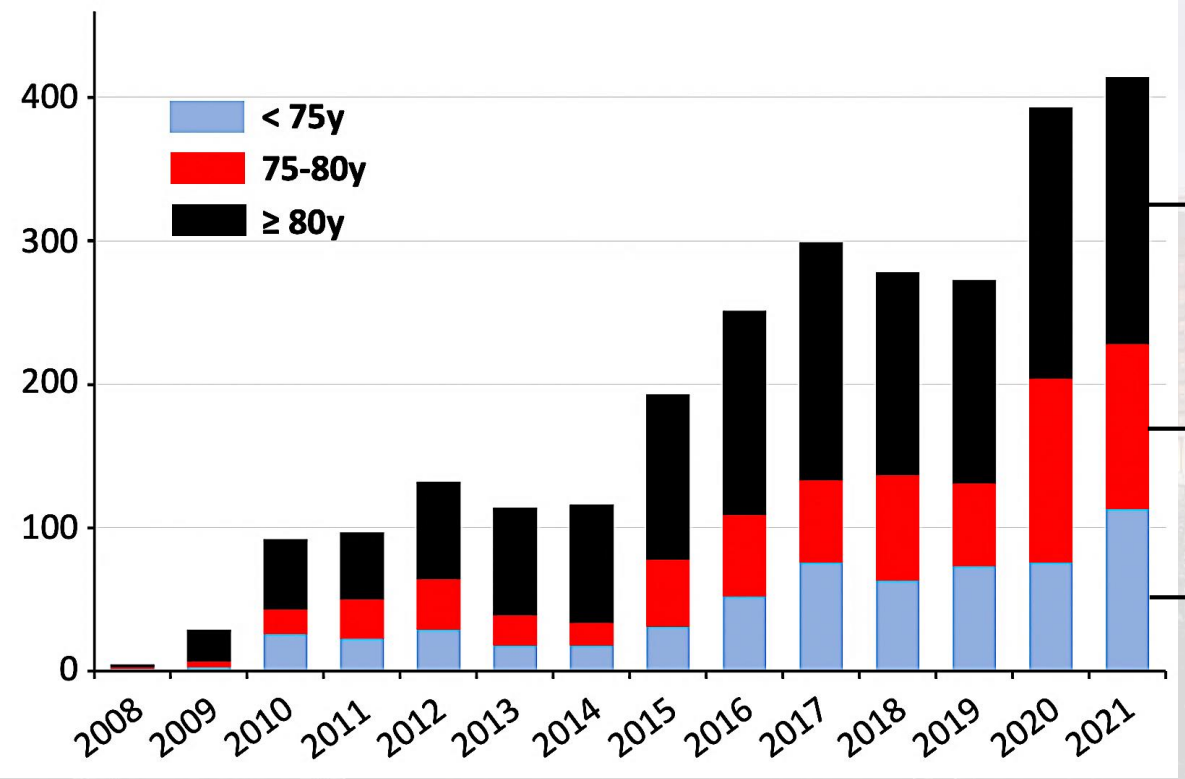
Potential conflicts of interest

Speaker's name: Ole De Backer

❑ I do not have any potential conflict of interest to report

X I have the following potential conflicts of interest to report: Received institutional research funds and consulting fees from Medtronic, Abbott, Boston Scientific and Shockwave Medical.

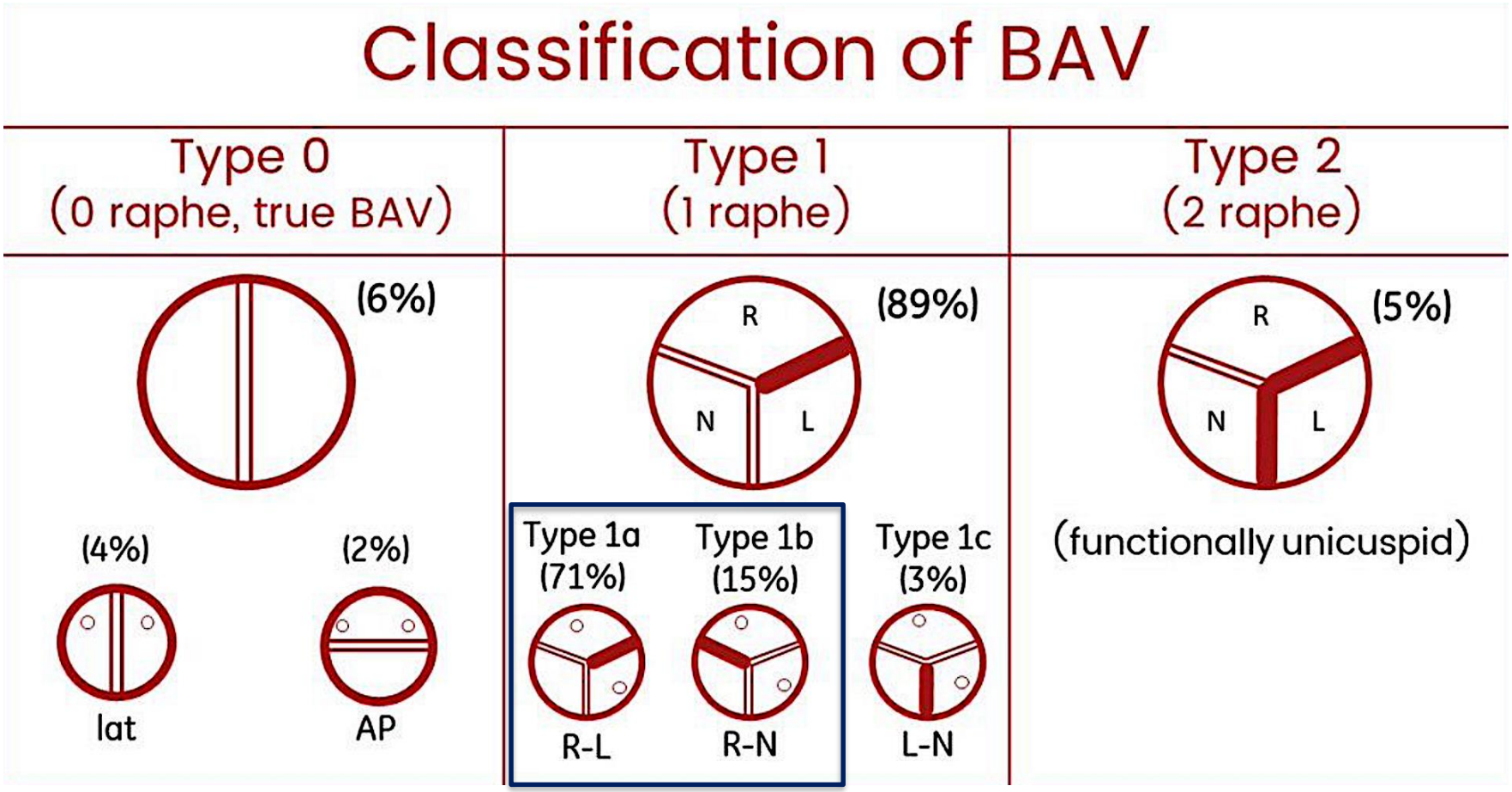
TAVI – bicuspid AS - Copenhagen



<5% bicuspid

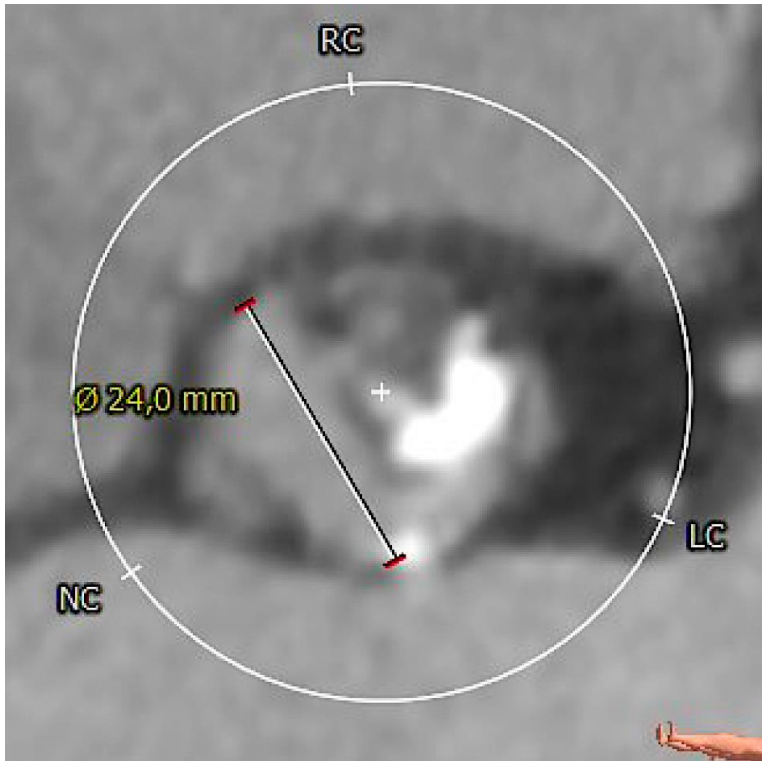
5-10% bicuspid

20-25% bicuspid



Adapted from Sievers HH et al. J Thorac Cardiovasc Surg 2007:133;1226-1233.

Challenging bicuspid AS for TAVI



Bicuspid type 1 R-L fusion
with <u>asymmetric</u> leaflet calcification

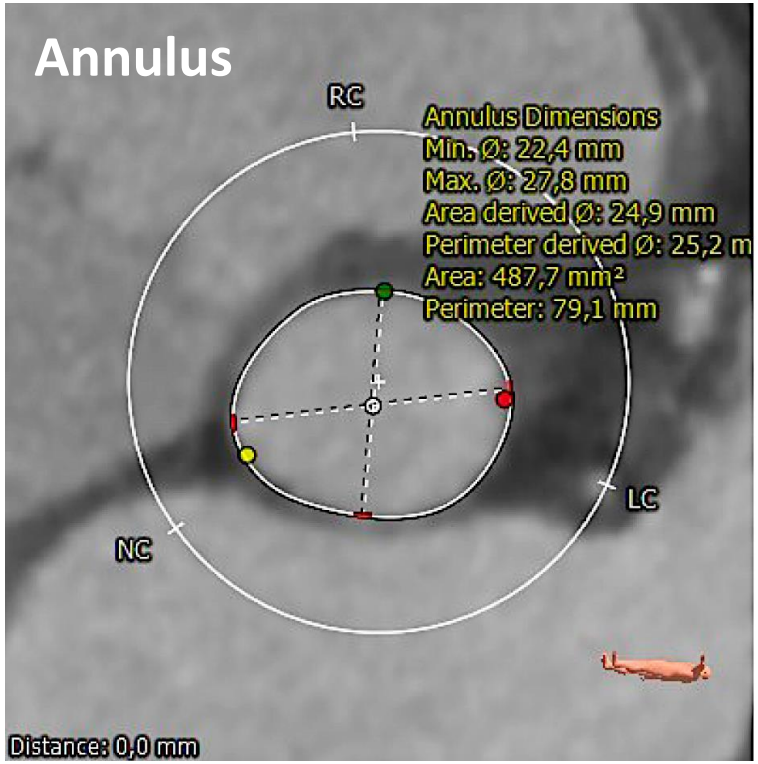
Type 1 R-L fusion with asymmetric leaflet calcification

73-year old male

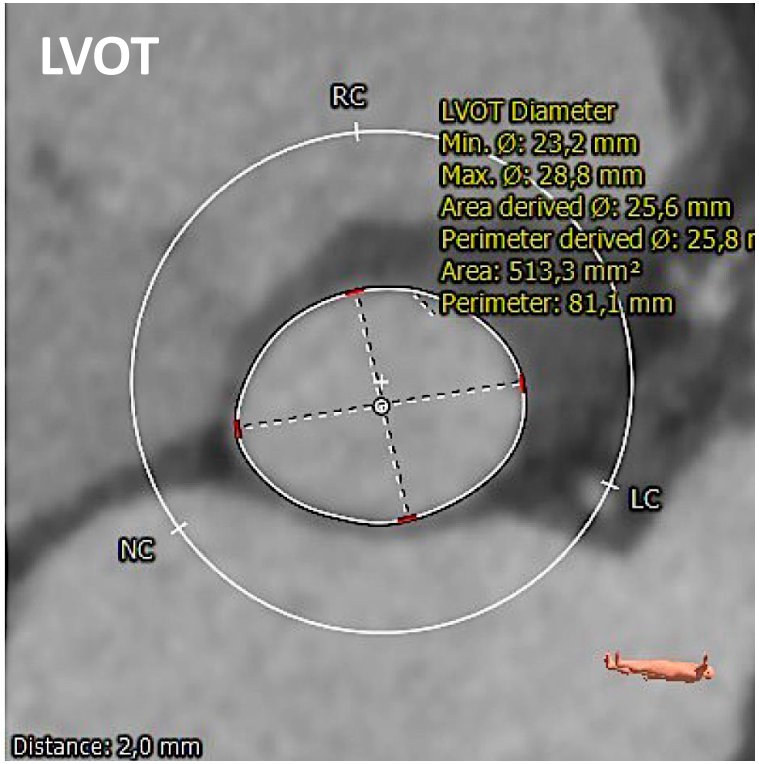
- Diabetes mellitus type 1
- 2002: CABG
- Atrial fibrillation
- TTE: LVEF 25%, peak/mean 45/26 mmHg
  - dobutamine-stress echo: 108/60 mmHg
- CAG: well-revascularized
- ECG: sinus rhythm, PR 174 ms, QRS 128 ms (LAH)

Presenting with severe AS, dyspnea NYHA 2b

Type 1 R-L fusion with asymmetric leaflet calcification

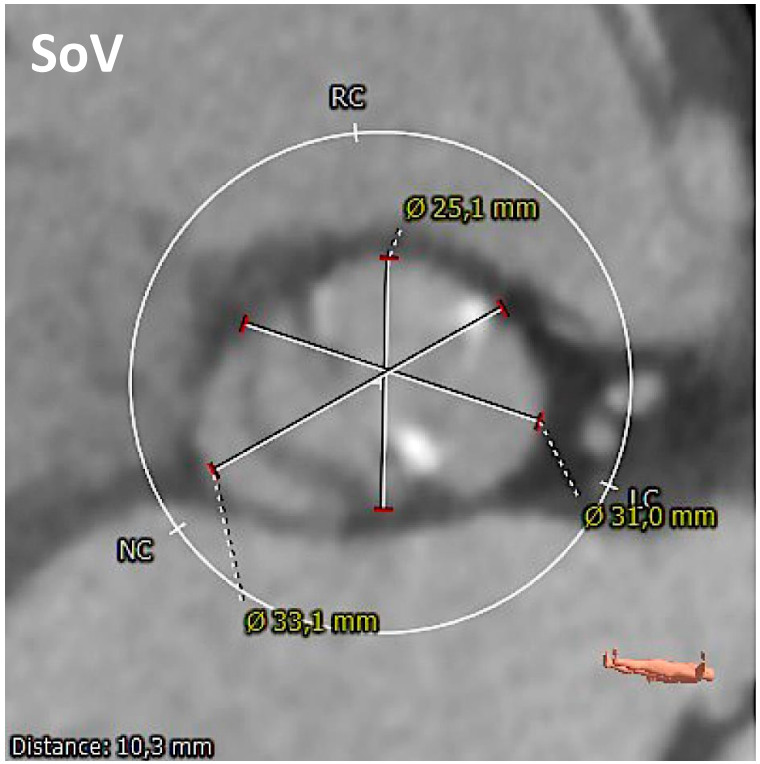


Perimeter: 79.1 mm



Perimeter: 81.1 mm

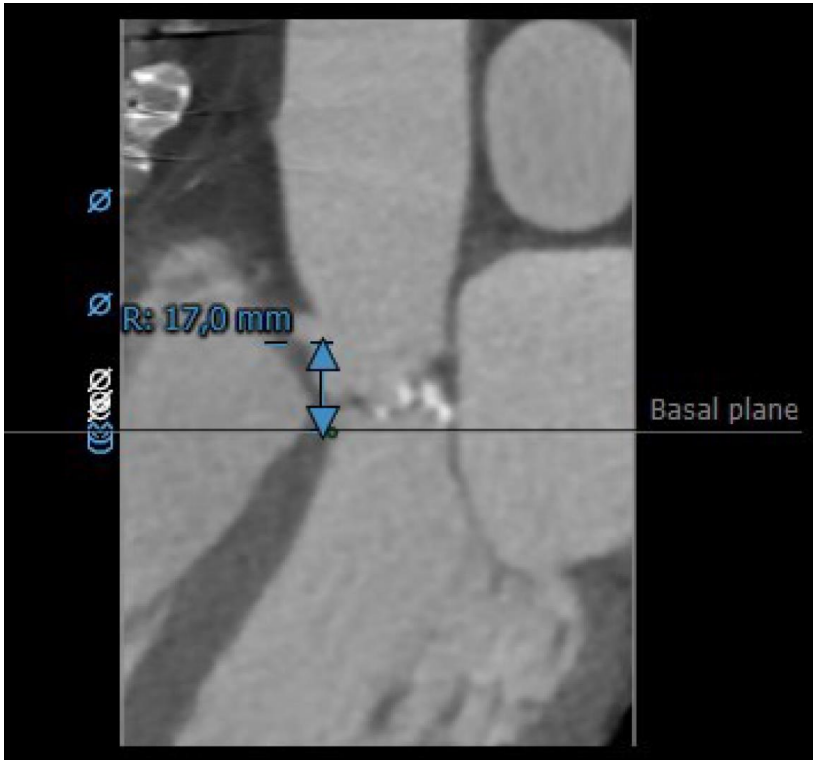
Type 1 R-L fusion with asymmetric leaflet calcification



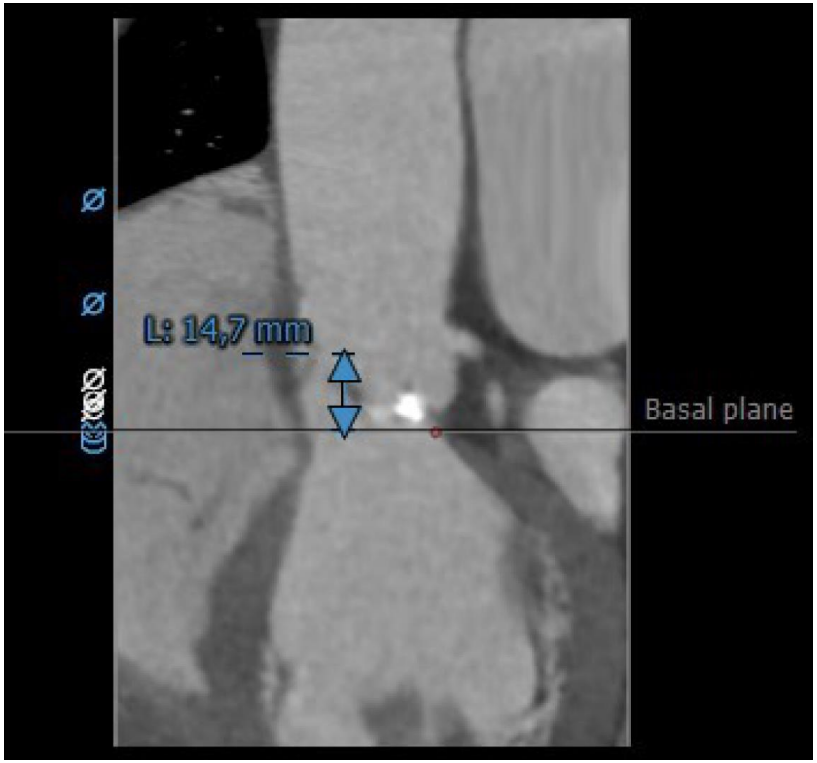
25 x 31 x 33 mm

28 x 28 mm

Type 1 R-L fusion with asymmetric leaflet calcification

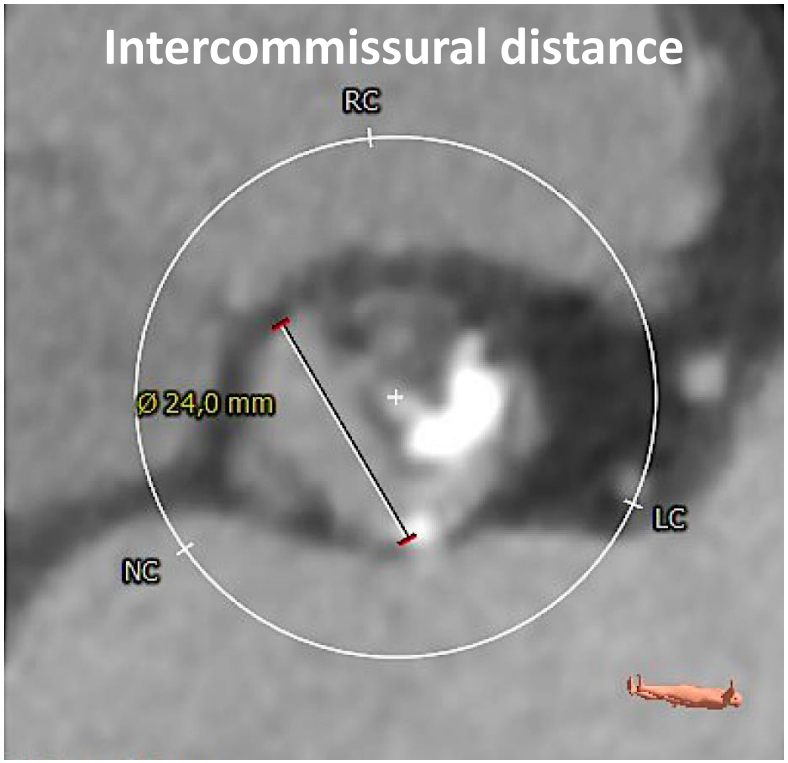


RCA height: 17.0 mm

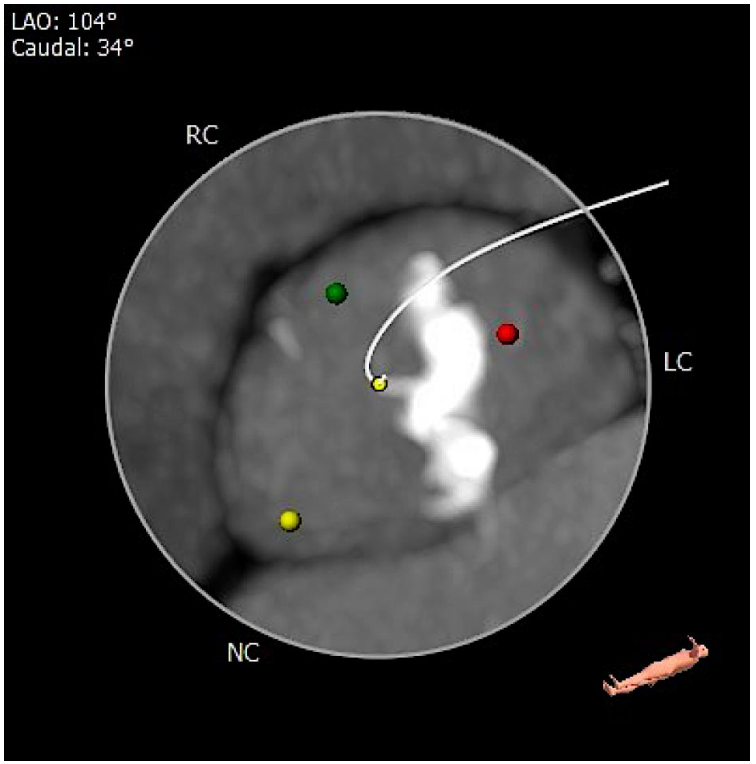


LCA height: 14.7 mm

Type 1 R-L fusion with asymmetric leaflet calcification



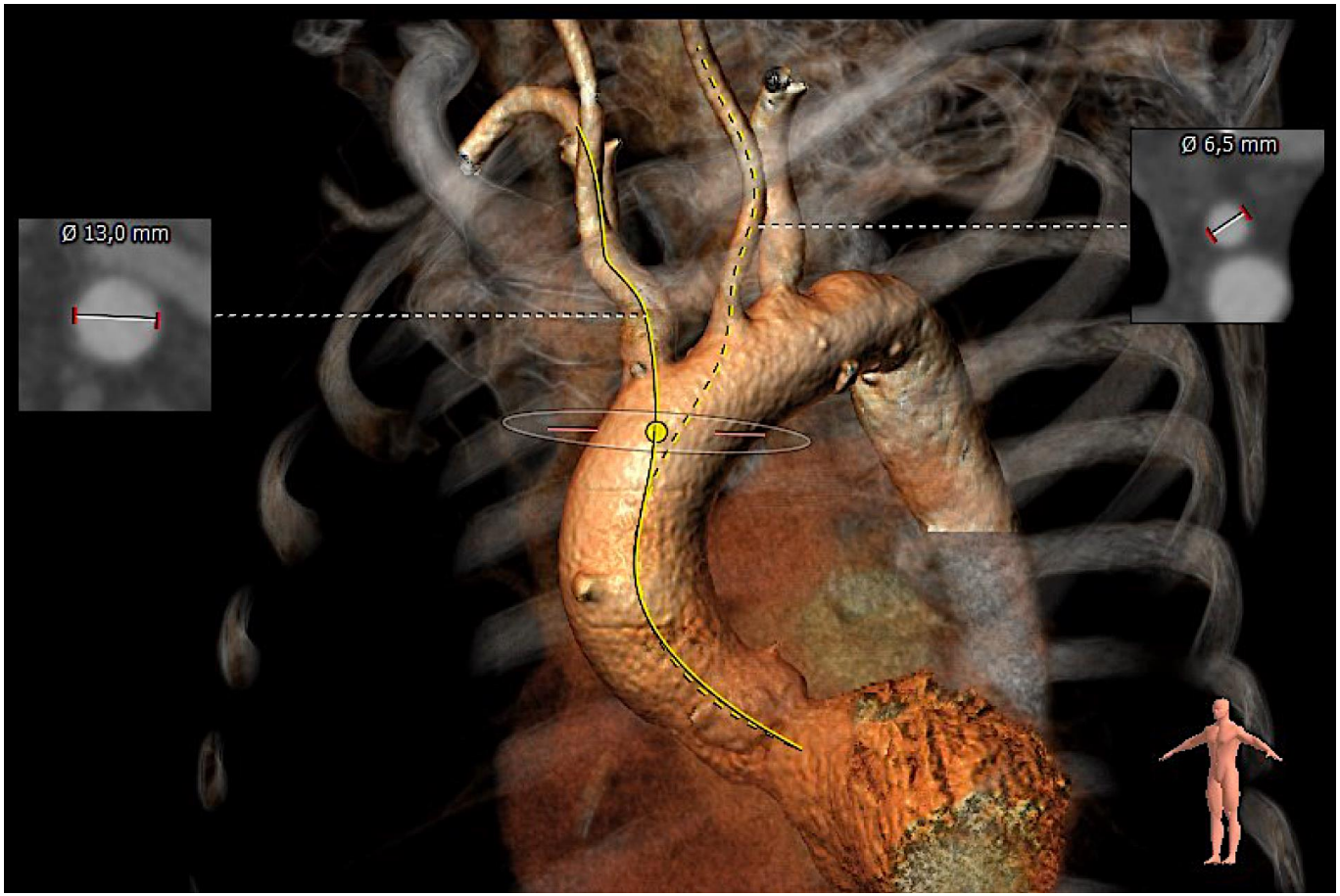
ICD (+4 mm): 24.0 mm



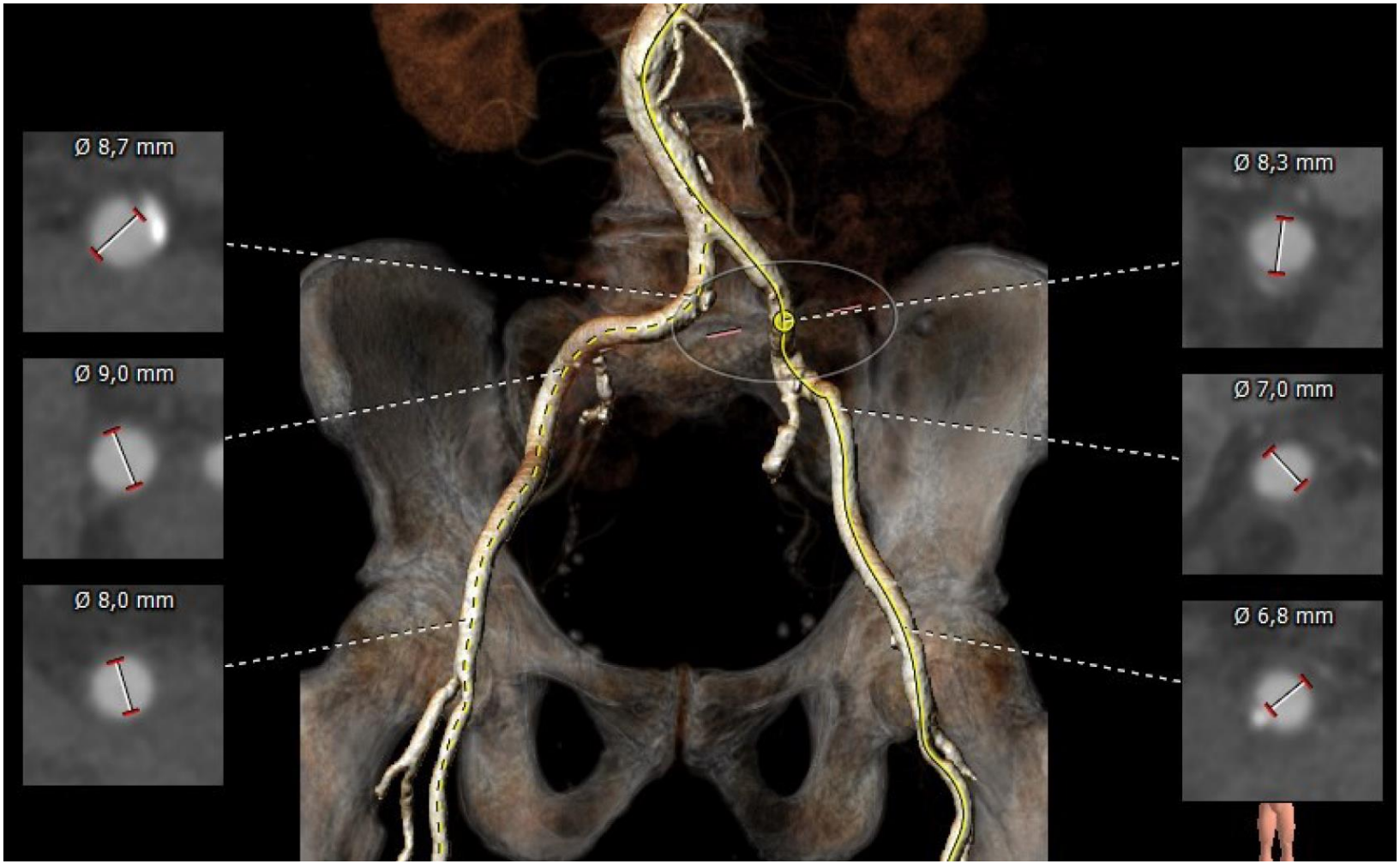
Asymmetric calcification

CT scrolling technique

Type 1 R-L fusion with asymmetric leaflet calcification



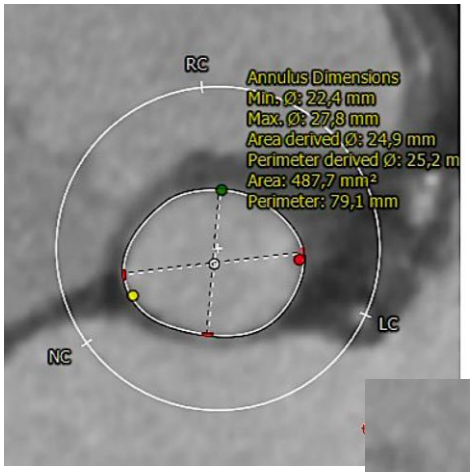
Type 1 R-L fusion with asymmetric leaflet calcification

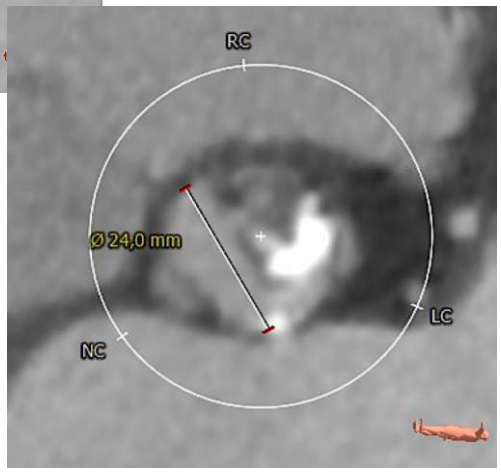


CASE SUMMARY

73-year old male

- Diabetes mellitus type 1
- Prior CABG
- Atrial fibrillation
- LVEF 25%, severe AS

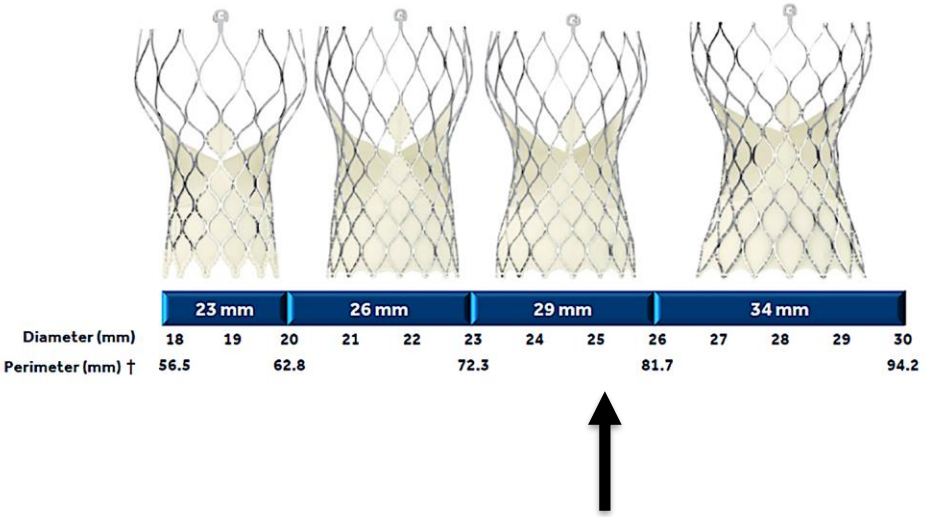




- Bicuspid type 1 R-L fusion
- Severely calcified raphe
- Asymmetric leaflet calcification

TAVI in bicuspid AS – THV sizing dilemma

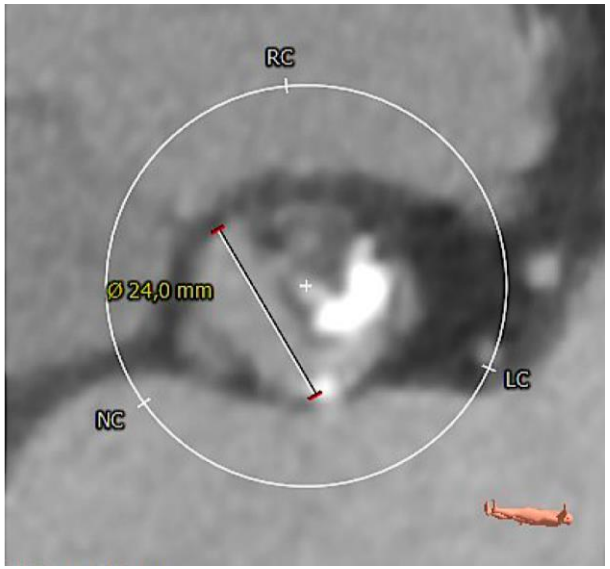
Annulus-based sizing



Evolut PRO+
29 mm

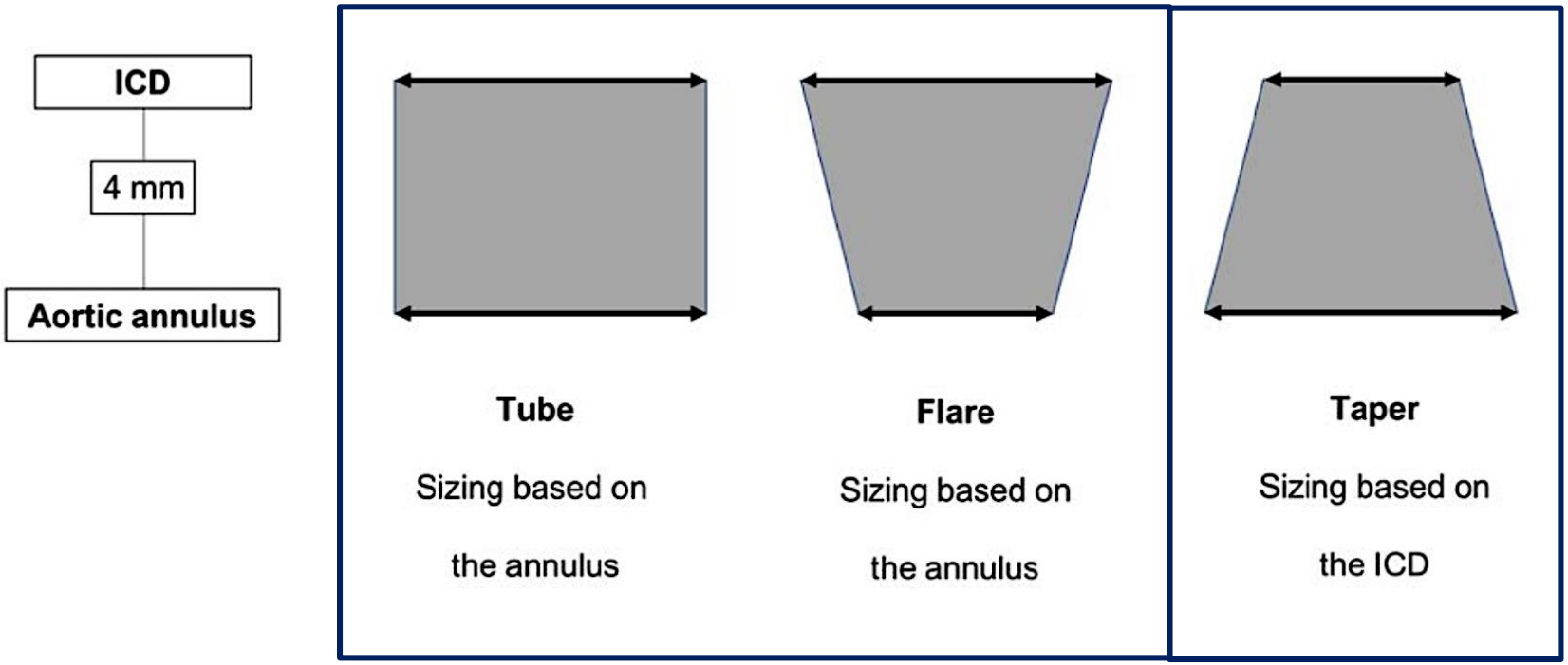
VS.

ICD-based sizing



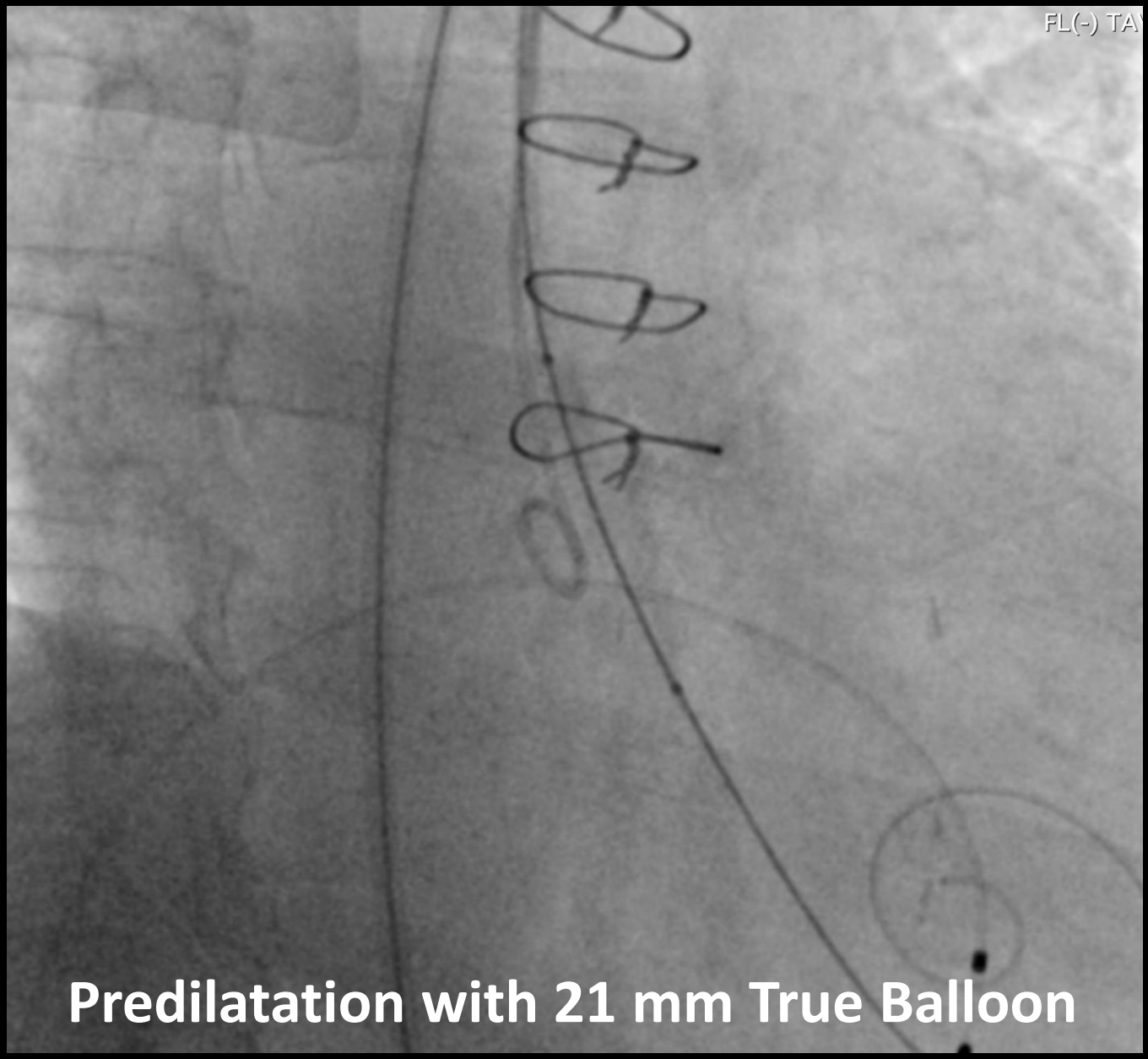
Evolut PRO+
26 mm

BAVARD sizing strategy – landing zone configuration

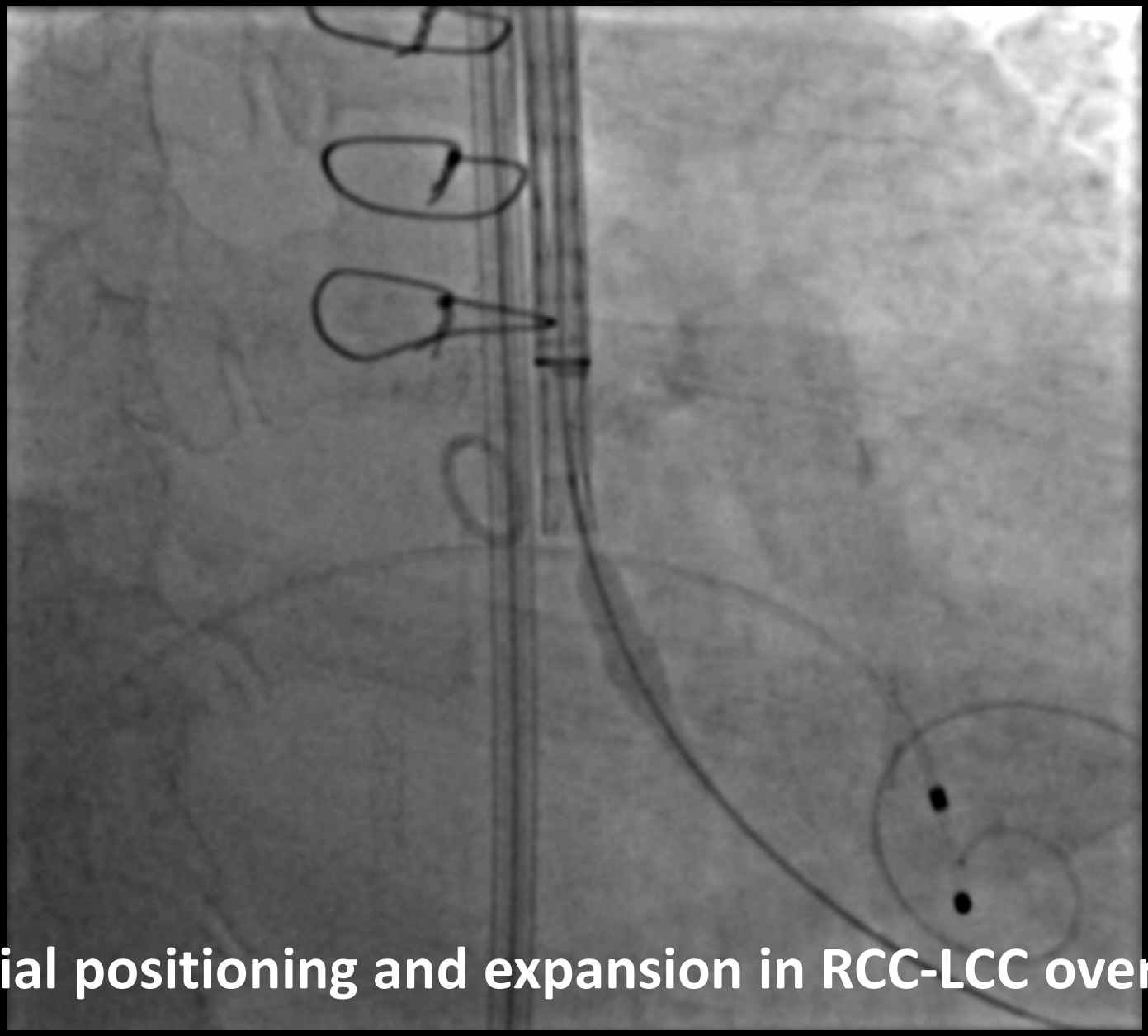


Annular sizing in 88% of patients

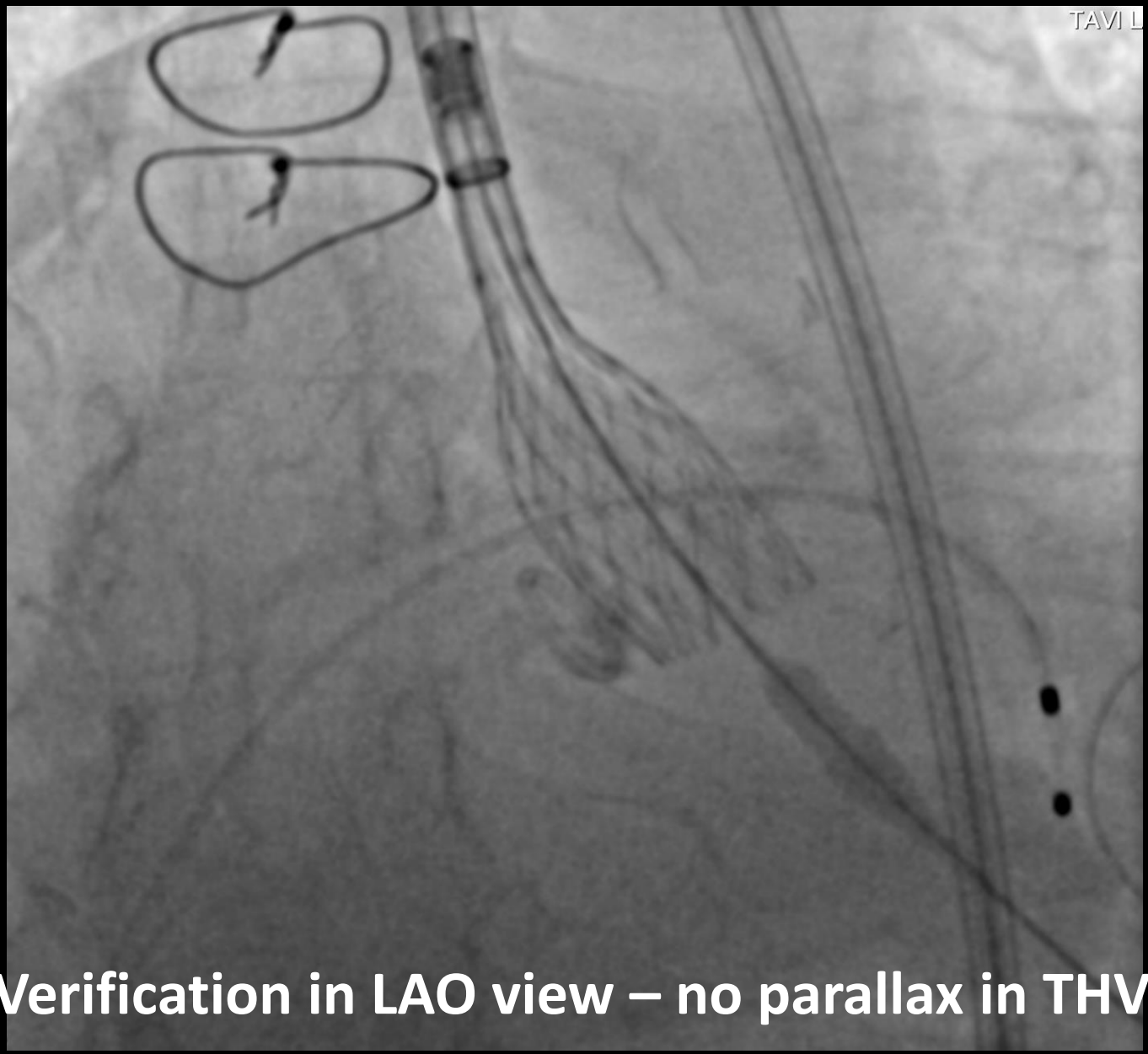
Tchetche et al. CCI 2019.



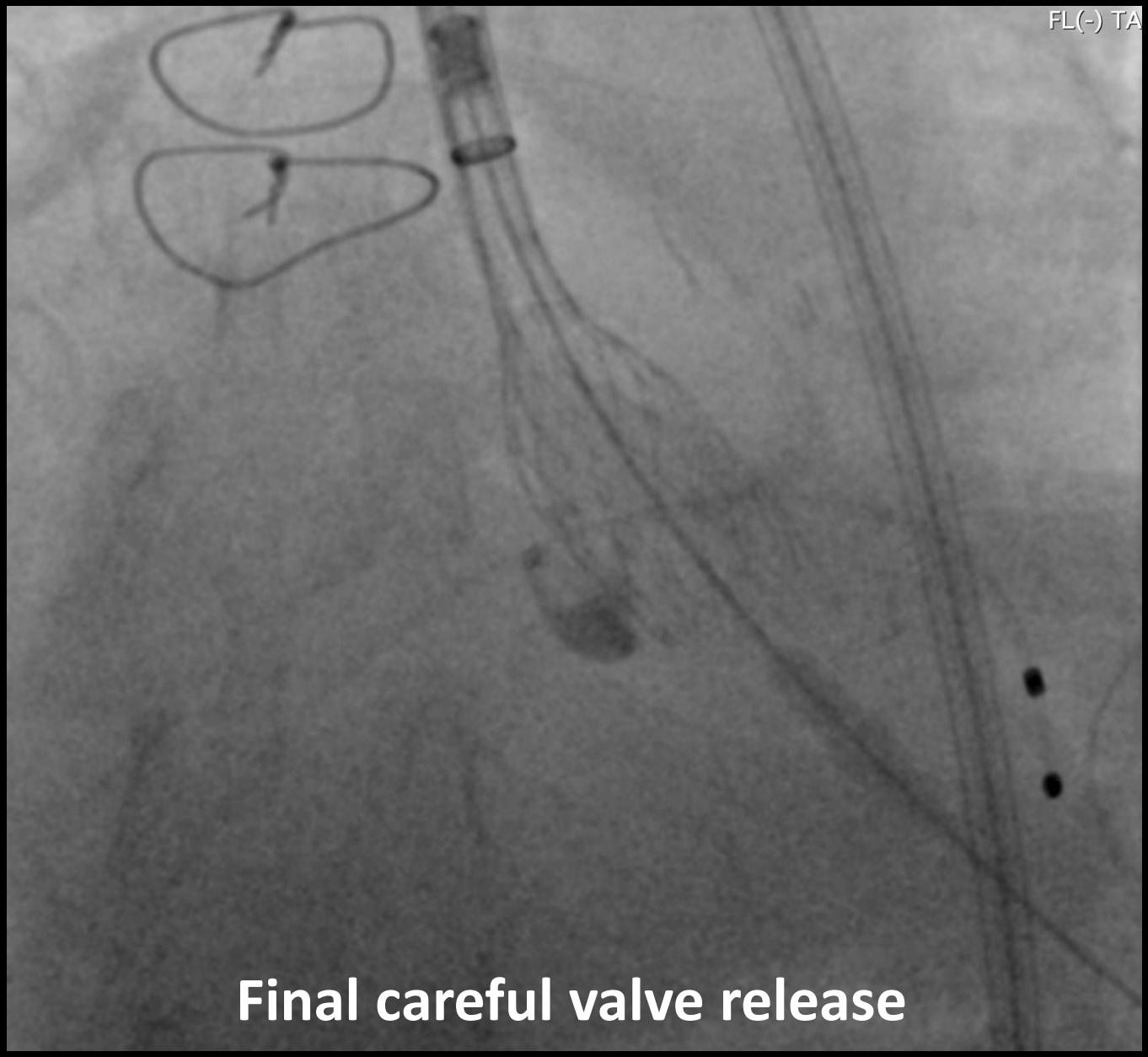
Predilatation with 21 mm True Balloon



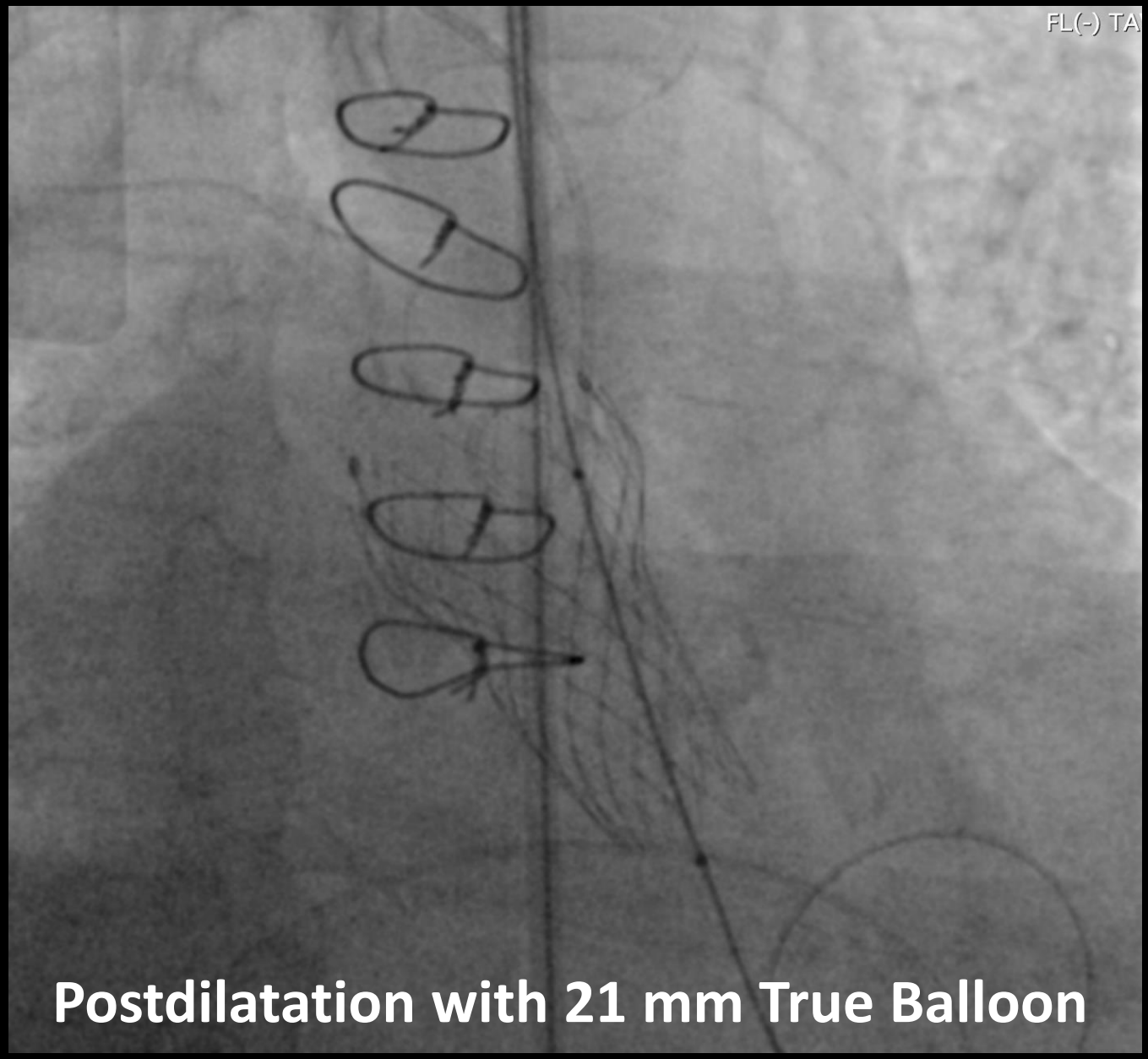
Initial positioning and expansion in RCC-LCC overlap



Verification in LAO view – no parallax in THV



Final careful valve release



Postdilatation with 21 mm True Balloon

Excellent procedural outcome

BAV-Evolut - clinical outcome

Excellent procedural and clincal outcome

- ✓ No procedural complications
- ✓ TTE +1 day: - mean gradient 7 mmHg
  - trace PVL
  - LVEF 30%
- ✓ ECG: AF (70 bpm), QRS 108 ms

Next-day discharge homewards in good clinical condition

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Transcatheter Aortic Valve Implantation in a patient with small anatomy

Dan Blackman

Consultant Interventional Cardiologist, Leeds Teaching Hospitals

Professor of Interventional Cardiology, University of Leeds, UK

Potential conflicts of interest

Speaker's name: Dan Blackman

I have the following potential conflicts of interest to report:

Medtronic: Consultant, Proctor, Speaker
Boston Scientific: Consultant, Proctor, Speaker
Edwards Lifesciences: Consultant, Speaker

Case Presentation

89 year old male

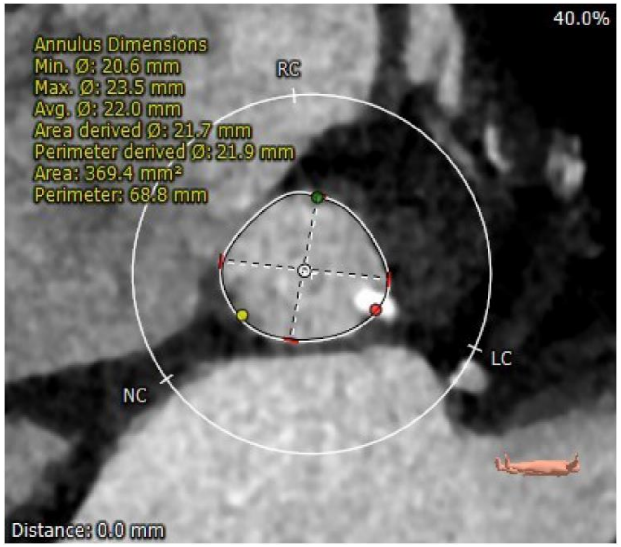
Hypertension
Permanent atrial fibrillation
Chronic kidney disease (eGFR 20)

Height 1.60m, weight 71 kg, BSA 1.8 m^2

Peak velocity 4.4 m/s, mean gradient 46mmHg, AVA 0.42 cm^2
LV systolic function normal

NYHA 3 breathlessness; No chest pain/presyncope/syncope

CT 3mensio analysis

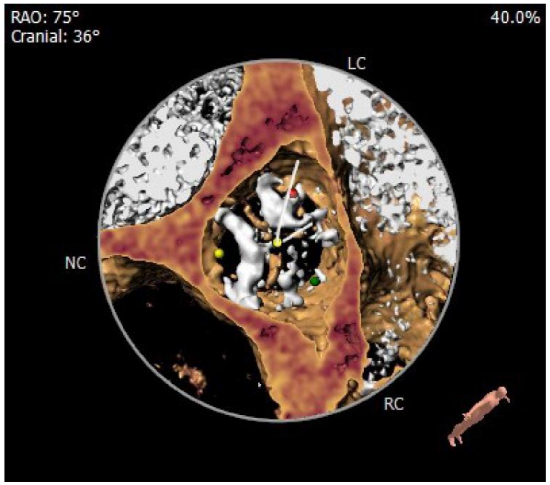


Annulus
Perimeter 66.8mm (21.9mm)
Area 369mm^2(21.7mm)

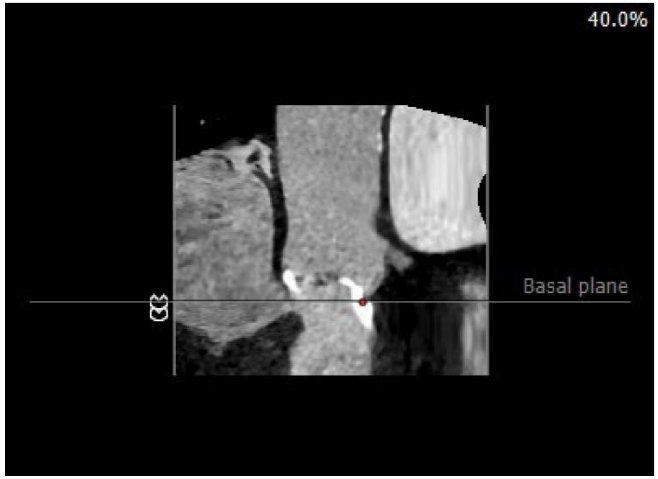
LVOT
Perimeter 69.5mm (22.1mm)
Area 365mm^2(21.6mm)

SOV
Average diameter 32.5mm

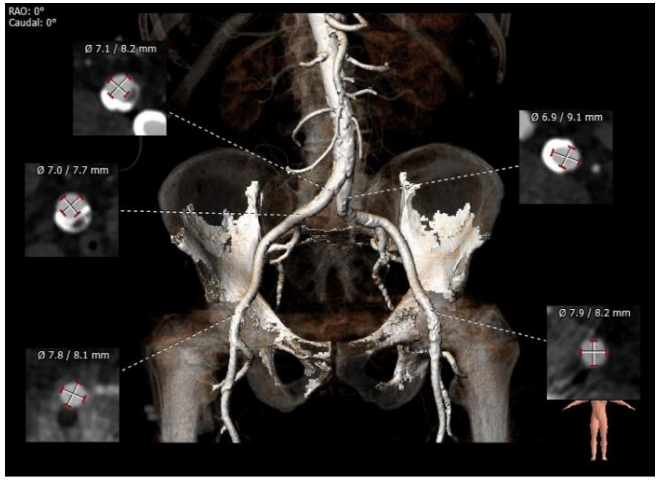
CT 3mensio analysis



Severe cusp calcification



Severe LVOT calcification to 10mm



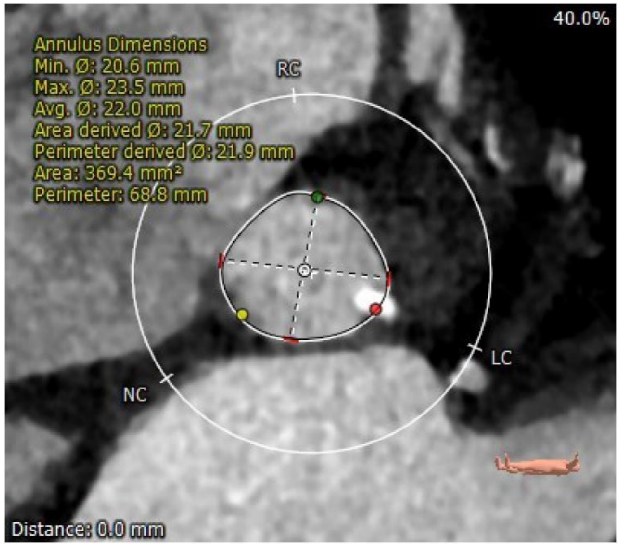
Good access vessels

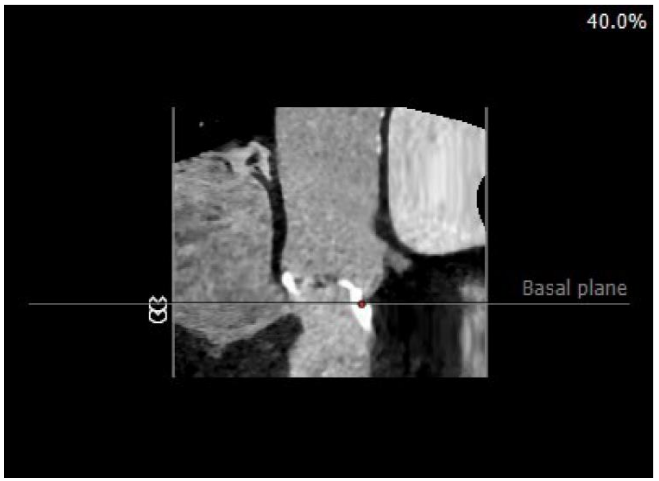
Summary

89 year old male of average size (BSA 1.8m^2) with severe symptomatic AS

Small annulus with protuberant bar of LVOT calcification

Diffuse 3-vessel coronary calcification on TAVI CT. No chest pain





Procedural Strategy

Supra-annular self-expanding Evolut Pro Plus 26mm

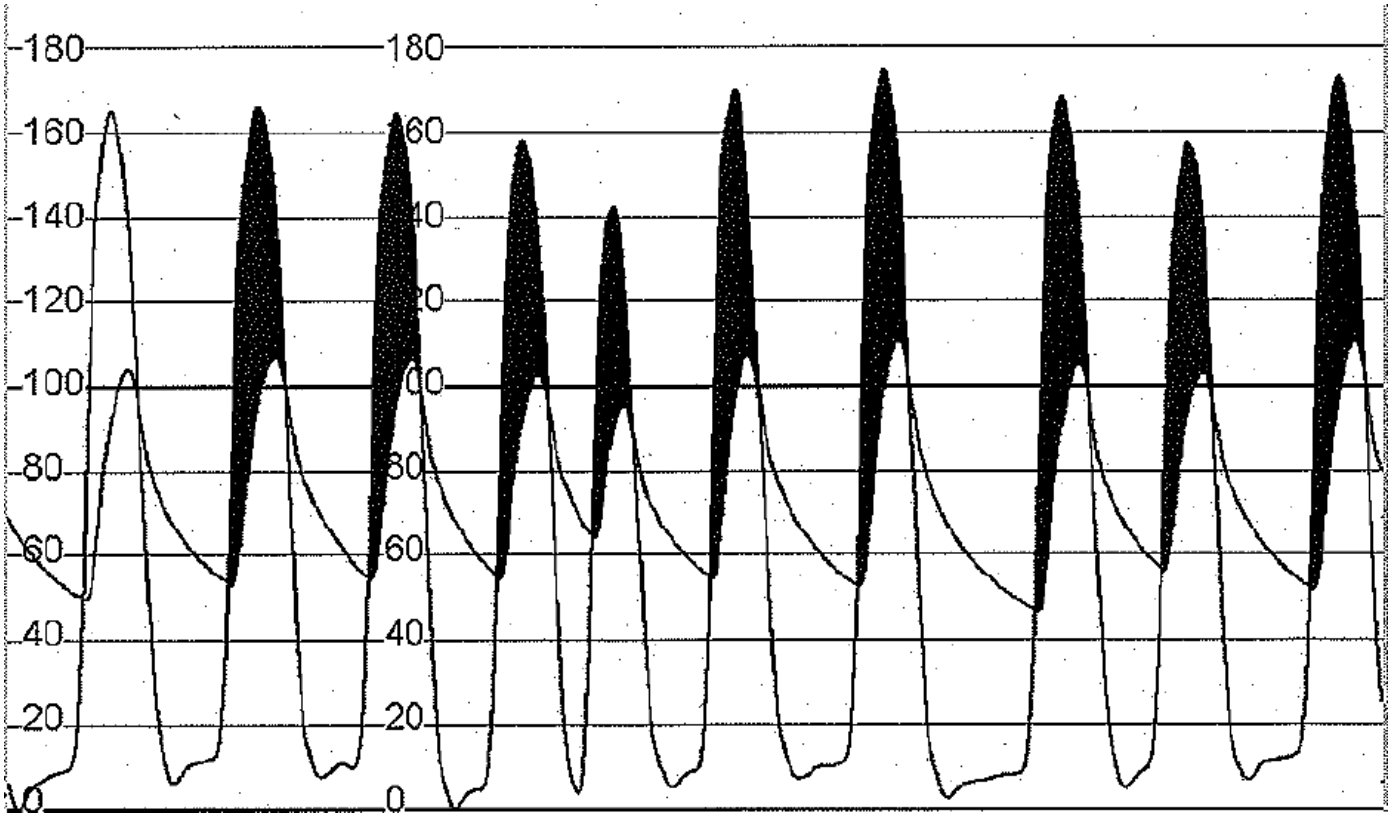
Cautious pre-dilatation
High threshold for post-dilatation

No invasive coronary angiography / revascularisation
Commissural alignment to preserve coronary access

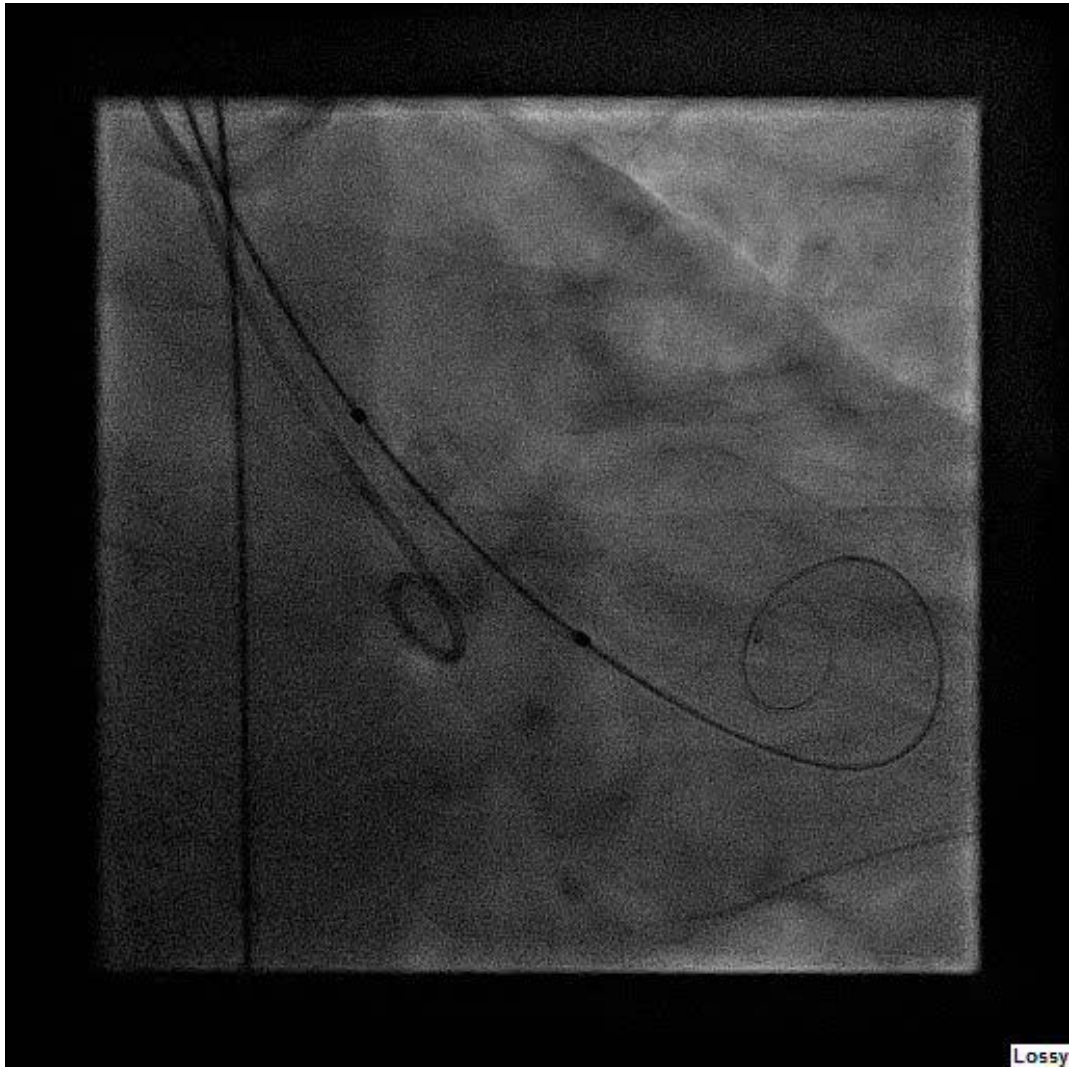
Not recruited to SMART trial due to risk of annular rupture with BEV

Recruited to BHF-PROTECT CEP Trial – randomised to control

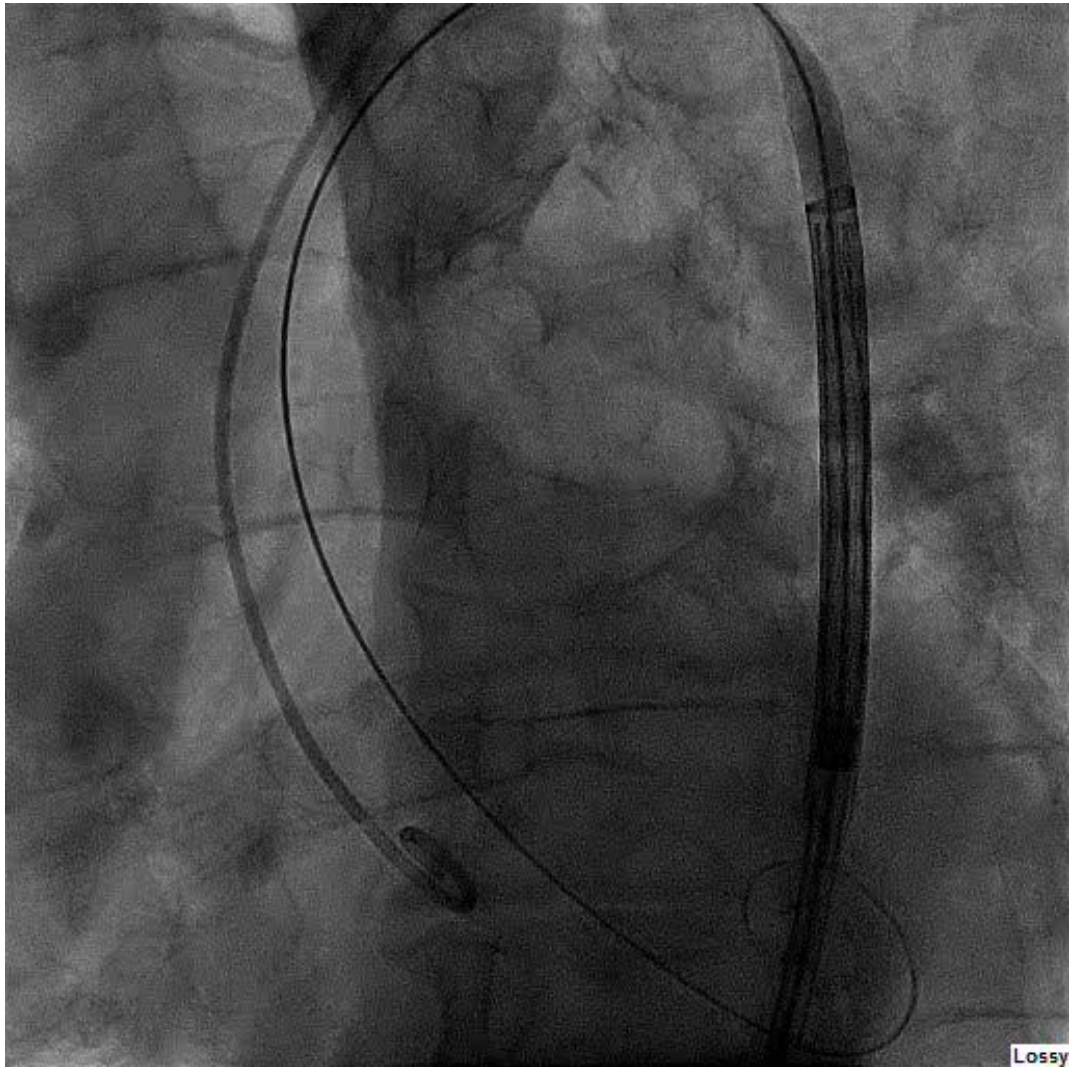
Pre-TAVI invasive haemodynamics



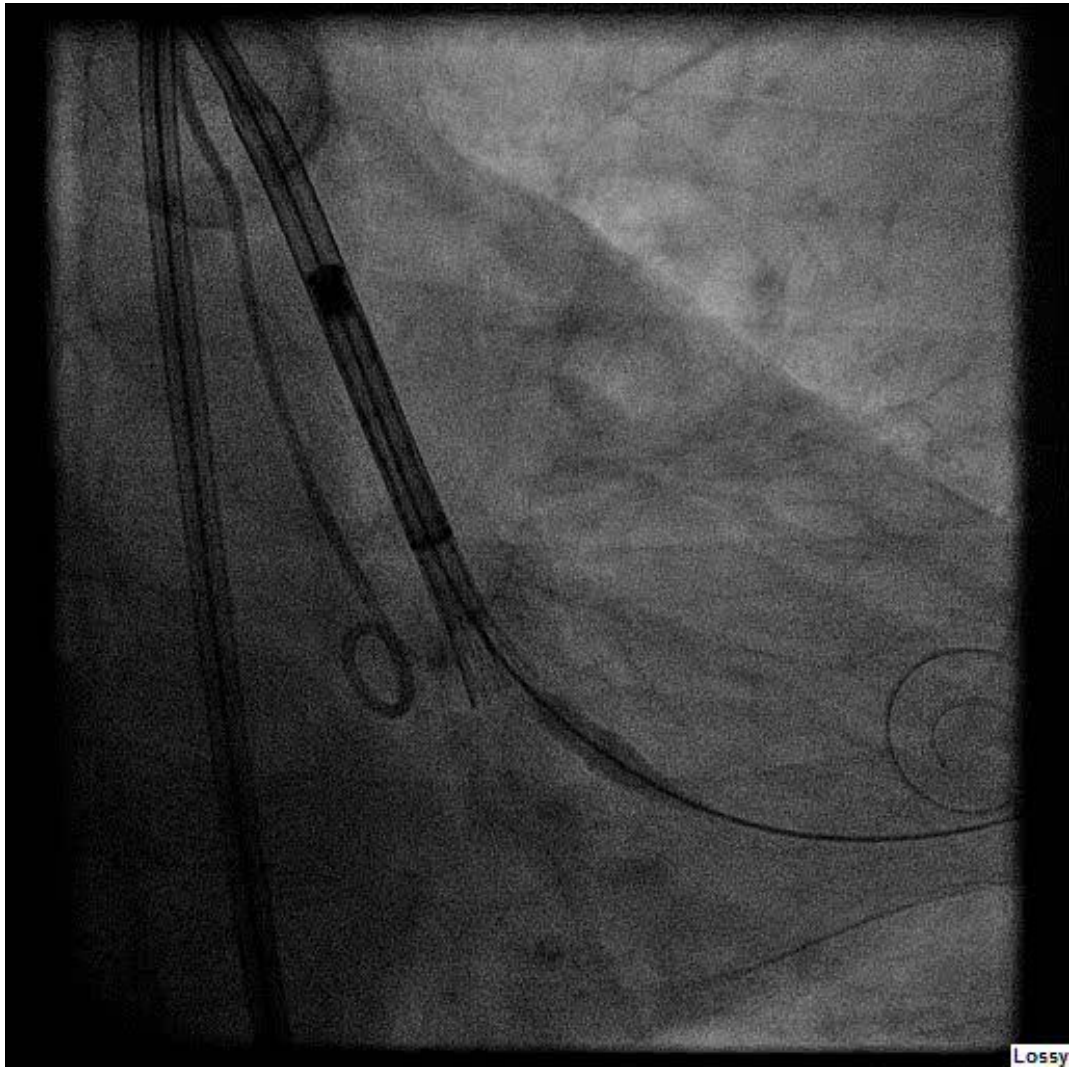
Balloon pre-dilatation with an 18mm balloon



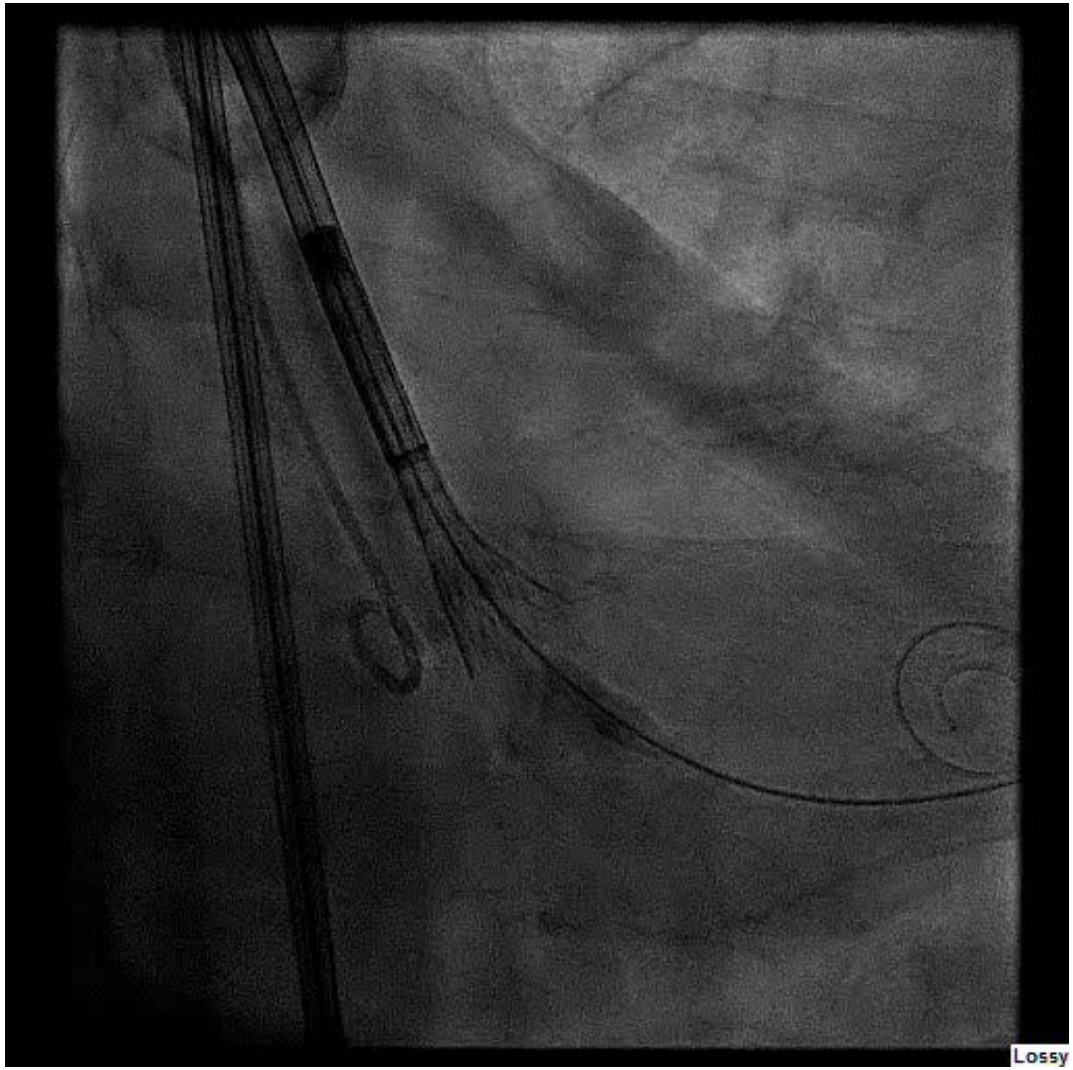
Traversing the arch with the ‘Half-hat’ marker on the outer curve in the LAO projection to optimise commissural alignment



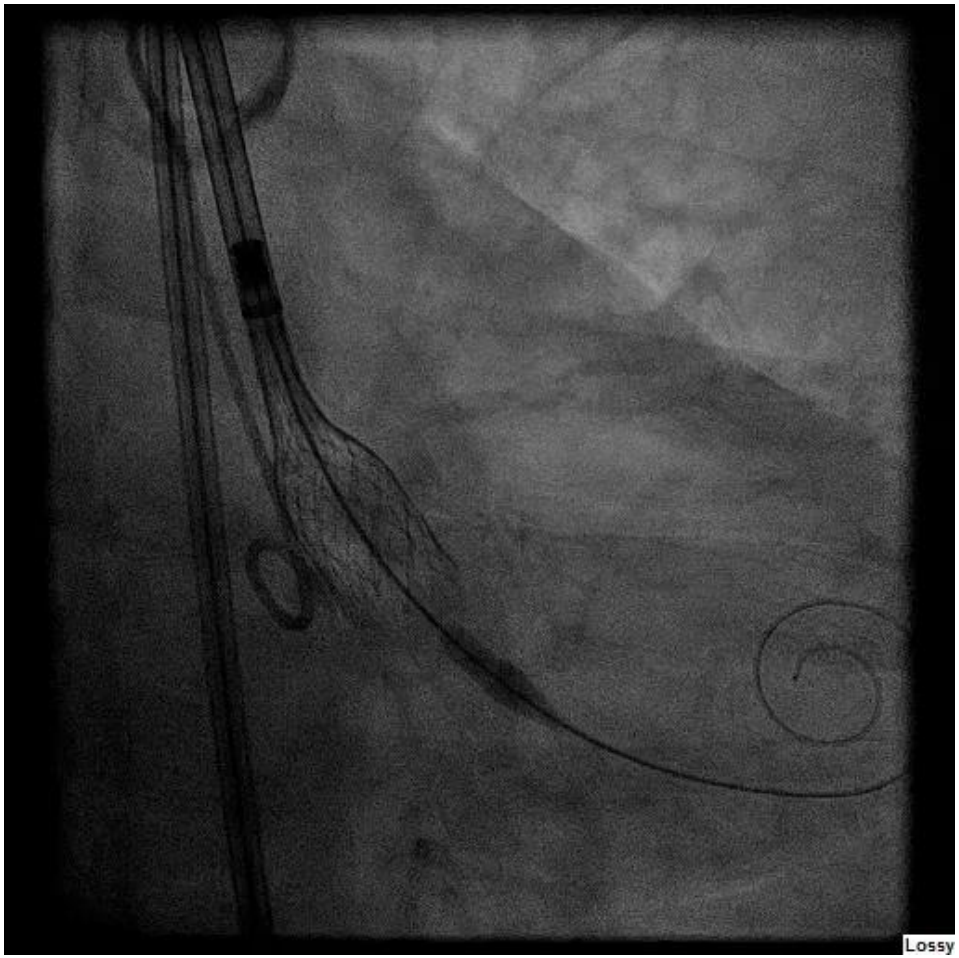
High deployment using the RAO Caudal cusp overlap projection



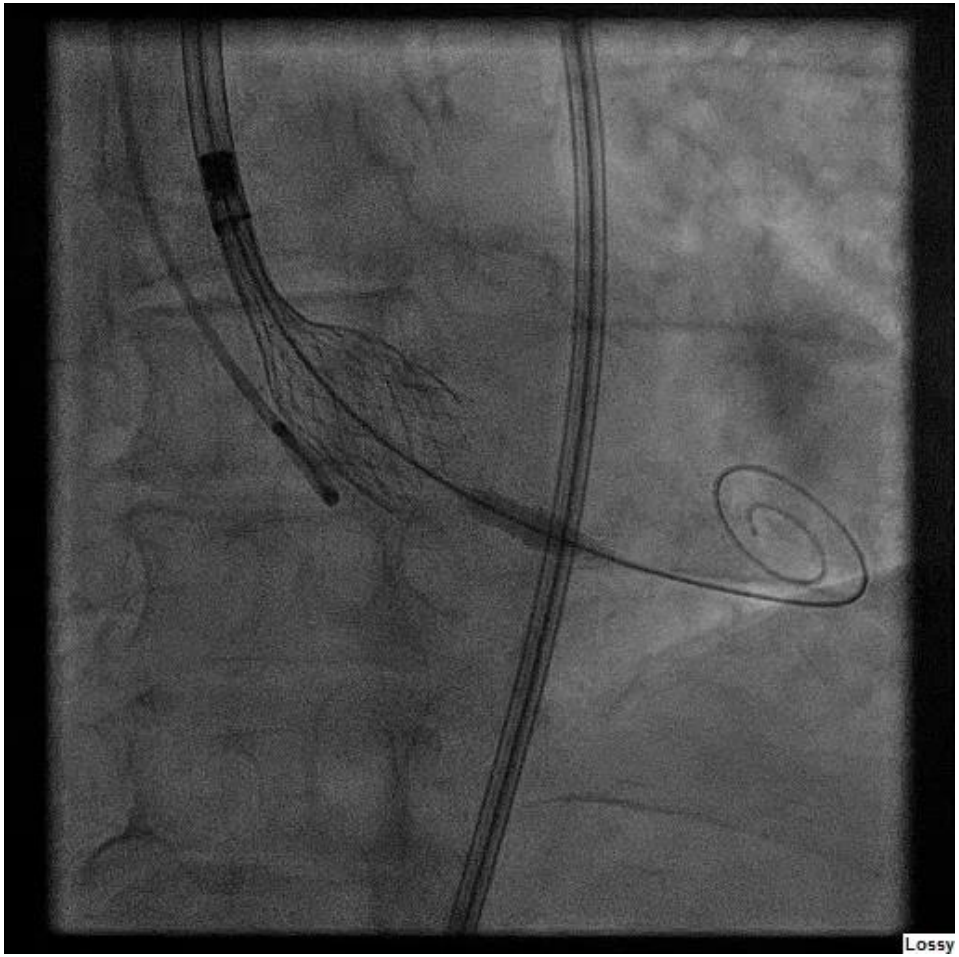
Deployment in the cusp overlap projection with rapid pacing



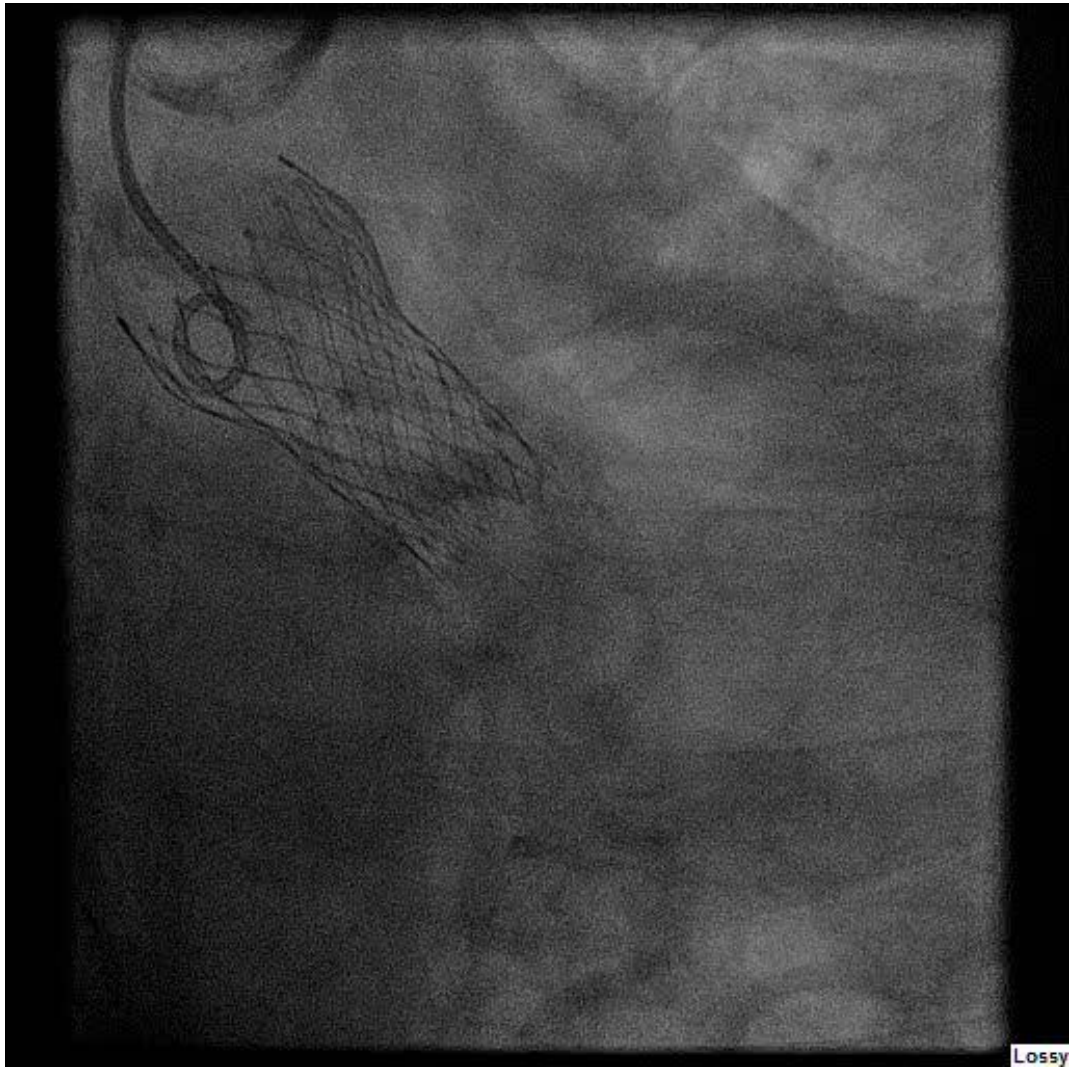
Pre-release position check versus NCC in cusp overlap projection



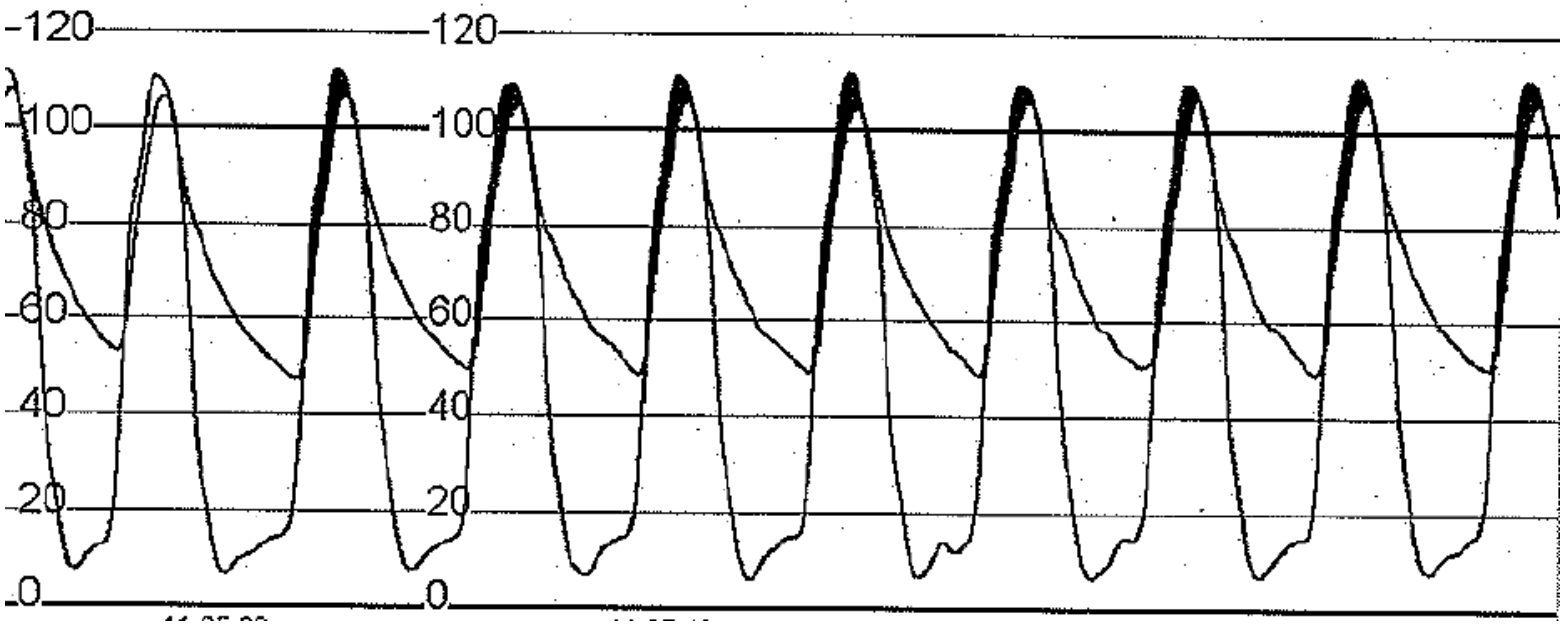
Pre-release position check versus LCC in LAO projection



Final result. High position; trivial AR; Confirmation of commissural alignment by ‘C-tab’ positioned on inner curve in cusp overlap projection.



Final invasive haemodynamics



Outcome

Uncomplicated recovery

New borderline LBBB (QRS 122ms)

Discharged post-TAVI day 2

Pre-discharge echocardiogram

- Trivial AR
- Peak velocity 1.5 m/s; Mean gradient 5,
- AVA 2.3cm^2
- Indexed AVA 1.3cm^2/m^2 - no PPM

Asymptomatic at follow-up 8 weeks

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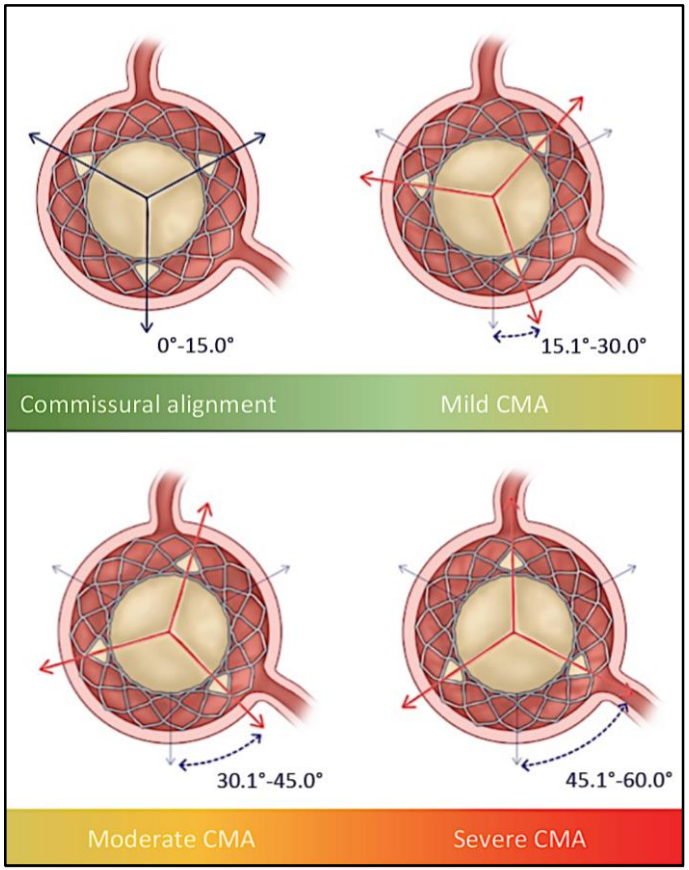
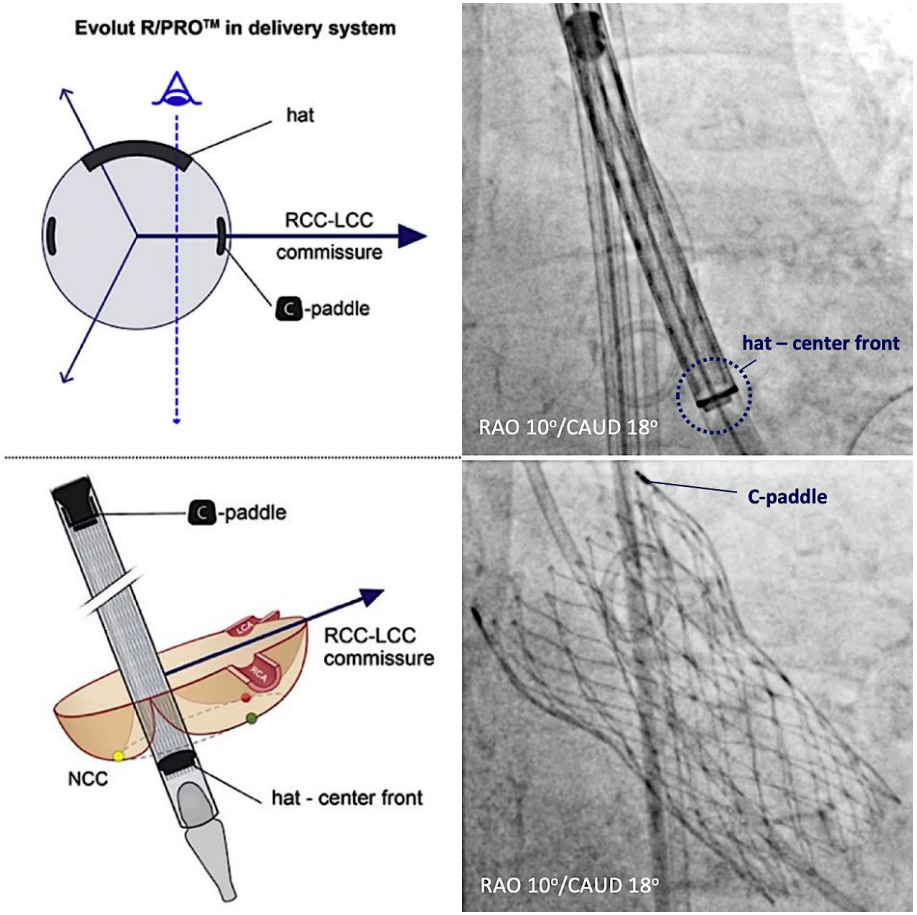
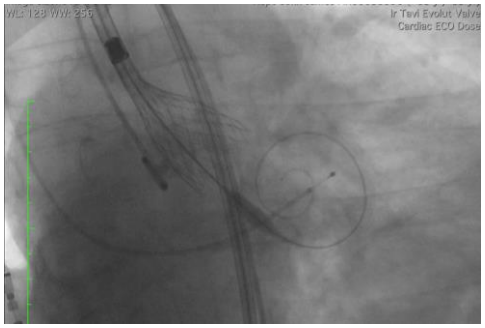
Commissural alignment with Evolut THV

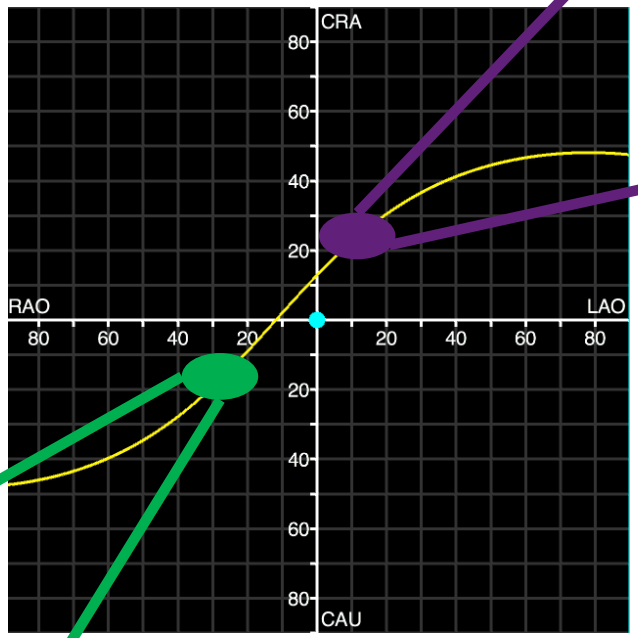


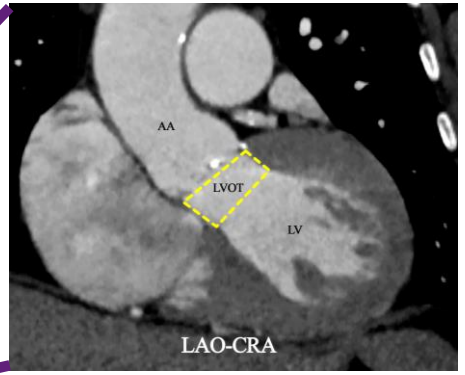


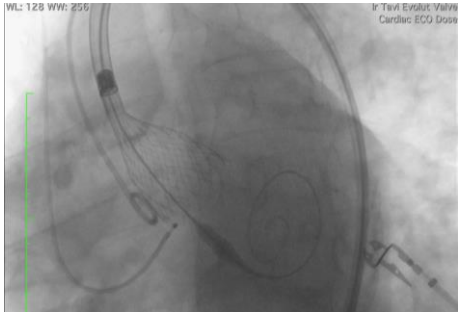
Bieliauskas, De Backer et al. JACC CVI 2021.

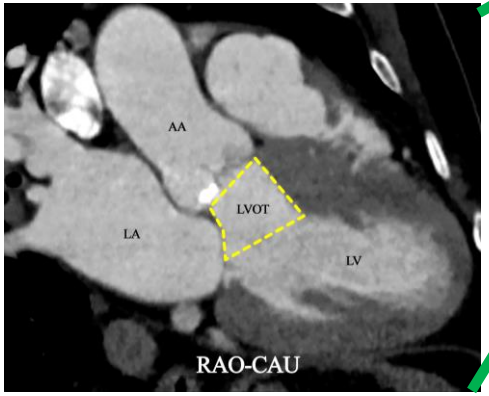
Cusp Overlap technique











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