Hostile Anatomy: case based discussion on calcification and bicuspid anatomy

Dr Karl Poon
MBBS, FRACP
Interventional cardiologist
The Prince Charles Hospital, Brisbane, Australia
Senior Lecturer, University of Queensland

Disclosure

- In the past 12 months, I and/or my spouse, have received the following:

• Relevant conflict to this presentation	Company
• Consulting fee/Proctoring fee	Edwards LifeSciences, Abbott Vascular
• Unrestricted institutional grant	Edwards LifeSciences, Abbott Vascular

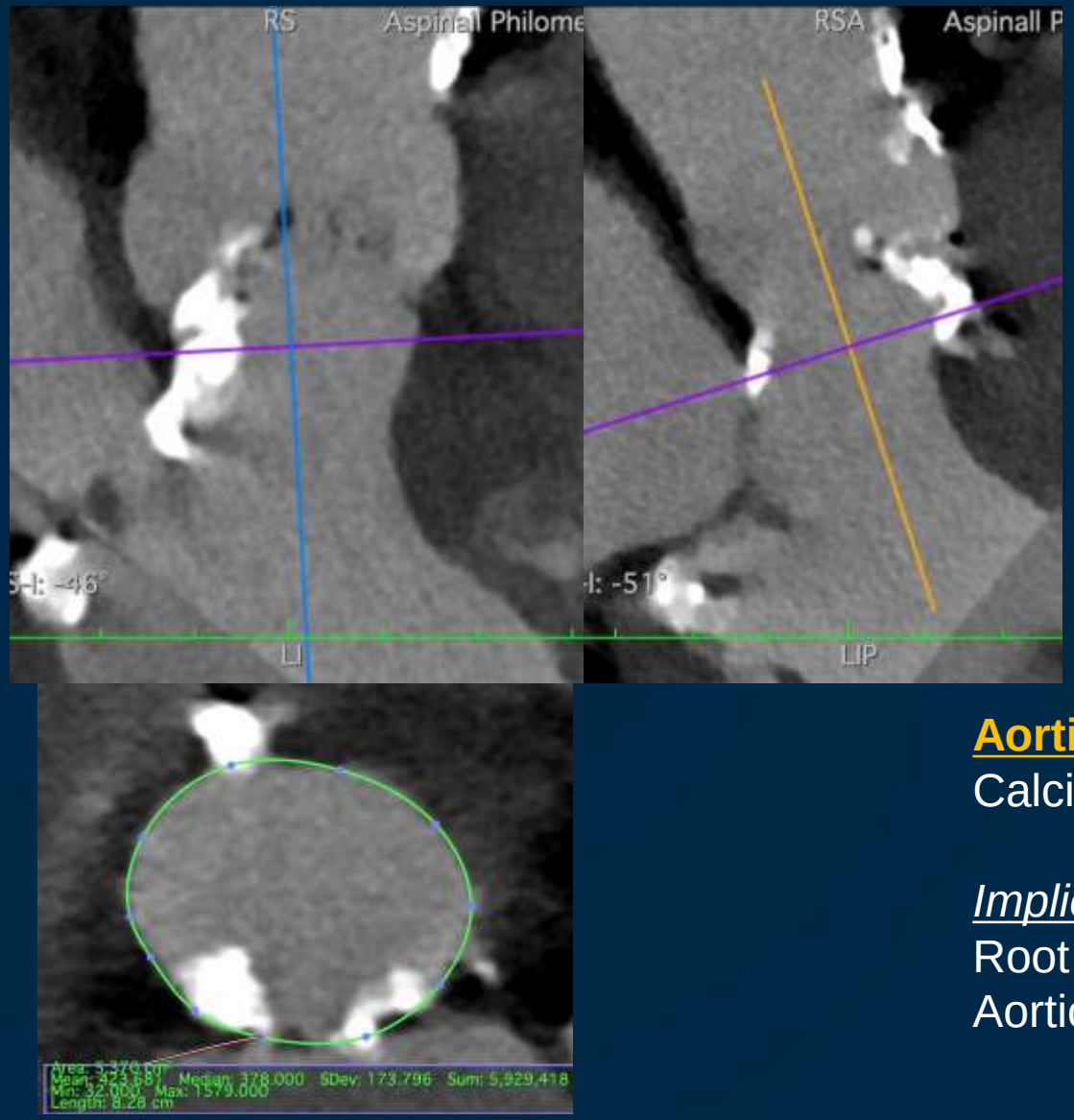
Aortic valvar complex is not just the annulus

Aortic leaflet
Calcium size
Calcium elongation of leaflet

Implication
Coronary obstruction
Sinus/root rupture
? Stroke

Annulus plane
Calcium distribution
Calcium indentation into area
Calcium longitudinal extent

Implication
PVL
Annular rupture
Pacemaker (NCC nodule)
? Stroke



Aortic root
Calcium deposit at STJ

Implication
Root rupture
Aortic hematoma

Clinical background

- 81 year old male with severe bicuspid aortic stenosis and NYHA II dyspnoea

- Background
  - Persistent atrial fibrillation
  - Hypertension
  - Hypercholesterolaemia
  - Immunosuppression on steroids – polymyalgia rheumatica

- ECG
  - Normal QRS, AFib

- TTE:
  - Vmax 5.4m/s; mean 73mmHg; AVA 0.9cm2;
  - Normal LV ejection fraction
  - No other valvular disease

Relevant investigations

- **Coronary angiography**
  - No significant coronary artery disease
  - Anomalous LCx from RCA posterior to aortic annulus
- **CTS MDT**
  - If suitable TAVI rather than SAVR
  - Age/immunosuppression
- **CT analysis**
  - Sievers Type I RCC/LCC fusion

CT analysis

Area 500mm2

Perimeter 81mm

Max diameter 28mm

Min diameter 23mm

Calcium Score: 1500

Inter-commissural distance: 30mm

Large posterior calcium at annular level adjacent to anomalous LCx

Moderate calcium at raphe

Moderate calcium at leaflets

CT TAVI

Right coronary height 16mm

Sinotubular junction 31mm

Left coronary height 15mm

CT analysis and plan

Concerns

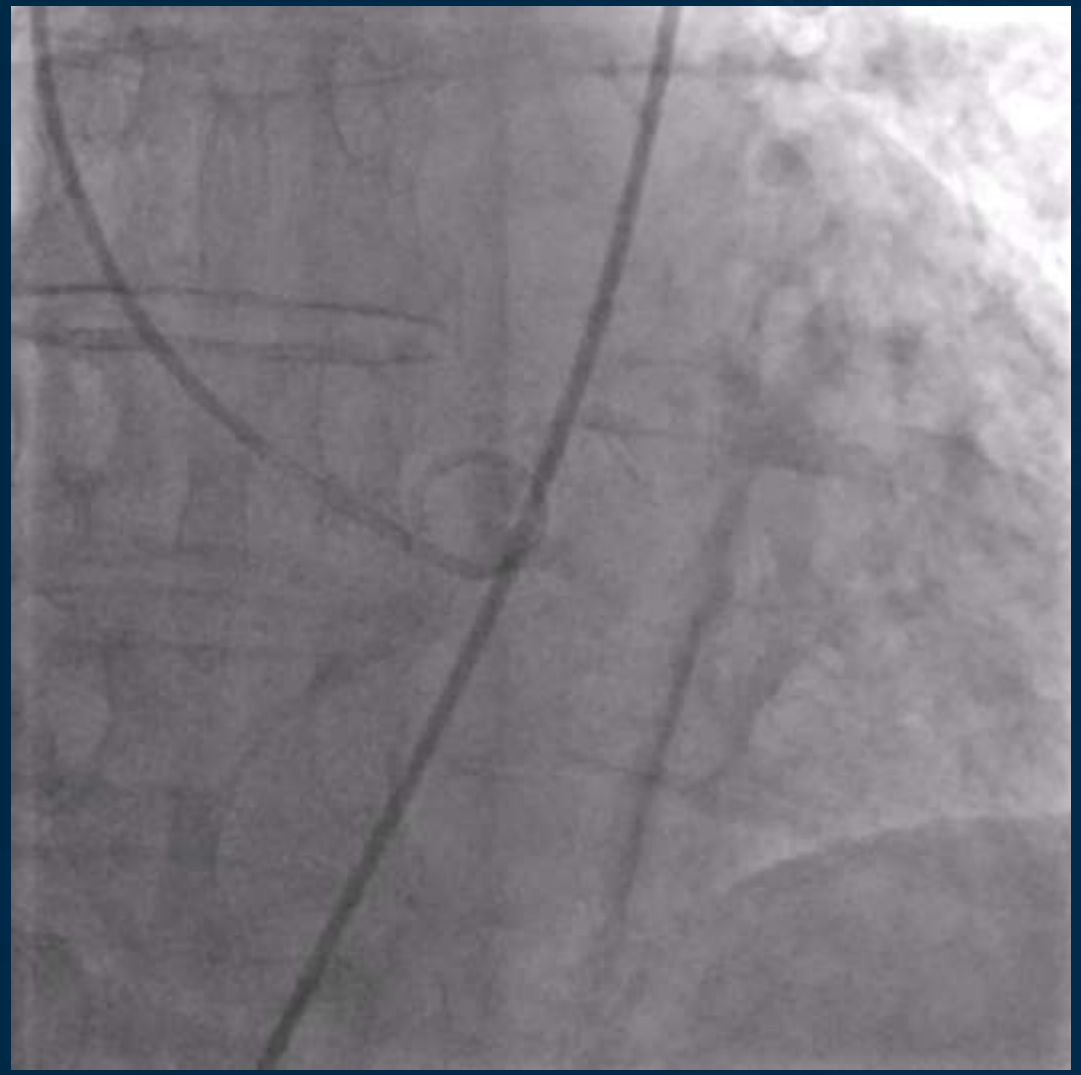
- Posterior calcium and anomalous LCx?
- Calcified raphe?
- Annular calcium intraluminal

Strategy

- R transfemoral 26mm S3ULTRA
  - Based on 500mm2 annular area; 5 to 6 % oversizing only
- High implant with 2cusp view
  - Avoid protruding calcium
- TOE guidance for post-dilatation

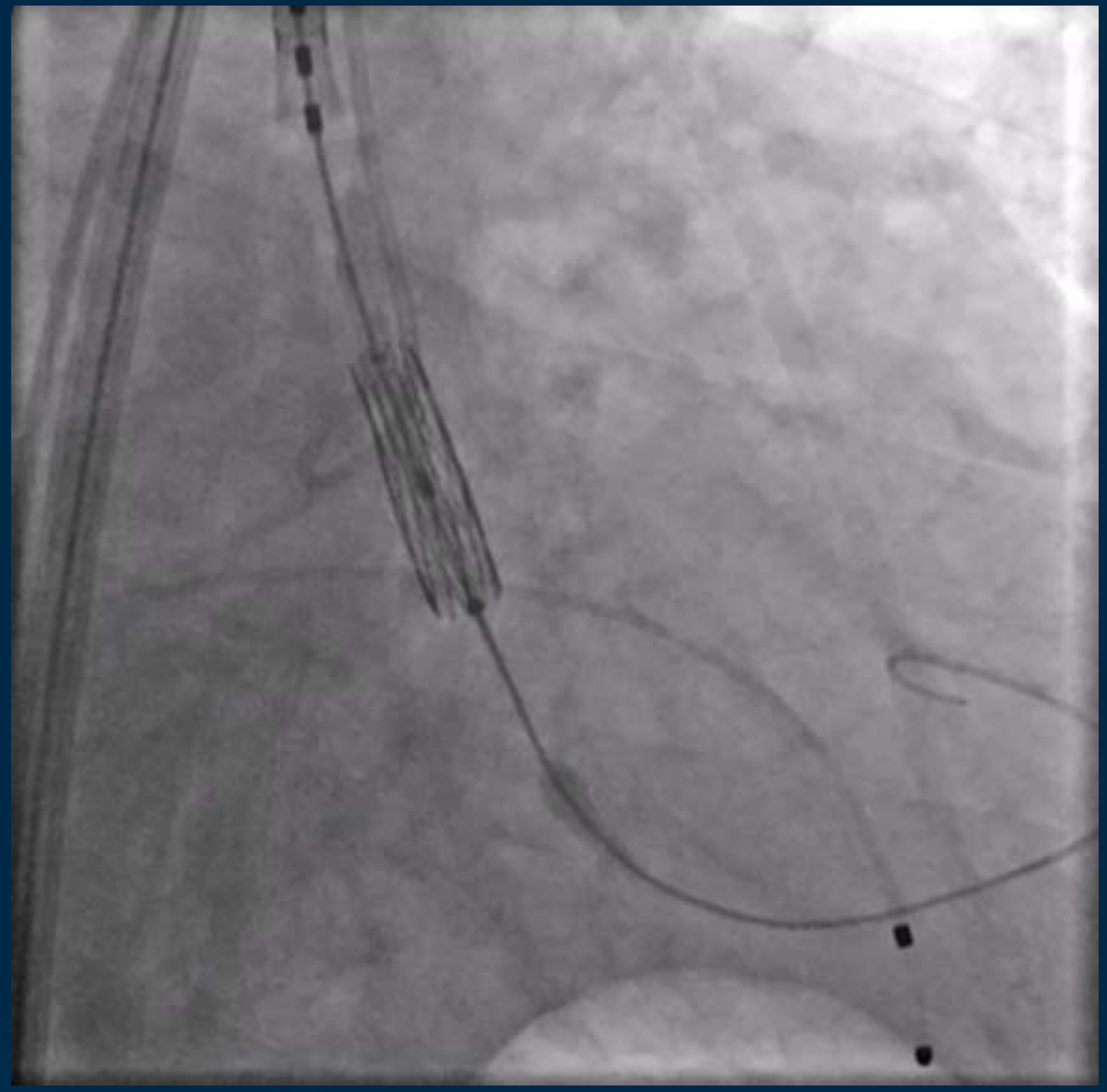
TF TAVI 26mm S3U nominal filling

Three cusp view



Anomalous LCx

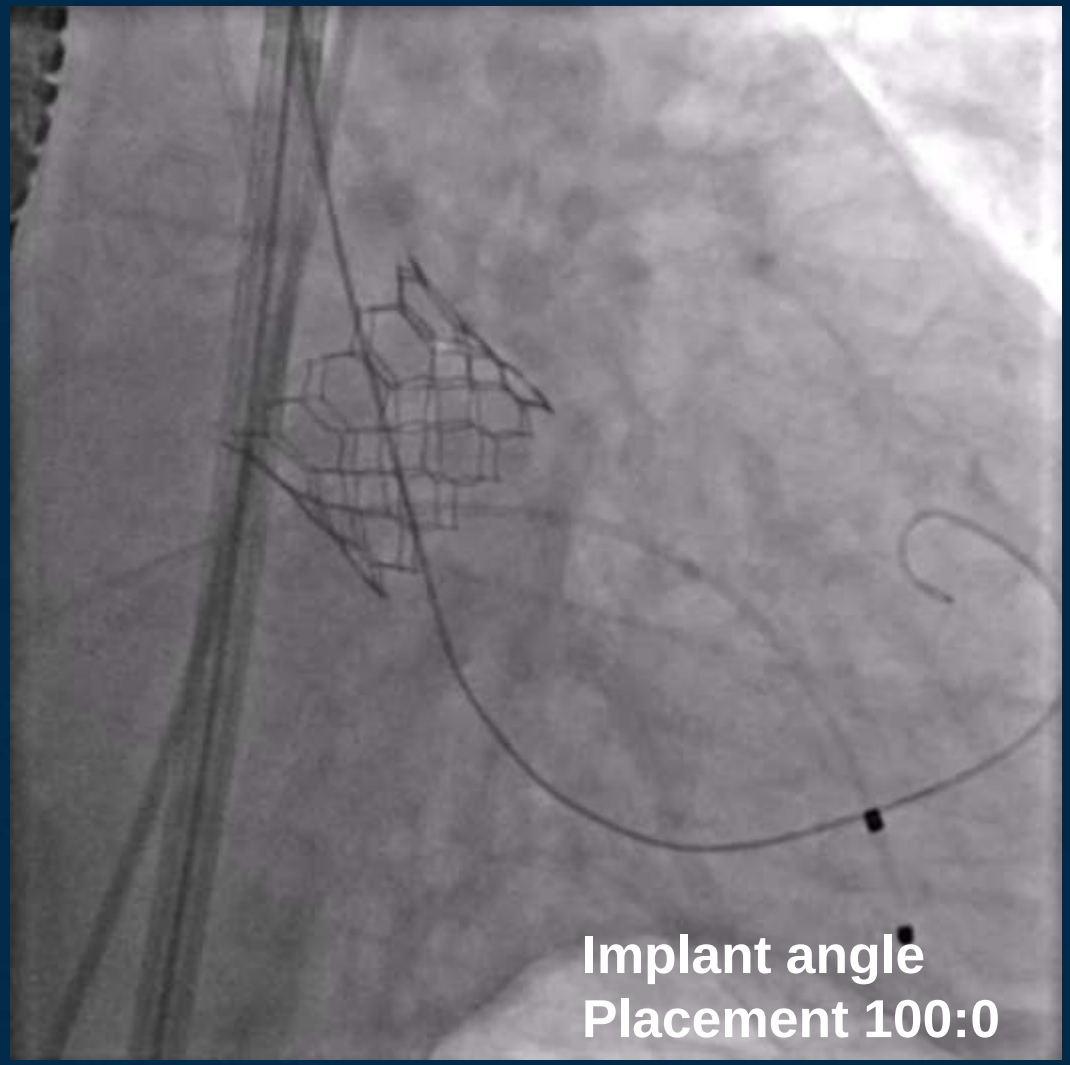
TF TAVI 26mm S3U nominal filling

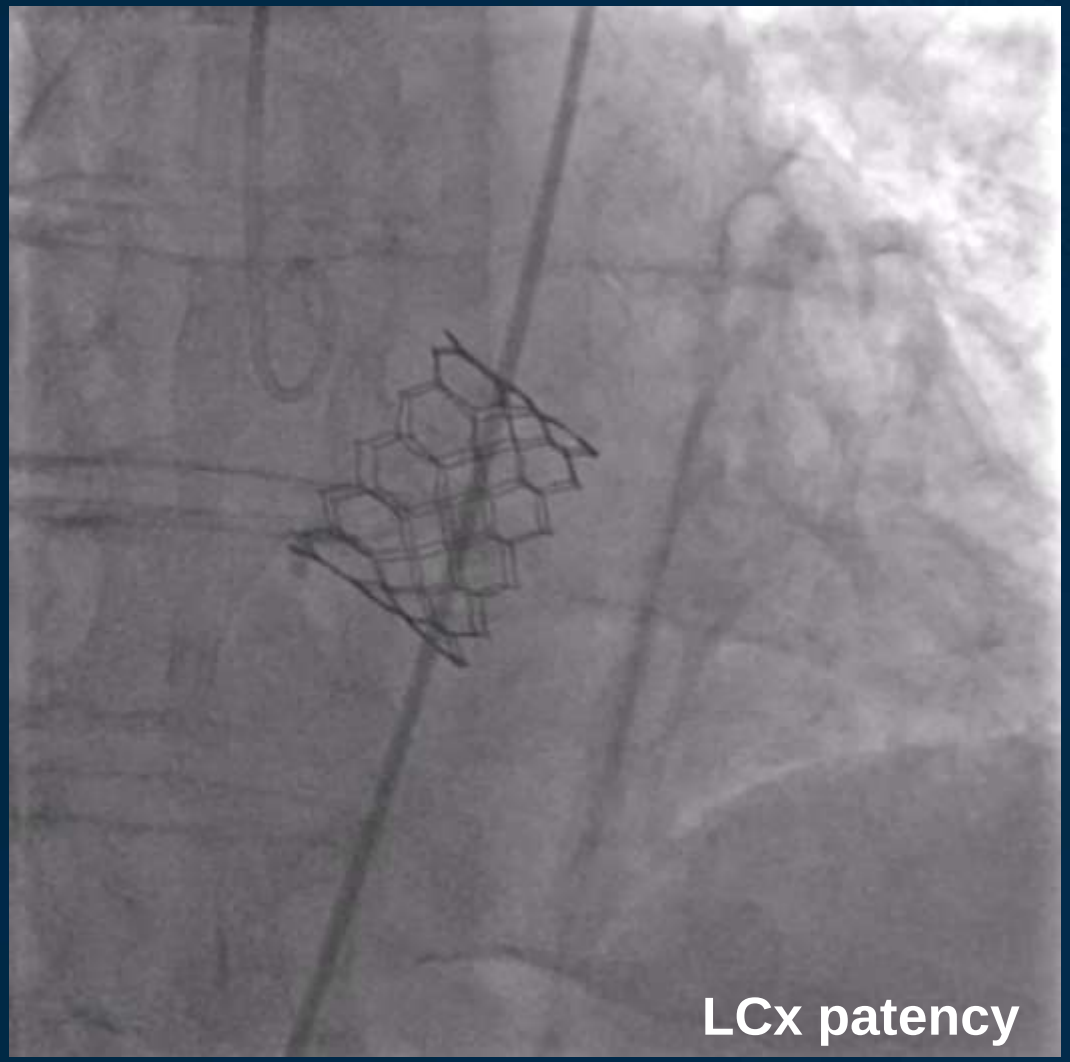


Two cusp view deployment

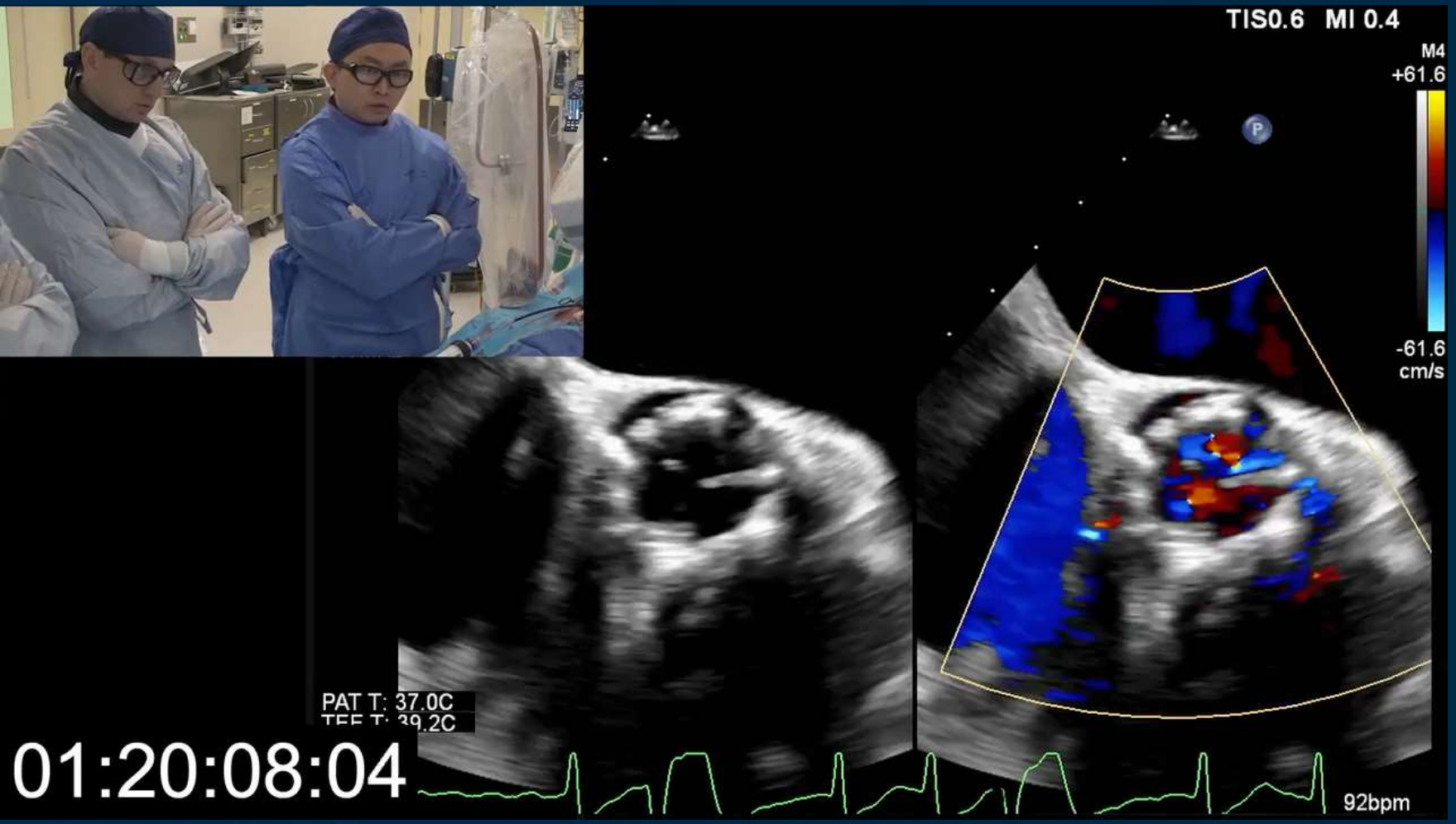
23cc balloon filling
Full inflation @ 9atm

TF TAVI 26mm S3U aortography result





TF TAVI 26mm S3U outcome



TEE

- **1/4 PVL**
- **LA wall calcium indentation**
- **LCx patent**

One month clinical follow up

- **Resolved dyspnoea**
- **Normal QRS AFib**

TTE Day 30

- EOA 2.3cm2
- Mean gradient 9mmHg
- ¼ PVL

TAVI in bicuspid anatomy

- Bicuspid aortic stenosis can be more heterogenous in calcium pattern (raphe) and burden compared to tri-leaflet aortic stenosis.

- Occasional more tailored an approach is needed
  - Placement adjustment
  - Over and underfilling S3 THV

- In this case, only moderate calcification and sizing (significant oversizing not needed) were favourable for a good result.