

# High-Risk TAVR for Calcified Bicuspid Valve in Cardiogenic Shock

**Complicated by Contained Root/Annular Injury**

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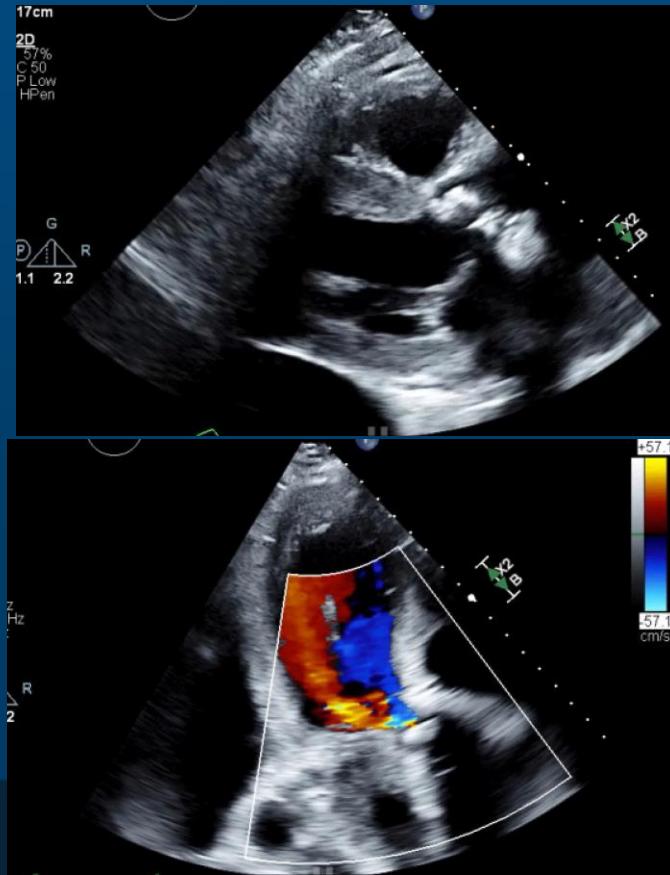


# Disclosure of Relevant Financial Relationships

I, Pradeep Nadeswaran, DO NOT have any financial relationships to disclose.

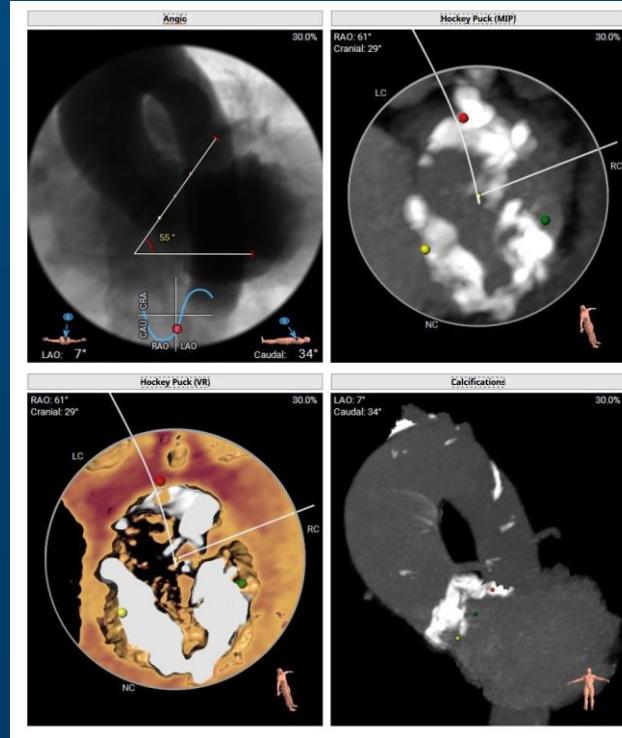
# Clinical Snapshot

- 69-year-old male with a prior medical history of DM, HTN, HFrEF (NYHA IV), O<sub>2</sub>-dependent combined pre/post-capillary PH
- Echo: LVEF 37%; severe AS (MG 38 mmHg; AVA 0.7 cm<sup>2</sup>) + severe AR
- Shock physiology: PA 99/46 mmHg; CI 1.4 L/min/m<sup>2</sup>; elevated bi-ventricular filling pressures
- Multidisciplinary valve team: prohibitive surgical risk → high-risk TAVR



# CT Planning — Bicuspid Risk Map

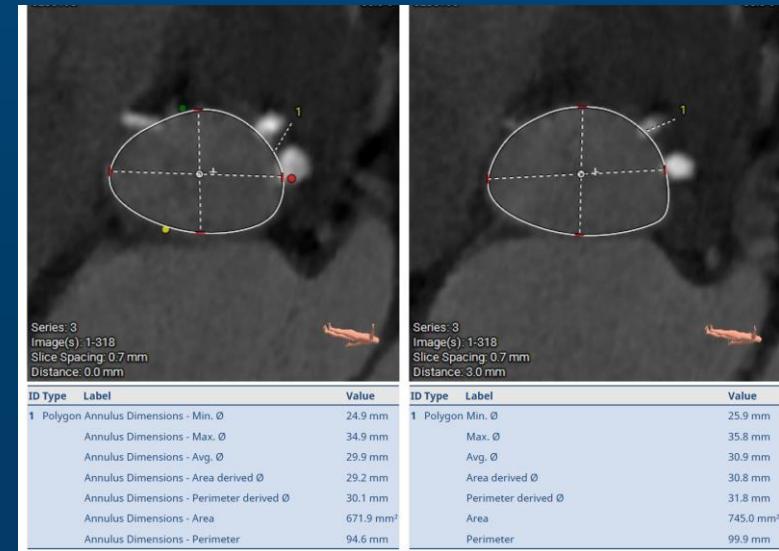
- Sievers type 1 (R/L fusion) with gross annular/root calcification; calcified raphe
- Annulus/LVOT: elliptical; heavy annular & sub-annular (LVOT) calcium
- Root/Coronary: sinus/STJ dimensions & heights acceptable; root angulation considered
- Access: iliofemoral evaluation acceptable



# Strategy & Device Rationale

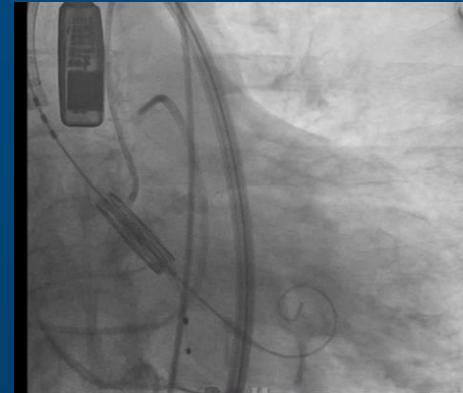
- Goal: Rapid afterload relief with predictable hemodynamics & low PVL
- Chosen platform: 29-mm balloon-expandable SAPIEN 3 Ultra RESILIA
- Pre-dilation: 20 mm balloon to accommodate delivery

Aortic Valve	
Annulus Area	671.9 mm <sup>2</sup>
Area Derived Diameter	29.2 mm
Annulus Perimeter	94.6 mm
Perimeter Derived Diameter	30.1 mm
Annulus Min Diameter	24.9 mm
Annulus Max Diameter	34.9 mm
THV Oversize/Uncer-size (%) Calculation	
Annular Area	671.9 mm <sup>2</sup>
THV Size	20 mm      23 mm      26 mm      29 mm
% THV Over (+)/Under(-) Annular Area by 3D CT	-3.4%



# In-Lab Course & Complication Recognition

- Post-deploy: No central AR; trace PVL; immediate hemodynamic improvement
- ≈10 min later: Hypotension + rising CVP
- Differential: Coronary obstruction; severe AR/malposition; LV failure; annular/root injury
- TEE: Rapidly enlarging circumferential effusion → follow tamponade pathway

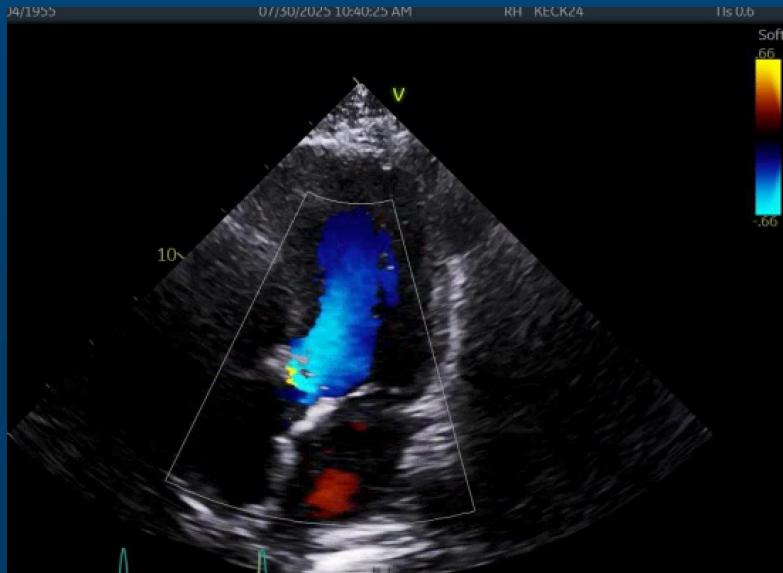


# Rescue

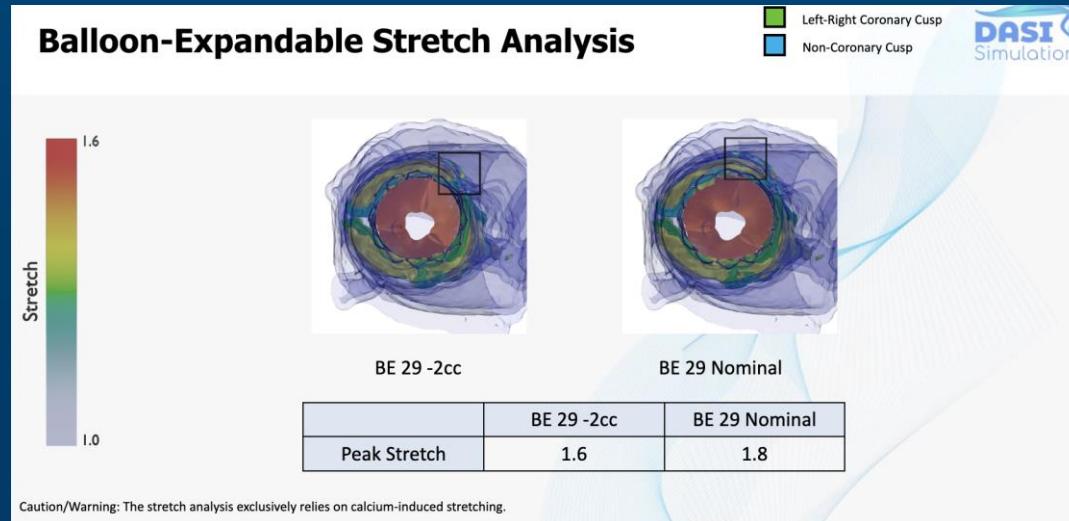
- Subxiphoid pericardiocentesis → 1L fresh arterial blood, auto-transfused to patient
- Reversed heparin with protamine after device removal
- Result: Bleeding stopped and hemodynamics stabilized
- Dx: Likely contained annular/root perforation from calcified bicuspid anatomy
- Post-procedure: Pericardial drain, continued mechanical ventilation, sedation/paralysis in the ICU

# Outcome

- Discharge TTE: well-seated valve; MG 10 mmHg; no significant regurgitation; LVEF 72%



Valve	% Oversizing [2]	Coronary Analysis [3,4]	Stent Apposition	Stretch Analysis [5]	Waist Diameter (mm)
BE 29 -2cc	N/A	LCA DLC/d = 0.7 RCA DLC/d = 1.2	Largest gap = 2.6 mm	Max Stretch 1.6	23.8mm/24.5mm
BE 29	-11.6% undersized	LCA DLC/d = 0.6 RCA DLC/d = 1.2	Largest gap = 2.4 mm	Max Stretch 1.8	25.2mm/25.9mm



# Take-Home Points

- Calcified BAV (raphe/LVOT calcium): the oversizing penalty = rupture
  - Size conservatively; gentle pre-dilation; avoid routine post-dilation
- CT imaging predominates and TEE complements intra-procedurally
- Arrive rescue-ready
  - Pericardial kit, protamine drawn, occlusion balloon/covered stent, surgical + ECLS plans
- Patient-specific simulation: Useful adjunct in extreme strain/expansion scenarios

*One-line takeaway: In calcified bicuspid (raphe/LVOT calcium), conservative sizing + rescue readiness are paramount; simulation can flag extreme strain risk pre-case.*