TAVI in the Obese Bicuspid Patient

Dr Ravinay Bhindi
Interventional Cardiologist
Royal North Shore Hospital
Sydney, Australia

Associate Professor
University of Sydney
Australia

@Ravinay

Case Presentation

- 61 year old gentleman presents with:
  - Dyspnoea, chest pain, pre-syncope
- **Background History:**
  - Extreme Super Obesity (197kg, Body Mass Index 63.5 kg/m^2)
  - Type II Diabetes Mellitus
  - Ex Smoker (80 cigarettes/day for 40 years)
  - Chronic Obstructive Pulmonary Disease
  - Obstructive Sleep Apnoea
  - Independent with mobility and activities of daily living. Carer for mother

Echocardiography

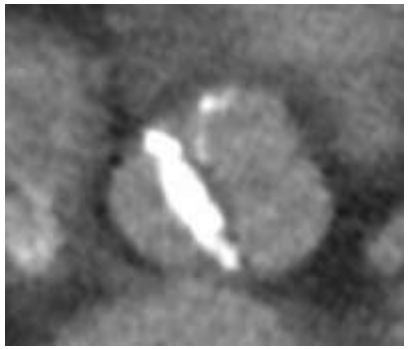
- Poor acoutic windows, Normal biventricular systolic function
- Peak AV flow velocity 4.9m/sec, Peak pressure gradient 99mmHg
- Mean pressure gradient 48mmHg
- LVOT flow velocity 1.2m.sec^{-1}
- Dimensionless index 0.28
- Calculated valve area 1.1cm^2
- AVA-Indexed for BSA: 0.4cm^2/m^2
- Trivial aortic regurgitation
- Functionally bicuspid AV

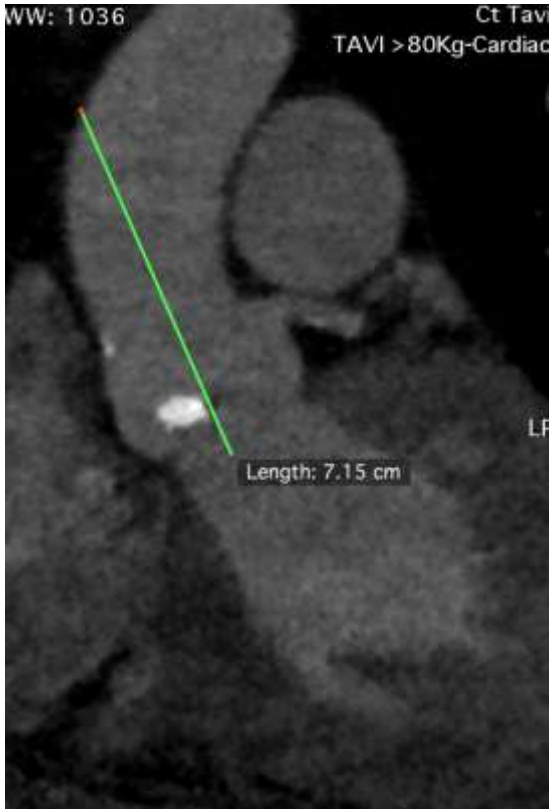
Case Progress

- **Heart Team Discussion:**
  - Normal coronary angiogram
  - At least moderate aortic stenosis, likely functionally severe given body habitus
  - Prohibitively high risk for bariatric surgery
  - Prohibitively high risk for apronectomy
  - Decision to recommend weight loss and to re-assess symptoms and aortic valve
- **4 Months later:**
  - Weight down to 175.5kg, BMI 56.6kg/m^2 (from 197kg and 63.5kg/m^2)
  - Exercise capacity limited by exertional shortness of breath and pre-syncope
  - NYHA III
  - Valve haemodynamics unchanged on transthoracic echo
  - Decision to consider TAVI.
- **TAVI Workup:**
  - Femoral access not possible
  - 2 attempts at performing TAVI Computed Tomography
  - Both failed due to subclavian obstruction on lying supine, therefore contrast not delivery not optimal.

TAVI CT

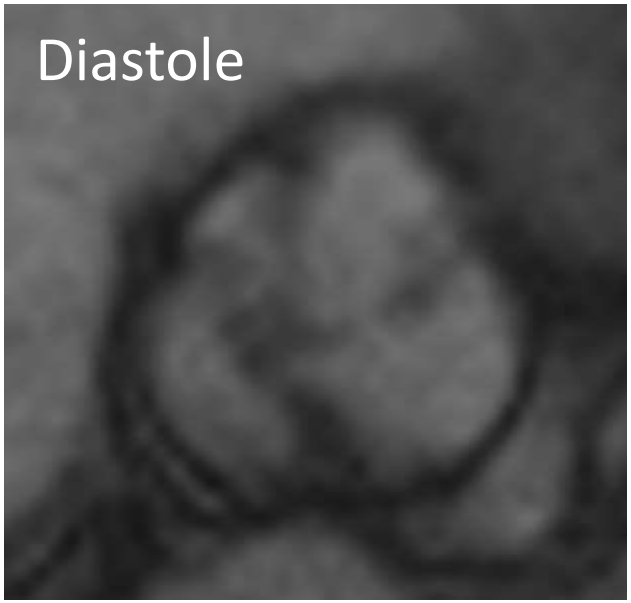
- Suboptimal
- Perimeter 81mm
- Coronary heights >18mm
- Aortic sinus 37mm
- Adequate space for transaortic access





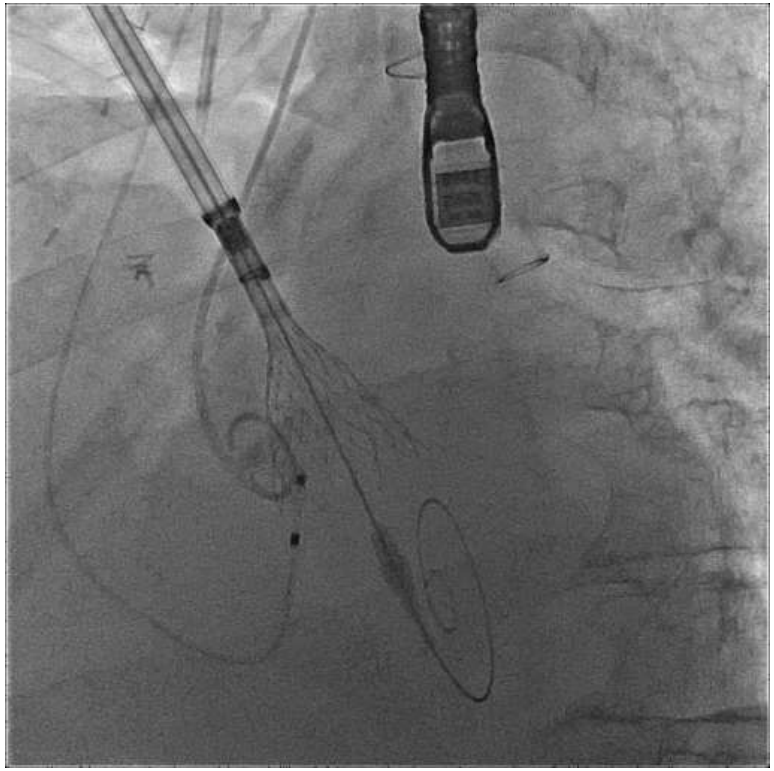
Valve Anatomy

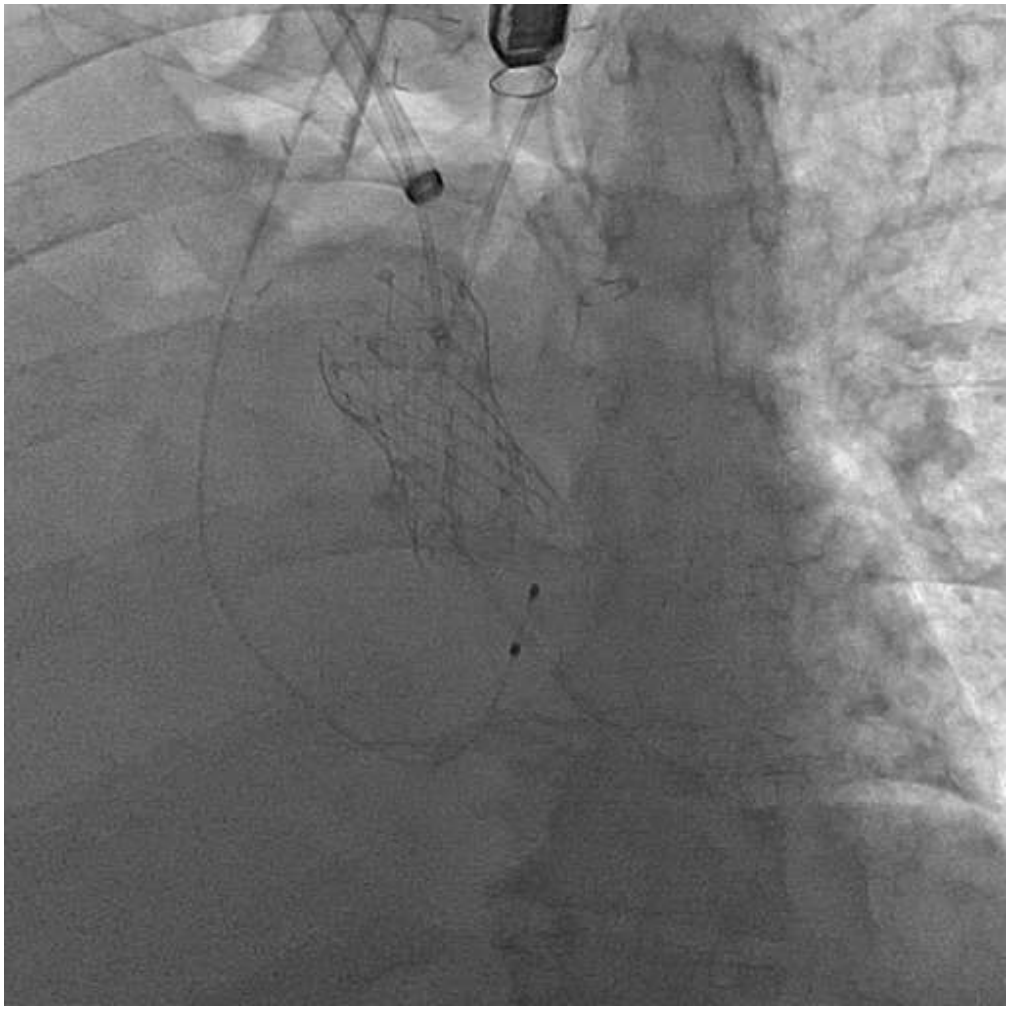
- Increased risk for transoesophageal echo without general anaesthetic
- Cardiac MRI -functionally bicuspid valve and severe aortic stenosis
- TAVI device chosen to optimise deployment, allow repositioning, and minimise aortic regurgitation

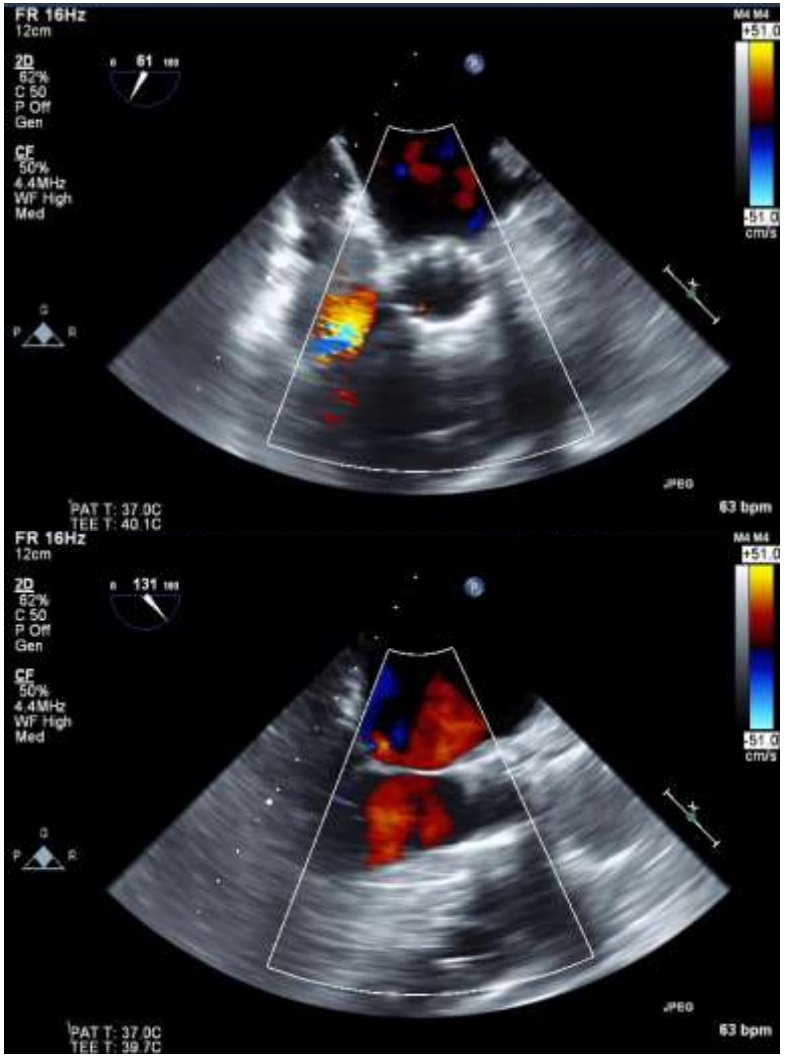


29mm Evolut R Valve Implanted

- Technical Difficulties with procedure:
  - Double lumen endotracheal
  - Body habitus made accessing aorta via second intercostal space difficult
  - Extended to min-sternotomy
  - Deep, oblique access to aorta
  - Tunnel below clavicle
  - 29mm Medtronic Evolut R deployed






FR 16Hz
12cm
2D
62%
C 50
P Off
Gen
CF
50%
4.4MHz
WF High
Med
61
+51.0
-51.0
cm/s
PAT T: 37.0C
TEE T: 40.1C
JPEG
63 bpm
FR 16Hz
12cm
2D
62%
C 50
P Off
Gen
CF
50%
4.4MHz
WF High
Med
131
+51.0
-51.0
cm/s
PAT T: 37.0C
TEE T: 39.7C
JPEG
63 bpm

Conclusions

- Obesity epidemic is increasing the number of super and extremely obese patients with aortic stenosis
- Assessing severity of aortic stenosis in this cohort can be challenging
- Multimodality imaging provides potential for better assessment
- Technical challenges of valve implantation need to be planned and overcome to optimise clinical results