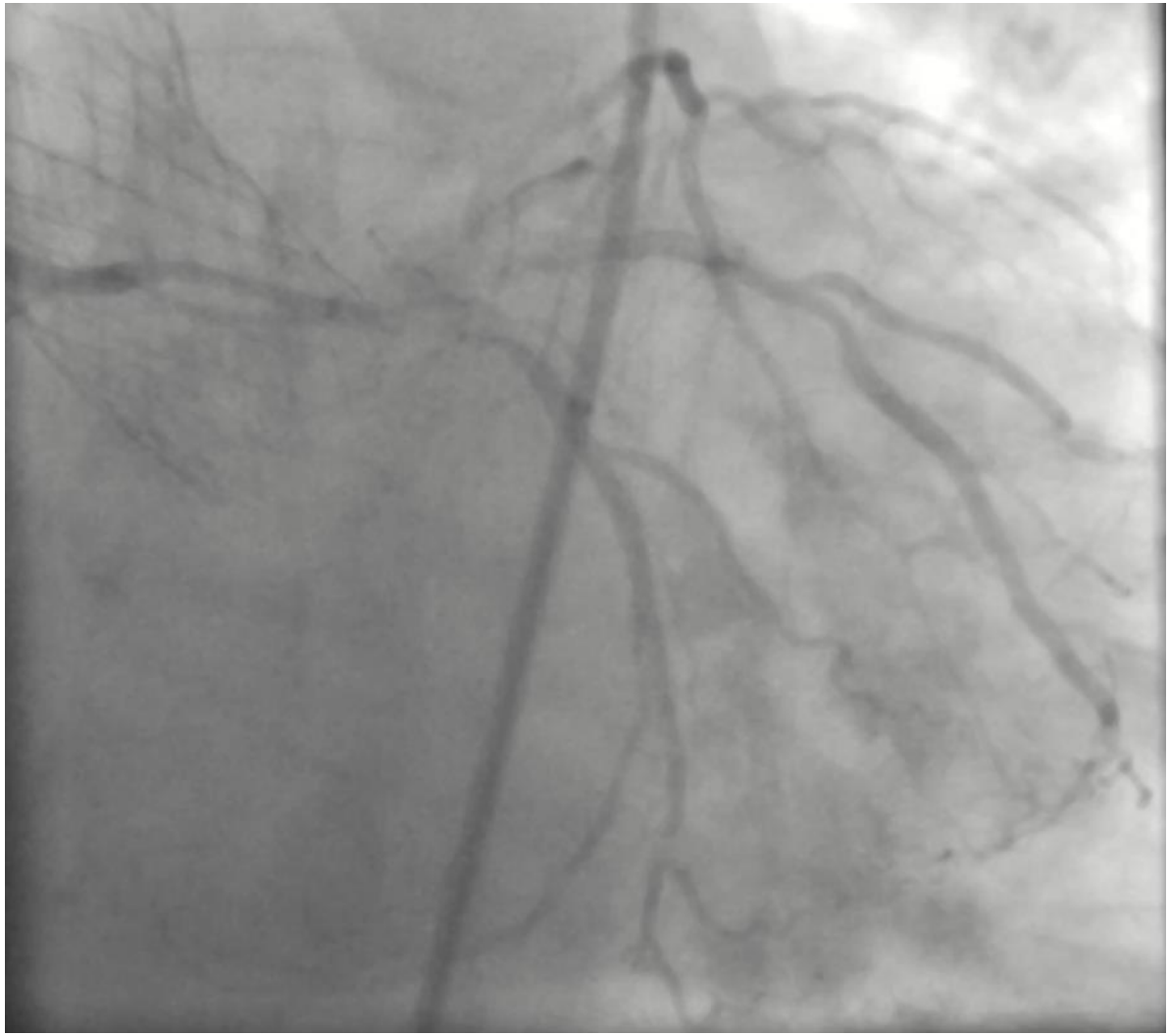
Emergency high risk percutaneous coronary intervention following transcatheter aortic valve implantation in bicuspid anatomy

Case presentation

- RFA, USS guided, 7F sheath
- Attempt to selectively cannulate LMS through nitinol frame of TAVR
- Difficulties encountered:
  - tendency to engage superiorly and non-coaxially due to the high position typical of a bicuspid implant
  - the orientation of the Evolut commissures relative to the LMS origin
- Eventually achieved using
  - 7F JL4 guide catheter,
  - 7F guideliner over 0.035-inch wire
  - TurnTrak

Angiographic findings



Strategy I - IVUS

A

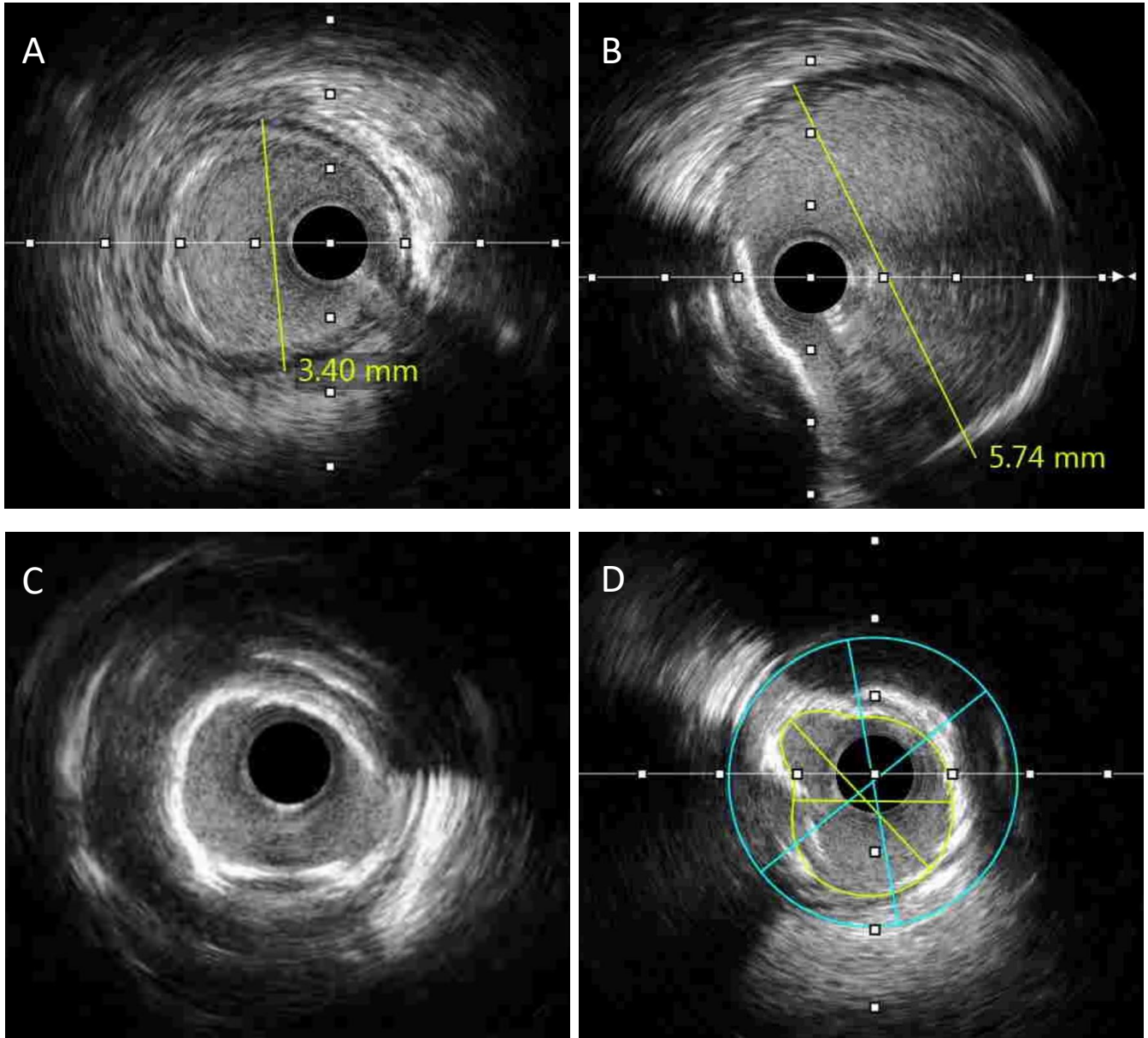
Left anterior descending

B

Left main stem

C and D

Intermediate: 360 arc of calcium in a 2-2.5mm vessel



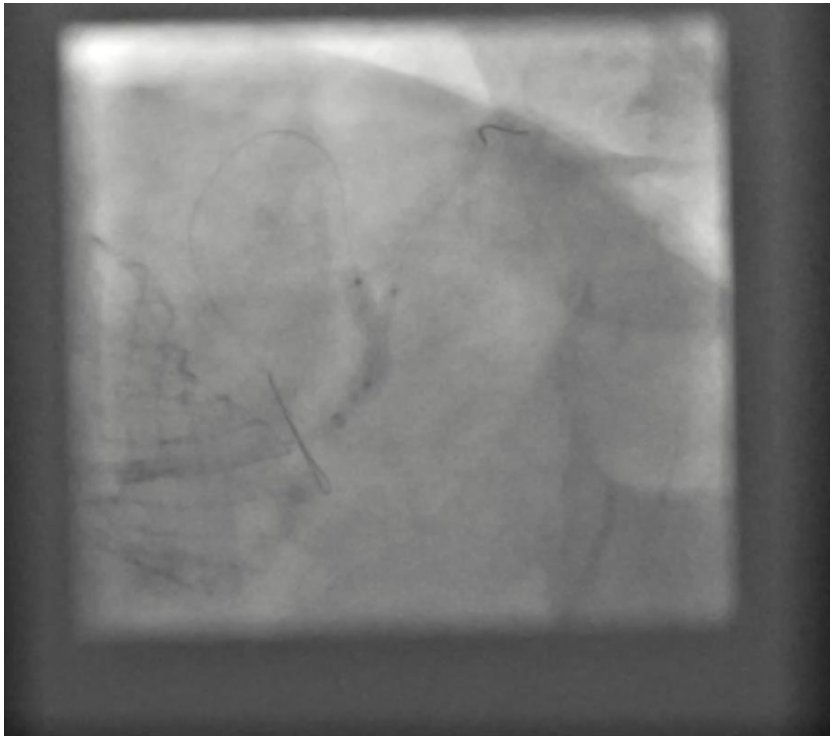
Strategy II

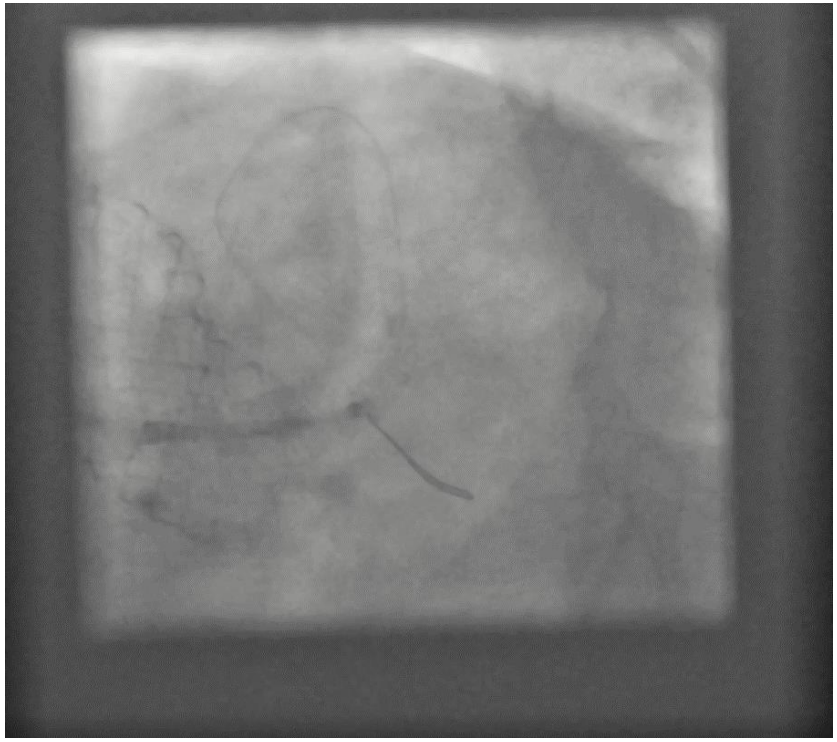
- Decision to treat culprit LMS/LAD and avoid 2-stent bifurcation involving intermediate

- Rationale:
  - Long term risk of stent failure
  - Probable non-viability of intermediate territory (akinetic inferolateral wall on TTE)

- Intervention:
  - LAD predilated with 2.5mm balloon
  - 3.5x21mm Ultimaster™ Sirolimus eluting stent to distal LMS/LAD
  - Post dilated with 3.5mm NC to LAD and 4.5/5mm NC to LMS

- Stent optimisation with Kissing inflation to LAD/D1 using 2.5/3mm balloon
- Good result
- 8F angioseal





Follow-up

- Patient taken to ITU overnight for haemofiltration
- Although complete revascularization of D1/intermediate was felt to be desirable, impression was that this would prove impractical without surgical conduits and hence only the culprit lesion was treated
- Subsequent MDT confirmed the view that the substrate for ventricular arrhythmia was likely to remain and so he underwent implantable cardiac defibrillator (ICD) implantation prior to his successful discharge

Discussion

- TAVR indications are expanding towards treating younger patients
- AS and CAD share common risk factors and pathophysiology
- Acquisition of appropriate images of the coronary arteries by selective CA is paramount to establish an accurate diagnosis and management strategy
- The different types of commonly used TAVR present various challenges by virtue of their overall structure and cell size
- RE-ACCESS study showed that unsuccessful coronary engagement following TAVR was demonstrated in nearly 8% of patients, which occurred almost exclusively in those receiving Evolut-R devices

Considerations and strategy in post TAVR coronary re-access

Consideration	Strategy
Baseline anatomy & TAVR valve type	**TAVR valve type**: • Frame/ skirt height, cell size, commissure orientation Baseline Anatomy: • Depth of TAVR implant, baseline aortic root anatomy, coronary height, ascending aorta diameter
Complexity of coronary intervention proposed	Consider need for intravascular imaging, Calcium modification or 2 stent strategies
Choice of Guide	• LCA: Preference for smaller short tipped JL shape over EBU due to narrow aortic root constraints • RCA: JR4 or usual catheter choice • French size: Guide extension use common and so consider 6, 7 or 8F systems depending on complexity of proposed intervention
Access	**Operator preference**: • Radial or ultrasound guided femoral • Left radial approach may be favoured over right radial
Intubating the coronary ostium	**Simple cases**: • Direct intubation • Intubation over coronary guidewire / buddy balloon / balloon tracking • Guide extension **Complex cases**: • Use a 0.035-inch J wire to enter closest diamond (ideally in front of coronary ostia). Rail road guide extension, then guide catheter over wire. • Stiff angled glide wire if difficulty persists entering diamond

Conclusion

- CAD remains one of the most frequent comorbidities among TAVR candidates
- Scarce data exist on the occurrence, impact, and management of coronary events following TAVR
- Although complex PCI is technically feasible following TAVR, this requires good anatomical understanding as well as strategy planning