

Anaesthetic Challenges in Alternate Access TAVI

APCASH 2022

Dr Linda Lai

Consultant, Department of Anaesthesia and Intensive Care

Prince of Wales Hospital, Hong Kong SAR



威爾斯親王醫院
Prince of Wales Hospital

Access Sites

- ~90% transfemoral approach
- Remaining: other access sites due to unfavourable iliofemoral anatomy

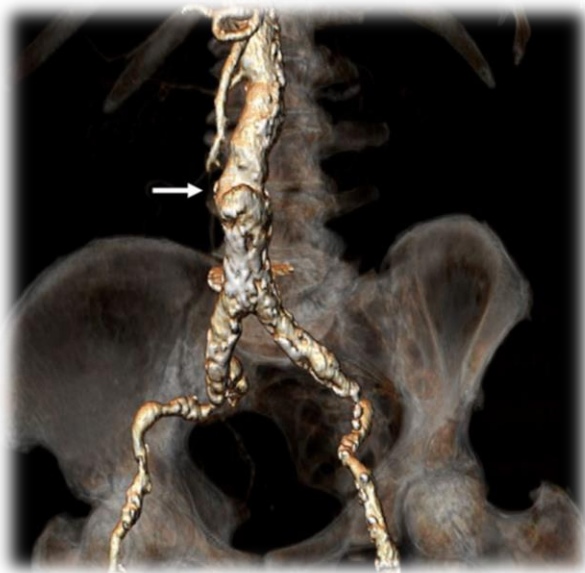
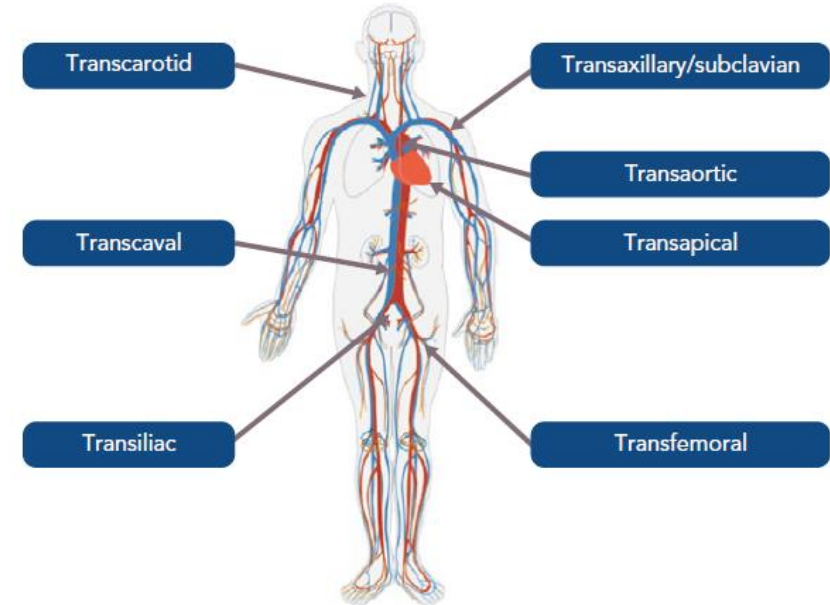


Figure 2: Access Options in Modern Transcatheter Aortic Valve Implantation



Anaesthetic Challenges

- Case volume/ unfamiliar procedure
- High risk patient
- Serious complications
- Specific anaesthetic interventions

- Hybrid theatre/ cardiac intervention centre
- Multi-disciplinary

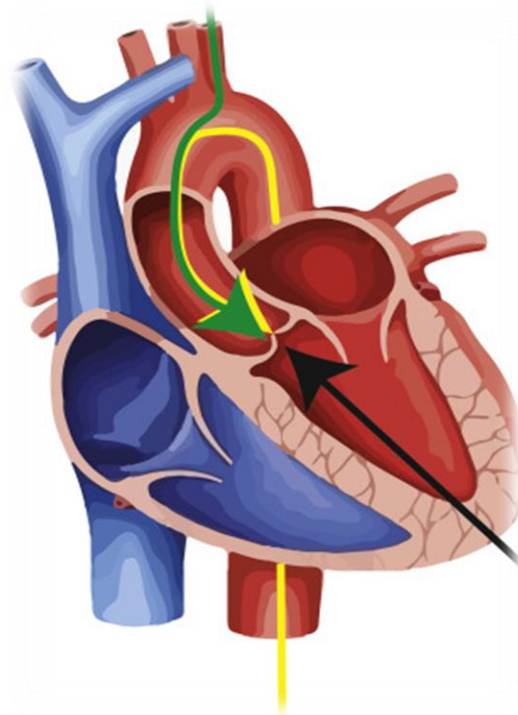
Solutions

Preoperative

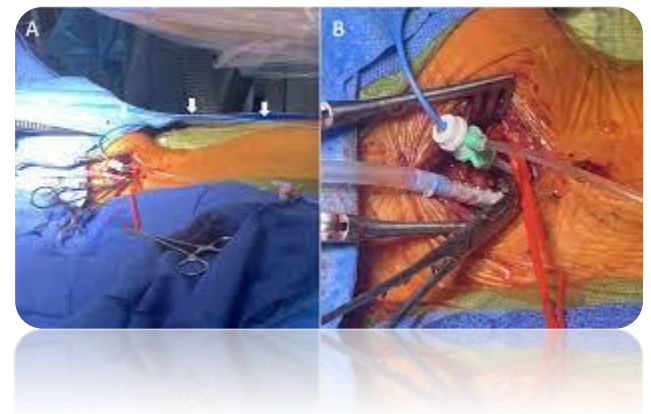
Intraoperative

Postoperative

- Trans-carotid
- Trans-caval

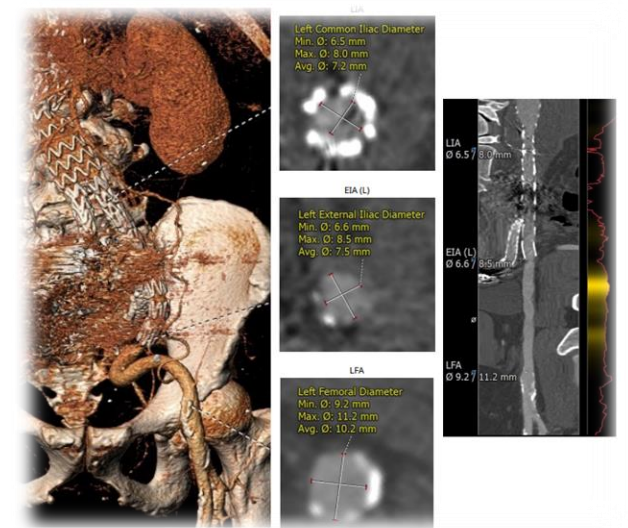


Trans-carotid TAVI



Trans-carotid TAVI: Patient

- 70/M, ASA 3 to 4
 - IHD with CABG 2002, LIMA to dLAD
 - CTCA 2021 showed patent LIMA graft
 - AAA with EVAR
 - Embolization done for endoleak 2020
 - Old TB/DM/HT, ↑Cr
 - Severe AS
 - Peak/mean gradient: 89/43mmHg, PASP 30, EF 55-60%
 - STS: Isolated AVR: Mortality: 3.6% M or M: 18%
 - Pre-TAVI CT: femoral, bilateral subclavian, transcaval, right carotid not feasible
- **Heart team:** High re-operative risk and recommend for **Left Transcarotid TAVI**



Trans-carotid TAVI: Procedure

- TEE
- Left carotid artery access (surgical cut down) with 14Fr sheath
- LFA (7Fr x 40cm) with pigtail insertion, LFV (6Fr x 40cm) with TVP
- Evolut PRO
- Surgical repair of carotid artery
- Arch DSA
- Skin closure

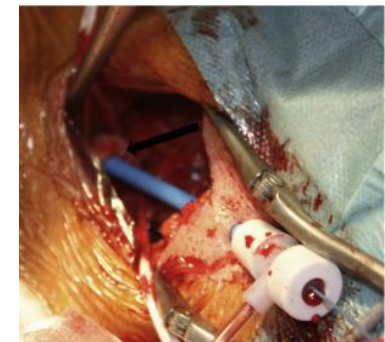
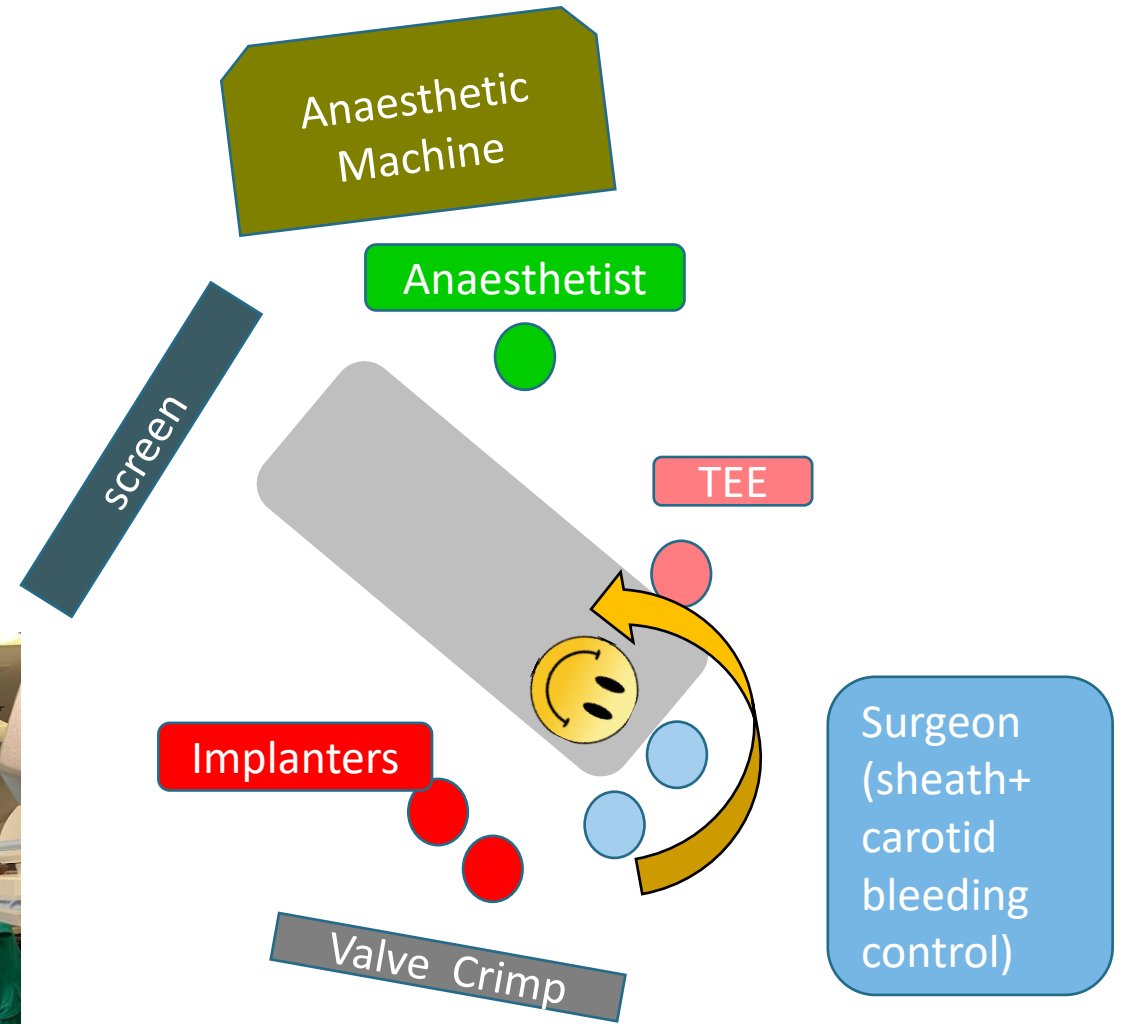


Table Set-up: Hybrid



Trans-carotid TAVI: Challenges

1. Unfamiliar procedure
2. Accessibility to head and neck
3. High stroke risk
4. Major vascular bleeding
5. Procedural specific concerns

Trans-carotid TAVI: Solutions

1. Unfamiliar procedure:

- ✓ Preop meeting
- ✓ Dry run

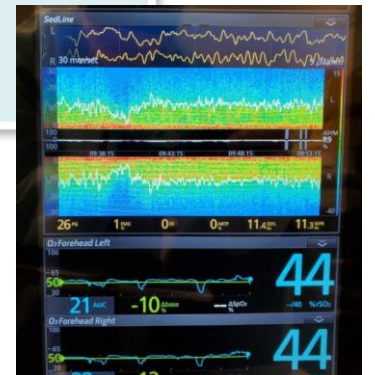


2. Patient's head & neck accessibility

- ✓ GA/ endotracheal intubation
- ✓ IJV CVC insertion

3. High stroke risk:

- ✓ High perfusion pressure: SBP 130-140mmHg
- ✓ Cerebral oximetry monitoring
- ✓ ACT>250s



Trans-carotid TAVI: Solutions

4. Major vascular bleeding:

- ✓ Blood products
- ✓ Volume line
- ✓ Protamine
- ✓ Hybrid theatre

5. Procedure-specific concerns:

- ✓ DSA for non-selective carotid angiogram after carotid repair → respiratory hold
- ✓ Neurological monitoring → early extubation

6. Team



Trans-caval TAVI



Trans-caval TAVI: Patient

- 83/M, NYHA 3, smoker
- Severe COPD:
 - Lung function test : FVC 22.4% → 40.1% (+ 78.3% post BD); FEV1 16.7% → 27.8% (+22.4% post BD)
- CAD:
 - C.C.: LM normal, LAD pLAD 50, mLAD 70 %, LCx 30%, RCA normal
- Severe AS
 - Echo: EF: 54%; Peak/Mean PG: 77/ 46mmHg, AVA: 0.60 cm², mild AR, trace MR/TR
- CT:
 - Bilateral femoral too small, bilateral axillary subclavian too small, carotid potentially feasible, direct aortic potentially feasible
 - CT cerebral :incomplete circle of Willis
- STS: Isolated AVR: Mortality: 5.6 % M or M: 18%

→ Trans-caval approach TAVI and PCI to LAD

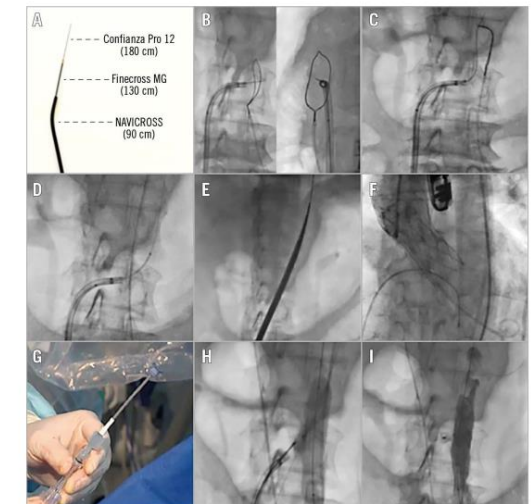
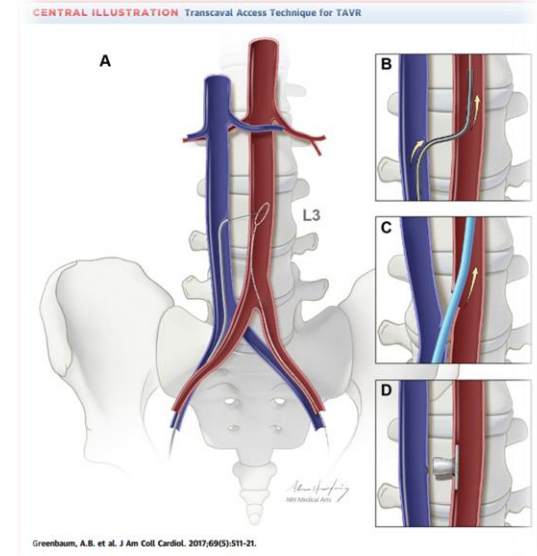
(Poor lung function, advanced age, frailty)

Table Setting (Same as TF TAVI)



Trans-caval TAVI: Procedure

- TTE
- RIJV pacing lead
- Vascular Access:
 - Right radial artery, right femoral vein, bilateral femoral arteries
- PCI to LAD under IVUS
- **Trans-caval crossing**
 - Upper 1/3 of L3 Body
- TAVI S3 23mm (first critical time out)
- CPS retrieval
- **Trans-caval closing**
 - Full Heparin reversal + second critical timeout (“Rescue team” ready)
 - ADO 10/8 occluder
- Wound Closure

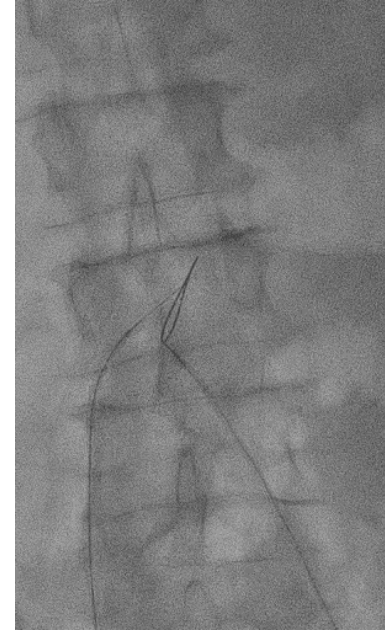


Challenges and Solutions:

1. Trans-caval crossing

- Size of the IVC will affect the crossing step
 - Preoperative fasting
 - Blood loss
 - IVC collapse
- Pain during crossing

- ✓ Adequate intravascular volume to keep IVC size similar to preop CT scan
- ✓ Deepen sedation/ analgesia before crossing

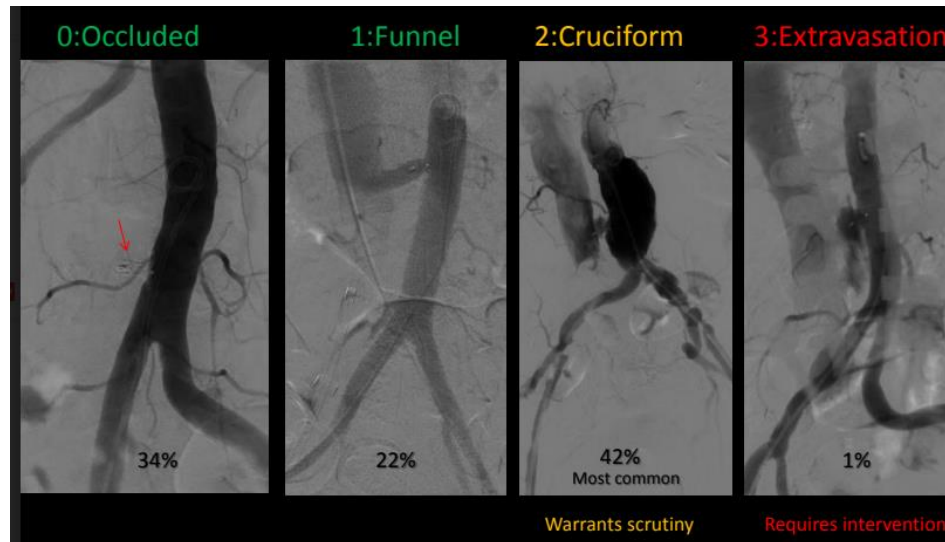
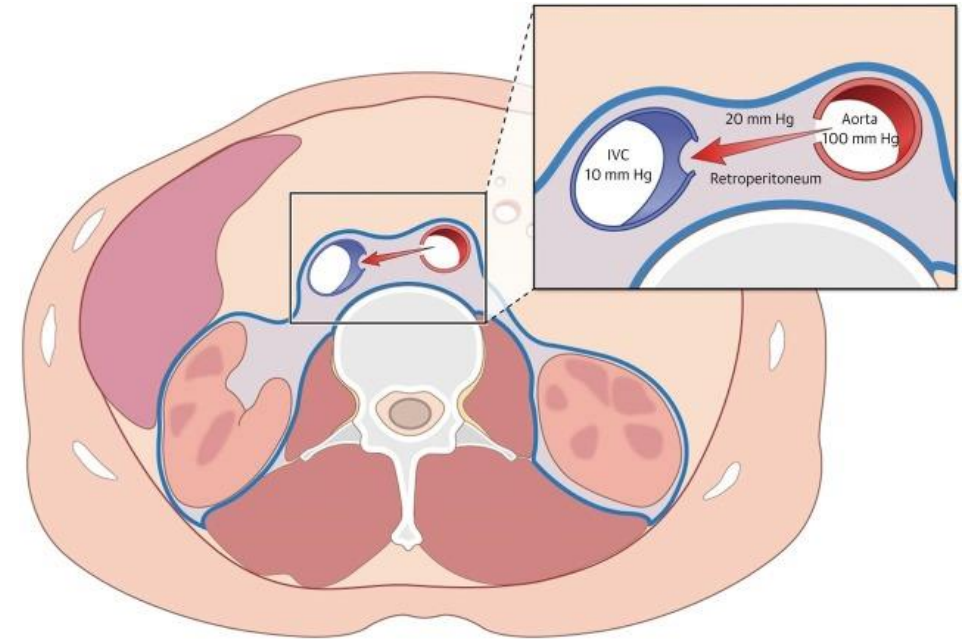


Challenges and Solutions:

2. Trans-caval closing

Failure of aortic access site occlusion:

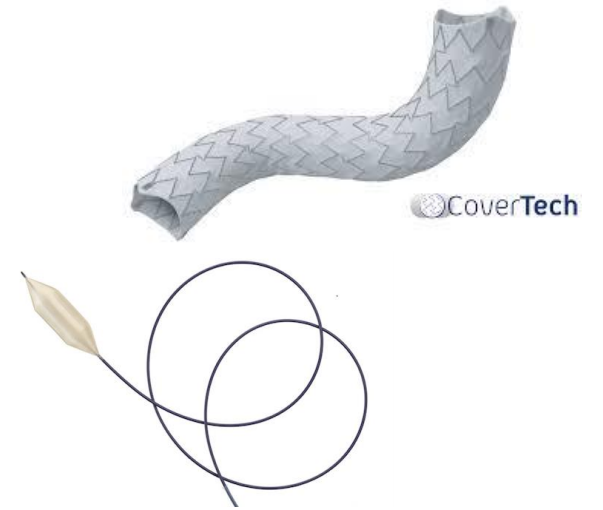
→ Aortocaval fistula instead of bleeding to retroperitoneal space



Challenges and Solutions:

3. Major vascular injury or bleeding

- ✓ Prepare for massive transfusion
 - Volume line, rapid transfusion set
 - Blood product and component
 - Protamine
- ✓ Bailout equipment
 - Aortic occlusion balloon+/- cover stent ready
- ✓ Surgical team standby for open vascular repair
- ✓ Hybrid theatre



Challenges and Solutions:

4. Hypovolaemia

Continuous leaking of blood after transcaval crossing into retroperitoneal space
→ Hypovolaemia and Hb drop

- ✓ Adequate volume replacement
- ✓ Check Hcue
- ✓ Transfuse if necessary

Message

1. Preop planning:

- ✓ Patient
- ✓ Procedure
- ✓ Team
- ✓ Backup plan

2. Intraop:

- ✓ Monitoring
- ✓ Specific aims/
intervention
- ✓ Anticipated
complications
- ✓ Communications

3. Postop:

- ✓ CCU/ ICU
- ✓ Look for
complications

