Prevention and Management of Vascular Complications Related to Transcatheter Aortic Valve Implantation

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Disclosure

Speaker name:

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I have the following potential conflicts of interest to report:

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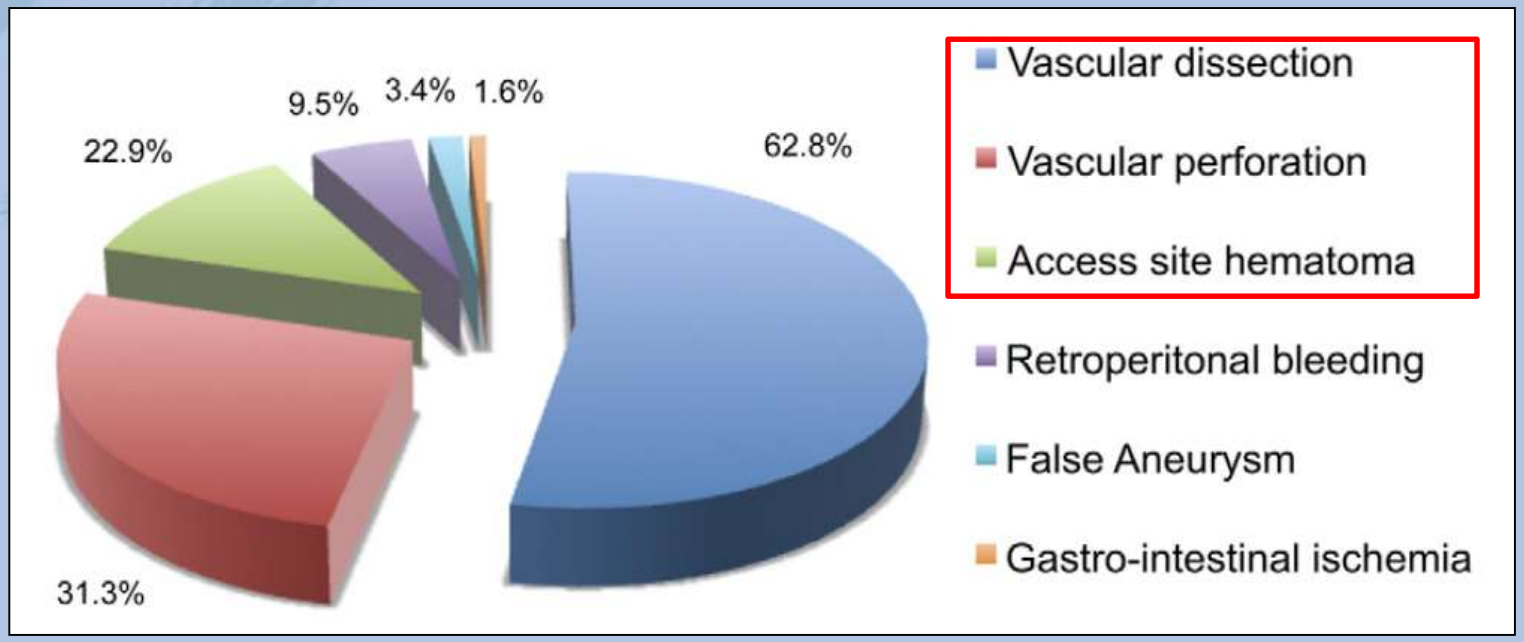
Major Vascular Complications (VC) in the PARTNER Trials

15.3% of patients had major VC

Major VC → independent predictors of 1-year mortality (HR: 2.3)



- Transfemoral TAVI, N=419
- First-generation Edwards-Sapien valves (22- or 24-F)
- Modified VARC definitions

Genereux P et al. JACC 2012

France-2 Registry

Gilard et al. N Engl J Med 2012;366:1705-15

Outcomes	Transfemoral Approach (N=2361)
Vascular complication	
Major	129 (5.5)
Minor	139 (5.9)

Major VC did not predict 1-year mortality

Despite vascular complications, invariably the transfemoral access has been superior to alternative access routes (in particular the transapical one)

Principles of Safe Percutaneous Transfemoral Access

- Careful evaluation of the ilio-femoral vasculature with CT (and angio)
- Know the minimun diameter of the vessel allowed according to the device used (sheaths commonly 14-18F while first generation devices were 22-25F!)
- If high femoral bifurcation or plaques/calcifications at the level of the distal CFA → consider puncture under ultrasound or roadmap/overlay (by contralateral injection)
- Pre-close: 2x 6-F Perclose devices or Prostar 10XL device
- Borderline vascular diameters: consider alternative sheath (Solopath)

Principles of Safe Percutaneous Transfemoral Access

- Have the appropriate set of equipment to manage complications
  - Covered stents
  - Crossover sheaths (appropriate F size for the covered stents!)
  - Stents, balloon, wires
  - Snares, protamin, thrombin
- If anatomy unfavorable, consider
  - Alternative access routes (trans-subclavian, - carotid, -aortic, -apical)
  - Femoral surgical cut-down (if focal problem et the level of the CFA) → direct visualization and tactile feel of calcium-free areas for puncture, allows for immediate repair.

CT-Angiography Mandatory

Critical to evaluate the ilio-femoral vasculature

- Minimal luminal diameter across the vasculature
- Severity and pattern of calcification (patchy, circular)
- Degree of tortuosity
- Localization of the femoral bifurcation

CT anyway required for Heart Team discussion and TAVI planning

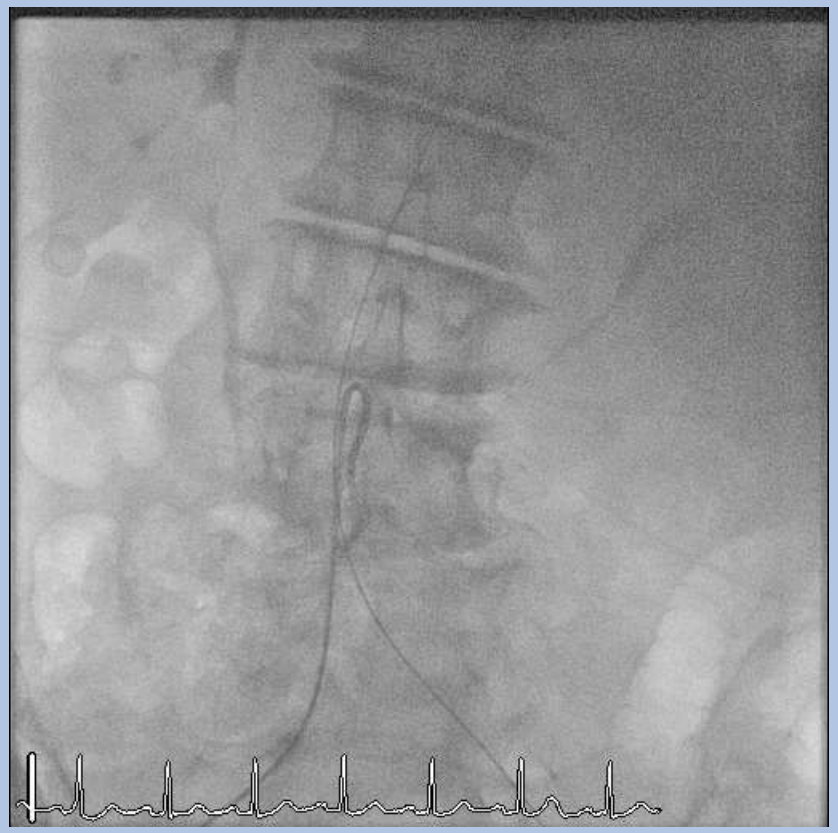
- Size of the annulus → size of the prosthesis
- Calcium score: help to establish the degree of severity of the AS
- Calcification patterns at the level of the aortic anulus
- Calcification of the ascending aorta (risk of surgery↑)

Good Option to Prevent/Treat Complications: Contralateral Crossover Access

- Crossover access* (access needed anyway for angiography)
  - Control angiogram
  - Rapid management of complications
- **Degrees of readiness**
  - No crossover access
  - 0.014 inch / 0.018 wire in the ipislateral SFA
  - Routine balloon inflation in the external iliac artery prior to sheath removal
  - Routine balloon inflation + wire

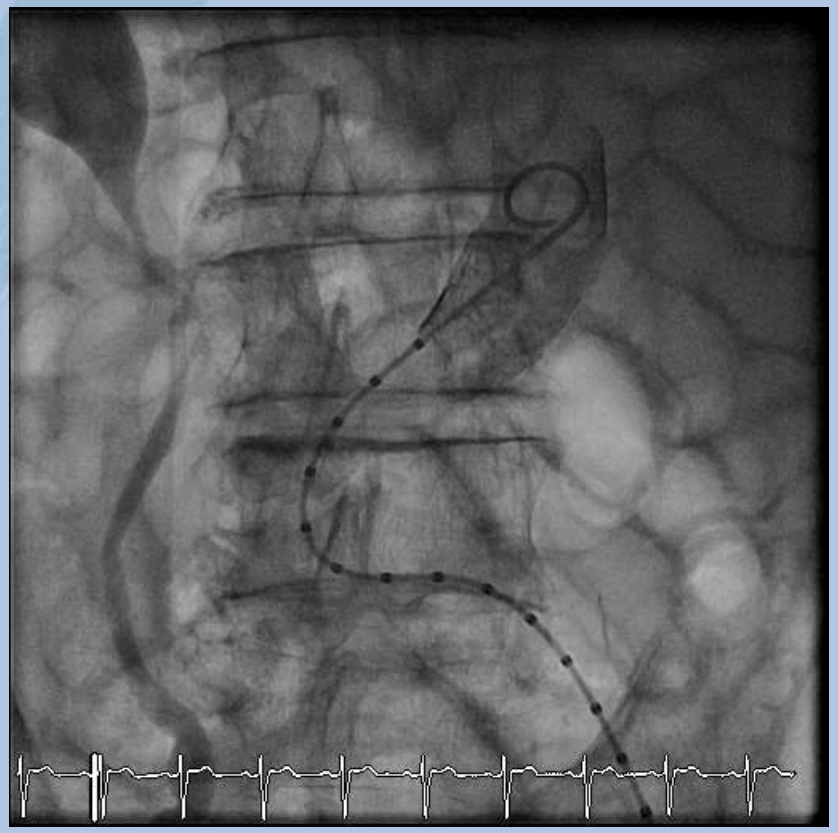
*Some operators use instead transradial access: with current equipment this allows for balloon occlusion, angioplasty and stenting but not covered stent implantation.

Challenging Anatomies for Contralateral Access: Narrow-Angle Aortic Bifurcation

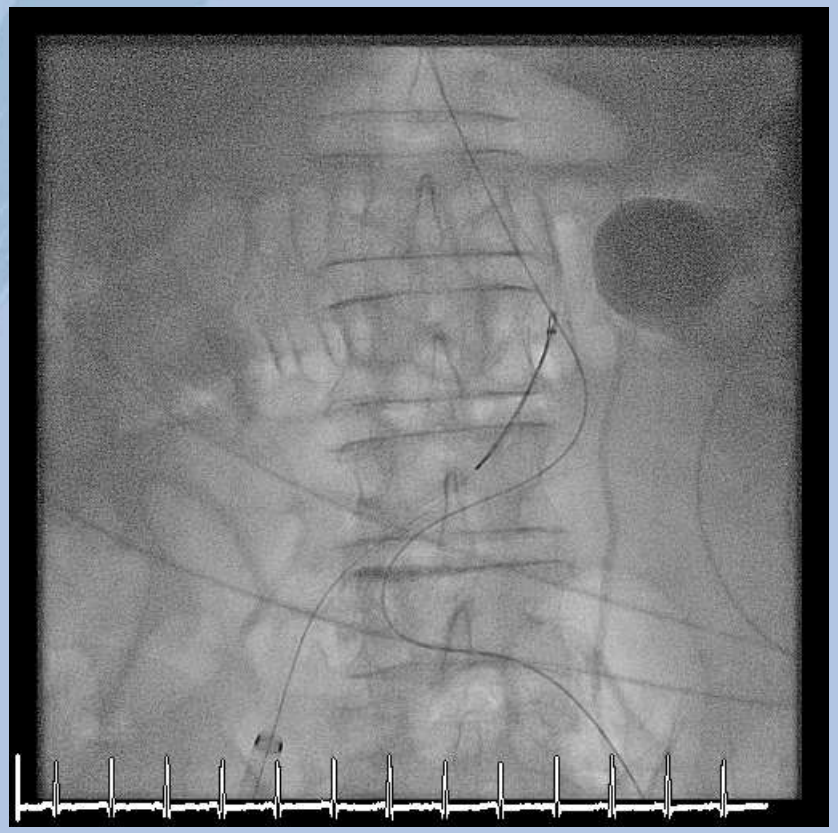


SOS catheter

Challenging Anatomies for Contralateral Access

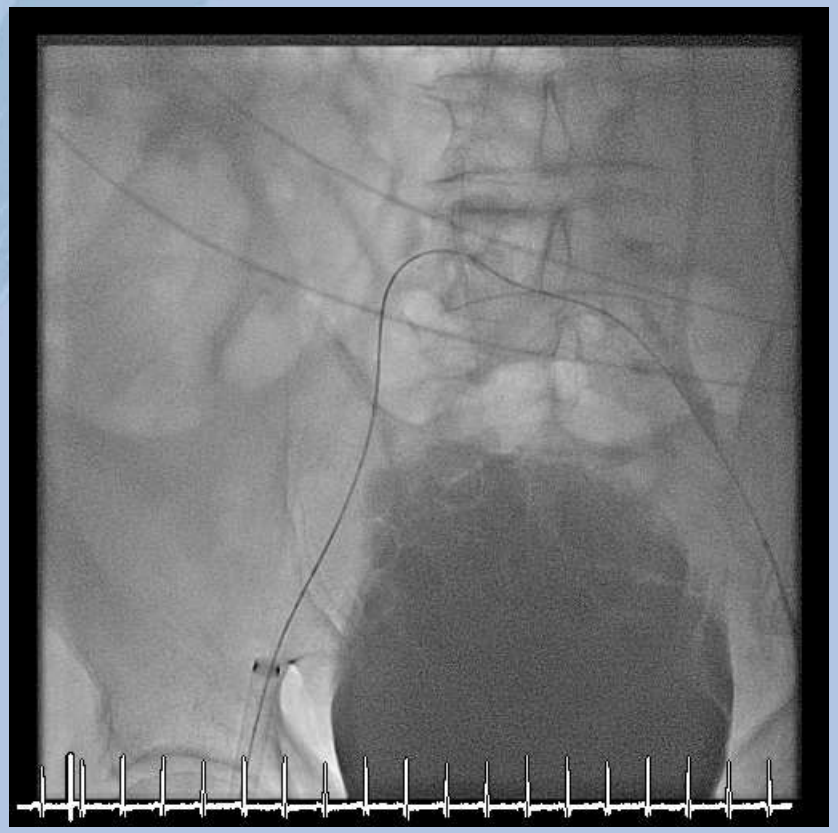


Challenging Anatomies for Contralateral Access

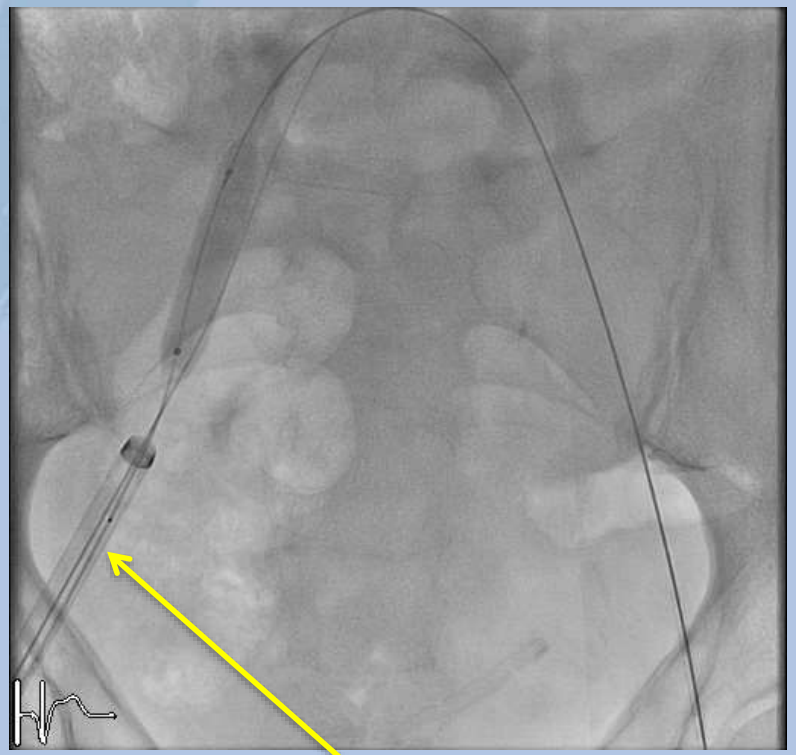


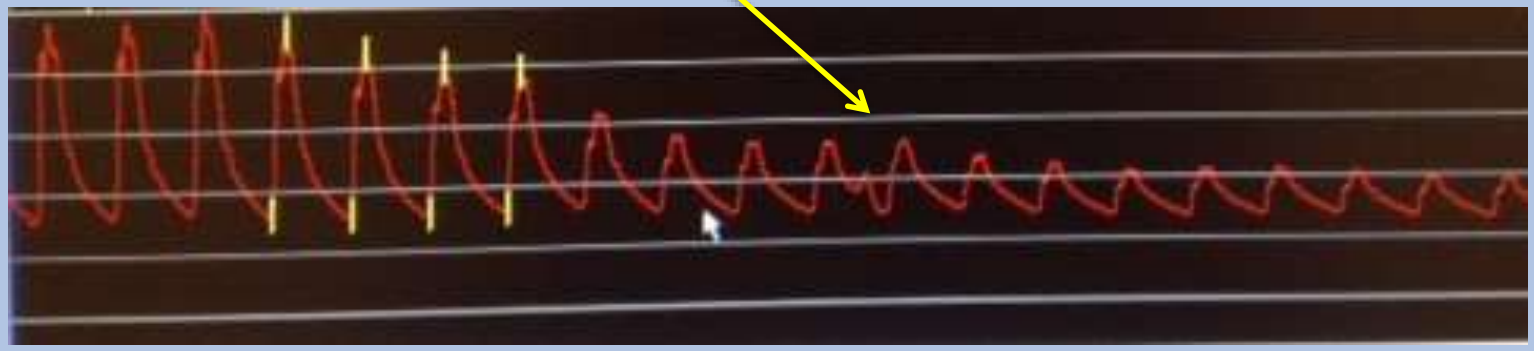
Snaring

Challenging Anatomies for Contralateral Access

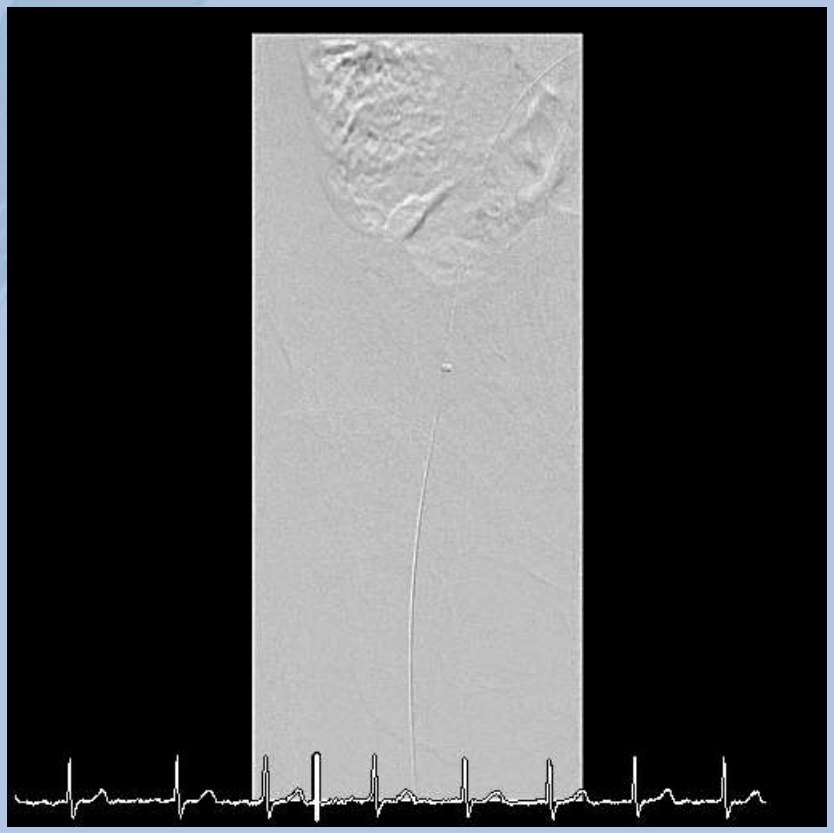


Proximal Balloon Occlusion





Rapid Treatment of Complications



Rapid Treatment of Complications

Conclusions: Prevention and Management of Vascular Complications Telated to TAVI

- Transfemoral TAVI superior to alternative routes in patients with suitable vascular anatomy.
- Major vascular complications remain one of the main draw-back of transfemoral TAVI, though the incidence is decreasing (operator experience/skills↑ and sheaths size of the devices↓)
- CT-angiography critical to estimate feasibility of transfemoral TAVI → Vessels diameter, area, calcifications, tortuosity, level of the femoral bifurcation.
- Patient (anatomy) selection key → Consider alternative access routes or surgical cut-down if anatomy unfavourable.
- Careful preclosing, proximal balloon inflation and final angiographic control important to prevent/treat vascular complications.

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