My Tips and Tricks for Prevention and Management of Aortic Valve Complications

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Affiliation/Financial Relationship	Company
Consulting Fees/Honoraria	Edwards, Abbott, Medtronic, Gore,Terumo, Shockwave

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All Relevant Financial Relationships have been mitigated.
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Why Focus on Aortic Valve Complications?

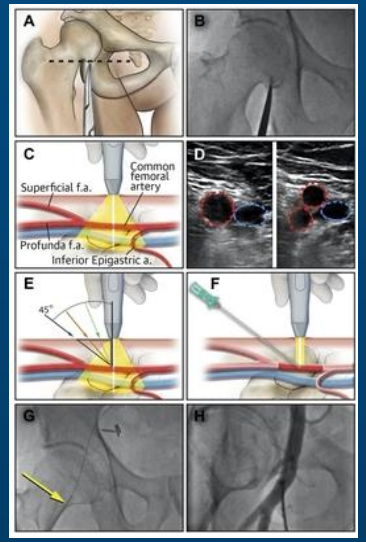
- Complications ≈ 5–10 % of TAVR cases
  - Drive mortality and cost.
- Pre-planning × Execution × Team communication = Prevention
- Many adverse events are predictable with imaging.

Complication Categories
1. Vascular access
2. Device landing zone rupture
3. Valve embolization
4. Coronary obstruction
5. Stroke
6. Conduction abnormalities

J Am Heart Assoc. 2019 Sep 17;8(18):e013801.

Vascular Access Complications

- Incidence 6–8%.
- Risk factors: female sex, vascular calcification, PVD, sheath:artery mismatch.
- Prevention: CT sizing, ultrasound guidance, intravascular lithotripsy, alternate access use.
- Management: early angiography, balloon tamponade, angioplasty, stent or covered stent repair.

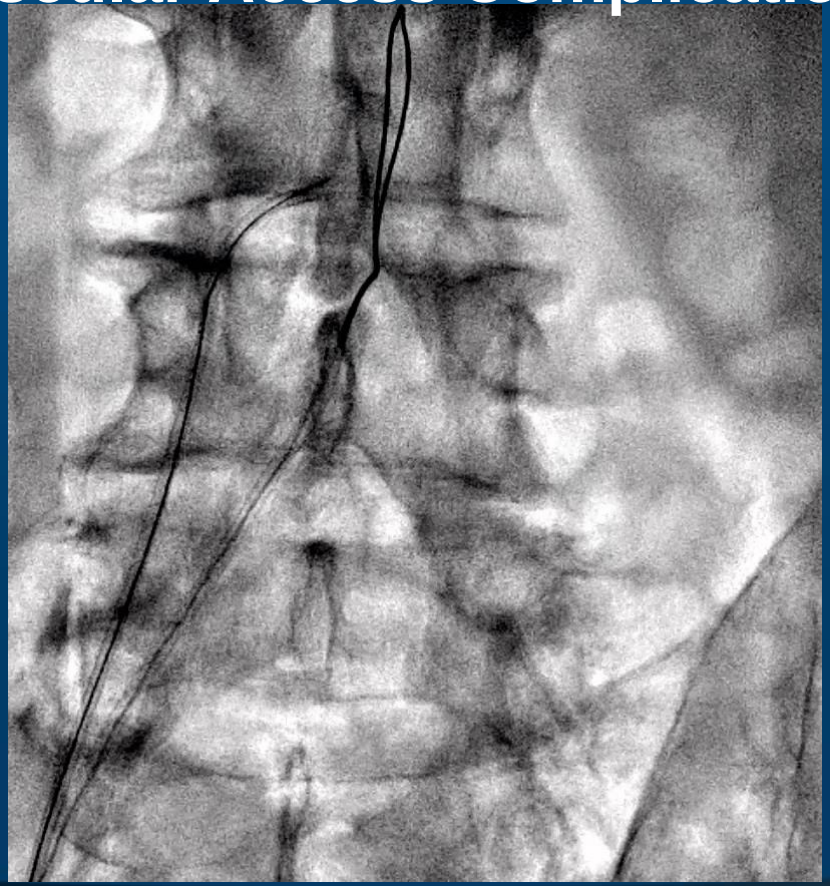


The management of vascular complications.

Location	Management
Hematoma	• Conservative, manual compression • Prolonged balloon angioplasty
Pseudoaneurysm	• Size ⩽ 3–3.5 cm, observation Size ⩾ 3.5 cm or expanding, thrombin injection
Arterial perforation	• Immediate reversal of anticoagulation • Prolonged balloon angioplasty or, less commonly, covered stent from contralateral or ipsilateral CFA access
Arterial dissection	If flow-limiting, prolonged balloon angioplasty or stent
Arterial stenosis, arterial thrombosis and arterial occlusion	Thrombectomy or balloon angioplasty

J Am Heart Assoc. 2019;8:e013801.
Sandoval Y. JACC Intv. 2017;10(22):2233–41.
Adapted from Vasc Med. 2017 Jun;22(3):234-244.

Vascular Access Complications



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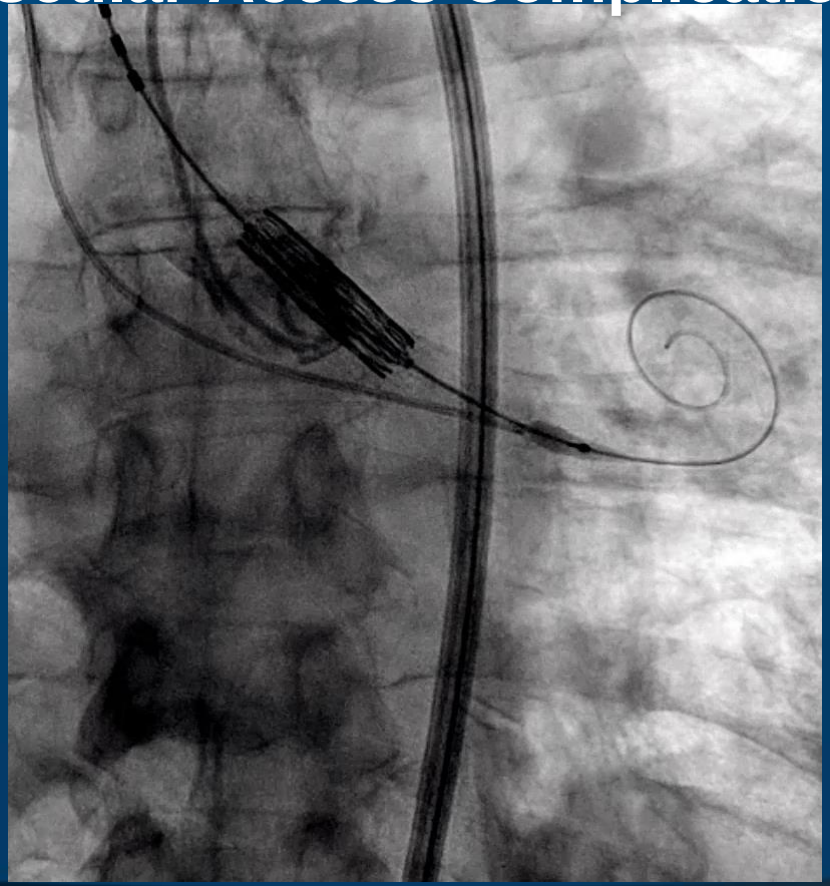

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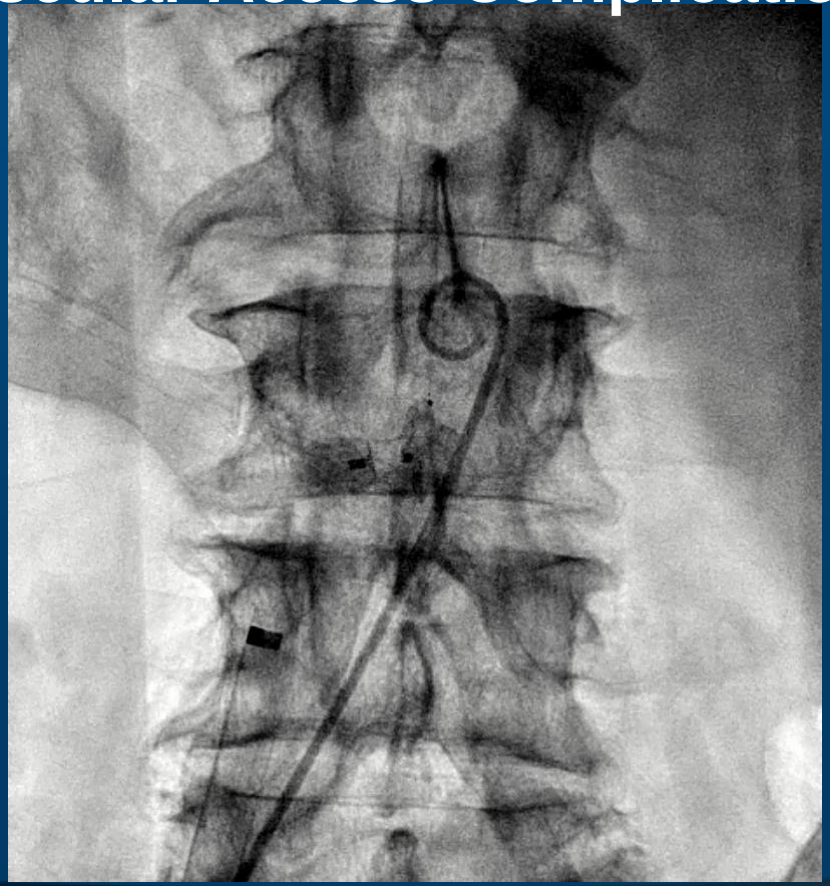

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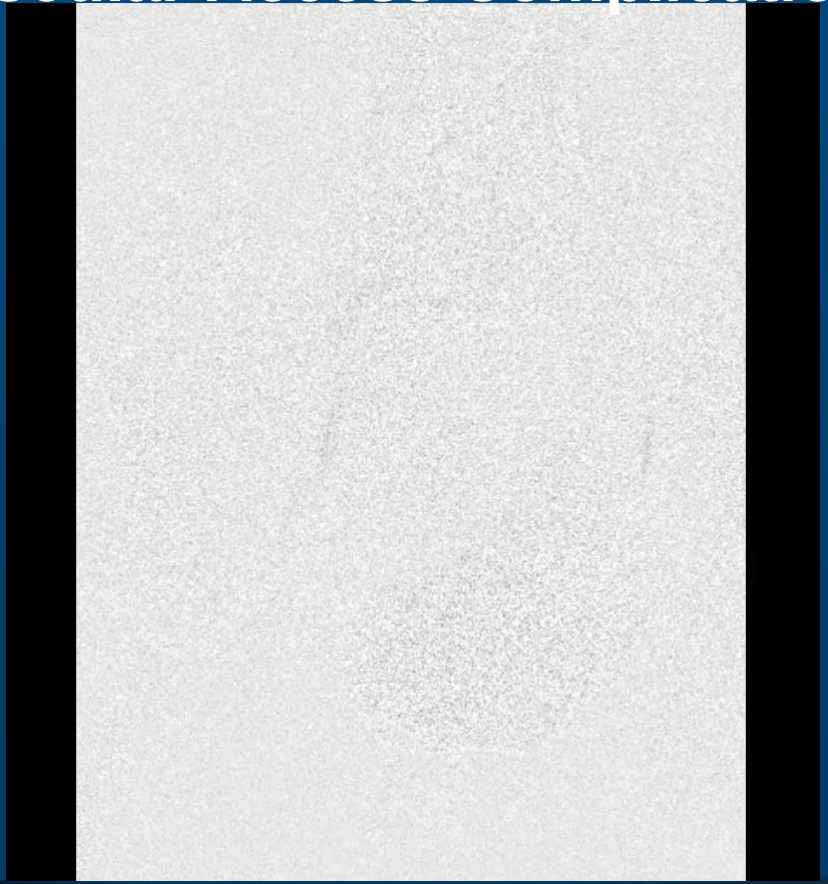
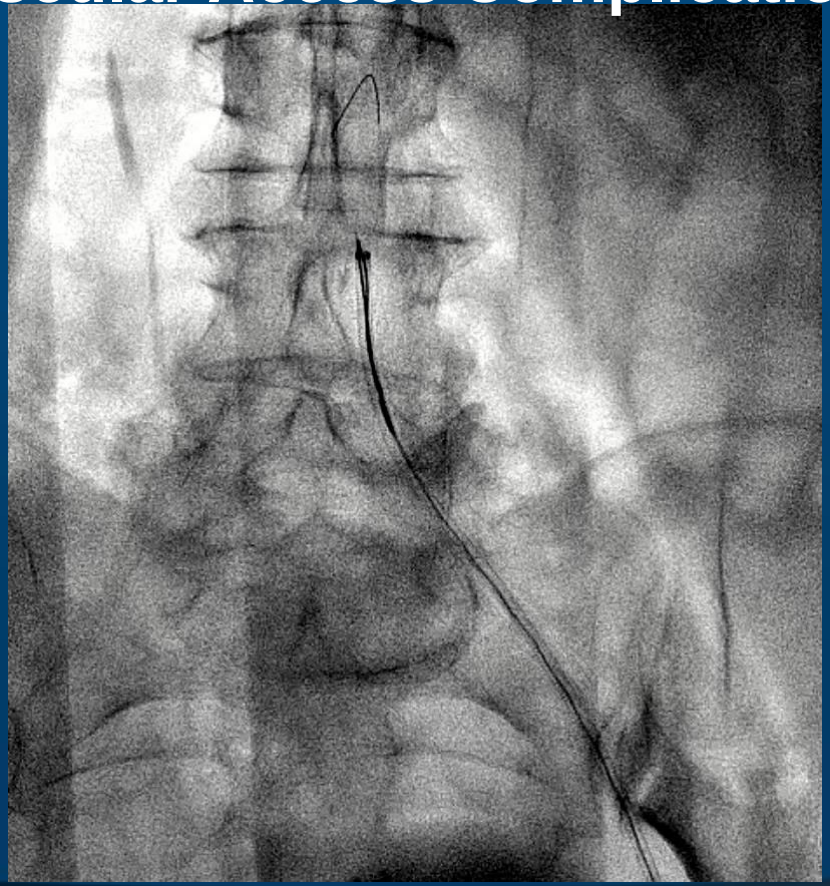


Vascular Access Complications



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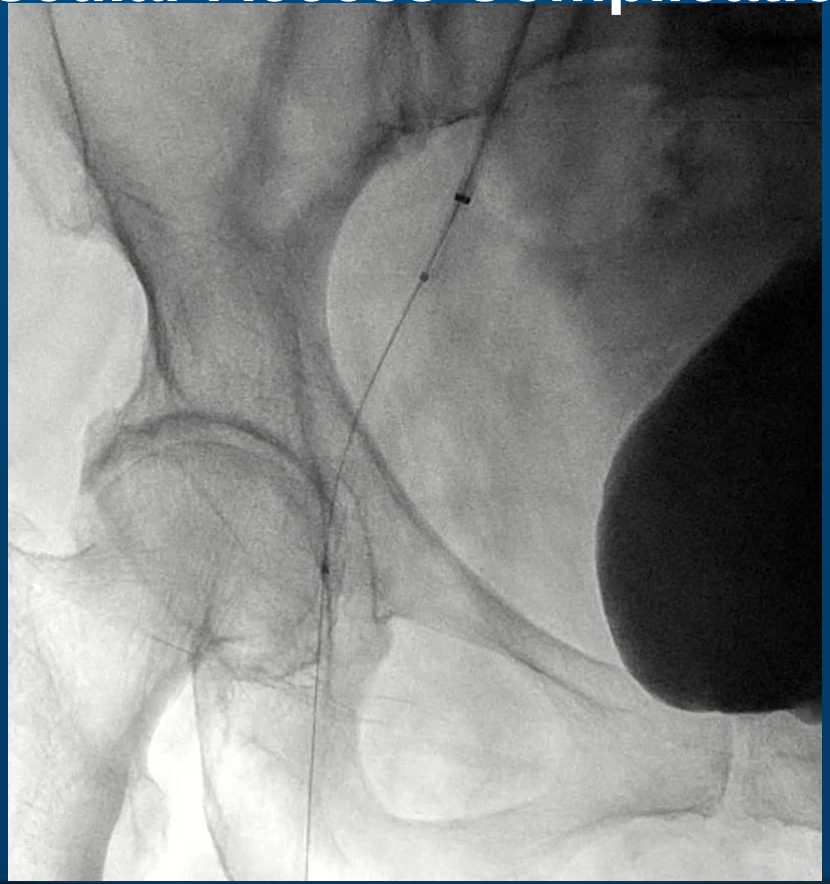

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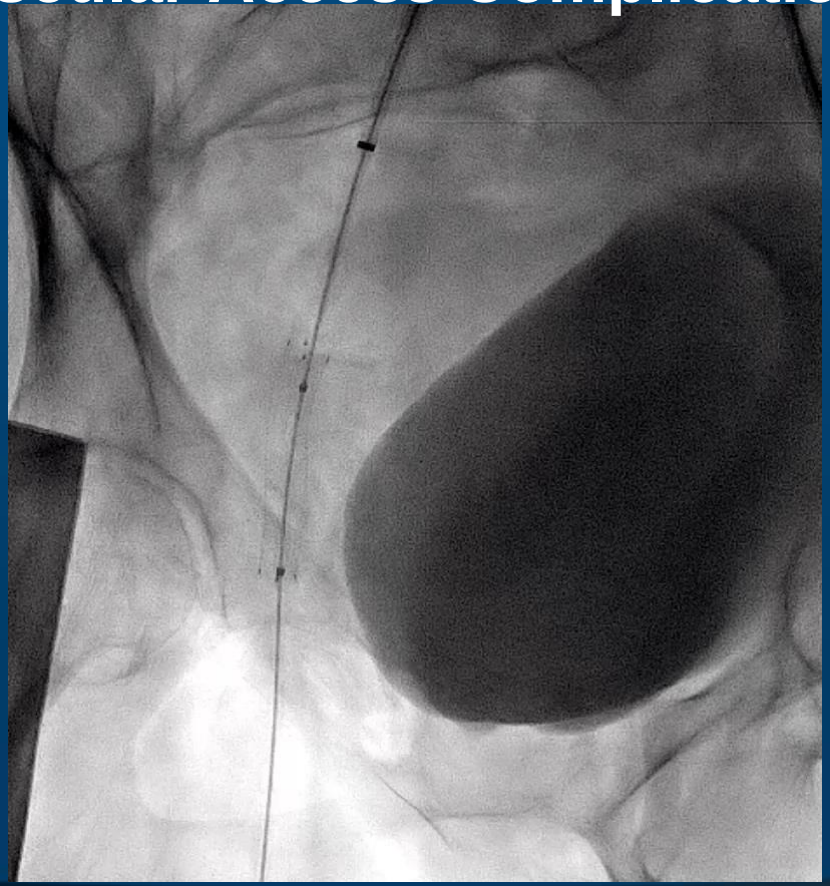
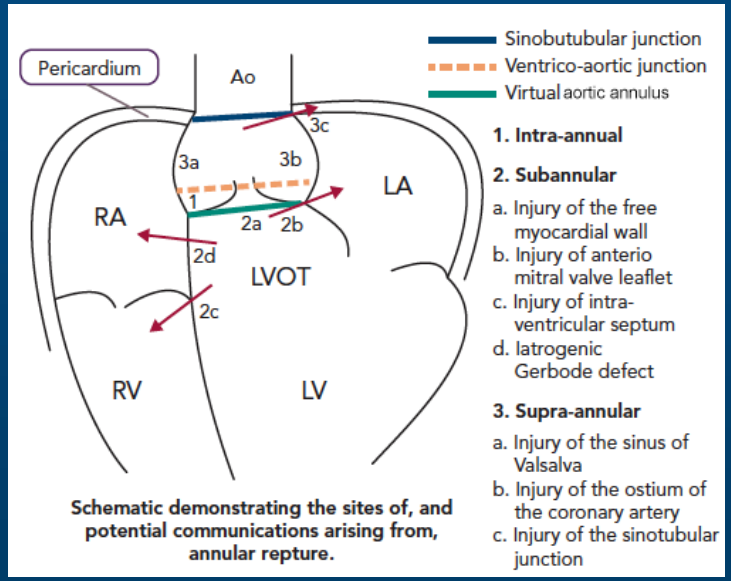


Vascular Access Complications

Device Landing Zone Rupture

- Incidence: 0.5–1%, mortality up to 48%.
- Risk factors: LVOT calcification, oversizing >20%, postdilatation.
- Prevention: CT-based sizing, use self-expanding valves if risk high.
- Management:
  - Contained vs uncontained
  - Surgery, hemostatic matrices, second valve, coils

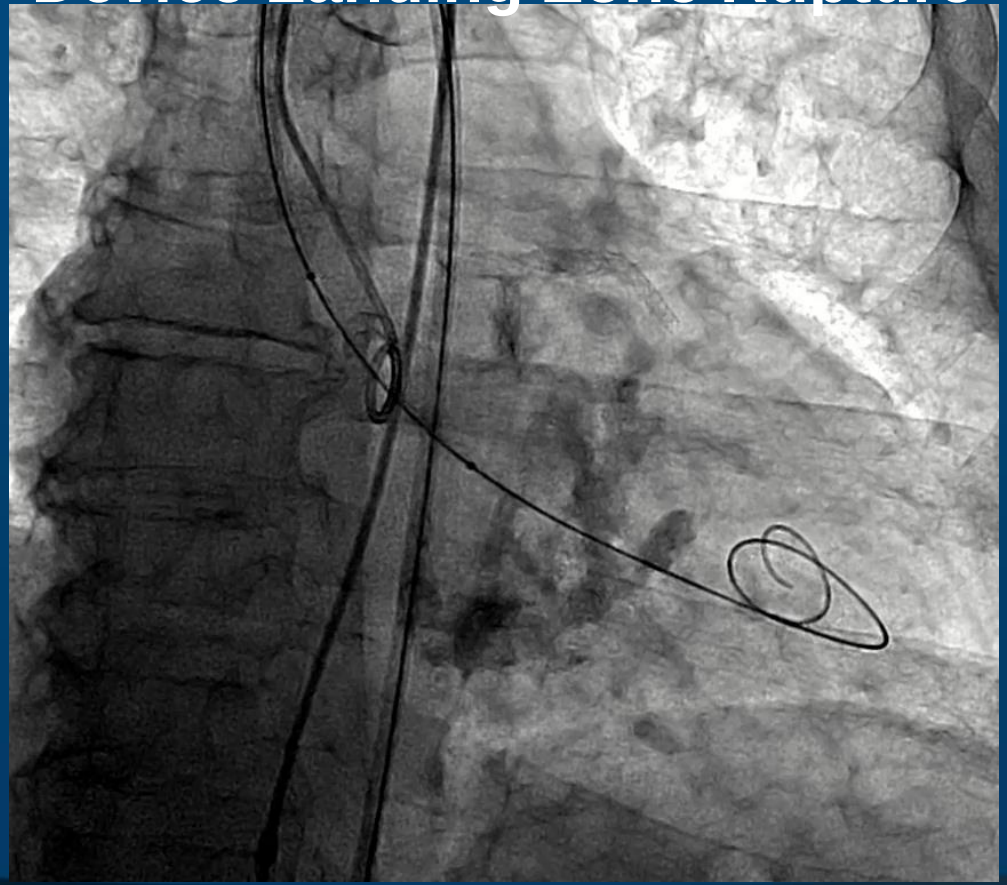


Schematic demonstrating the sites of, and potential communications arising from, annular repture.

- The anatomically weakest region of the muscular LVOT is the region between the left fibrous trigone and the left/right commissure.

Interv Cardiol. 2018 Sep; 13(3): 140–144

Device Landing Zone Rupture



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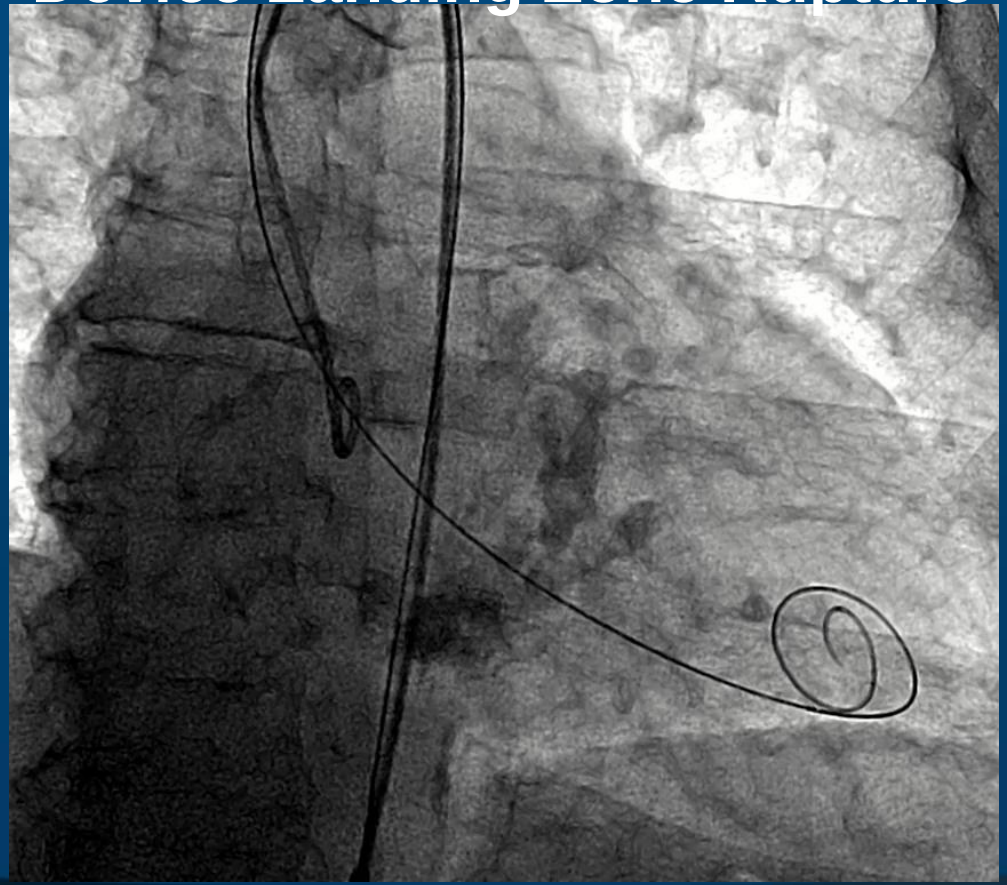

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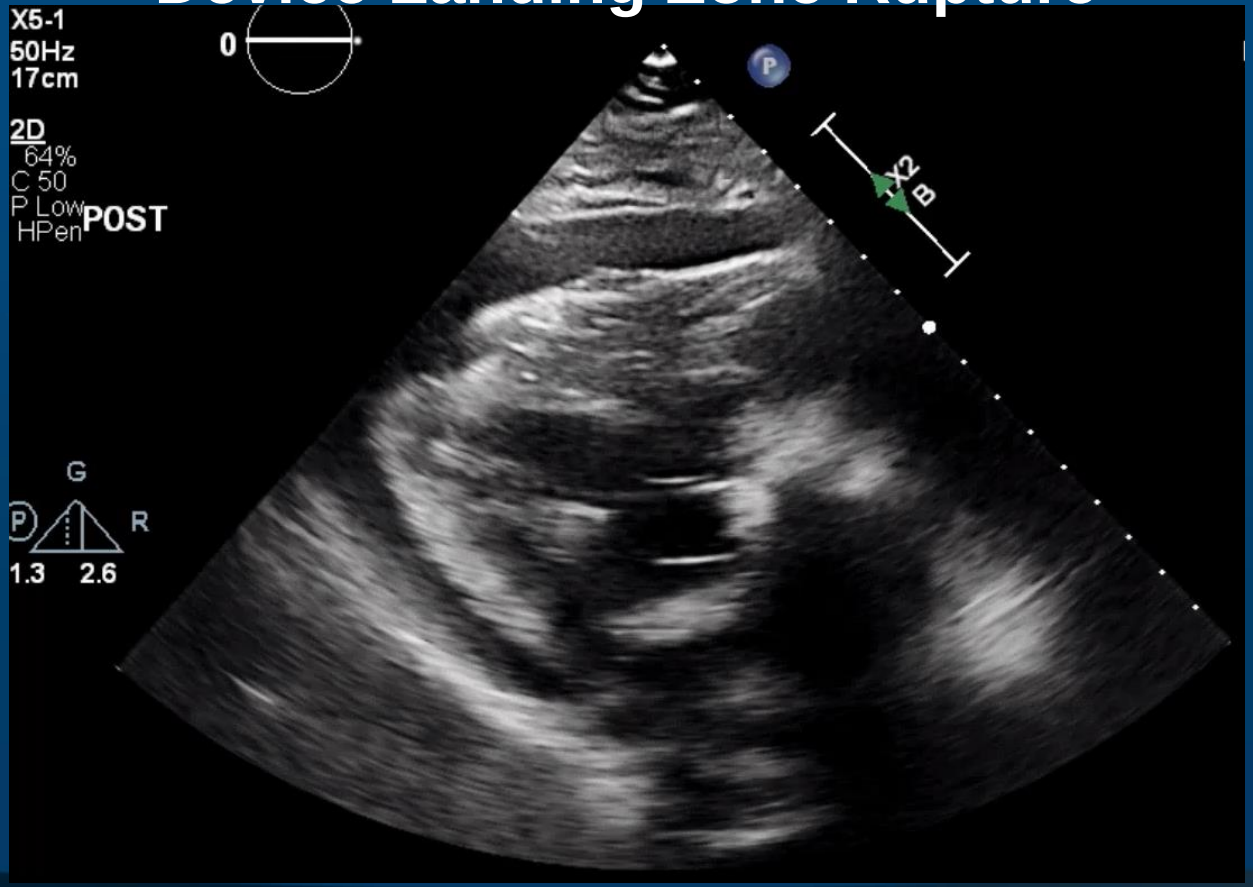

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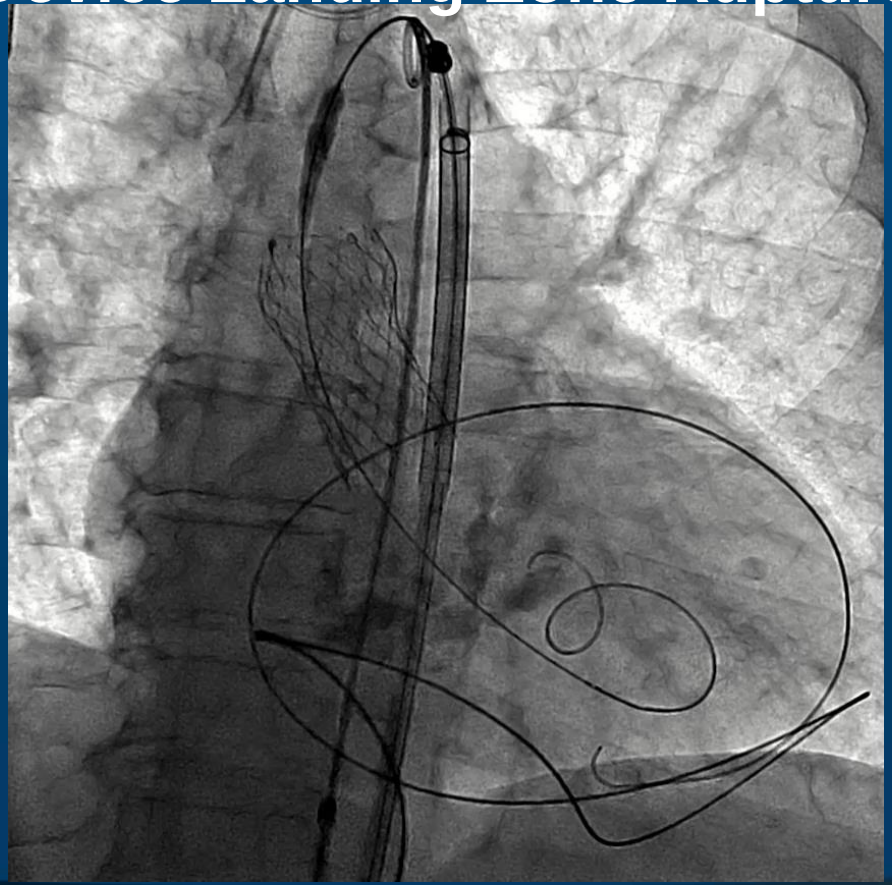

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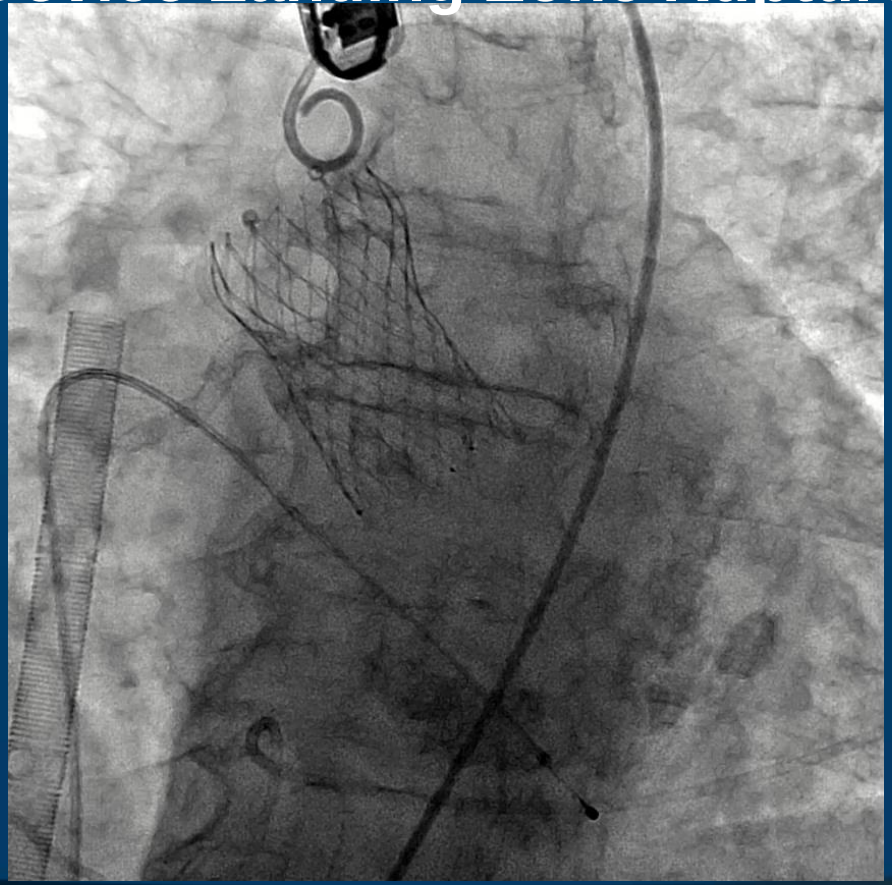

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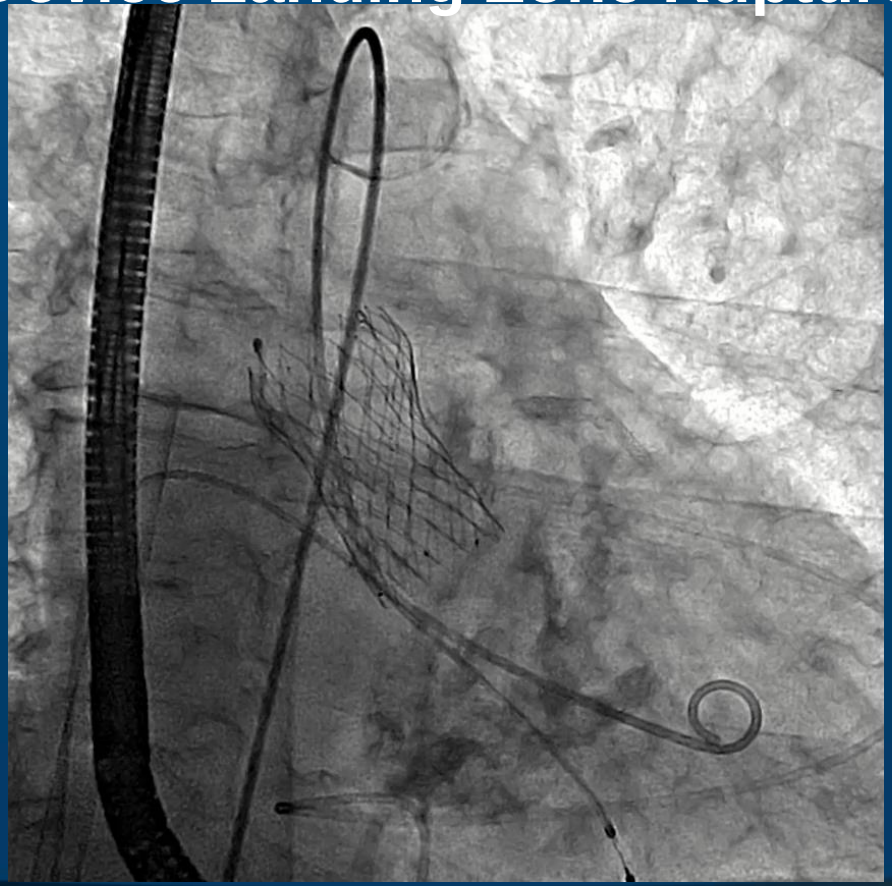

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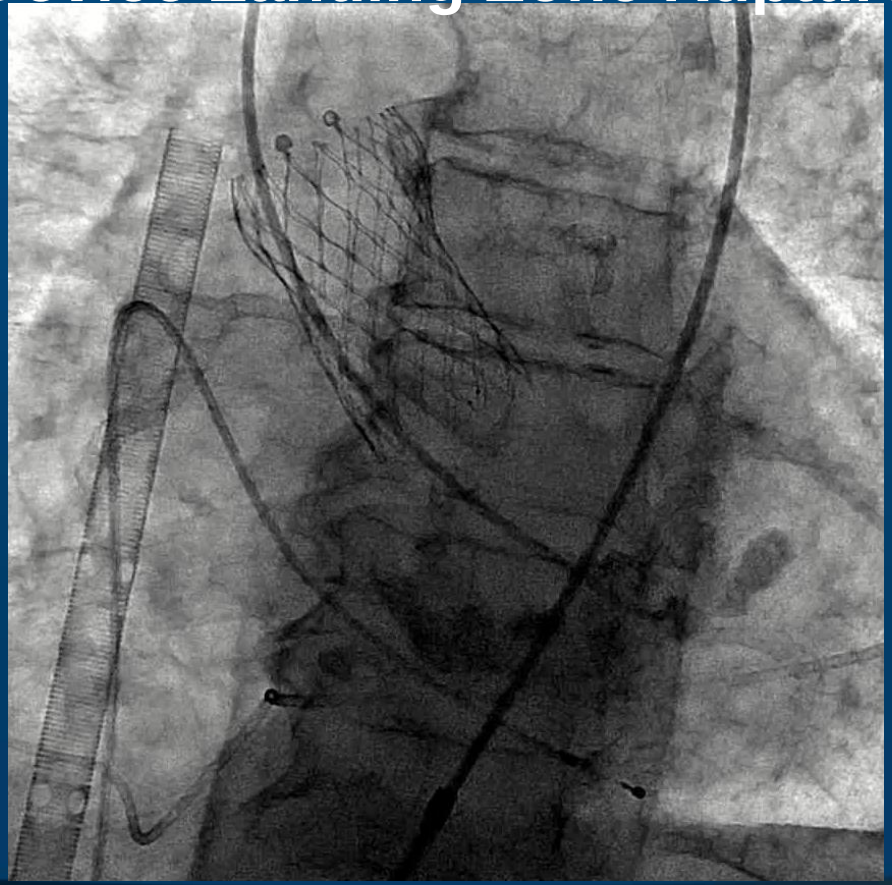
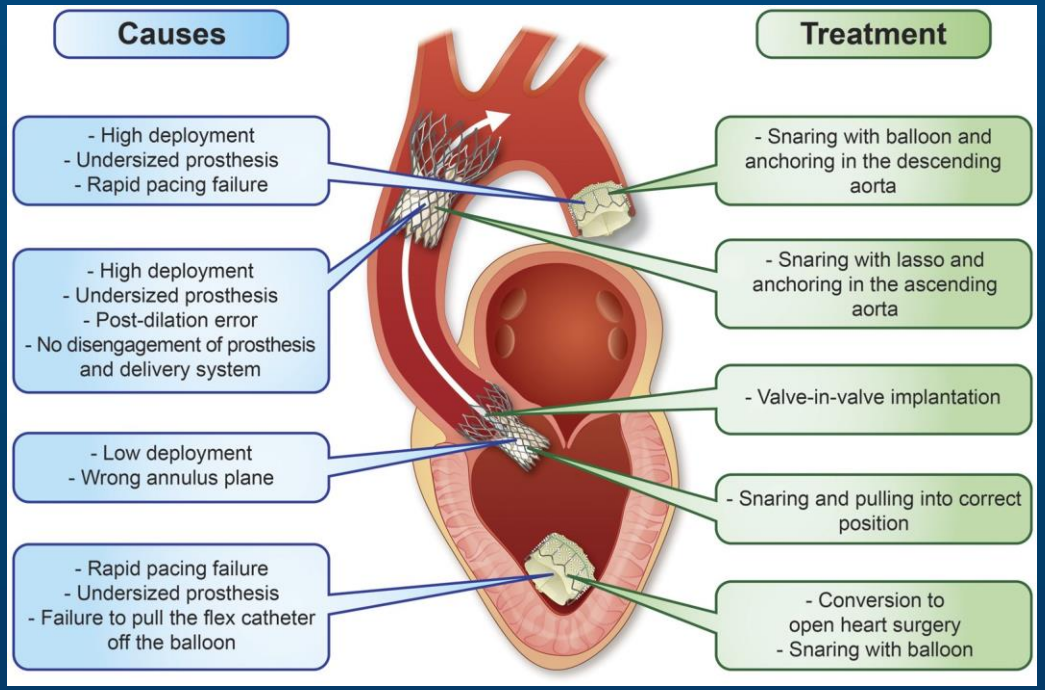


Valve Embolization

- Incidence: 0.2–1.2%; cause of emergent surgery.



Eur Heart J, Volume 40, Issue 38, 7 October 2019, Pages 3166–3168

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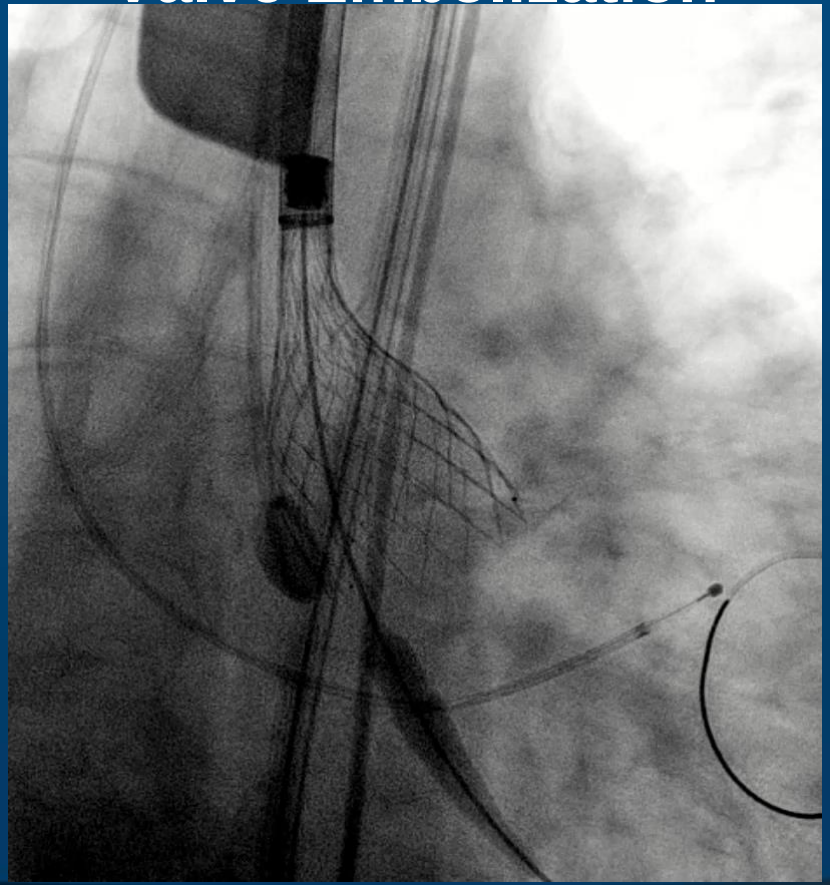

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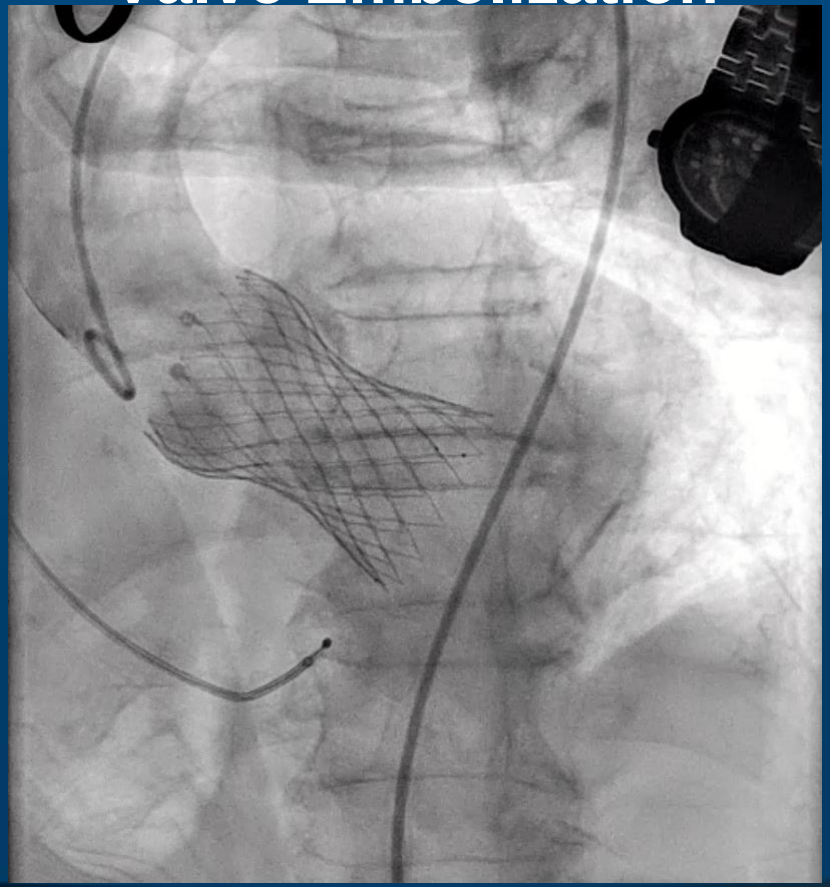

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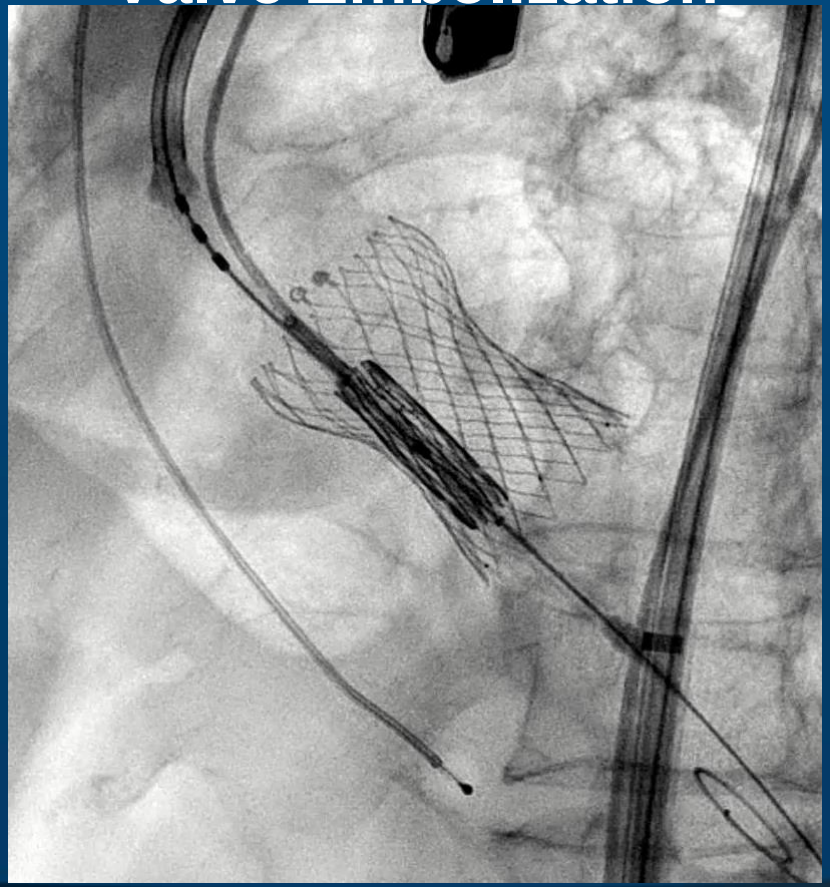

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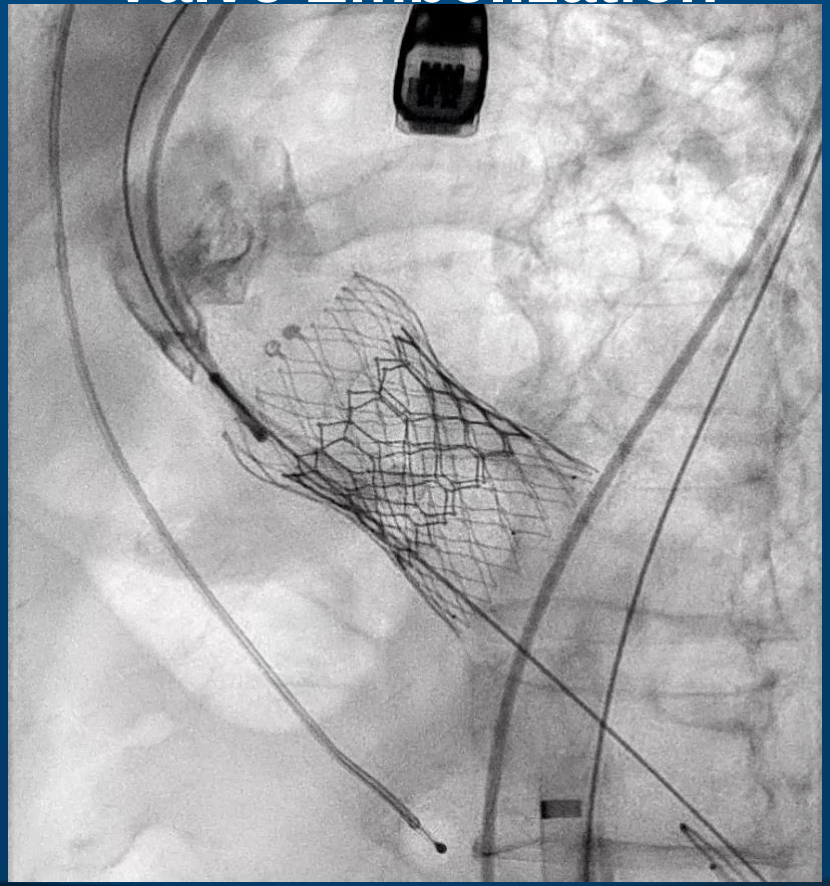


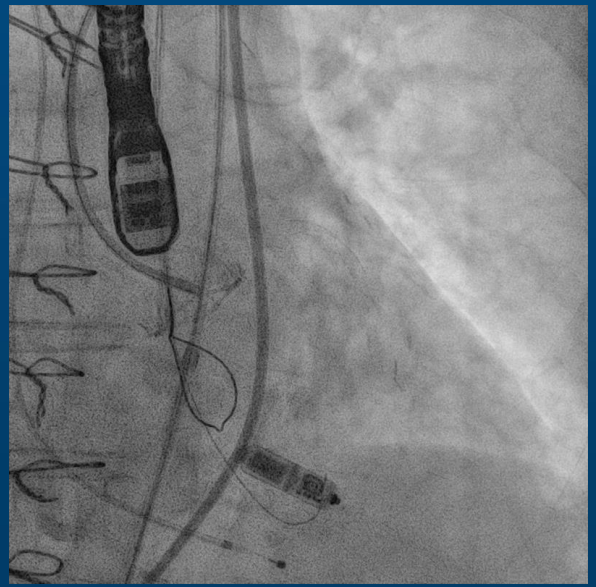
Coronary Occlusion

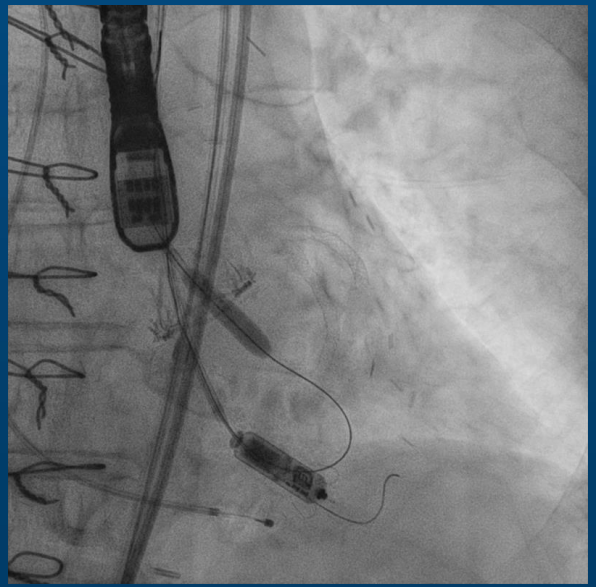
- Incidence <1%, mortality up to 50%.
- Risk factors: coronary height <10 mm, sinus <30 mm, valve-in-valve cases.
- Prevention: CT planning, coronary protection (guidewire/stent),Leaflet modification (Shortcut, BASILICA) for high-risk.
- Management: hemodynamic support, PCI or surgical bailout.

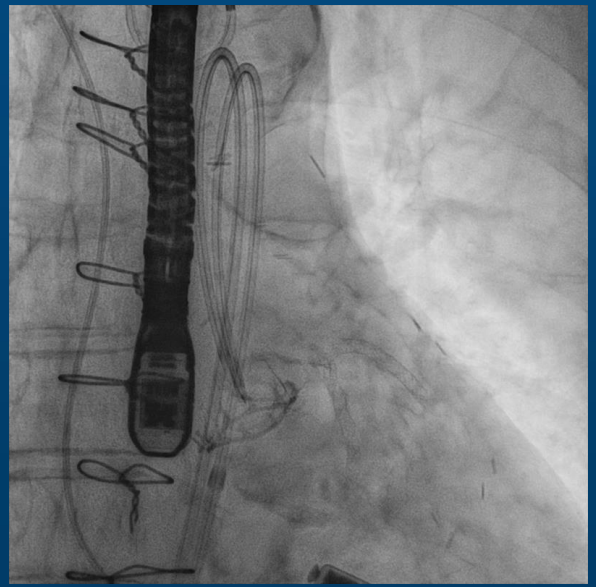
Parameter	High-Risk Threshold	Mechanism
Coronary height	<10–12 mm	Coronary ostial coverage
Sinus of Valsalva width	<30 mm	Leaflet trapping
STJ height	<20 mm	Limited leaflet displacement
VTC distance	≤4 mm	Direct obstruction risk
VTSJ distance	≤2 mm	Sinus sequestration risk
Valve type	Externally mounted / stentless	Leaflet displacement
Leaflet calcification	Heavy/bulky	Poor leaflet deflection

JACC Cardiovasc Interv 2022;15(5):508–10.
JACC Cardiovasc Interv 2019;12(13):1197–216.
Cardiovascular Interventions 2021;14(9):941–8.
JACC Cardiovasc Interv 2023;16(4):415.
Ann Cardiothorac Surg 2021;10(5):700.

Coronary Occlusion







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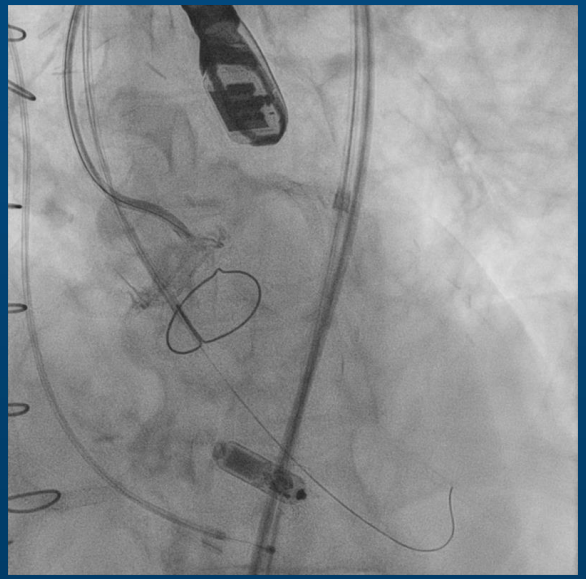

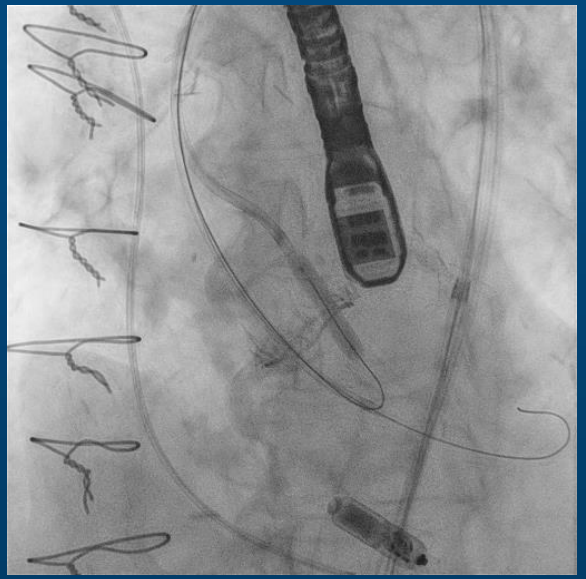

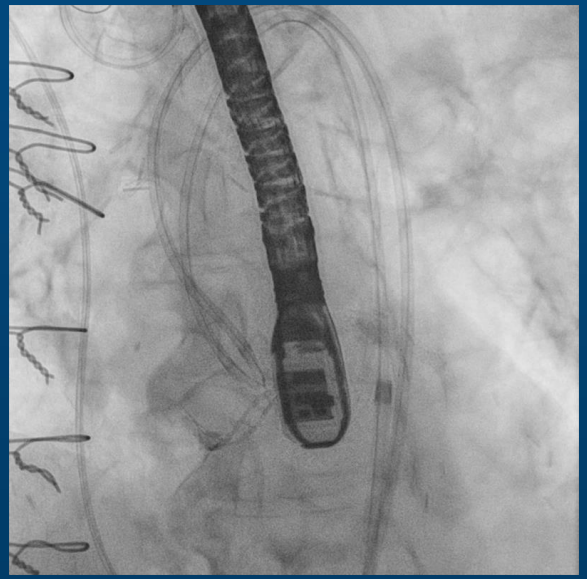

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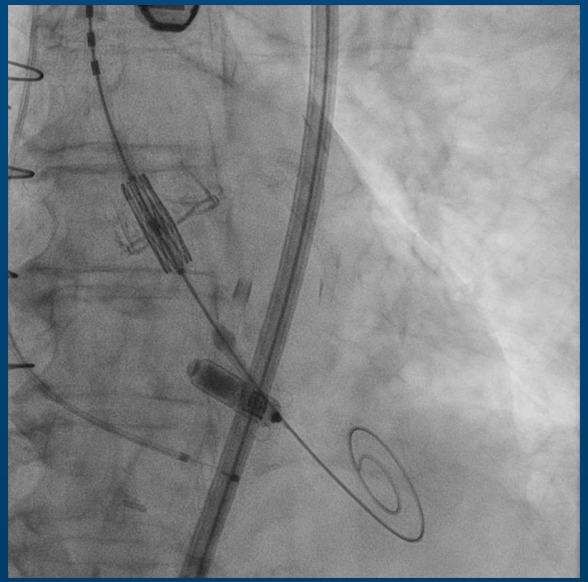
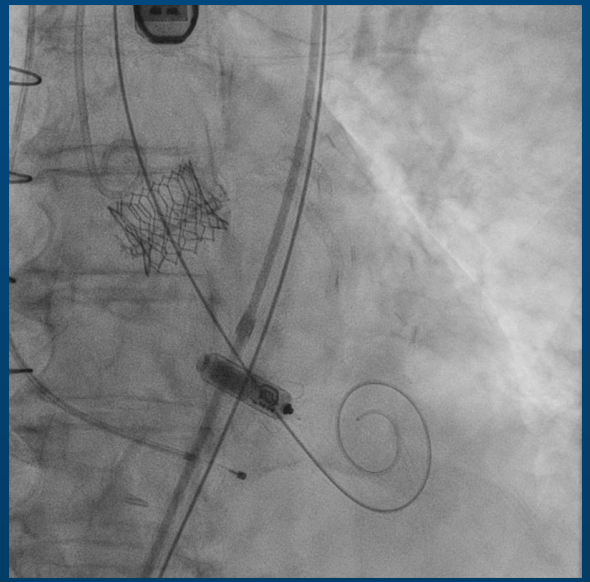
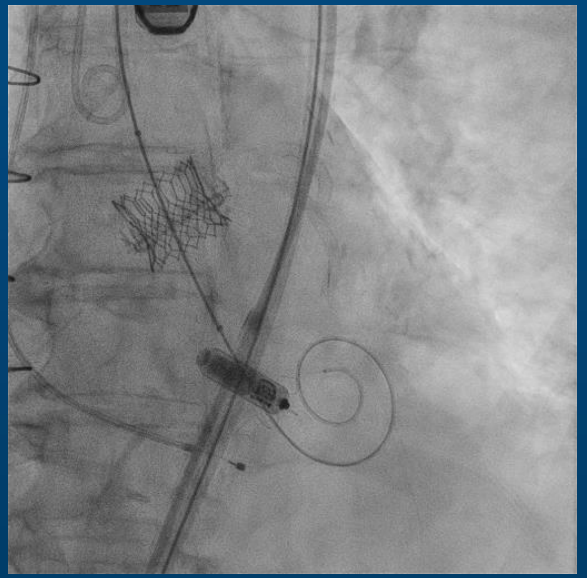






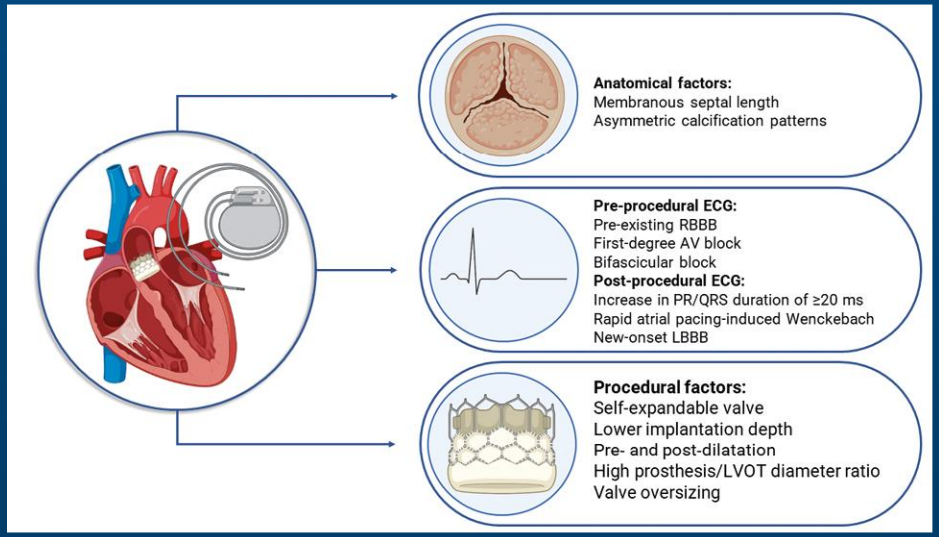
Stroke

- Disabling stroke 0.5–0.6%; MRI lesions ~80%.
- Early (<10 days) vs late (>10 days).
- Prevention: ACT 250–300s, CEPDs (Sentinel use for selected cases), antiplatelet therapy.
- Management: CT/CTA, thrombectomy if feasible

  If new neuro deficit suspected or reported:
  - Immediate neuro exam
  - Non-contrast head CT to rule out hemorrhage.
  - CTA head/neck if considering large-vessel occlusion.
  - ECG /Review telemetry for atrial fibrillation or arrhythmia.

Conduction Abnormalities

- Most common complication.



- Prevention: minimize implant depth, minimize oversizing, pacing for high risk.
- Management: Early EP consult, clear pacemaker protocol, Ambulatory ECG Monitoring

Kardiol Pol. 2023;81(4):330-337.

Summary

- Preprocedural imaging and planning are key.
- Prevention > treatment for TAVR complications.
- Team preparedness essential for bailout.

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Thank You!

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