

The Radial Catheterization Revolution

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Why Embrace Radial Catheterization?

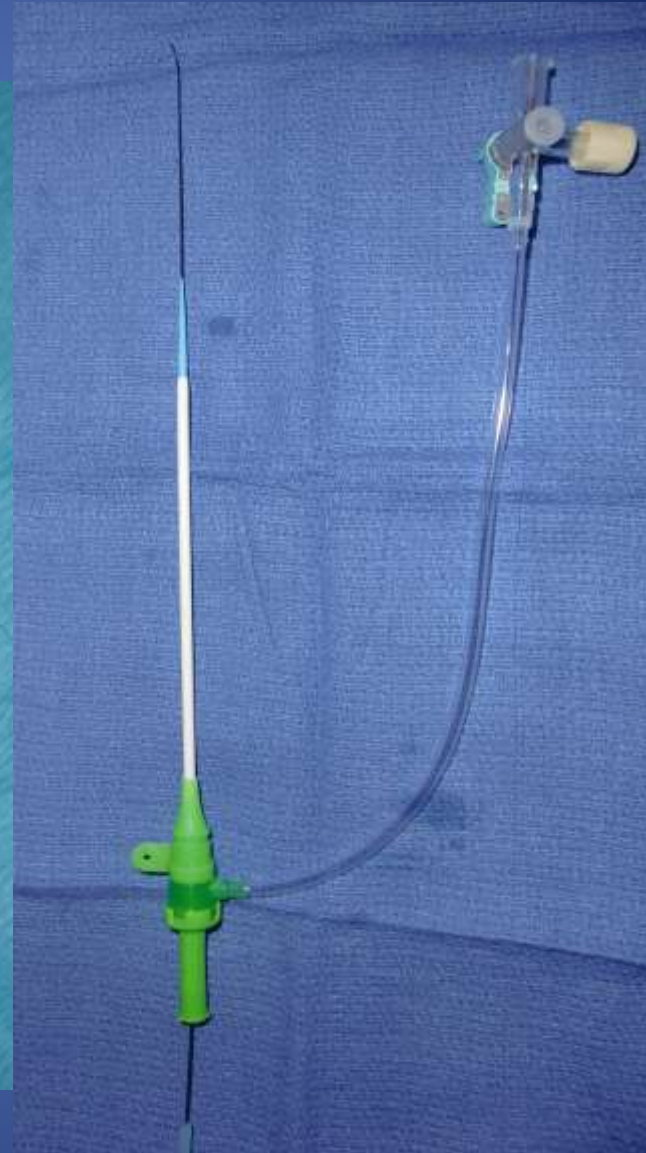
- Highly convenient for daily operations
- Diagnostic catheterization is safe and feasible for most patients
- Percutaneous revascularization is safe and feasible in many patients
- Vascular complications particularly bleeding is lowered
- MACE events lowered in STEMI populations
 - Guideline endorsement by ESC
- Patient preference is consistent and compelling
- Physician radiation risk is lower today

What is the Reality?

- Failure rates remain 5-10% even in experienced centers
- Femoral bleeding rates and overall complications are much lower today
- The femoral approach remains most suitable for the most complex procedures
- Vascular closure devices also improve efficiency and cath lab efficiency
- Improved MACE events in STEMI inconclusive
- Procedural expenses may be higher

Radial Artery Access

- Operator experience is essential
 - Patient meticulous technique, finesse not force
- Use dedicated micropuncture needle and guide wires
- Hydrophilic tapered short sheaths, 5-6 Fr
- Vasodilators: nitroglycerine +/- calcium blockers
- Heparin 3000-5000 units at start of procedure
- Minimize catheter exchanges
- Ensure supportive equipment available
 - Hydrophilic glide wires, Wholey Wires, 0.014- 0.018 wires, coronary balloons, catheter variety



Access Set Up and Technique



Anatomy and Access



Radial Hemostasis, Patency and Repeat Access

- Remove sheath very soon after procedure
- ACT assessment not essential
- Use patent hemostasis with dedicated transradial occlusive bands
- Compress 20-30 min after diagnostic cases and 30-45 min after PCI
- Repeat access is feasible in most patients
- Alternative wrist also very reasonable

Pancholy S, et al CCI 2008;72:335-40

Pancholy S, Patel T. CCI 2012;79:78-81

Dahm J et al. CCI 2002; 57:172-176

Sciahbasi A et al. Am Heart J 2011;161:172-9.

Allen's Test

Case For

- Demonstrates collaterals through the Palmer arch
- Radial artery vital if no collaterals present
- Hand ischemia is potentially devastating
- Documentation provides protection against law suits

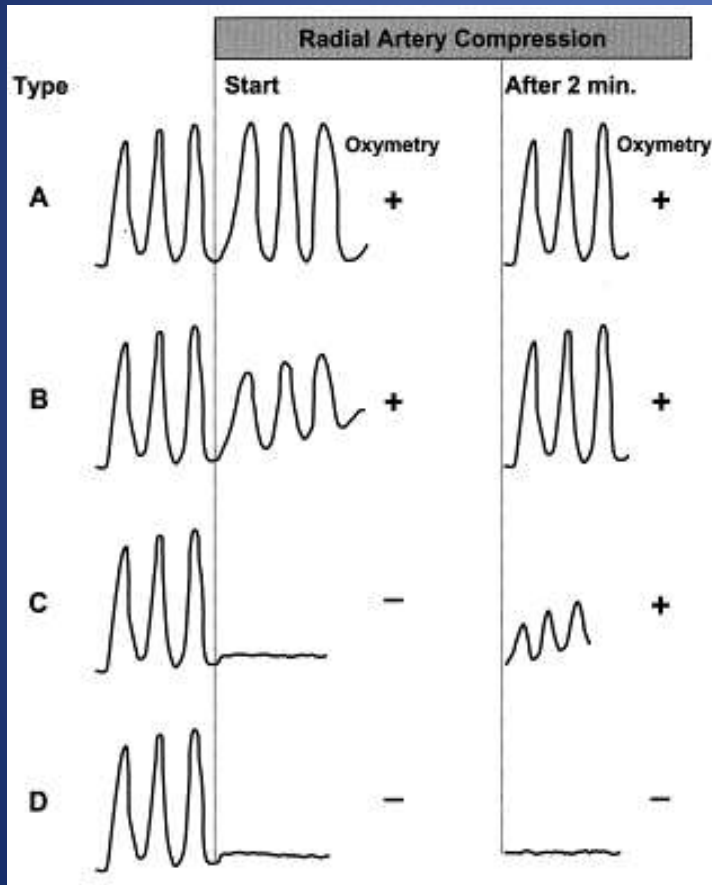
Case Against

- Surgical experience shows no ischemia following harvest for bypass
- No clear correlation between absence of collaterals and hand ischemia
- Ischemia usually due to thromboembolism to digits
- Collaterals rapidly develop in response to ischemia

1. J Trauma 2006;206:468-70
2. Surg Today 2006;36(9):790-2.

Oxymetry + Plethysmography

The clamp sensor is applied to the thumb



n=1,010 patients

No damping of pulse tracing immediately after radial artery compression

15%

Damping of pulse tracing

75%

Loss of pulse tracing followed by recovery of pulse tracing within 2 minutes

5%

Loss of pulse tracing without recovery within 2 minutes.

5%

Radial Artery Occlusion

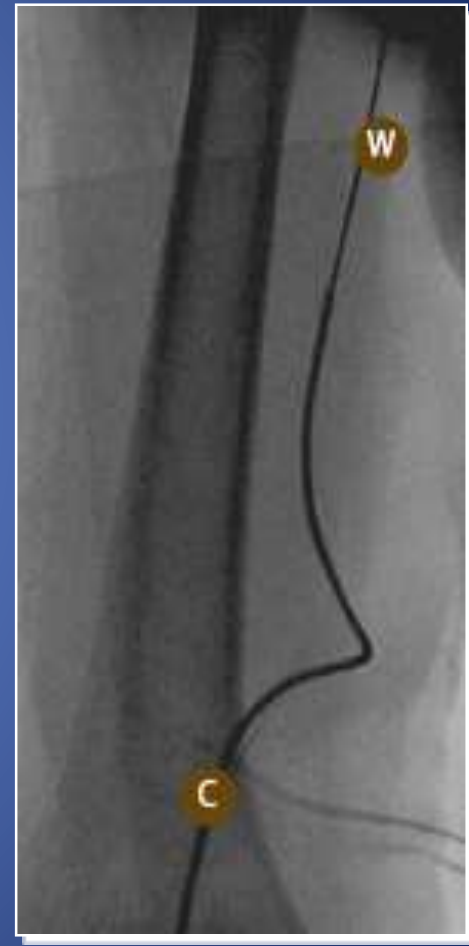
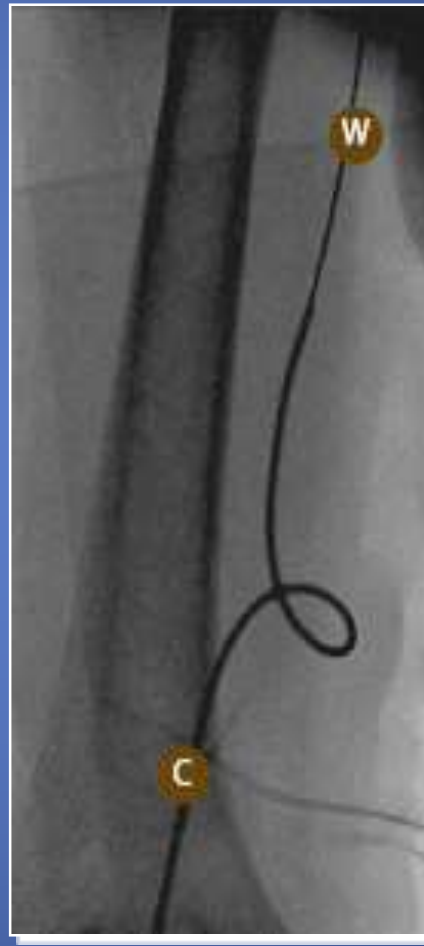
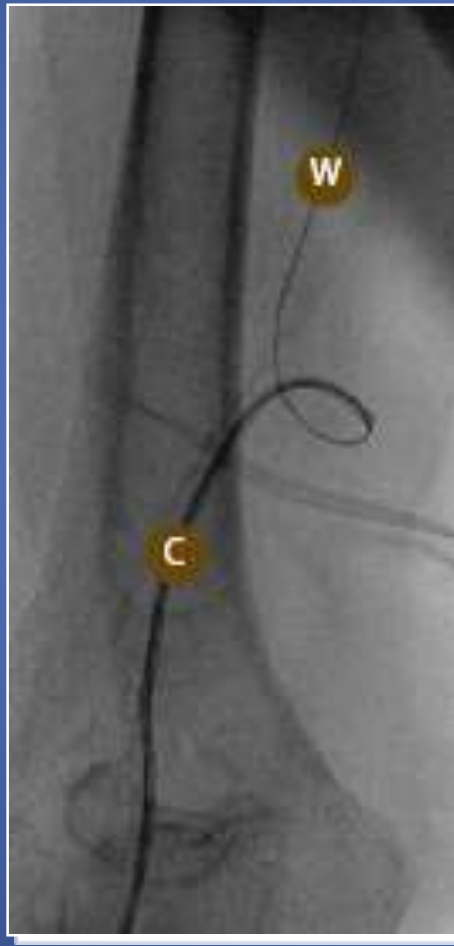
- Seen in ~ 5-10% of patients with systematic surveillance
 - ~1% symptomatic
 - Low rates today attributed to improved techniques
- Vast majority asymptomatic: No Intervention indicated
- Symptomatic acute occlusion may be treated with heparin for 24 to 48 hours

Catheter Manipulation and Mechanisms of Failure

- Radial/Brachial spasm
- Subclavian tortuosity
- Radial artery loops and tortuosity
- Radial anomalies
- Radial/Brachial stenosis
- Radial dissection



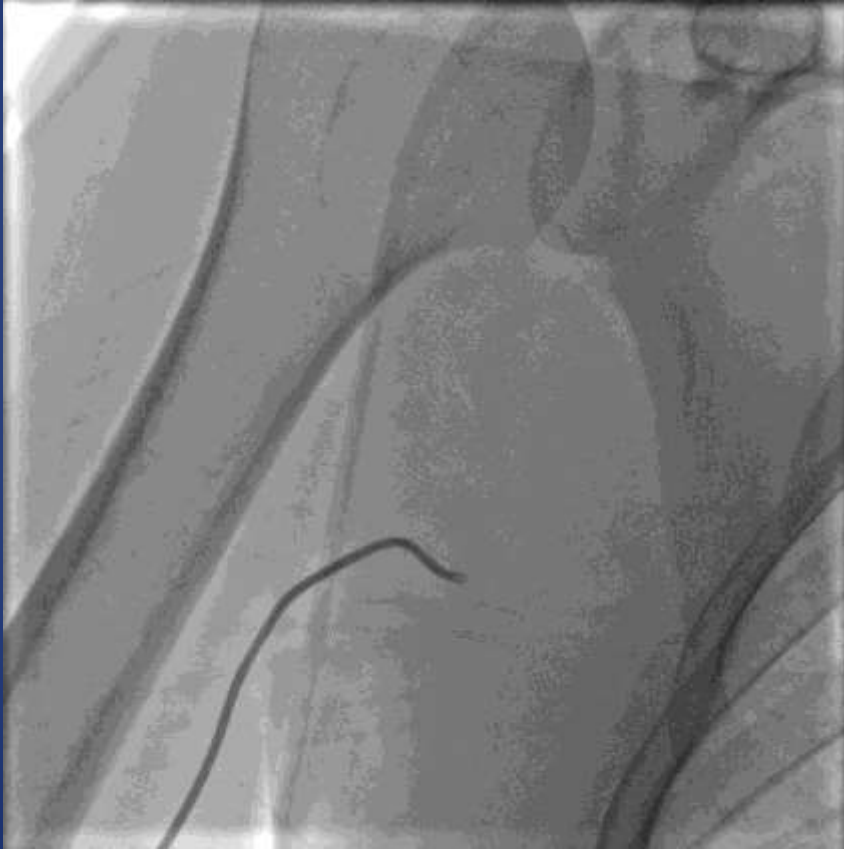
Traversing Radial loops



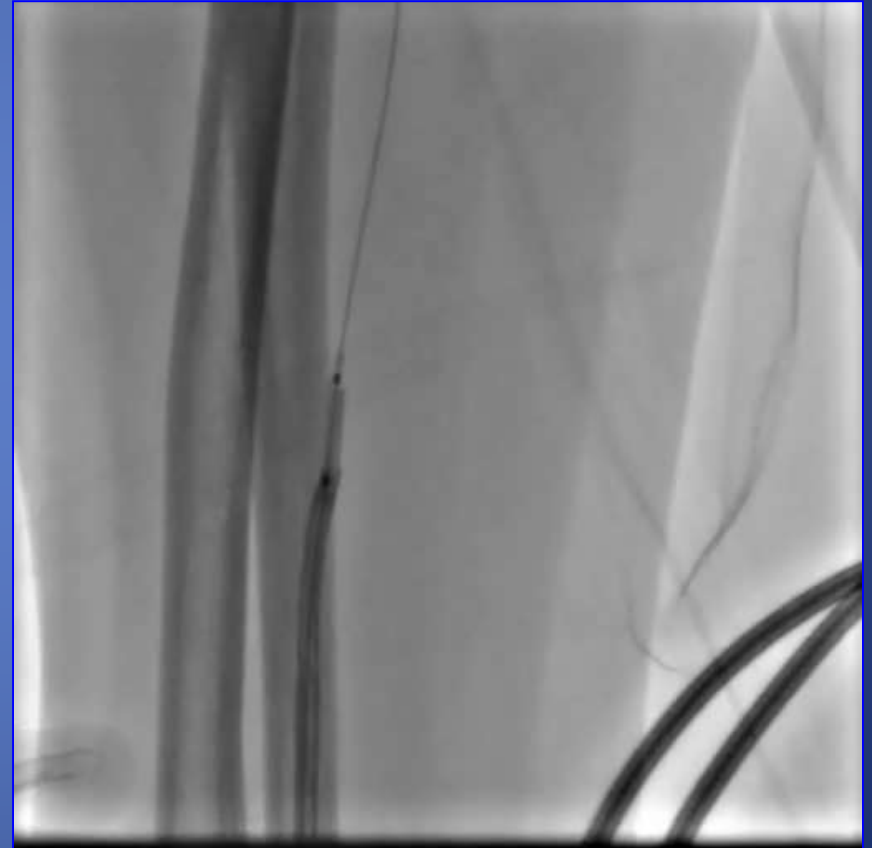
Brachial Tortuosity



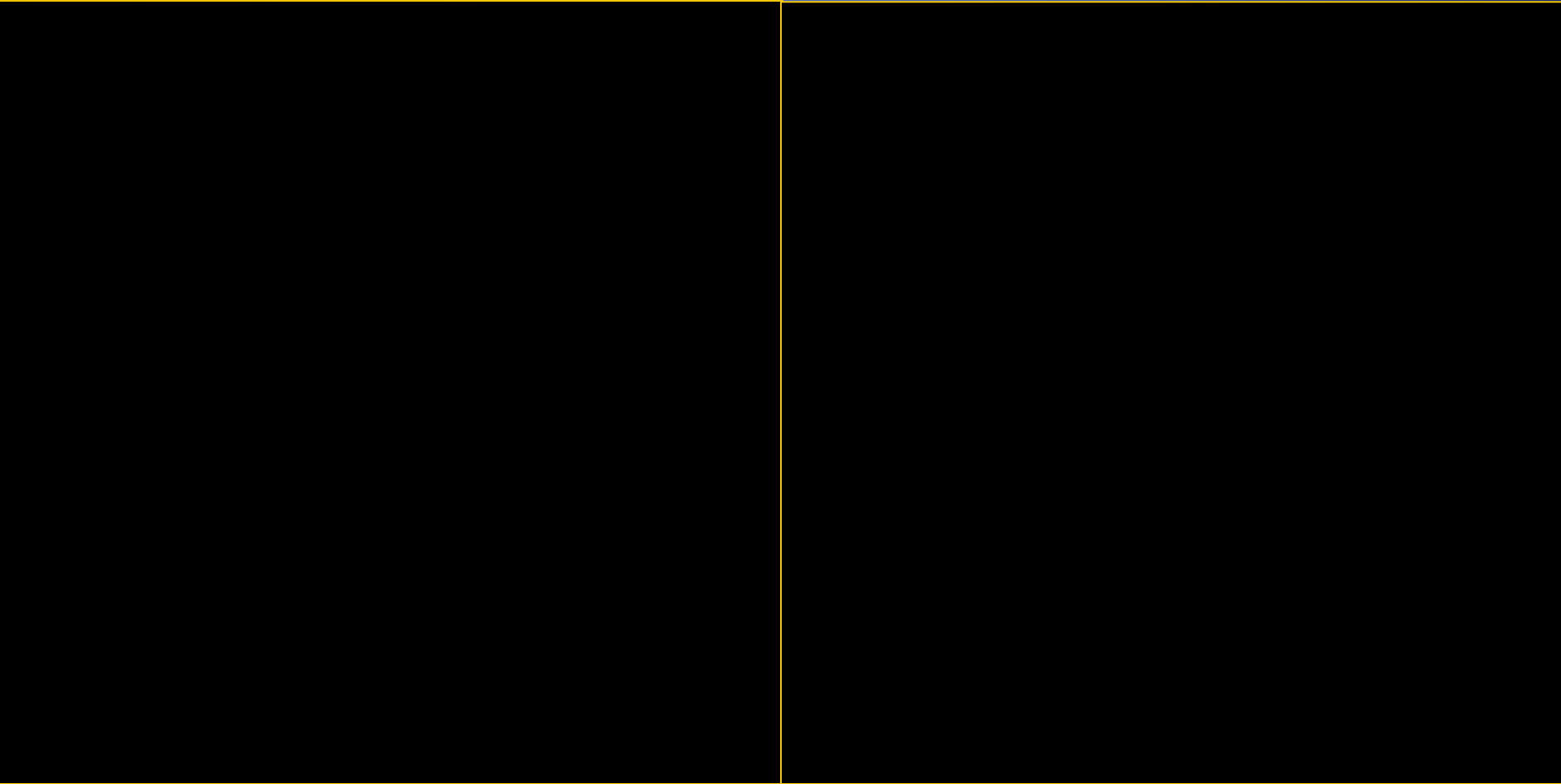
Brachial Tortuosity



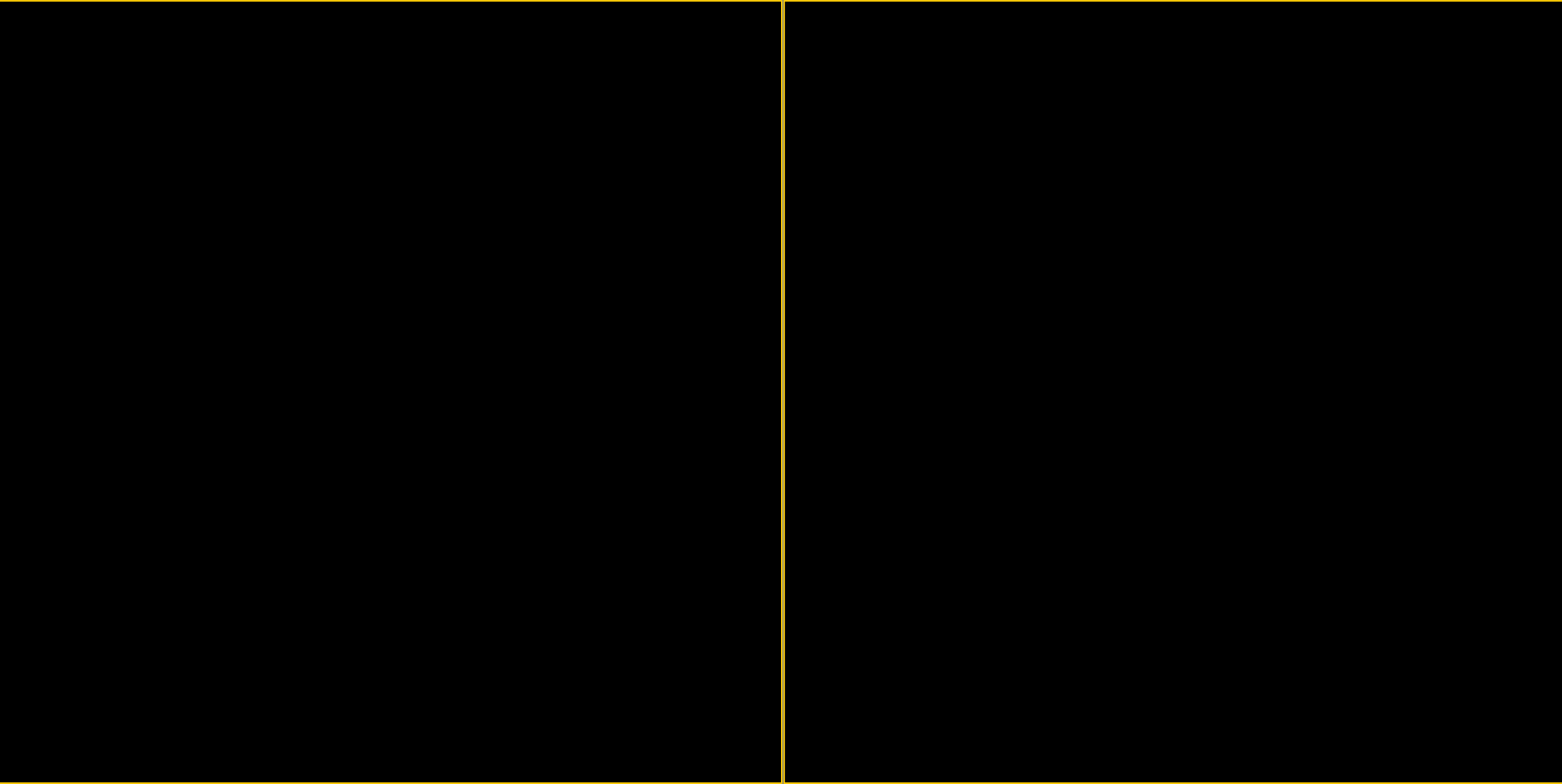
Balloon Assisted Tracking for Spasm



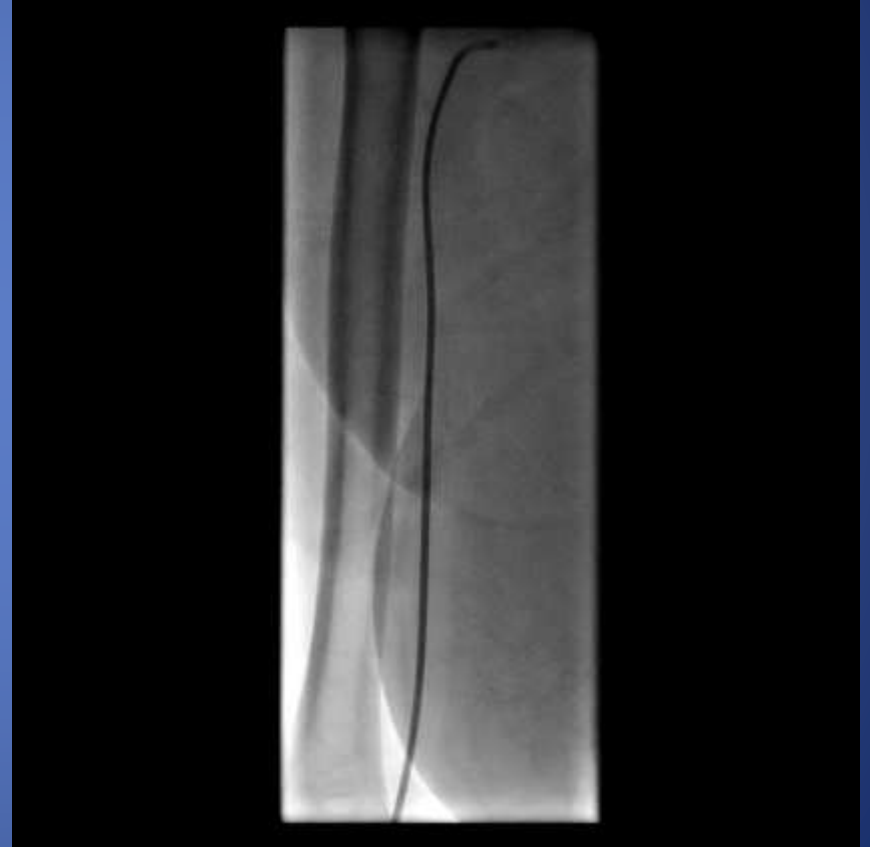
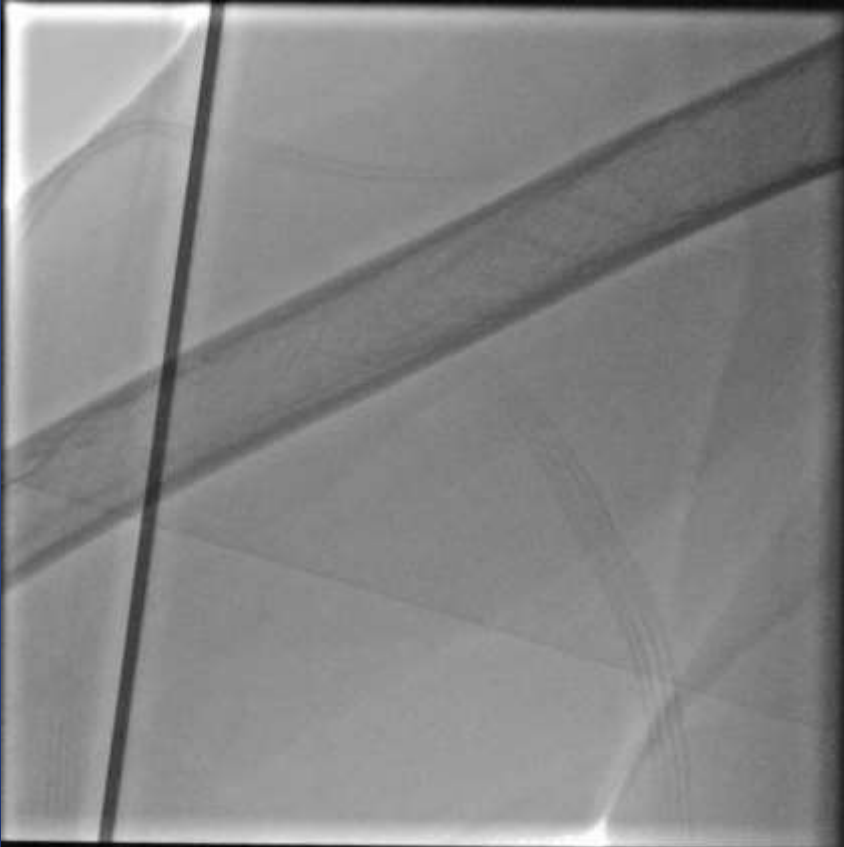
Negotiating Subclavian Tortuosity



Negotiating Subclavian Tortuosity



High Bifurcating Radial Artery



Radial Catheterization Revolution

- The radial is here to stay
- Adoption is feasible and useful for many patients
- Maintain excellent femoral skills
- Do not become stubborn, switch when the case calls for it

TRA: Mechanisms of Failure

Total number of Failures

98/2100 (4.6%)

Failure of arterial access

Inadequate arterial puncture

13%

Failure to advance catheter to ascending aorta

Radial artery spasm

34%

Radial artery dissection

10%

Radial artery loop/tortuosity

6%

Radial artery stenosis

1%

Failure to complete PCI due to lack of guide support

Subclavian tortuosity

18%

Inadequate guide backup support

17%

2100 patients
n=2,100

Dehghani, P. et al. J Am Coll Cardiol Intv 2009;2:1057-1064
Dehghani, P. et al. J Am Coll Cardiol Intv 2009;2:1057-1064

