Radials for everyone?

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Interventional Cardiology

Radial prevalence, worldwide

TABLE I. Worldwide Transradial PCI Utilization by Country and Region

	National Database			
Source	PCI/year	% radial (%)	Year	Type
Germany		25		
France	115,000	55	2008	National
UK	80,331	35	2008	National
Spain		43		
Italy		25		
Poland	90,238	21.8	2008	National
Countries (<50 K PCI/year)	16,527	15.7	2006	EAPCI/ SCAAR
Europe total	719,094	47.5	2009	
USA			2008/9	NCDR

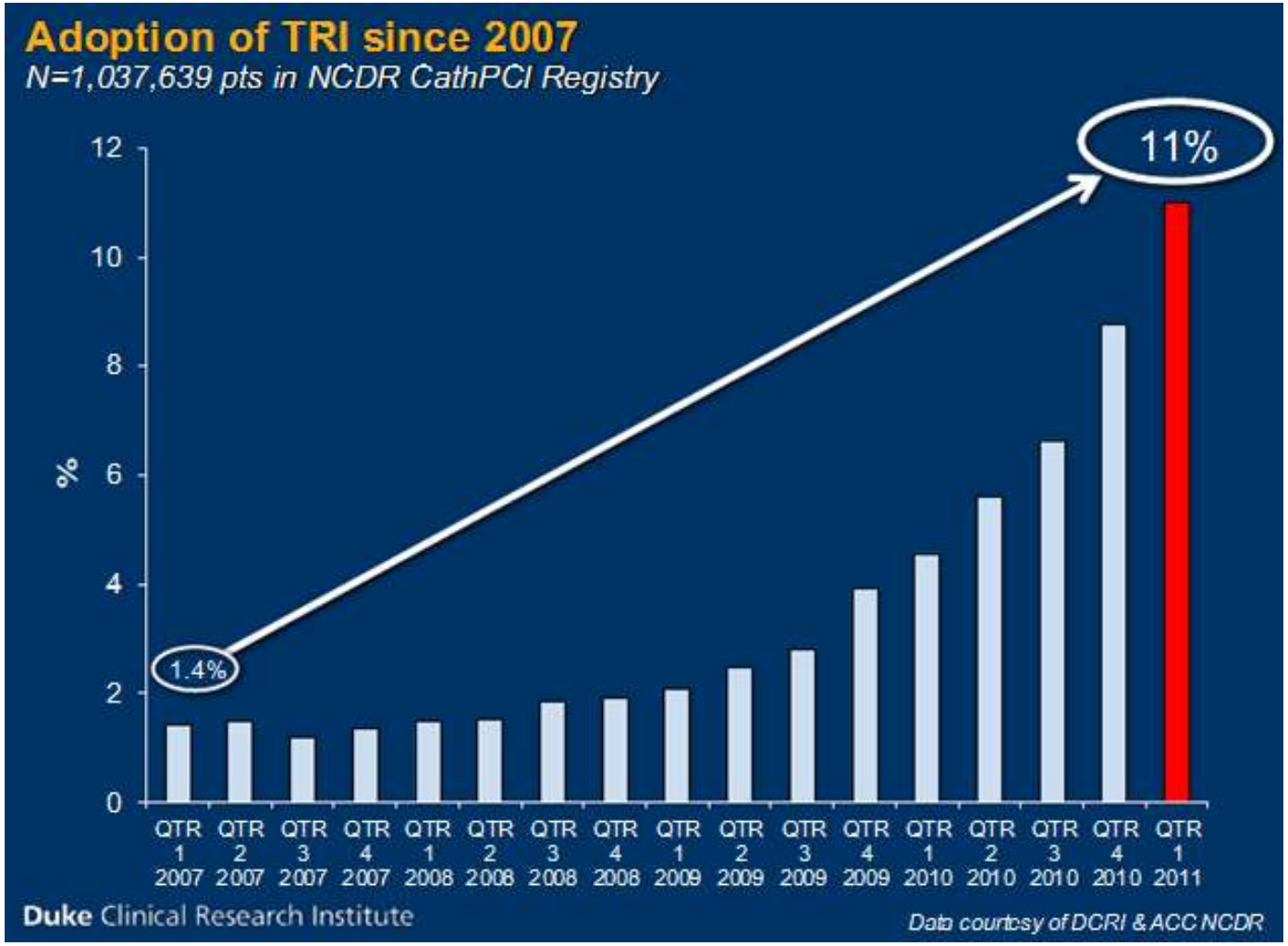
Japan 60%

India 32%

China 25%

Caputo, CCI, 2011

Radial prevalence, US



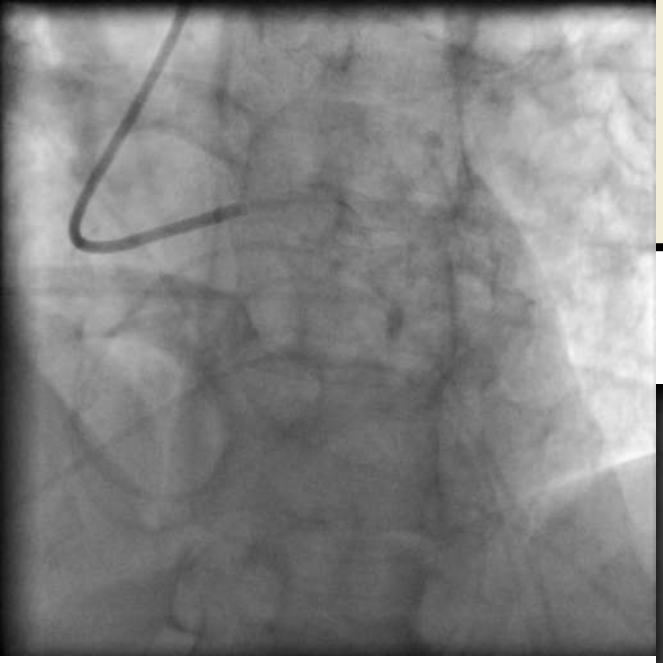
We went to the leg for a reason…

Why go back to the arm now?

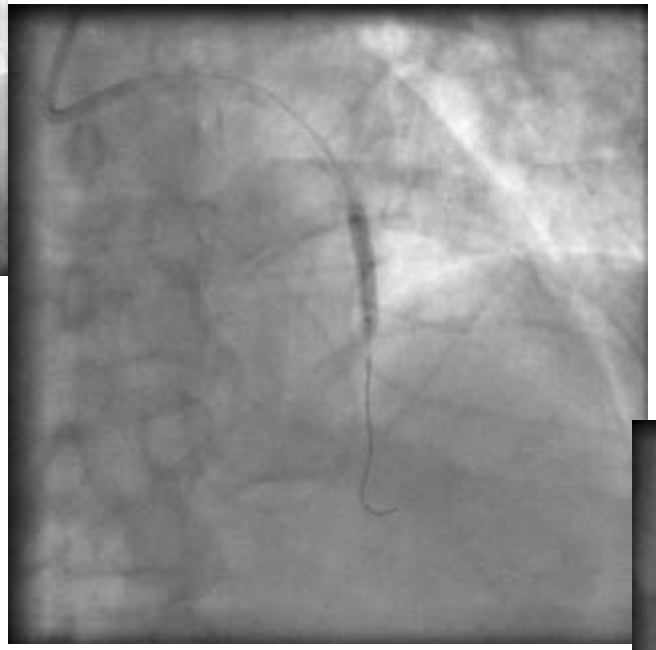
The benefits of radial access

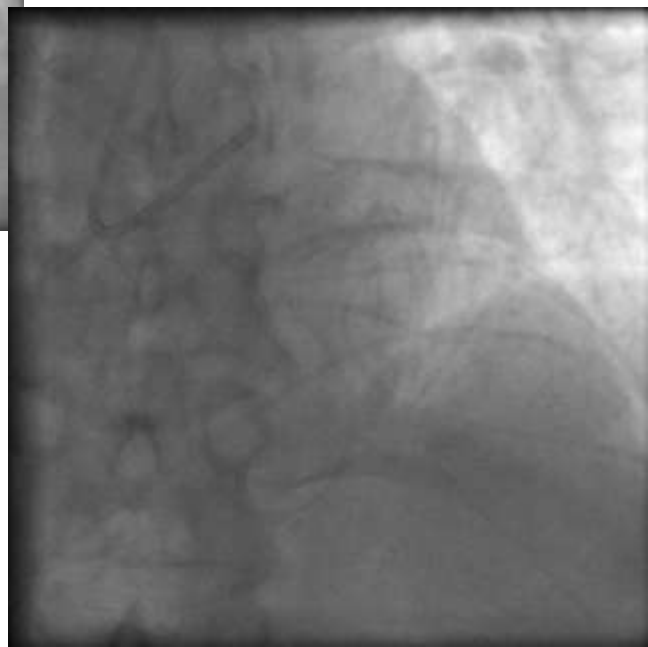
- Safety
- Patient preference
- Efficacy
- Cost
- Niche access

Case #1



75 yo female, anterior STE
Received UFH, ASA, Plavix, at OSH
Transferred to PCI Center
Body weight: 61 kg





Bleeding risk factors:

- -STEMI presentation
- -Sex
- -Age
- -Body weight
- -Adjuvant meds

Safety

Serious access site complications can be (almost) completely eliminated

Bleeding complications with PCI remain 2-5%

Photos from Z. Turi

Unselected PCI: bleeding site

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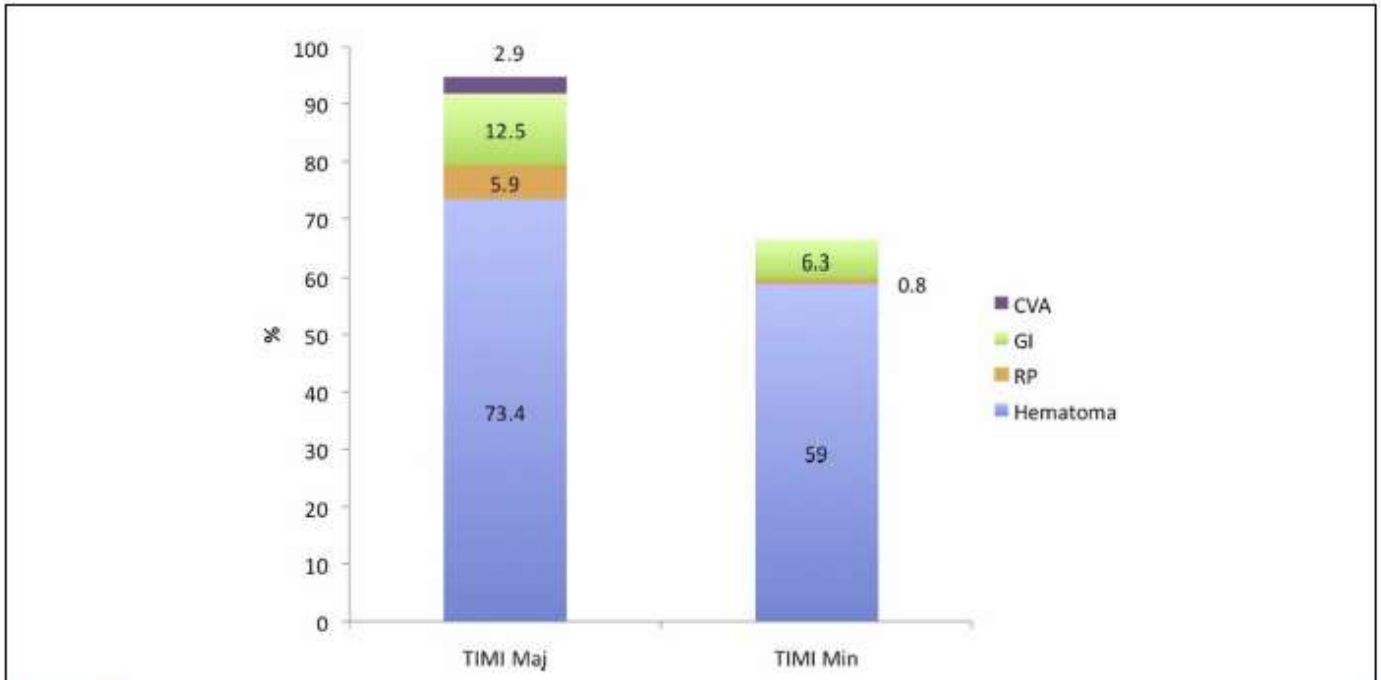


Figure 3 Site of Bleeding Complications in an Unselected Cohort of Patients Undergoing PCI

Overall rate of Thrombolysis In Myocardial Infarction (TIMI) major (maj) bleeding = 5.4%; overall rate of TIMI minor (min) bleeding = 12.7%.
CVA = cerebrovascular accident (ischemic stroke); GI = gastrointestinal bleeding; RP = retroperitoneal hemorrhage. Adapted from Kinnaird et al. (30).

Bleeding and negative outcomes

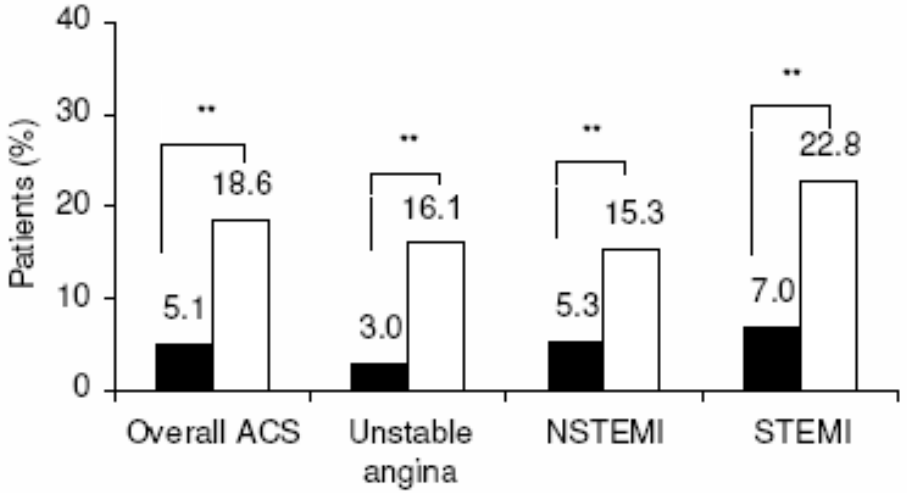


Fig. 2 In-hospital death rates in patients who developed (open bars) or did not develop major bleeding (closed bars) (STEMI=ST-segment elevation myocardial infarction; NSTEMI=non-ST-segment elevation myocardial infarction). **P< 0.001 for differences in unadjusted death rates.

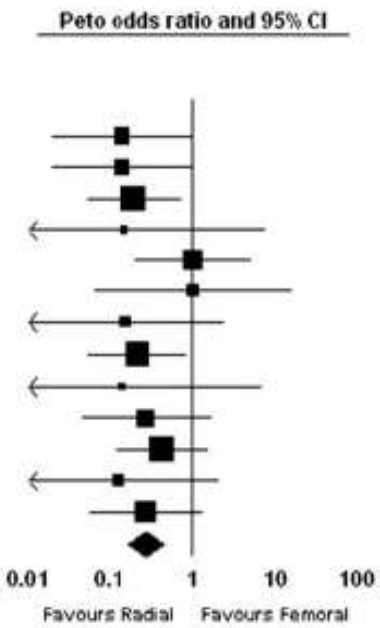
Bleeding with PCI is associated with negative outcomes including mortality across the spectrum of CAD presentation

Moscucci, EHJ, 2003

Radial vs. Femoral bleeding rates

A) **Major Bleeding**

Study name	Radial	Femoral	Peto odds ratio
ACCESS	0 / 300	4 / 300	0.13
Achenbach	0 / 152	4 / 155	0.14
Bodi	3 / 666	7 / 332	0.19
BRAFE	0 / 50	1 / 55	0.15
FARMI	3 / 57	3 / 57	1.00
Gorge	1 / 214	1 / 216	1.01
Mann 1998	0 / 68	2 / 77	0.15
OCTOPLUS	1 / 192	7 / 185	0.21
OUTCLAS	0 / 322	1 / 322	0.14
RADIAL AMI	1 / 25	4 / 25	0.27
RADIAMI	3 / 50	7 / 50	0.41
TEMPURA	0 / 77	2 / 72	0.12
Vazquez-Rodriguez	1 / 217	5 / 222	0.27
	13 / 2390	48 / 2068	0.27

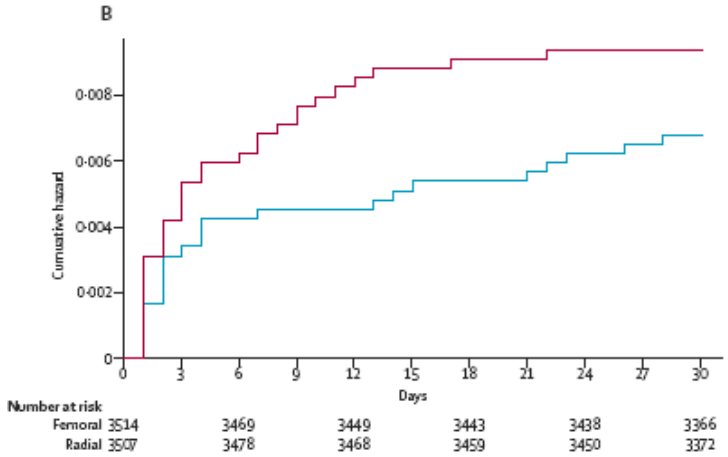


OR 0.27 (95% CI 0.16, 0.45) $P < .001$

Jolly, AHJ, 2009

RIVAL
Bleeding & Vascular complication data

- Randomized radial vs. femoral, ACS pts, ~3500 each arm
- Significant reduction in vascular access complications
- Trend toward reduction in major bleeding (stringent definition)



	Vasc Comp	Major Bleed
Femoral	3.7%	0.9%
Radial	1.4%	0.7%
	(p<0.0001)	(p=0.2)

Jolly, Lancet, 2011

Patient Preference

- Early ambulation
- Less discomfort with sheath removal
- Reduced back pain
- Can stand to urinate (BPH)

- In RIVAL, 90% of radial patients said they would rather have their next cath radially

Efficacy

- In the STEMI subset of **RIVAL**, radial access:

  Reduced the primary outcome (death, MI, stroke, bleeding)

  3.1% vs. 5.2%
  (HR = 0.6, p=0.026)

  Reduced mortality

  1.3% vs. 3.2%
  (HR = 0.39, p=0.006)

- In **RIFLE STEACS** (randomized STEMI trial), radial access: reduced NACE, MACE and mortality

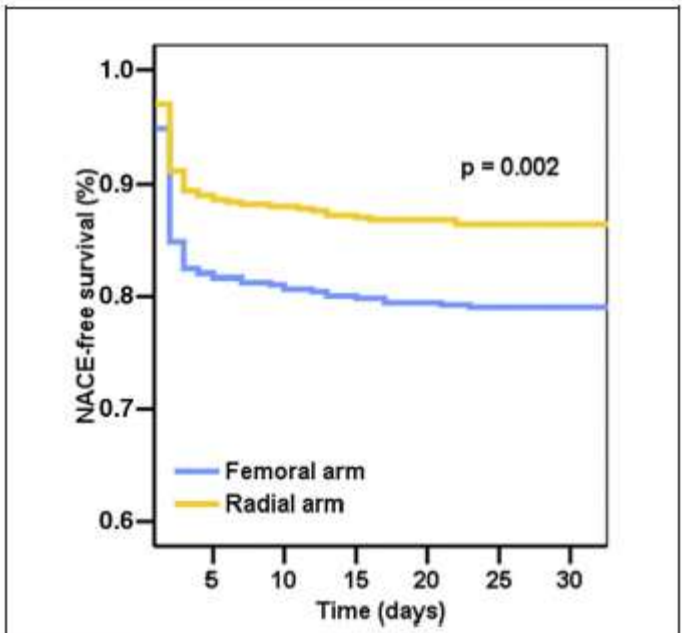


Figure 2 Time-to-Event Curves for NACE

Net adverse cardiac event (NACE) is the composite of cardiac death, myocardial infarction, target lesion revascularization, stroke, and bleeding.

Romagnoli, JACC, 2012

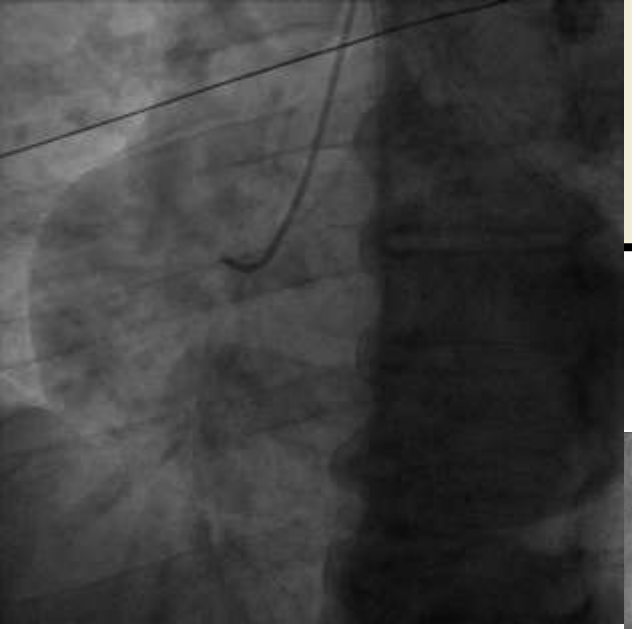
Reduced mortality in STEMI

- Most other strategies to reduce mortality in STEMI patients involve blood thinning (e.g. antiplatelets, anticoagulants, fibrinolytics)

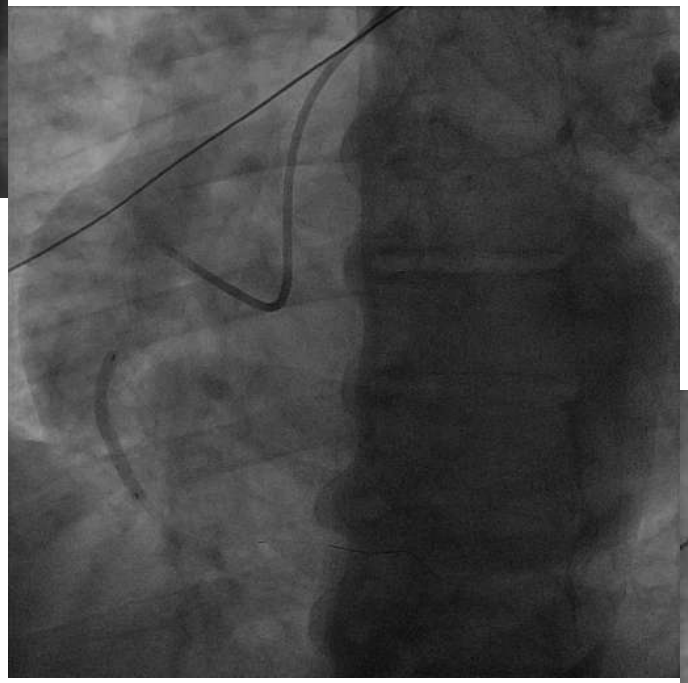
- In both RIVAL and RIFLE-STEACS, the observed mortality benefit with radial access was driven by reduction in major vascular access site bleeding complications

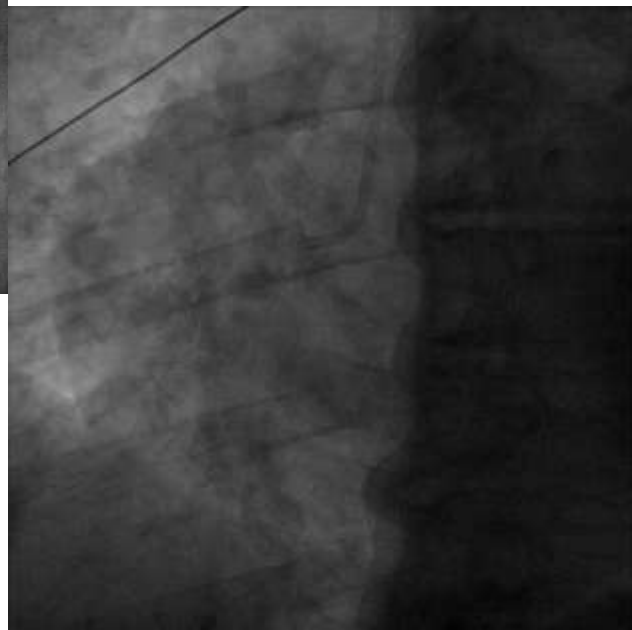
- There is a link between access site bleeding and adverse outcomes, including mortality, that cannot be ignored

Case #2



50 yo man
Cardiac Arrest at mall
Inferior STE, received fibrinolytics at OSH
Ongoing chest pain at PCI Center





Cost

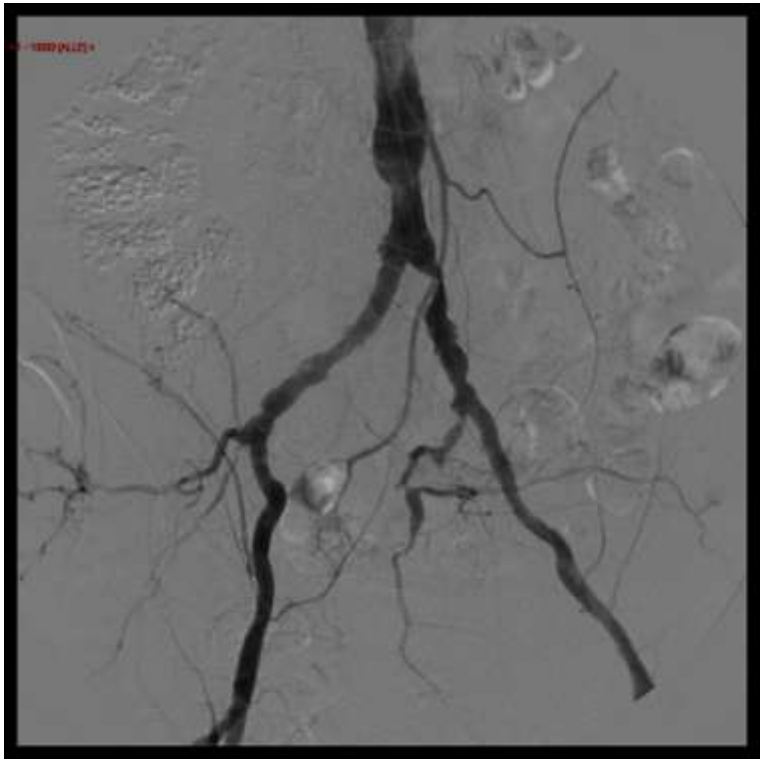
- Same day PCI
- Less nurse and staff intensive
- Fewer catheters
- Fewer vascular complications prolonging length of stay and resources

Radial access reduces cost to hospital

- Cost savings, single center study: $290 / case
  Cooper, Am Heart J, 1999
- Cost savings, systematic review 14 studies: $275 / case *Mitchell, Circ CV Qual and Outcomes, 2012*
- Nursing time spent with patient after PCI: 174 min vs. 86 min *Amoroso, J Cardiovasc Med, 2007*
- Femoral closure devices create comparable recovery times, but increase costs further: $370 - $553 *Roussanov, J Invasive Cardiol, 2007*

Niche Access

- Patients that are traditionally considered “tough access” can often be done easily from the radial site
  - Obese
  - PVD
  - Anticoagulated
  - Post-lytics



Can the “tough stuff” be done radially?

- Almost everything (6F)
  - L Main
  - STEMI
  - VG / DEP
  - Bifurcation: (no simultaneous stents)
  - Rotational atherectomy
  - Thrombectomy
  - FFR
  - IVUS / OCT
  - Guideliner
  - RHC

- Sheathless 7 F

Starting a radial program

- What are barriers?
  - Learning curve
  - Staff buy-in
  - Time of procedure
  - Radiation exposure

- What are strategies for implementing a radial program?
  - Spend a day or two training
  - Target key staff members for training
  - Start easy, work up to the hard stuff
  - Prep right groin but don't bail too soon
  - Have the equipment you need for success

- What is best practice?
  - A balanced lab that excels in both approaches