

Vascular Access Management for Coronary & Peripheral Interventions: Strategies to Prevent Bleeding

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Disclosures

- None related to this talk

- Hemorrhagic complications of cardiac catheterization remain one of the most common adverse outcomes of the procedure and create substantial patient risk .
- Bleeding complications far outweigh the cardiovascular complications.

Radial Access



Balaji N R , and Shah P B Circulation. 2011;124:e407-e408

RIVAL Trial

Table.

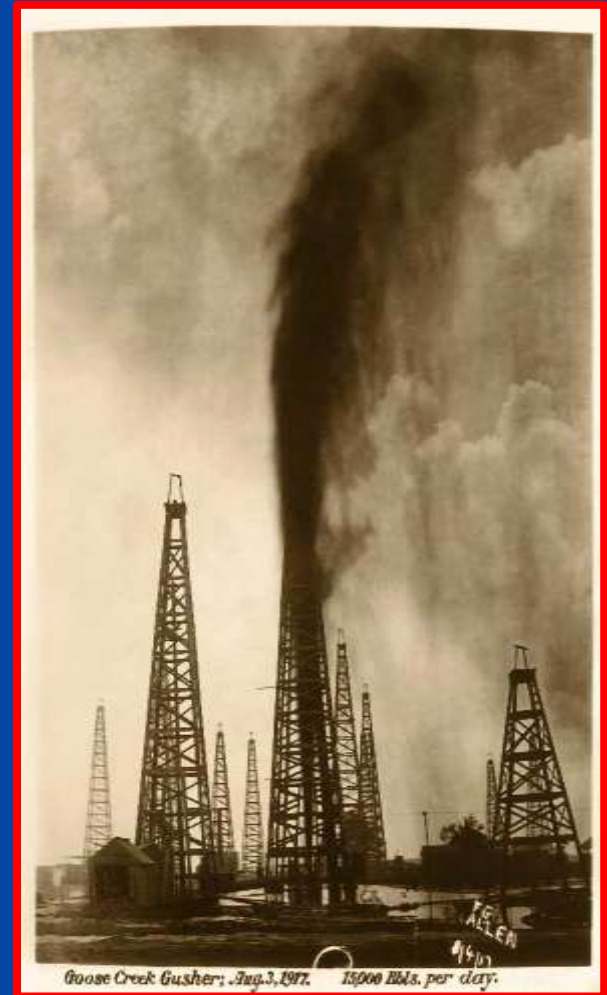
Comparison of the Radial and Femoral Approaches for Cardiac Catheterization

	Radial	Femoral
Percentage of Total Stent Procedures Performed in US	<4	>95
Bed rest, h	0	2-6
Procedural success, %*	95	95
Need to switch access site to complete procedure, %*	7.6	2.0
Major vascular complications, %*	1.4	3.7
Artery closure requiring surgery, %*	0	0
Patient prefers radial for next procedure, %*	90	50

- ↵* Data from the largest randomized comparison between radial and femoral access sites: the Radial Versus Femoral Access for Coronary Angiography and Intervention in Patients With Acute Coronary Syndromes (RIVAL) trial.¹



The Gusher!



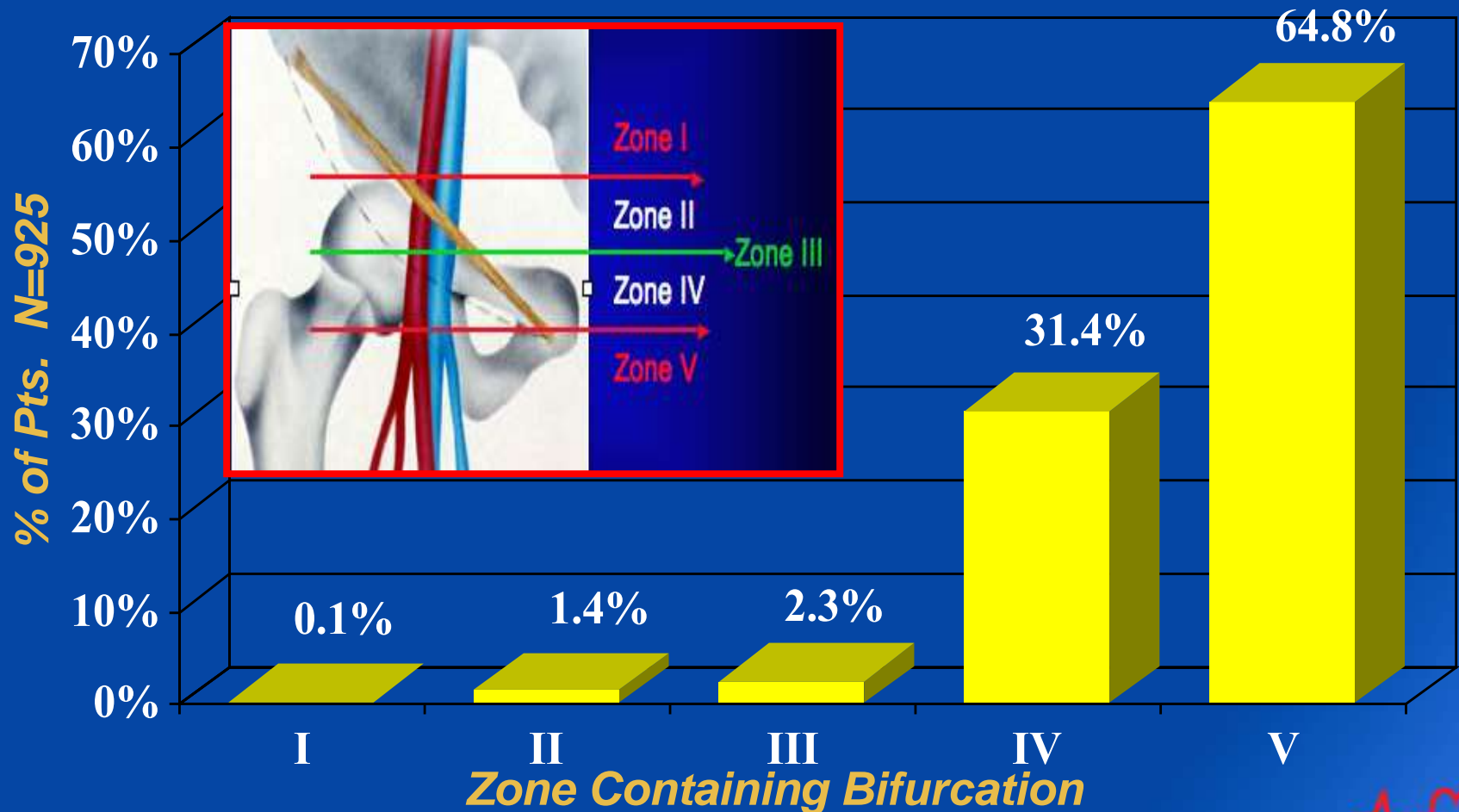
Goose Creek Gusher; Aug. 3, 1907. 15,000 Bbls. per day.

Access Site



Figure 1a. Bony landmarks and the femoral artery. 1. Iliac crest. 2. Symphysis pubis. Dotted line is path of inguinal ligament and red line is proposed path of femoral artery. The inguinal crease may or may not be directly over the ligament.

Level of CFA Bifurcation by Zone



Abu-Fadel et-al, Catheter Cardiovasc Interv. 2009 Oct 1;74(4):533-9.

Angiographic Predictors of Femoral Access Site Complications: Implication for planned Percutaneous Coronary Intervention

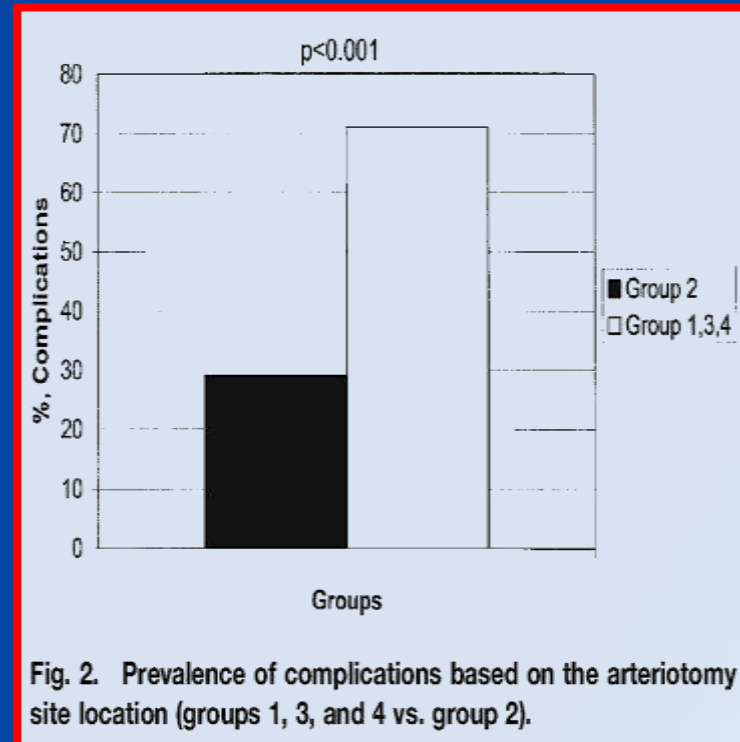
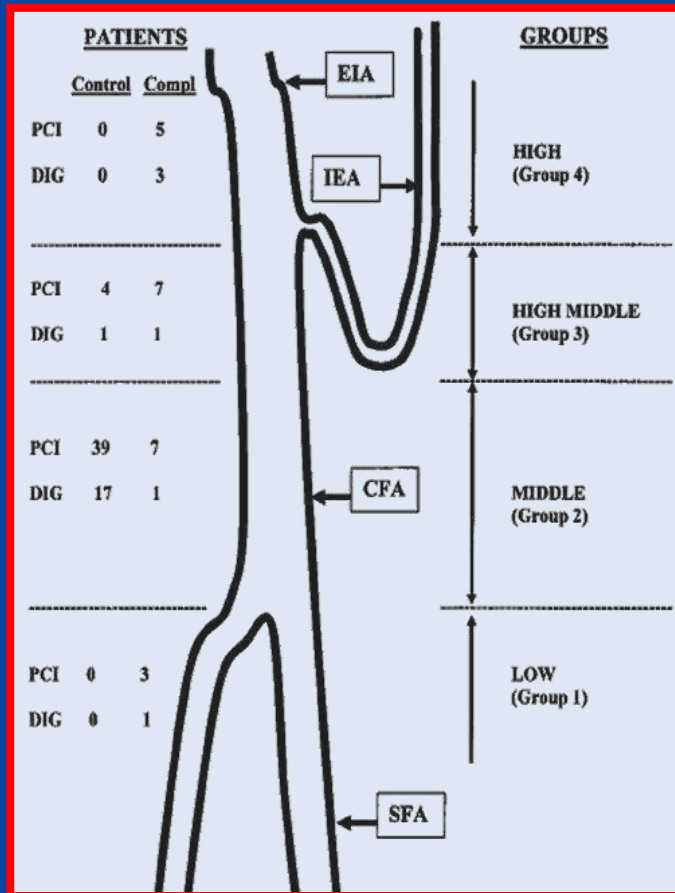


Fig. 2. Prevalence of complications based on the arteriotomy site location (groups 1, 3, and 4 vs. group 2).

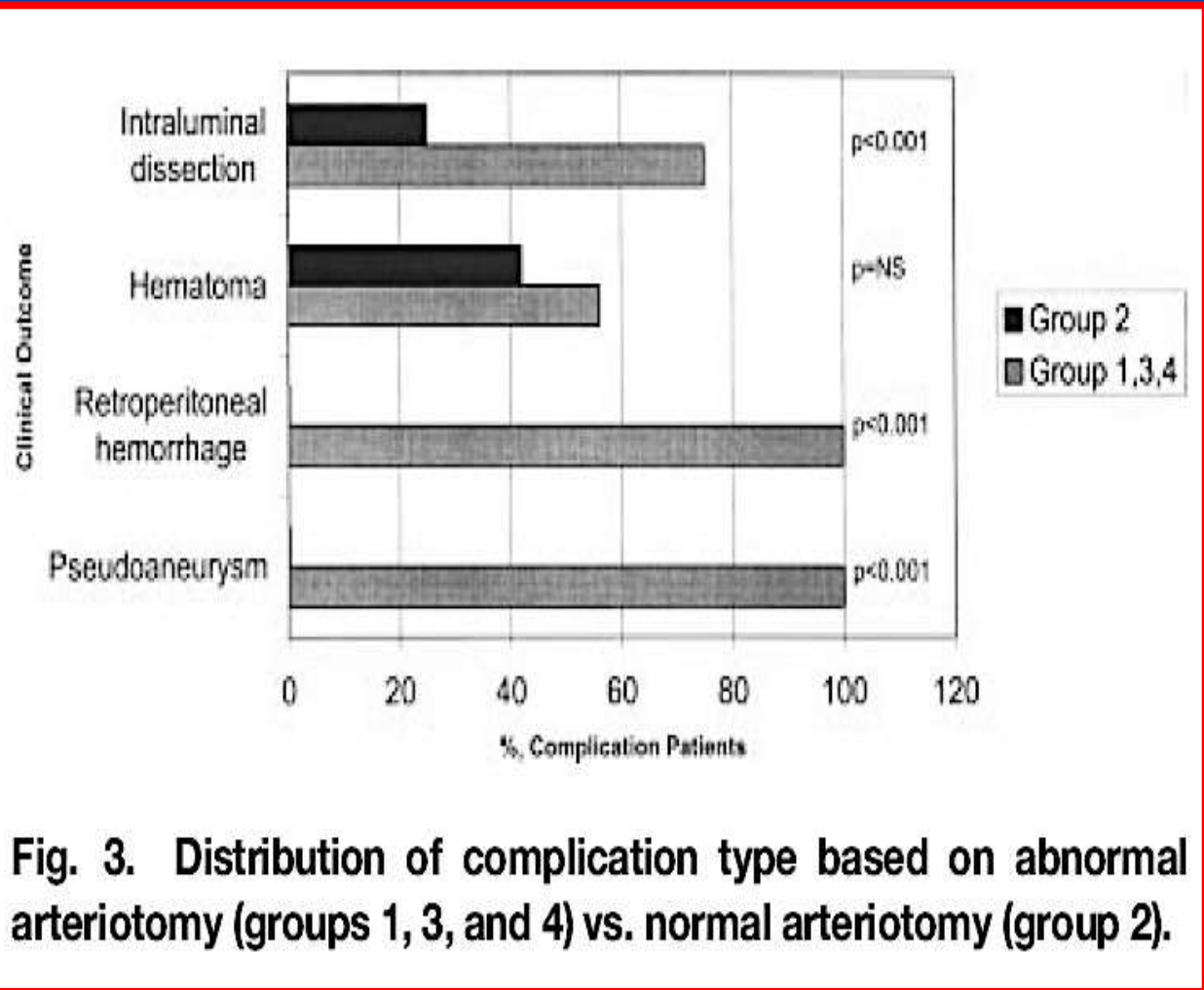


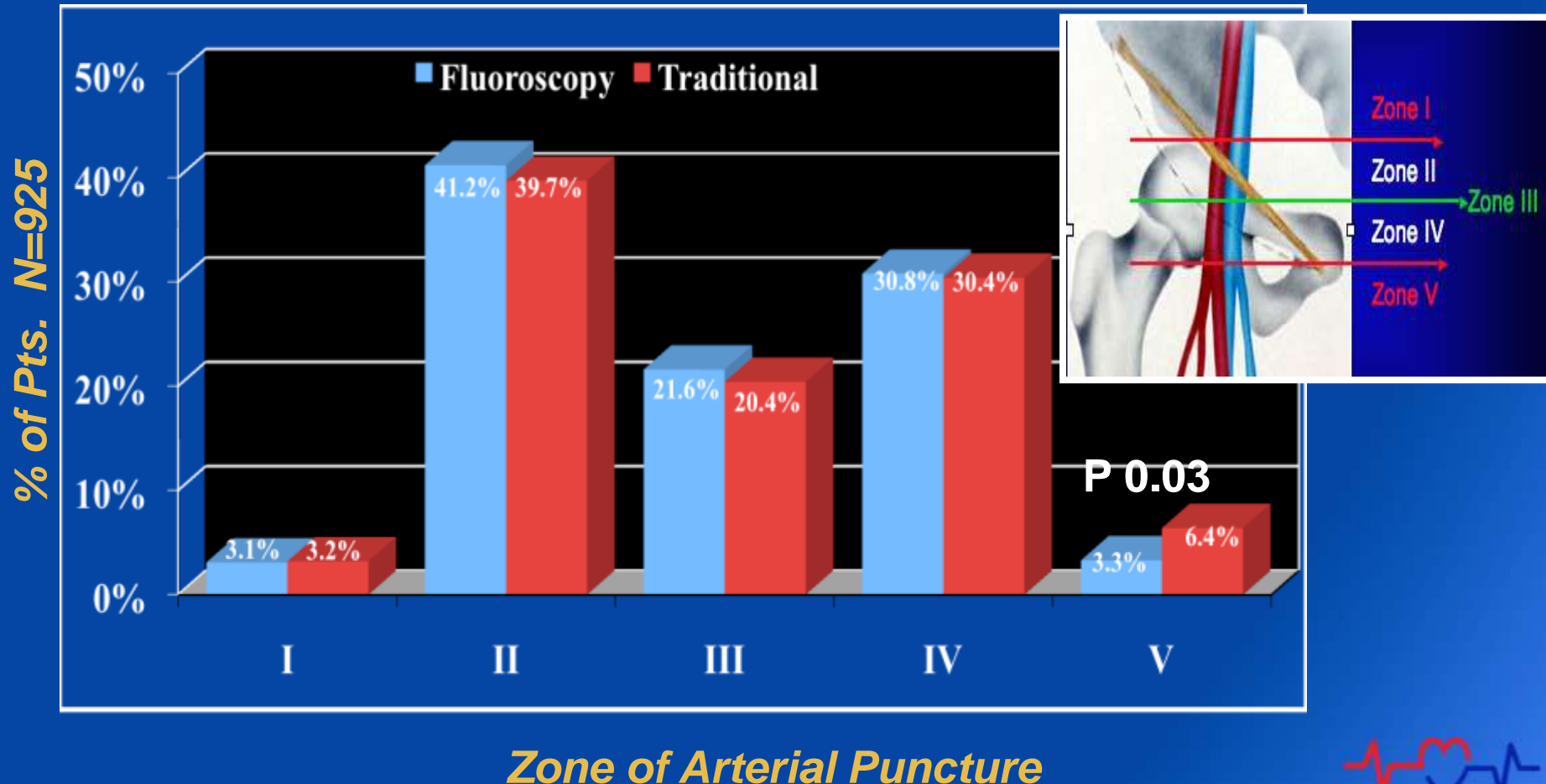
Fig. 3. Distribution of complication type based on abnormal arteriotomy (groups 1, 3, and 4) vs. normal arteriotomy (group 2).



Fluoroscopy vs. Traditionally Guided Femoral Artery Access During Cardiac Catheterization: Fluoro-Access Study.

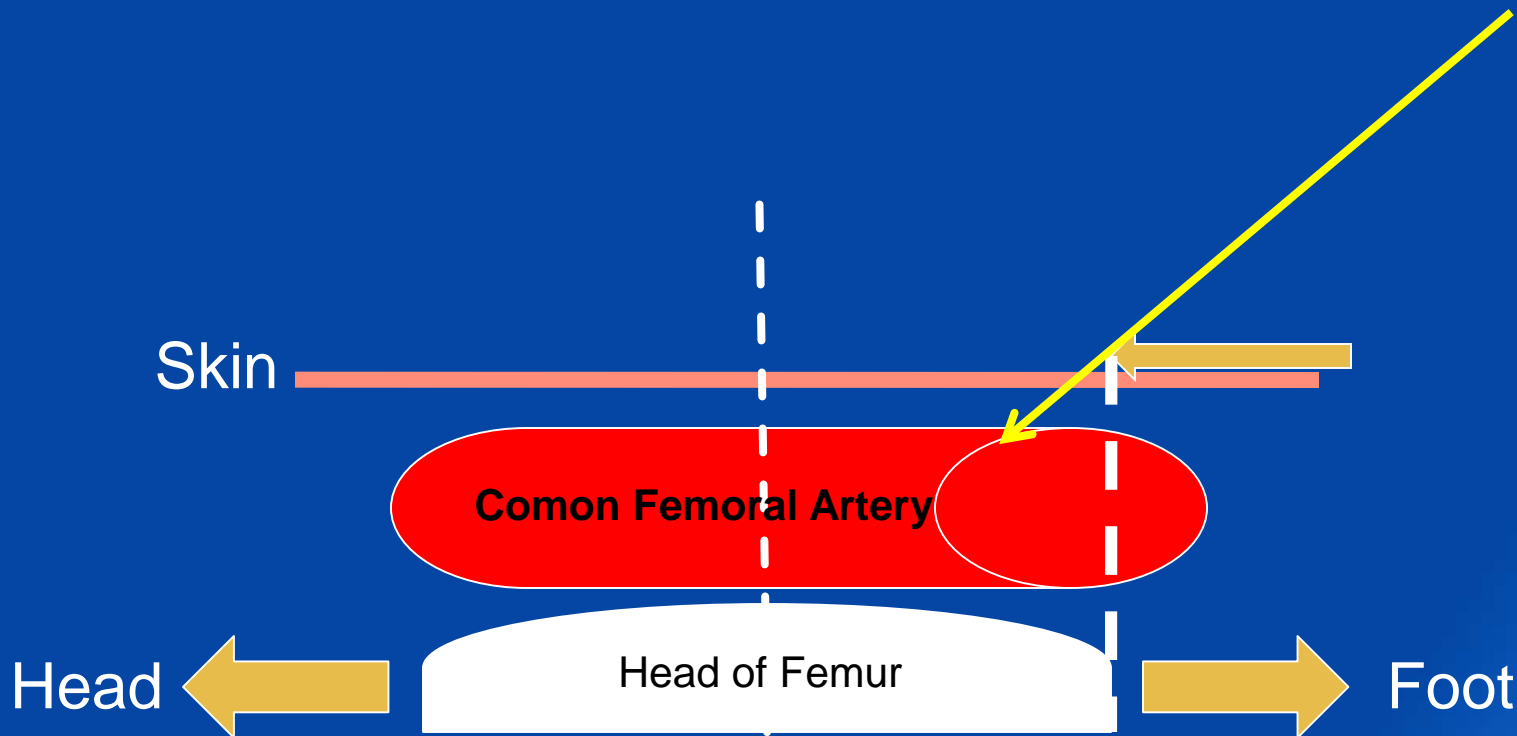
A prospective randomized controlled Trial

Level of Access Site by Zone

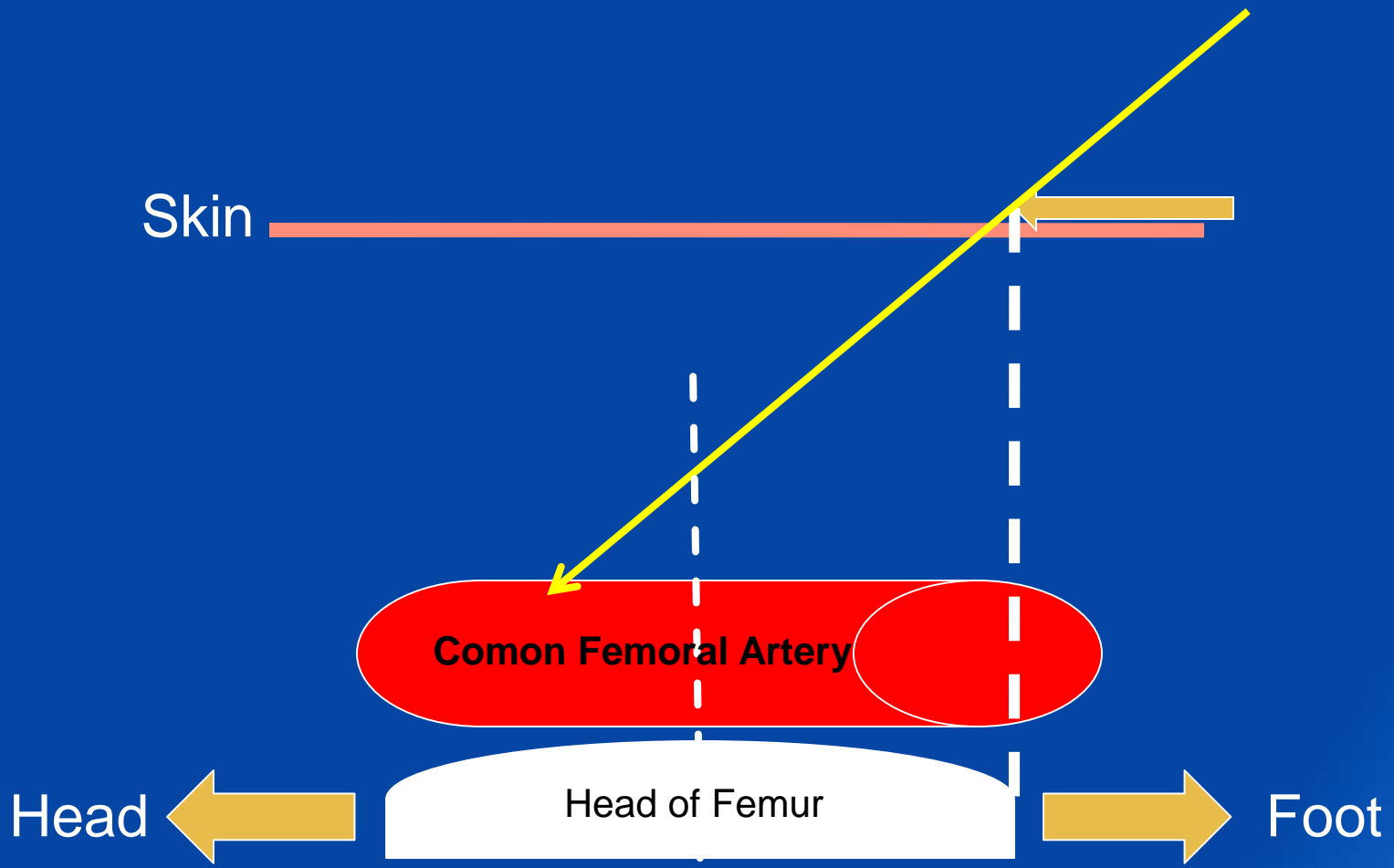


Abu-Fadel et-al, Catheter Cardiovasc Interv. 2009 Oct 1;74(4):533-9.

The Obvious



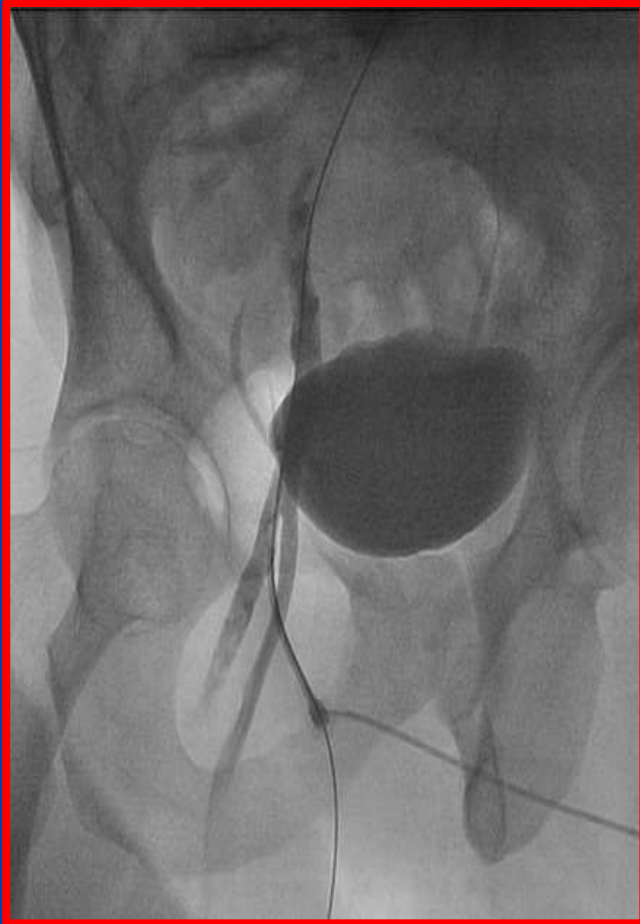
The Obvious



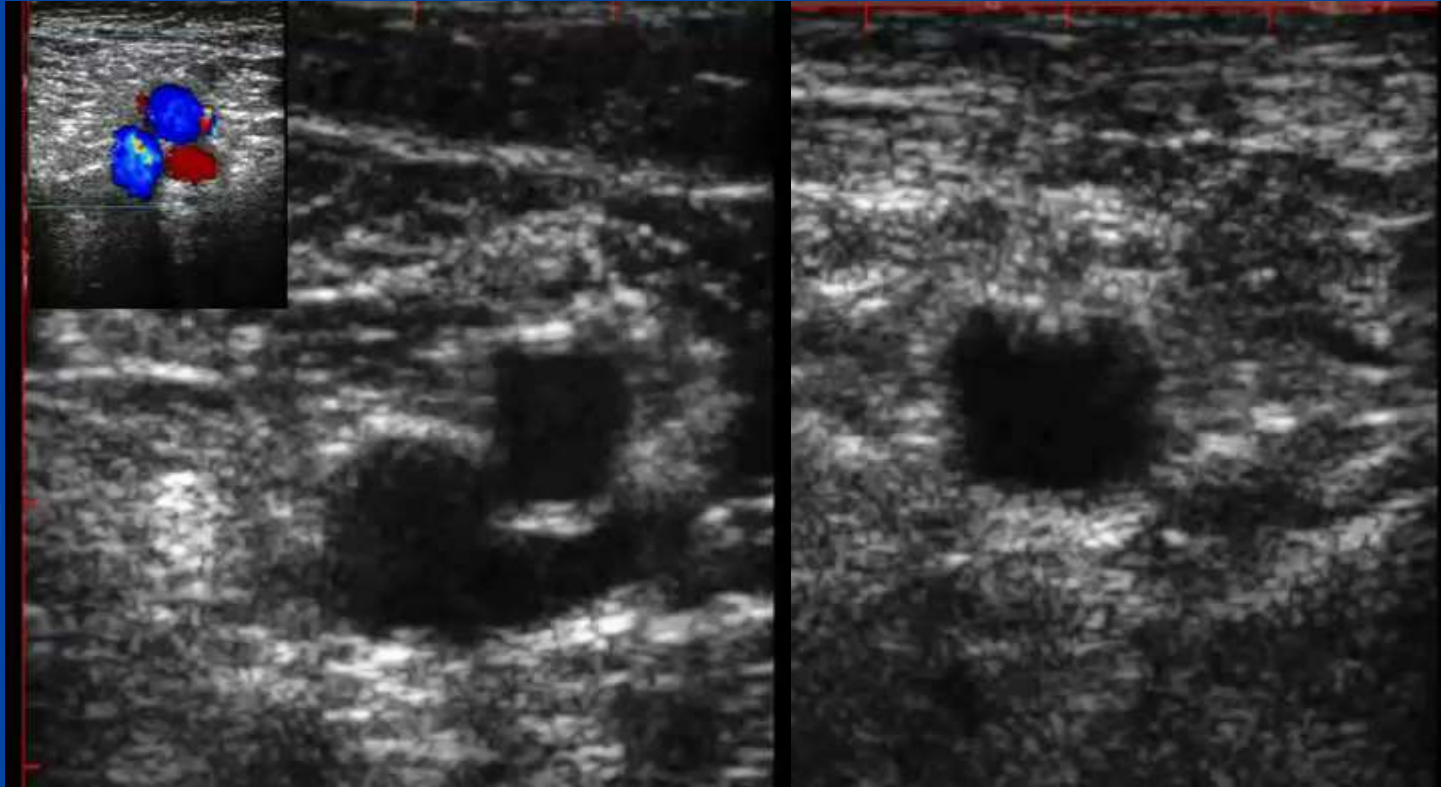
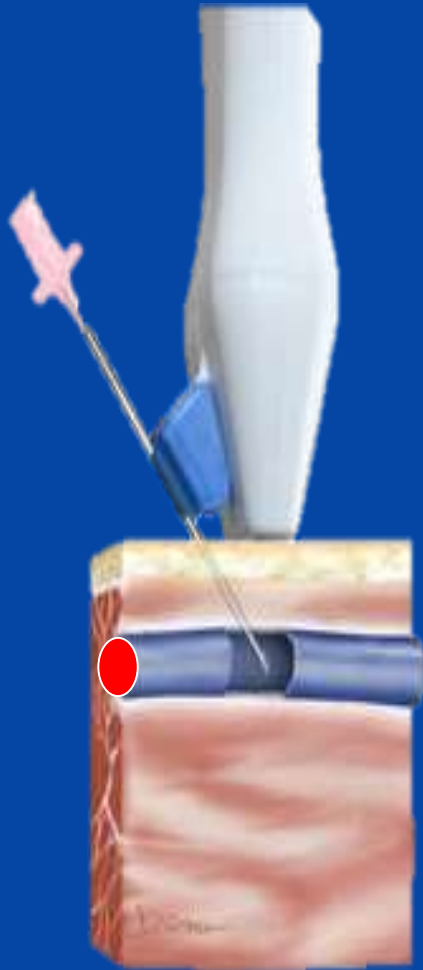
The Femoral Arterial Access with Ultrasound Trial (FAUST)

A prospective randomized controlled trial of ultrasound guidance versus standard fluoroscopic technique in femoral access

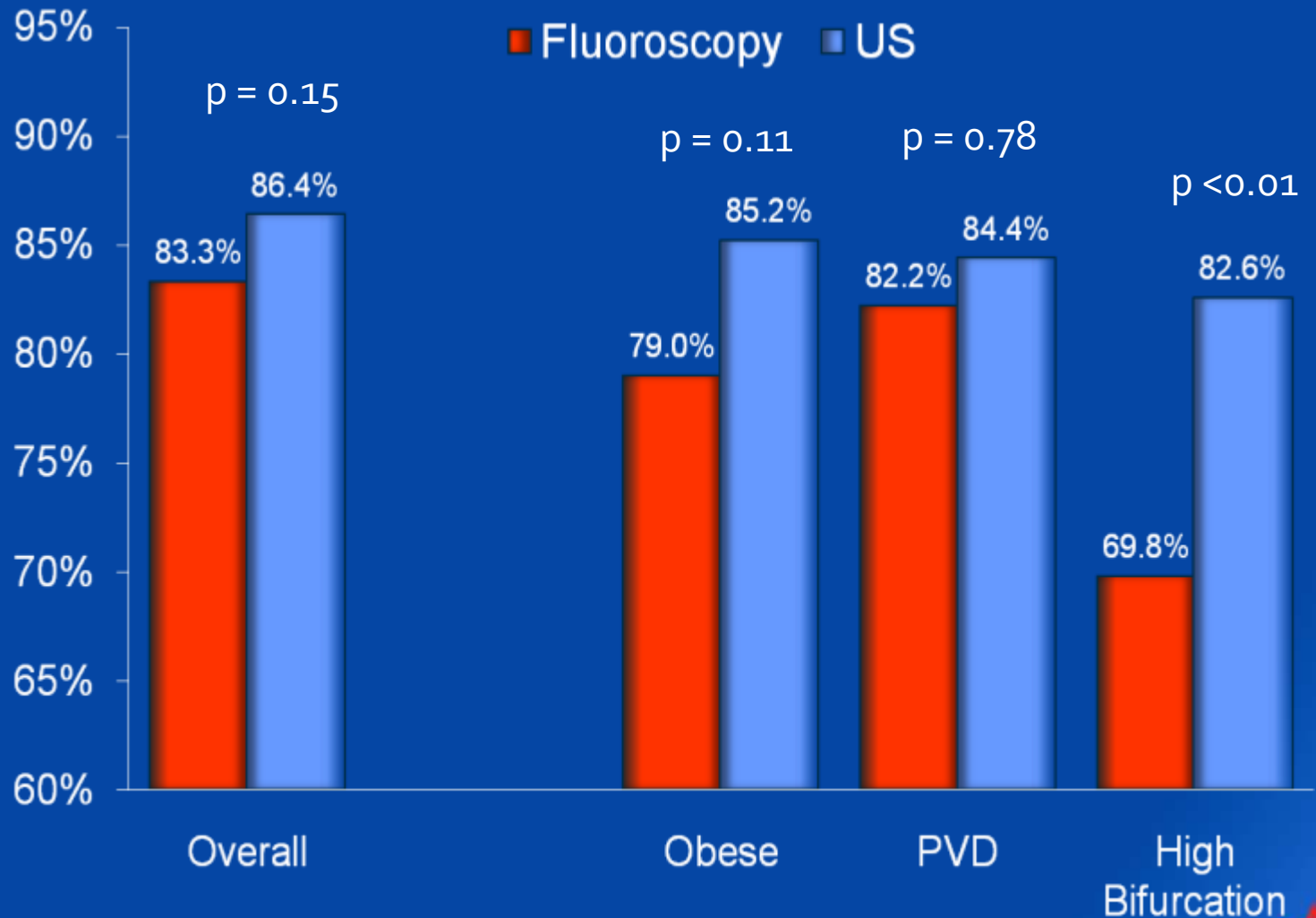
The Goal



Seto, Abu-Fadel et-al, JACC Cardiovasc Interv. 2010 Jul;3(7):751-8



CFA Cannulation Success

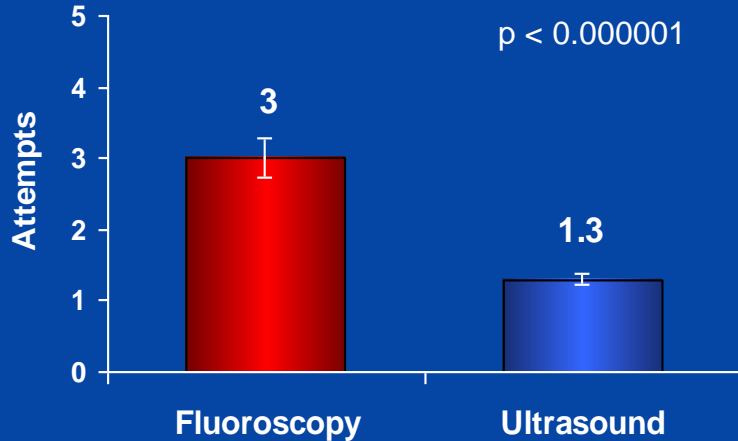


CFA Cannulation Success

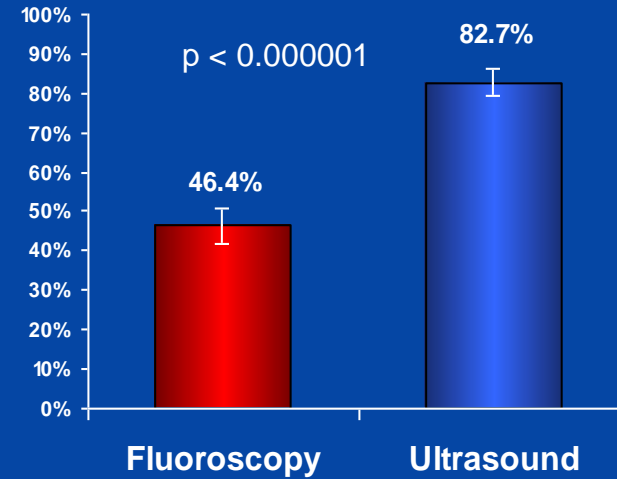
	Fluoroscopy	Ultrasound	P-value
High stick	24 (4.9)	33 (6.6)	0.25
CFA	408 (83.3)	431 (86.4)	0.15
Low stick	58 (11.8)	35 (7.0)	<0.01

Procedural Outcomes

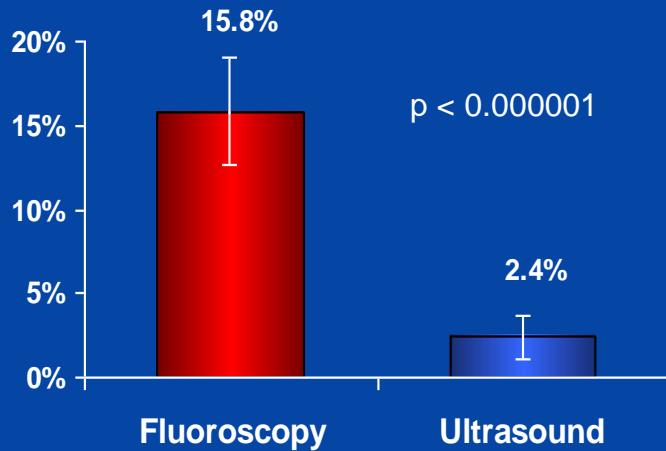
Number of Attempts



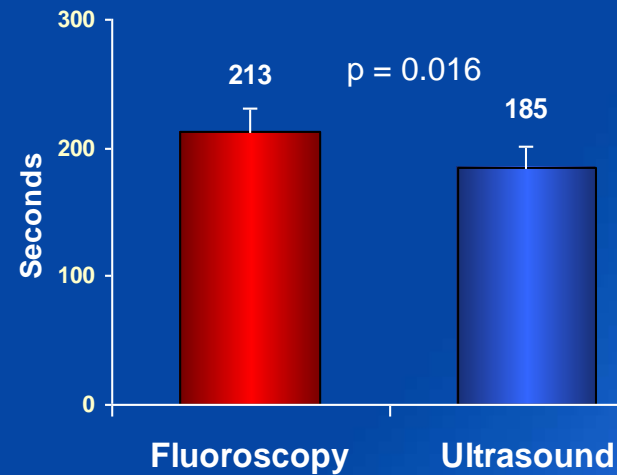
First Pass Success Rate



Risk of Venipuncture



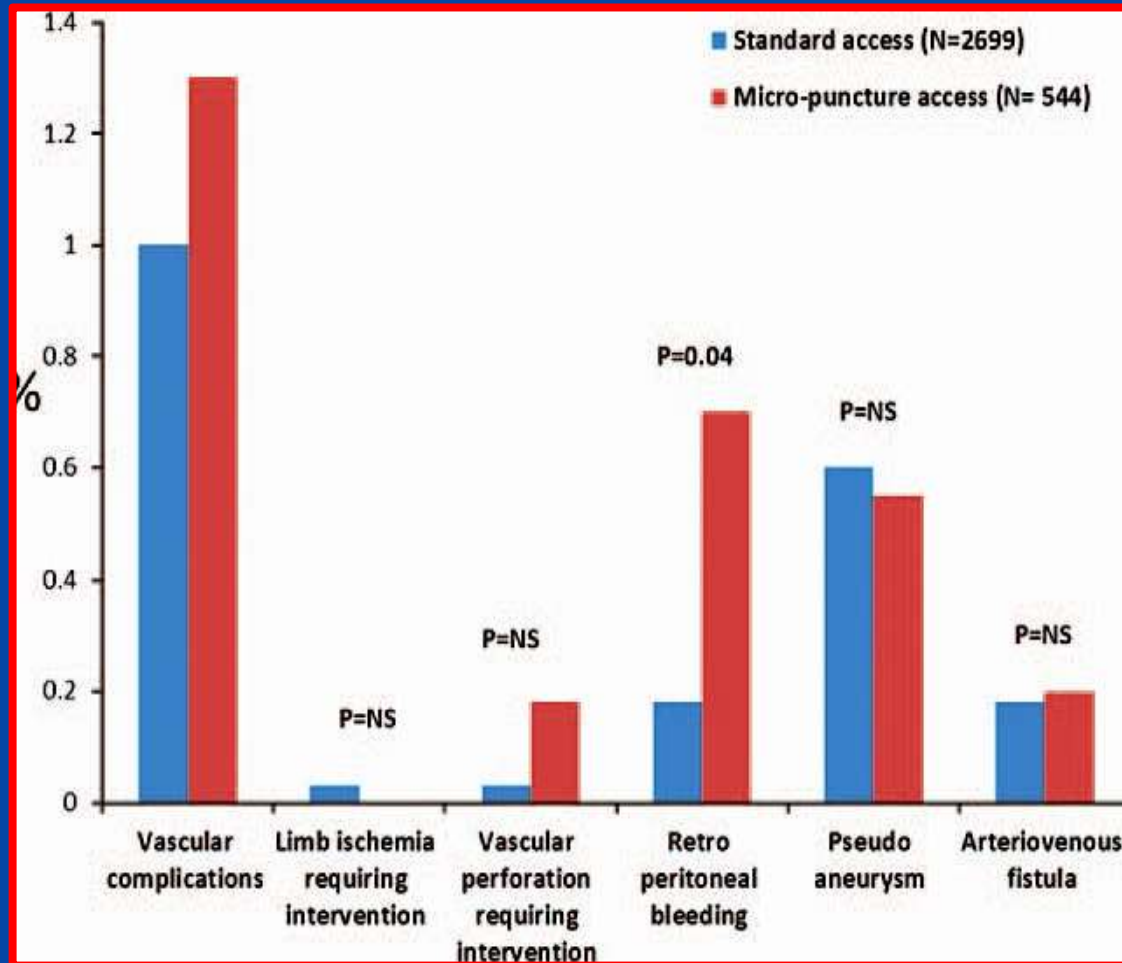
Time to Sheath Insertion



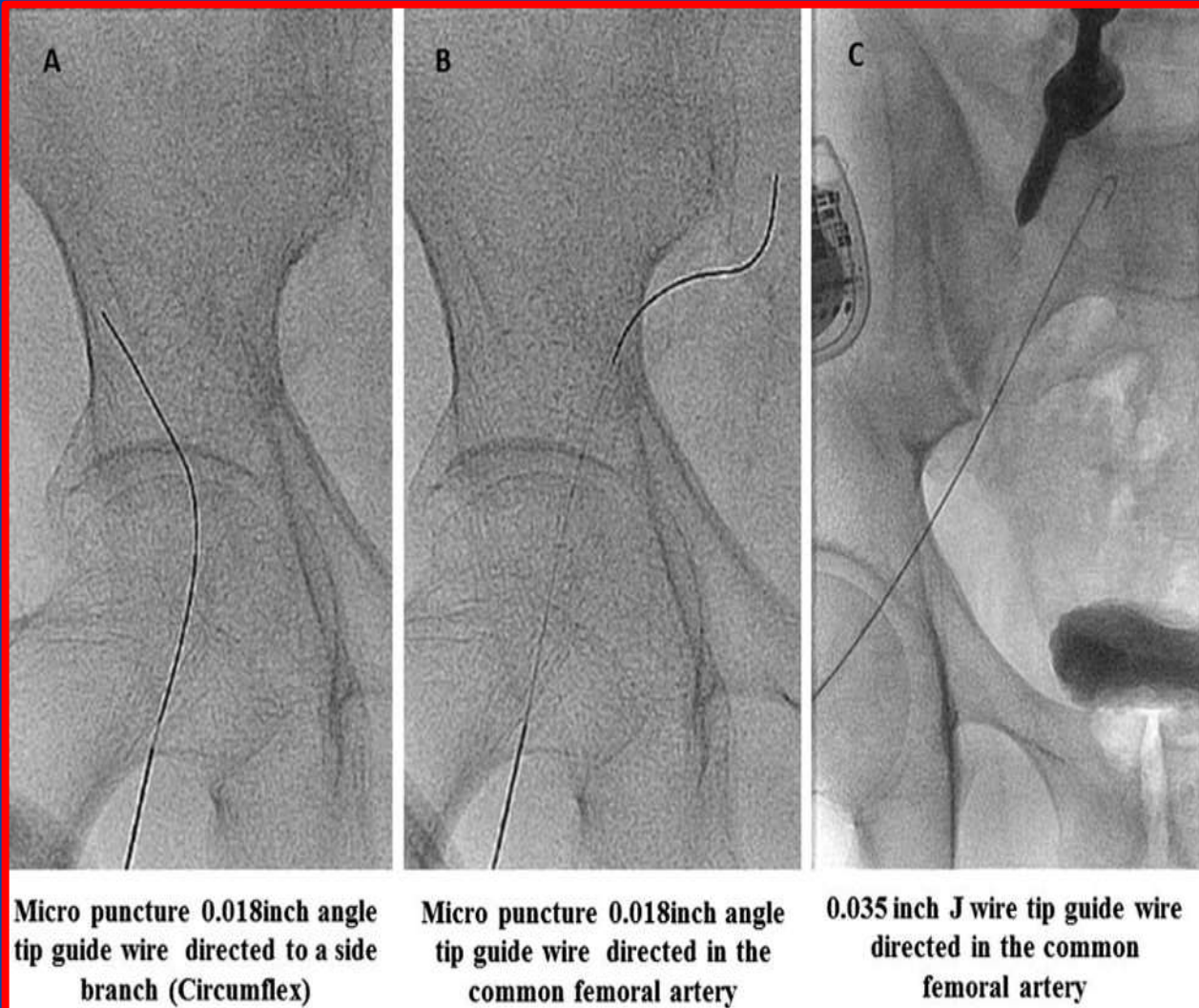
Complications

Complication	Fluoroscopy N=501	Ultrasound N=503	P-value
Hematoma >5 cm*	11 (2.2%)	3 (0.6%)	0.034
Pseudoaneurysm	0	1	NS
Dissection	3	2	NS
Access bleeding, transfusion	2	1	NS
Hematoma, DVT	1	0	NS
Any complication	17 (3.4%)	7 (1.4%)	0.041

Micro Puncture



Micro Puncture



Catheterization and Cardiovascular Interventions 79:1180–1185 (2012)





After femoral access has been established,
a femoral angiogram **SHOULD** be done to
risk-stratify patients for vascular access
complications.

Femoral Angiogram



Femoral Angiogram



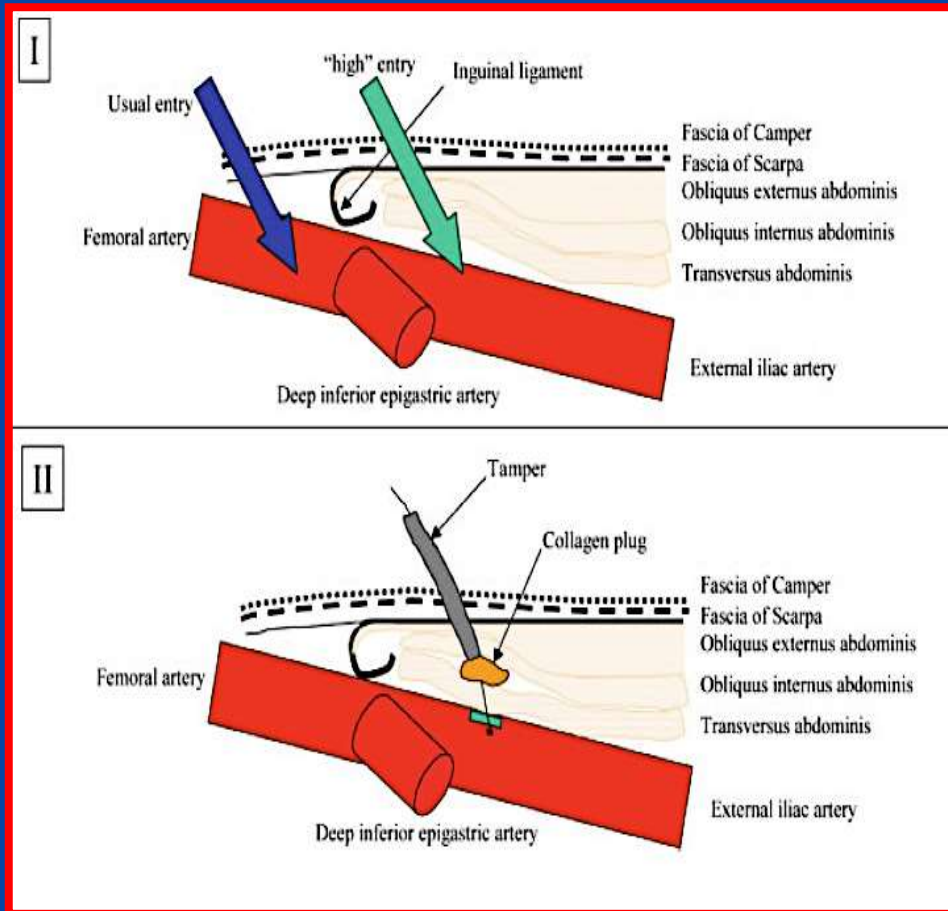
Correlates & Outcomes of Retroperitoneal Hemorrhage Complicating Percutaneous Coronary Intervention

TABLE II. Independent Correlates of Retroperitoneal Bleeding

	OR	95% CI	P-value
Sheath placement superior to inferior epigastric artery ^a	17.6	2.21–141.63	<0.001
Female sex	3.73	2.55–5.43	<0.001
Angioseal TM	2.80	1.95–4.00	<0.001
GP IIb/IIIa inhibitor	1.92	1.31–2.82	0.001
Weight (per kg)	0.987	0.976–0.997	0.014
Acute MI	1.82	1.05–3.17	0.035

^aFrom the case control portion of the study only (analysis of other variables was from the entire patient cohort).

Correlates & Outcomes of Retroperitoneal Hemorrhage Complicating Percutaneous Coronary Intervention



Association Between Use of Bleeding Avoidance Strategies and Risk of Periprocedural Bleeding Among Patients Undergoing Percutaneous Coronary Intervention

NCDR[®] CathPCI Registry[®]

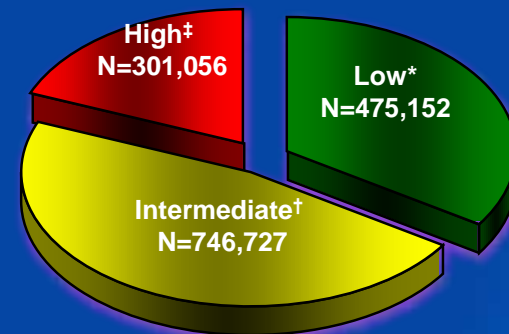
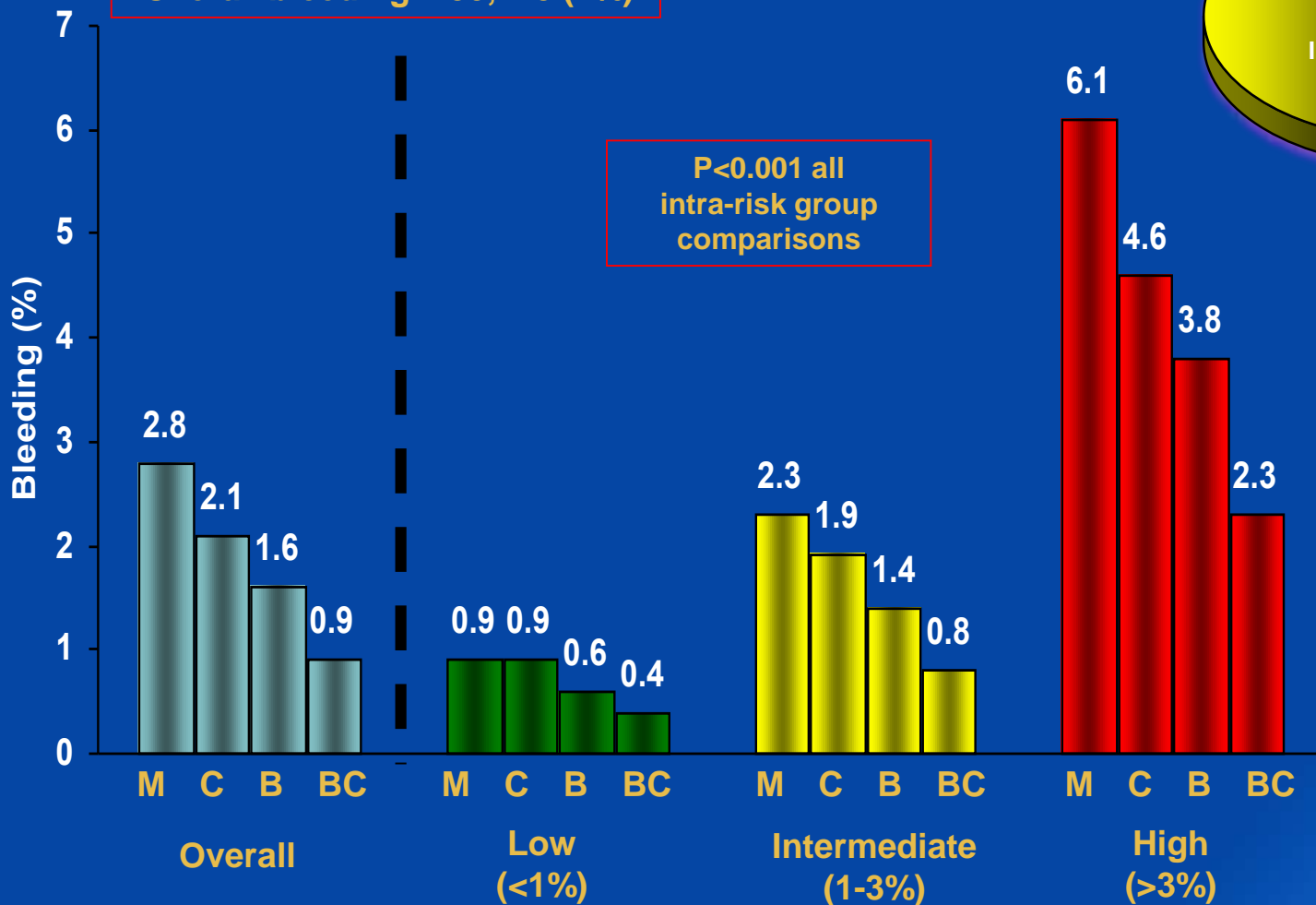
Patients undergoing PCI via the femoral artery

Marso et al. JAMA 2010;303:2156-2164



Bleeding Rates*

*Overall bleeding = 30,429 (2%)



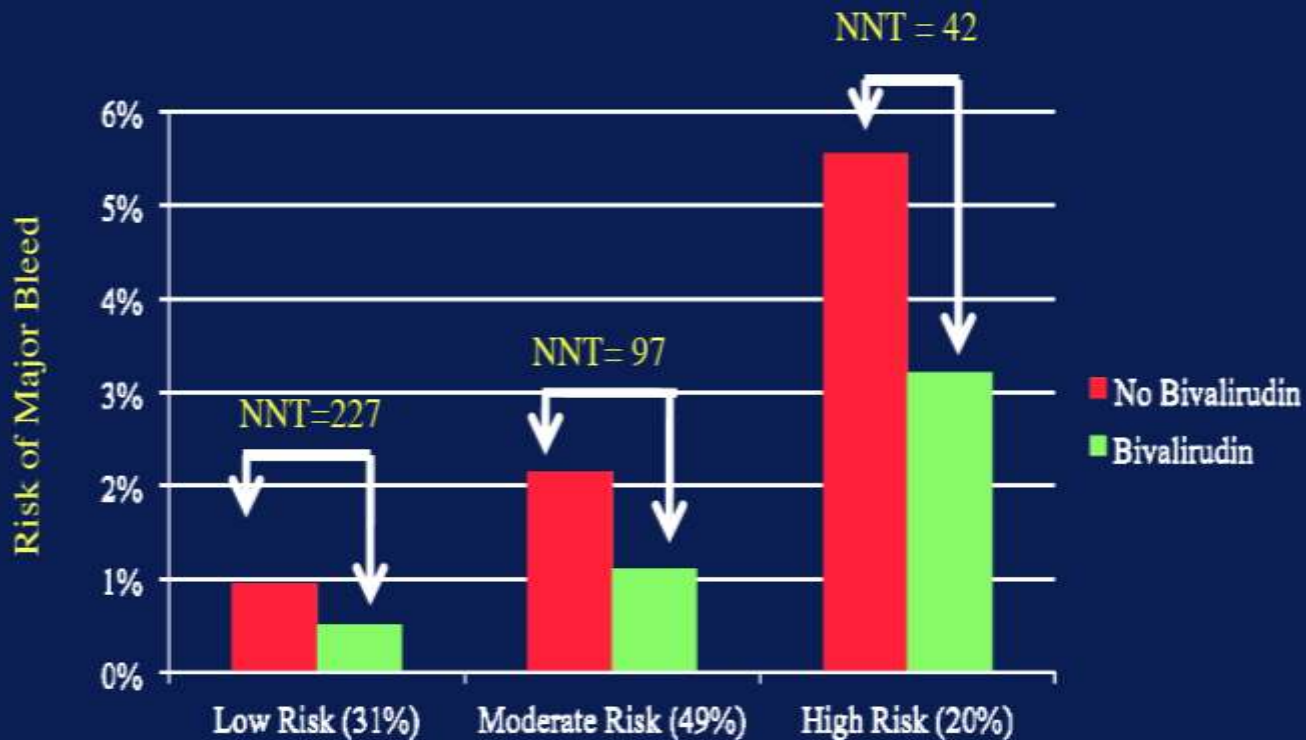
*NCDR bleeding risk <1%
[†]NCDR bleeding risk 1-3%
[‡]NCDR bleeding risk ≥3%

M = Manual comp.
 C = Closure only
 B = Bival only
 BC = Bival+closure

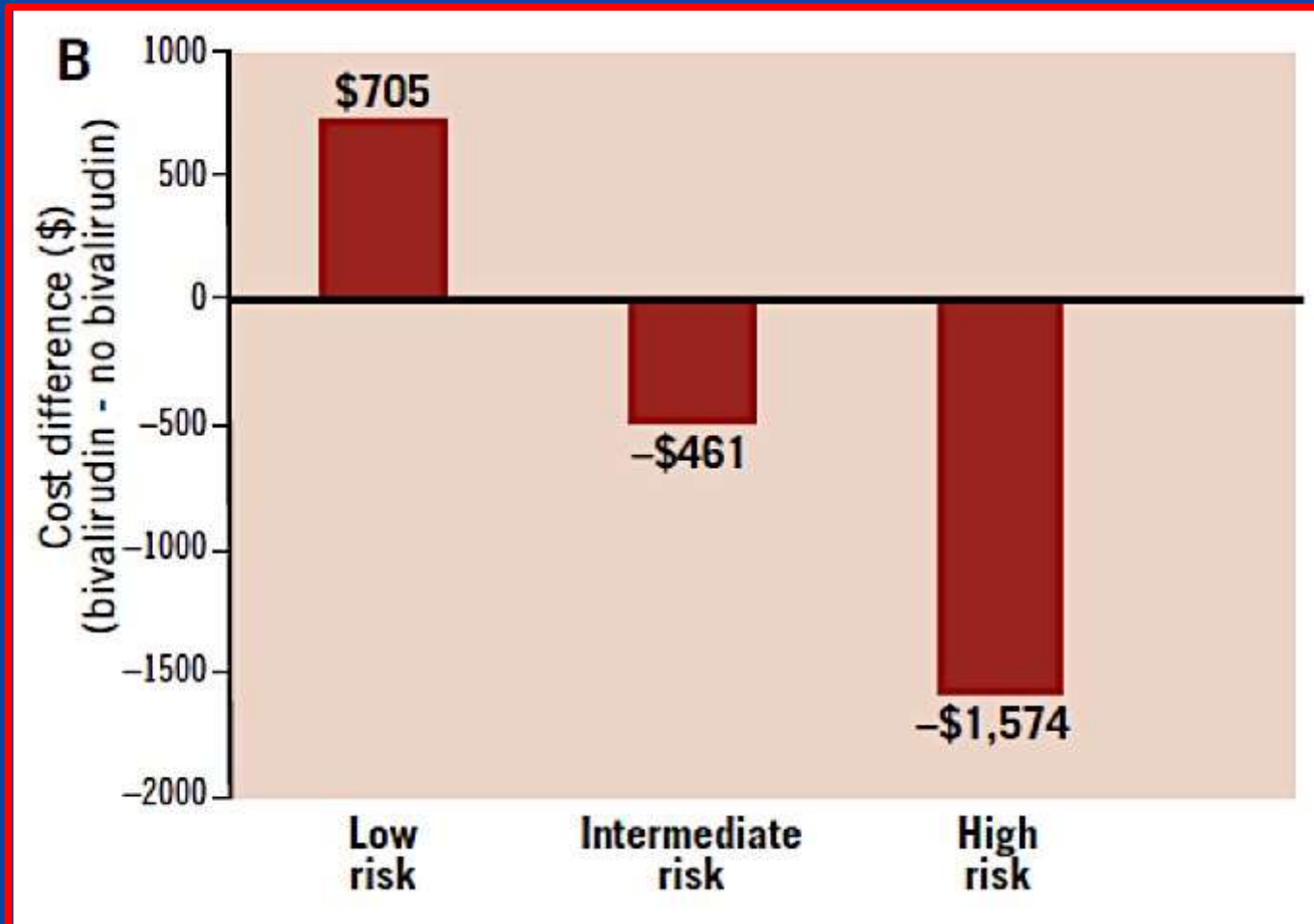
Estimated Bleeding Reductions—All Patients (Propensity Adjusted)

	Treatment (N)	Bleeding N (%)	Odds Ratio (95% CI)	NNT (95% CI)	Reduction in Bleeding Events per 1,000 Patients Treated (95% CI)
Manual compression	508,455	13,597 (2.7)	1 [Reference]		
Vascular closure devices	205,606	5,050 (2.5)	0.77 (0.73- 0.80)	148 (130- 175)	6.7 (5.7-7.7)
Bivalirudin	172,471	3,224 (1.9)	0.67 (0.63- 0.70)	118 (107- 132)	8.5 (7.6-9.3)
Both	130,378	1,361 (1.0)	0.38 (0.35- 0.42)	70 (68- 74)	14.2 (13.5-14.8)
Total	1,016,910	23,232 (2.3)			

Benefits of Bivalirudin by Bleeding Risk



Cost per Patient of Bivalirudin Use



Lindsey et al. EuroIntervention 2010; 6: 206-13



Use Common Sense

Other Strategies

- 5F or 5/6F sheath/guides & 5F Swan
- Preclose for large access
- Venous access with ultrasound
- Patients with elevated INRs
- Final Coronary angiogram...



The “Groin Group”

- Members from Cath Lab, CCRN, CCU staff nurse, outpatient unit nurse, and step-down unit nurse.
- Takes a zero tolerance attitude towards groin bleeds.
- Educate about techniques for preventing, recognizing, and managing groin bleeds.
- Systematic review and root cause analysis of groin bleeds and retroperitoneal hemorrhage.
- Every serious bleed should be reviewed in cath conference or otherwise disseminated among staff and physicians.

Take Home Messages

- Team approach to reduce the incidence of bleeds as much as possible, improve their early recognition and prompt intervention.
- We must train ourselves to systematically review the entire groin study, not just the sheath entry site for closure device use.
- Bleeds are not just addressed at the time of sheath removal or when a hematoma forms; they must be anticipated and steps taken to avoid them at each step of the catheterization procedure.

Thank You!

