

# Diagnosis and Management of Femoral Access Site Complications IV:

## Novel Techniques for Endovascular Rescue

Robert M. Bersin, M.D.

Director, Endovascular Services

Seattle Cardiology and the Cardiovascular Consultants of Washington

Seattle, Washington



# Conflict of Interest Statement

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Robert M. Bersin, M.D

Name of Company: Abbott Vascular P

Name of Company: Boston Scientific AB, C, GS, P, SB

Name of Company: Bristol-Myers Squibb C, SB

Name of Company: Cordis Endovascular AB,C, EI, P, SB

Name of Company: E.I Lilly C, SB

Name of Company: ev3 P

Name of Company: Guidant Corporation C, P

Name of Company: The Medicines Company SB

Name of Company: Medtronic Vascular P

Name of Company: Sanofi-Aventis C, SB

Name of Company: Vascular Solutions AB, C, SO

AB: Advisory Board

C: Consulting Relationship

EI: Equity Interest

GS: Grant Support

P: Proctor or Training Course Sponsorships

SB: Speakers Bureau

SE: Spouse Employee

SO: Stock Options or Positions

*Off label use of products will be discussed in this presentation:*

*Off label use of nitinol stents for iliac and femoral artery stenting*

# Access Site Complications

- Hypotension, hematoma, bleeding
- Pseudoaneurysm
- Neuropathy
- AV fistula
- Dissection, thrombosis, acute occlusion
- Infection

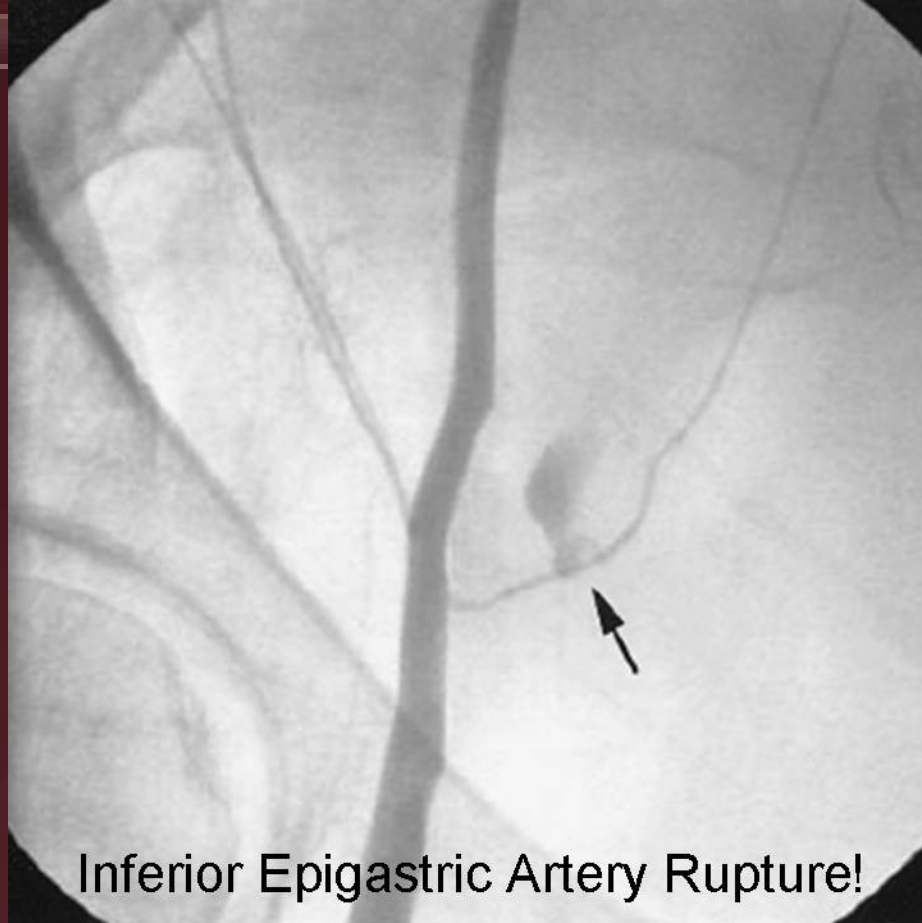
# Percutaneous Treatment Options

- Balloon tamponade
- Endoluminal grafts
- Coils
- Thrombin injection

# Endoluminal Graft for Retroperitoneal Hemorrhage



# What is the diagnosis?

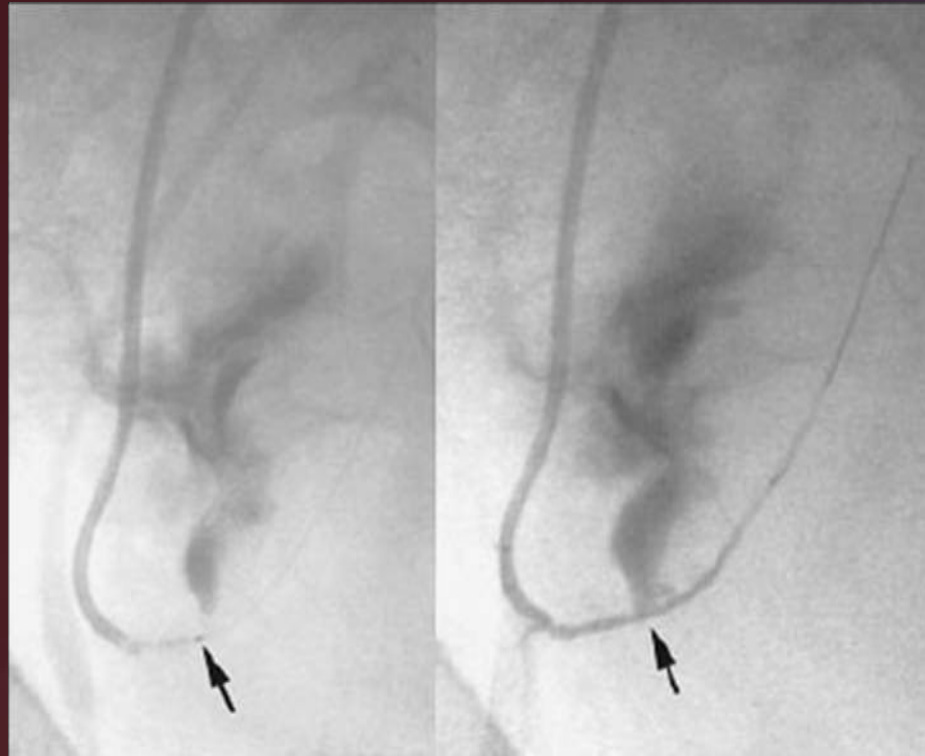


# Inferior epigastric artery engaged with 6Fr guiding catheter



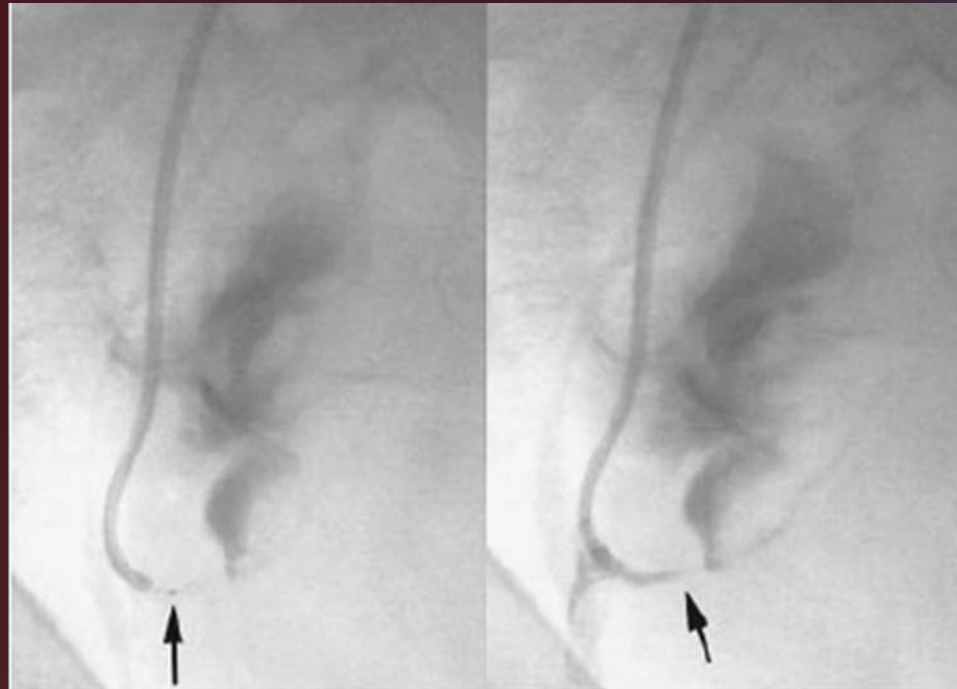
# Balloon inflated across perforation x 3

## No change in rapid bleeding





# Thrombin 200 IU injected distally Bleeding reduced but still present

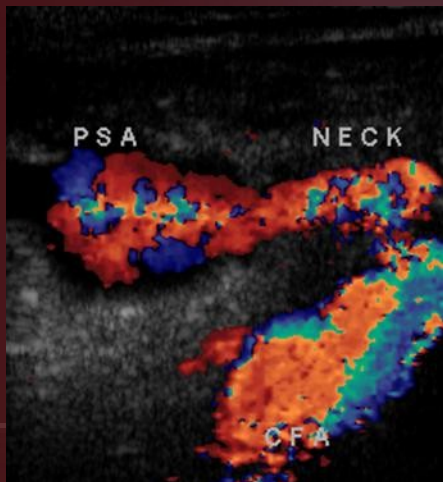
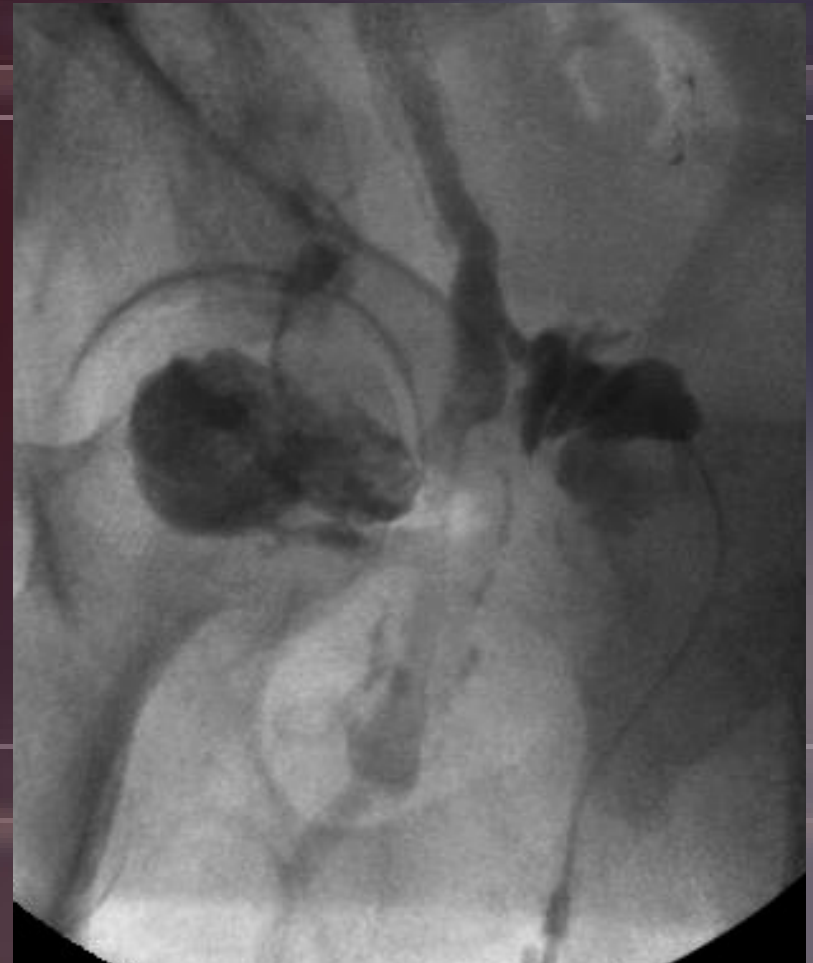
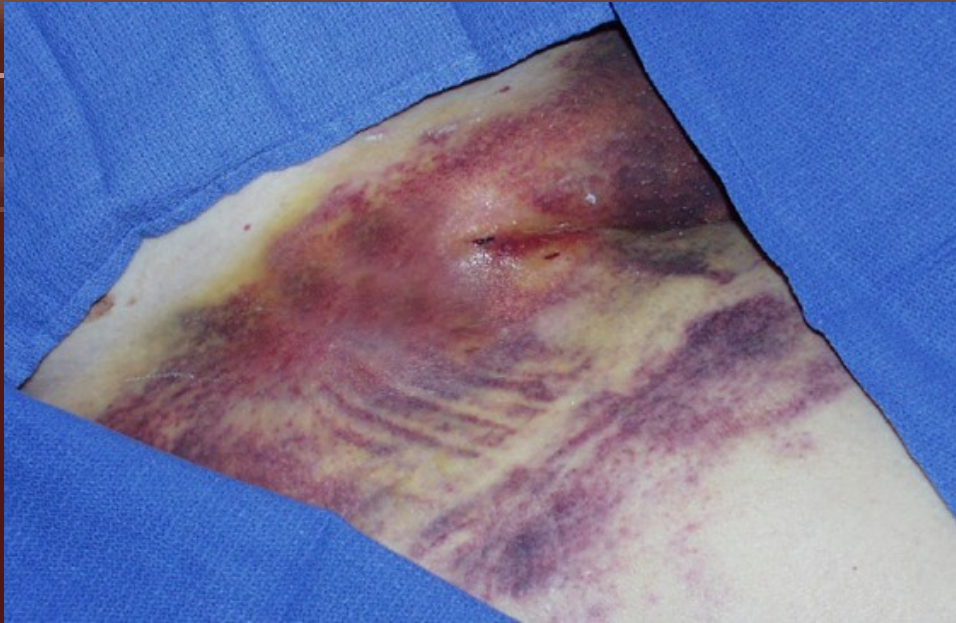


# Final angiogram

## No flow after 300 IU thrombin



# Pseudoaneurysms



# Pseudoaneurysms

- Incidence
  - Duplex ultrasound  $\leq 6.0$  %
  - Clinical detection 1 - 3.0 %
- Risk factors
  - Female  $> 70$  yrs
  - Diabetes
  - Obesity
  - High or low (SFA) stick

# Treatment Options

- Surgical repair
- Manual compression
- Ultrasound guided compression
- Thrombin injection
  - Ultrasound guided
  - Flourosopic

# Pseudoaneurysms

- Small ( $\leq 2$  cm) may be observed and are likely to close spontaneously
- Larger aneurysms may be closed with:
  - Ultrasound guided compression
  - Ultrasound guided thrombin injection
  - Surgical correction
  - Catheter-based therapy

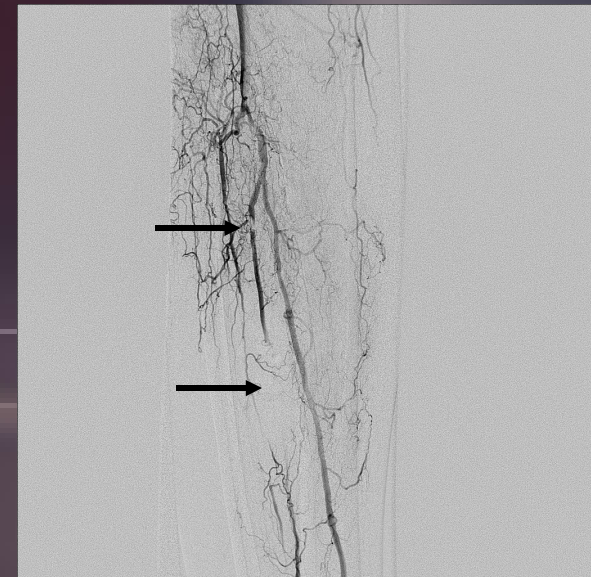
# Ischemia/Thrombosis/Emboli

- Incidence  $\leq 1.0$  %
- Causes:
  - Large access catheter/small artery
  - Presence of peripheral arterial disease
  - Iatrogenic dissection
  - Thrombus within sheath
  - Closure device complication

# Ischemia/Thrombosis/Emboli

- Signs and symptoms:

- Pain
- Pallor
- Paresthesia
- Pulselessness
- Polar (cold).





# Ischemia/Thrombosis/Emboli *Management*

- Contralateral access and angiography.
- Cross with hydrophilic wire.
- Mechanical thrombectomy.

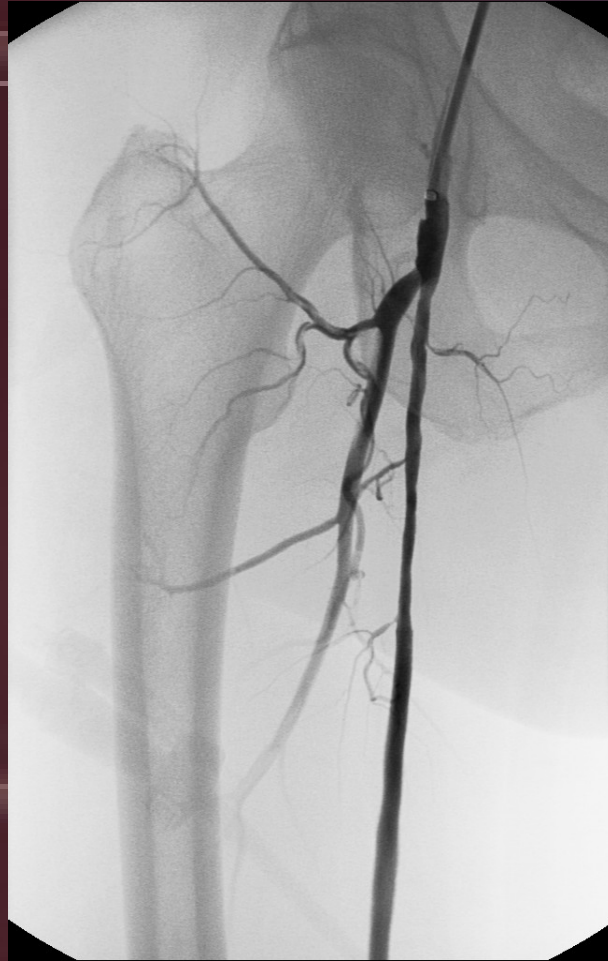
AND/OR

- PTA with provisional stenting.

# Ischemia/Thrombosis/Emboli



# Thrombectomy and PTA





# Access site closure

*“The right tool for the job!”*

- Manual compression
- External mechanical compression (FemoStop, Hold)
- External plug (Vasoseal, Quickseal)
- Internal fixation of external collagen (Angioseal)
- Surgical closure (Perclose, Sutura)
- Thrombin/collagen closure (Duett)
- Vascular Sealing Gel

With new technology comes  
new problems...

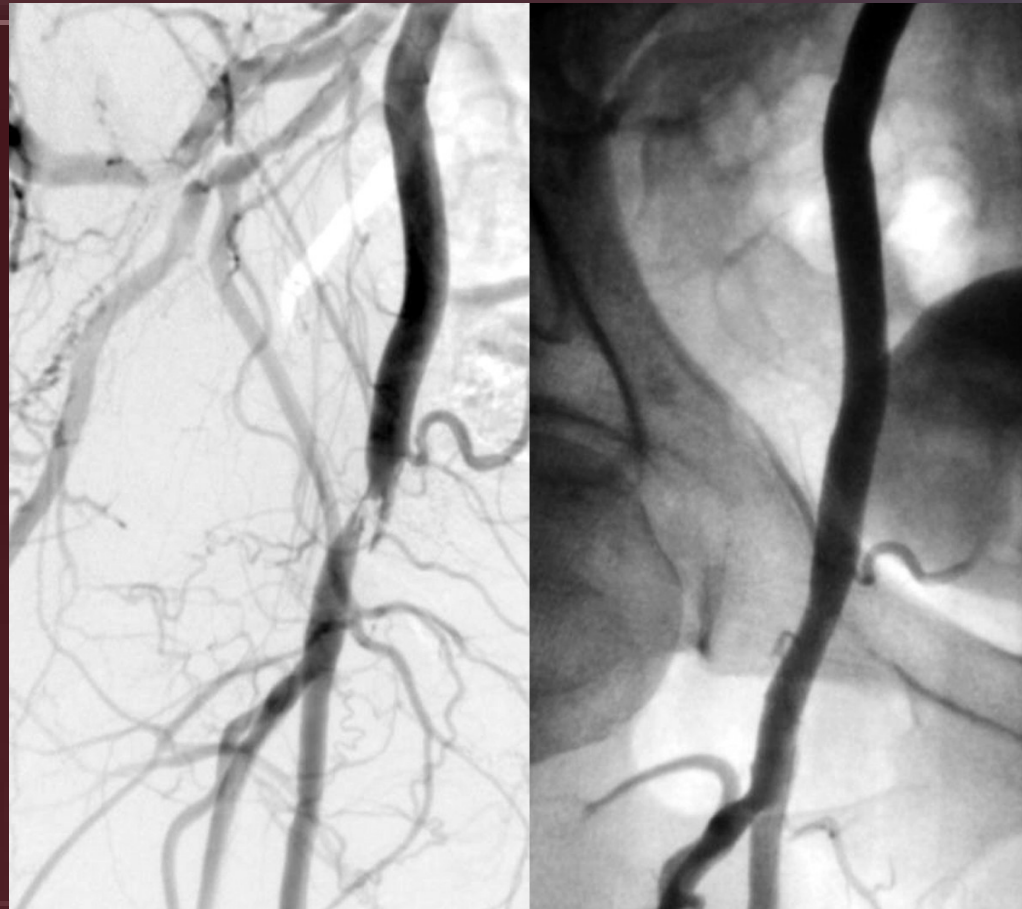


# New complications

## Closure device related:

- Device failure
- Access site abscess
- Septic emboli
- Collagen embolization syndrome
- Vessel rupture
- Acute limb ischemia

# Perclose Complication



# Angioseal Complication





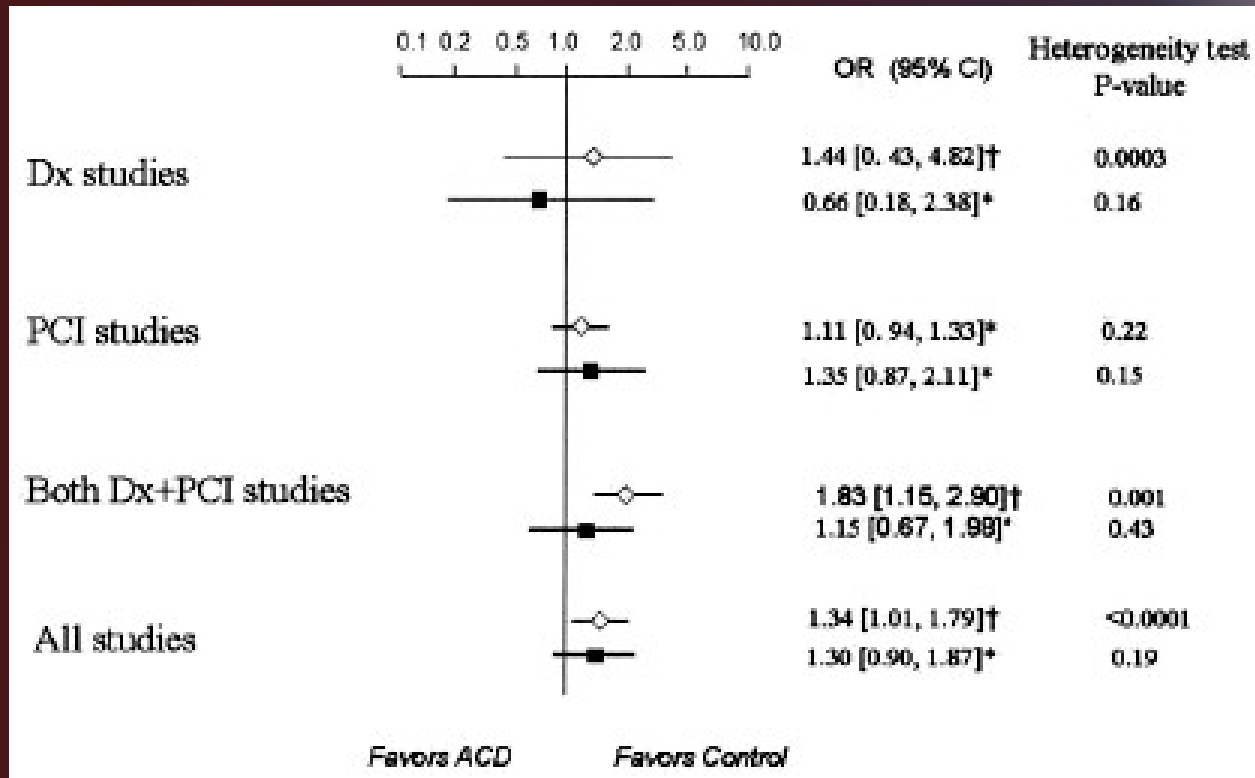
# Meta-Analysis of Closure Device Trials

*33,125 Patients - 21 Independent Trials*

	AngioSeal		VasoSeal		Duett		Perclose		Manual		
	Diag	Inter	Diag	Inter	Diag	Inter	Diag	Inter	Diag	Inter	
n=	1924	1671	1115	348	130	261	3180	4235	13212	7049	
Major Complications	2.3%	2.3%	1.8%	11.2%	2.4%	4.1%	2.0%	2.8%	0.5%	2.9%	Versus
Minor Complications	3.8%	3.9%	1.7%	16.1%	5.6%	4.9%	3.2%	7.8%	1.2%	7.7%	

# Meta-Analysis of Closure Device Trials

37,066 Patients - 30 Independent Trials



# Limitations of the trials

## *Excluded high risk patients!*

- Obese
- Uremia
- CFA calcification
- CFA or external iliac stenosis
- Coagulopathy
- Low platelet count
- Uncontrolled hypertension
- Oral anticoagulants
- Lumbar radiculopathy

*So...extrapolation of these results to the general patient population is hazardous!*

# Access Site Complications

## Conclusions

- Bleeding is life threatening and needs rapid diagnosis and treatment.
- CT scans document the obvious but don't tell you if the patient is still bleeding.
- Diagnosis requires CFD or Angiography
- Treatment options include:
  - Manual compression
  - Percutaneous tamponade, thrombin, ELG and coils
  - Surgery
- AVF only require treatment if symptomatic.
- Pseudoaneurysms, acute ischemia, and other access complications can be managed percutaneously or surgically.
- Baseline angiogram after obtaining access can permit safe intervention without bleeding from collateral bleeding and unusual access configurations.