

# CARDIOVASCULAR INNOVATIONS DIGITAL 2020

## Distal Embolization

Peter Monteleone MD, FACC, FSCAI  
7.2020



# Disclosures

- Medtronic – scientific advisory board, consulting, institutional grant support
- Biotronik – consulting, speakers panel, institutional grant support
- Abbott – institutional grant support
- Amgen – scientific advisory board, institutional grant support



# Distal embolization during lower extremity endovascular interventions



Cassius I. Ochoa Chaar, MD, MS,<sup>a</sup> Fatma Shebl, MD, PhD, MPH,<sup>b</sup> Bauer Sumpio, MD, PhD,<sup>a</sup>  
Alan Dardik, MD, PhD,<sup>c</sup> Jeffrey Indes, MD,<sup>d</sup> and Timur Sarac, MD,<sup>a</sup> *New Haven, West Haven, and Storrs, Conn*

CARDIOVASCULAR  
INNOVATIONS DIGITAL  
2020



**Methods:** All LEIs between 2010 and 2014 in the Vascular Study Group of New England (VSGNE) database were reviewed. Patient characteristics were analyzed to determine predictors of DE. LEIs involving the superficial femoral artery (SFA) were reviewed to assess the effect of type of treatment on DE. The outcomes examined were loss of patency, limb loss, and mortality after LEI involving the SFA. A multivariable regression was used to determine predictors of DE.

**Results:** There were 10,875 procedures. The incidence of DE was 17.3 per 1000 procedures, and 68% required treatment (57% endovascular, 11% open surgery). DE was more common in patients treated for critical limb ischemia compared with claudication (relative risk [RR], 2.06; 95% confidence interval [CI], 1.24-3.45;  $P = .006$ ) and for emergency interventions compared with elective (RR, 2.98; 95% CI, 1.22-7.30;  $P = .017$ ). DE increased with the number of arteries treated ( $P < .0001$ ) and with the length of occlusion ( $P < .0001$ ). The SFA was the most commonly treated artery (4751 [43.7%]). In comparison with atherectomy and balloon angioplasty, stenting alone (RR, 0.36; 95% CI, 0.17-0.73;  $P = .005$ ), balloon angioplasty alone (RR, 0.23; 95% CI, 0.13-0.41;  $P < .0001$ ), and combined stenting and balloon angioplasty (RR, 0.29; 95% CI, 0.17-0.49;  $P < .0001$ ) were associated with a significantly lower risk of DE. DE was not significantly associated with loss of patency, major amputation, or mortality.

**Conclusions:** The incidence of DE during LEIs is 1% to 2% in the VSGNE database, and most patients are treated with additional endovascular interventions. The incidence increases in patients with critical limb ischemia treated with atherectomy. (J Vasc Surg 2017;66:143-50.)

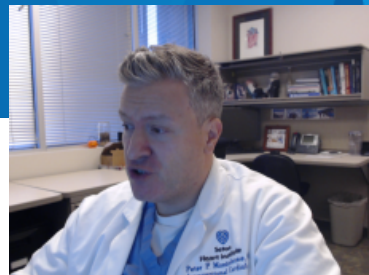


- Elevated index of suspicion for high risk disease
- Devices/techniques aimed at prevention
- Devices/techniques aimed at treatment




# Elevated index of suspicion

- Beware acute limb ischemia cases
  - Concern for thrombosis at site of prior treatment
  - Concern for embolization as etiology of occlusion being treated
  - Concern for patients with hypercoagulable states (HITT, antiphospholipid antibody, COVID19?)
- Beware the wire that “crosses easily”
  - “You’re not that good...”







“An ounce of prevention is worth a pound of cure.”

—Benjamin Franklin—

# Devices/techniques aimed at prevention

- 2006...

TABLE 2. EPDs AVAILABLE FOR FEMOROPOPLITEAL USE*			
Name	Manufacturer	EPD Type	Comments
FilterWire	Boston Scientific	Filter	Maximum diameter 5.5 mm
AccUNET	Abbott	Filter	Approved OUS for carotids
SpideRX	ev3	Filter	May use in CTOs; introduce over any .014-in wire; diameters up to 8 mm
Angioguard	Cordis	Filter	Maximum diameter 7 mm
Interceptor	Medtronic	Filter	In US carotid trials
TriActiv FX	Kensey Nash	Balloon	Maximum diameter 5 mm; loses inflation after 20 min
GuardWire	Medtronic	Balloon	May use in CTOs; maximum diameter approximately 6.2 mm

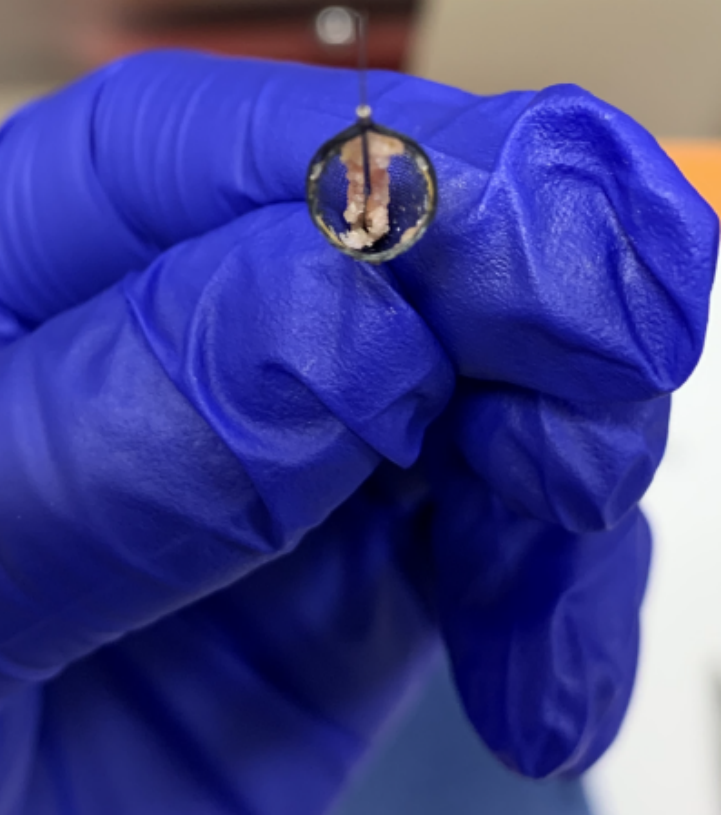


- Abbott Emboshield NAV6
- EPD is deployed on the previously placed BareWire
- Allows for free wire movement/rotation without moving the filter



- Medtornic Spider EPD
- Braided nitinol basket mounted on a 0.014 wire
- 3-7 mm
- Can be delivered over any 0.014 or 0.018 wire or via Trailblazer 0.035 straight catheter





# Devices aimed at treatment

- Removal of distal thrombus

# Devices aimed at treatment

- Removal of distal thrombus
  - Angiojet rheolytic thrombectomy



# Devices aimed at treatment

- Removal of distal thrombus
  - Angiojet rheolytic thrombectomy
  - Penumbra continuous aspiration thrombectomy





# Devices aimed at treat

- Removal of distal thrombus
  - Angiojet rheolytic thrombectomy
  - Penumbra continuous aspiration thrombectomy
  - Aspiration thrombectomy (Export, Pronto, Fetch, Aspire)



# Devices aimed at treatment

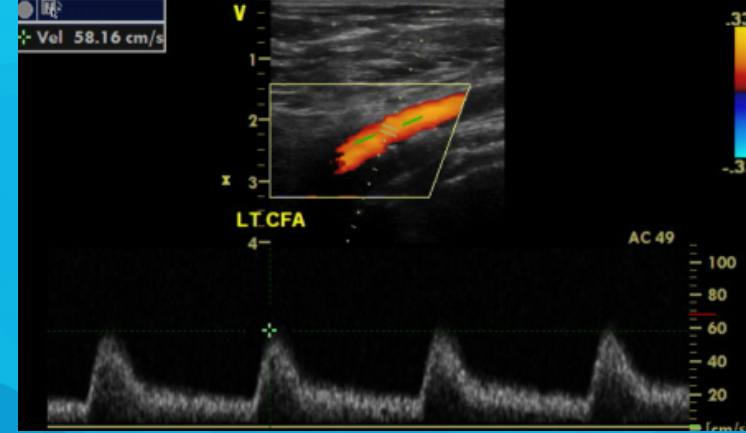
- Thrombolysis of distal thrombus
  - Catheter directed thrombolysis (CDT) including Ekos

# Case Example...

- 58 year old female with hx PAD s/p bilateral CIA stenting performed elsewhere 3 years prior for claudication
- Recent diagnosis of ovarian cancer status post chemotherapy and surgery

- Patient notes that her symptoms resolved completely after stenting
- However she reports severe recurrence of claudication (worse than before over the past 6 months)
- Denies rest pain/ulcerations

- RLE ABI 0.95
- LLE ABI 0.62
- LE arterial duplex demonstrates monophasic “parvus tardus” spectral doppler consistent with unilateral inflow iliac disease

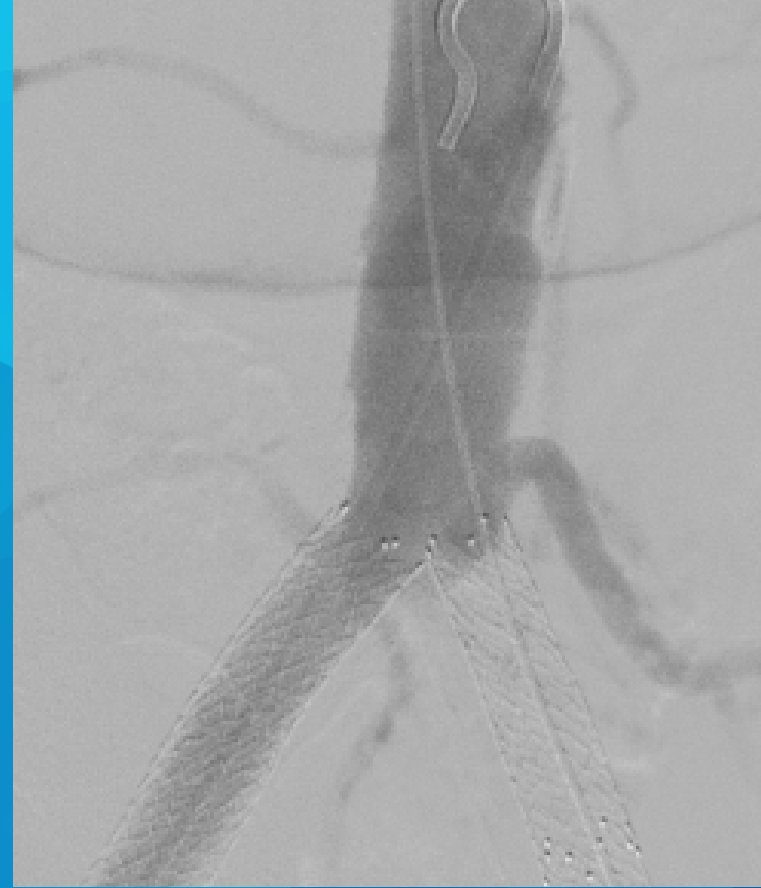


- CTA performed for suspicion of thrombotic occlusion demonstrates total occlusion of the LCIA stent
- Discussed options including potential risks of embolization with therapy
- Patient refused up front surgical evaluation
- Case discussed with vascular surgery to ensure surgical backup as indicated

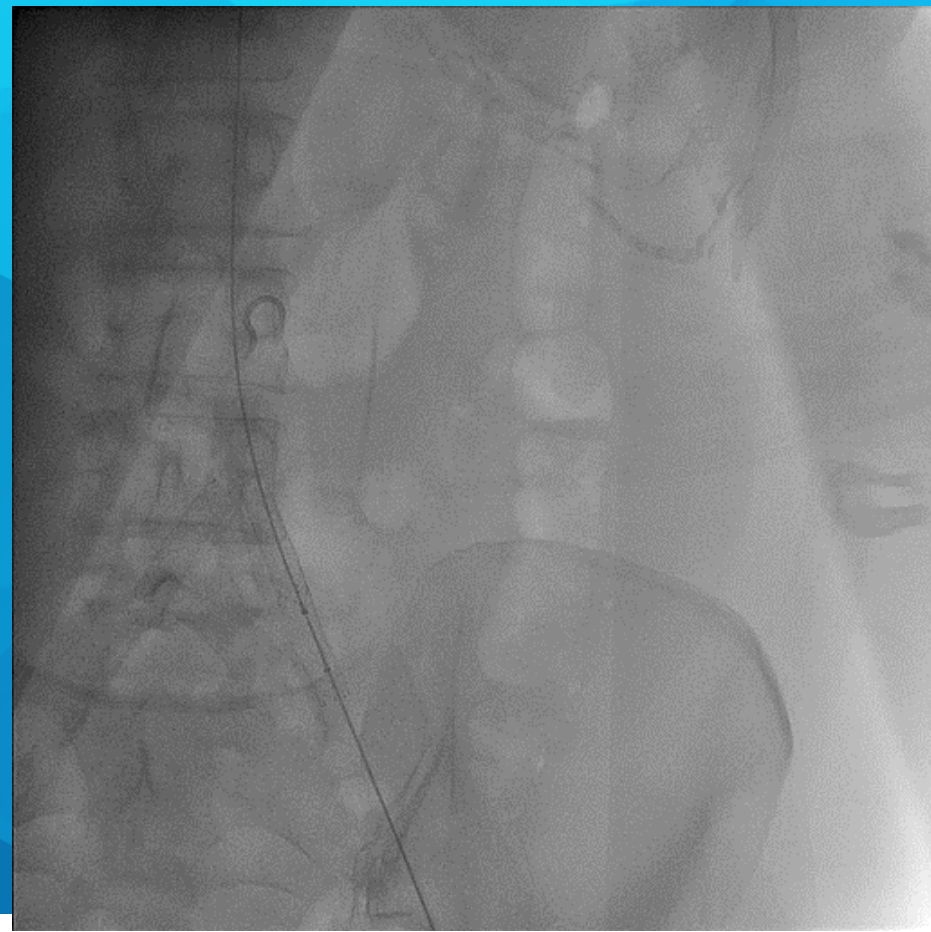


- RCFA access
- Omniflush  
aortogram
- Bilateral CIA stents
- LCIA stent occluded

- LCFA access obtained
- Wholey wire through 0.035 Trailblazer passed easily though the occluded stent into the aorta (“not that good”)
- Occluded approximately 2 mm into “inlet” of LCIA stent

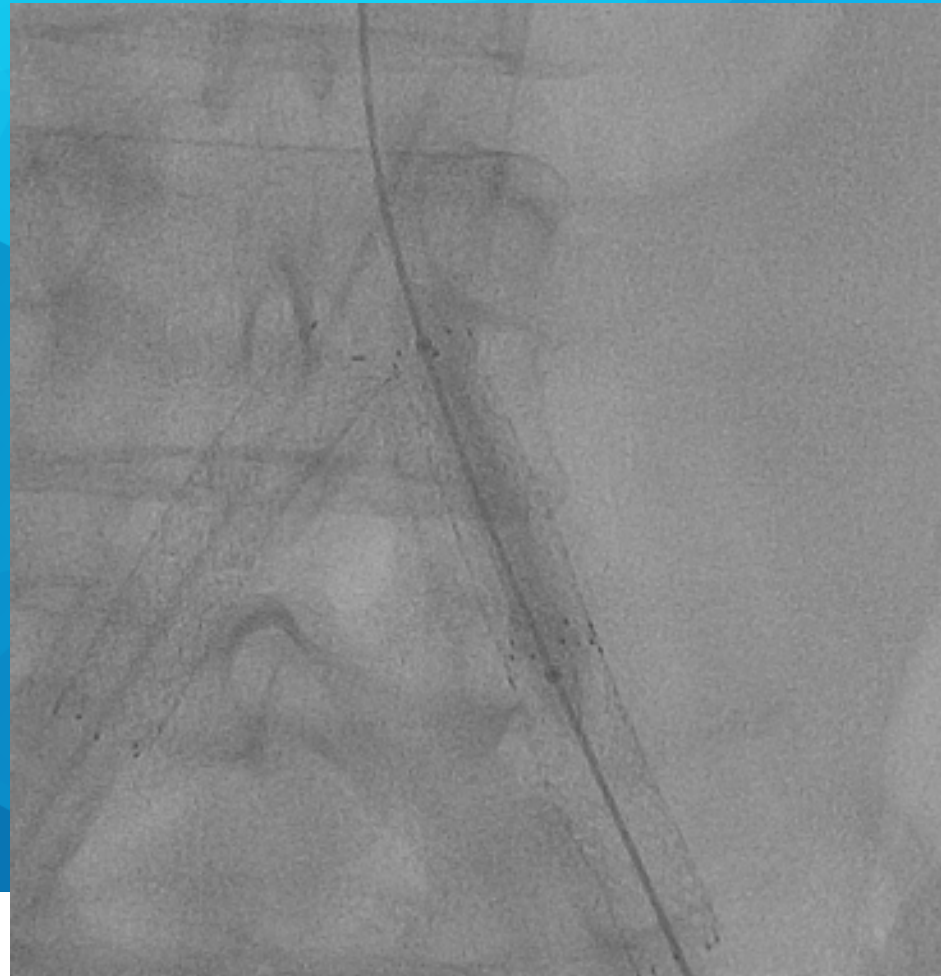


- IVUS performed demonstrates appropriate apposition and sizing of the LCIA stent with thrombotic occlusion
- Angiojet tPA pulsespray and rheolytic thrombectomy performed



- Post-AngioJet therapy unchanged
- Penumbra CAT6 mechanical aspiration attempted with minimal thrombus withdrawal and angiography unchanged

- Discussed with vascular surgery (in case embolization to CFA demanded surgical rescue) and decision for undersized (4.0mm) angioplasty and consideration of “covering with covered stent”

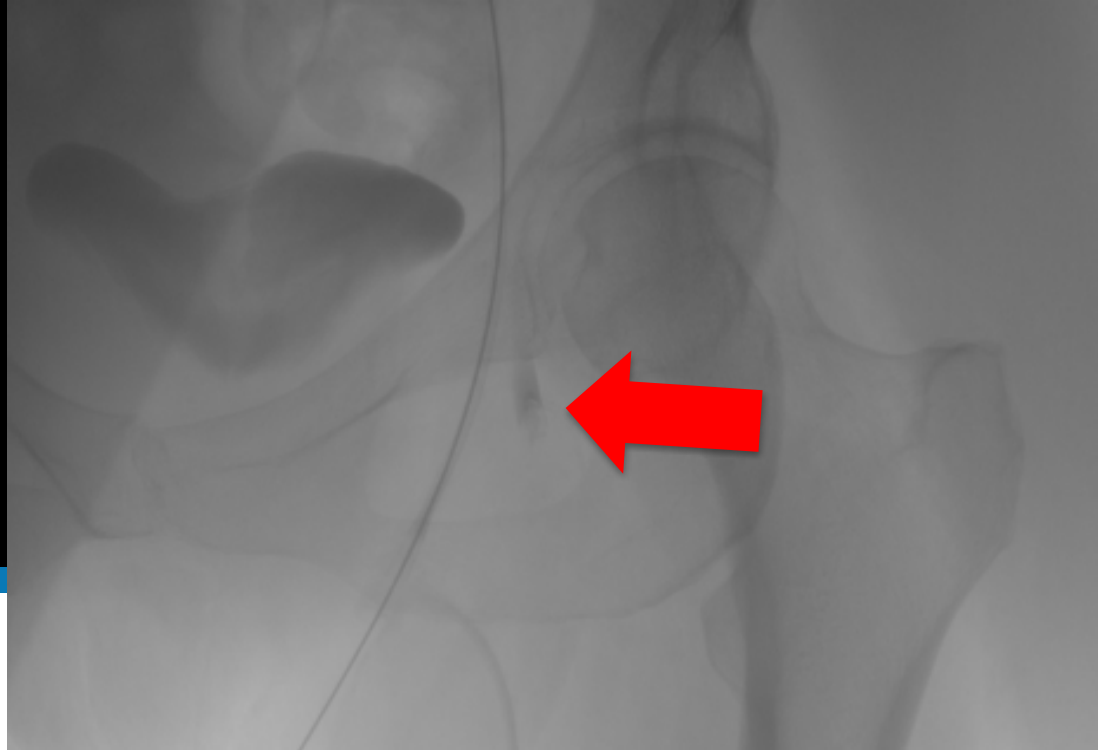


- Embolization of clot from LCIA to LEIA

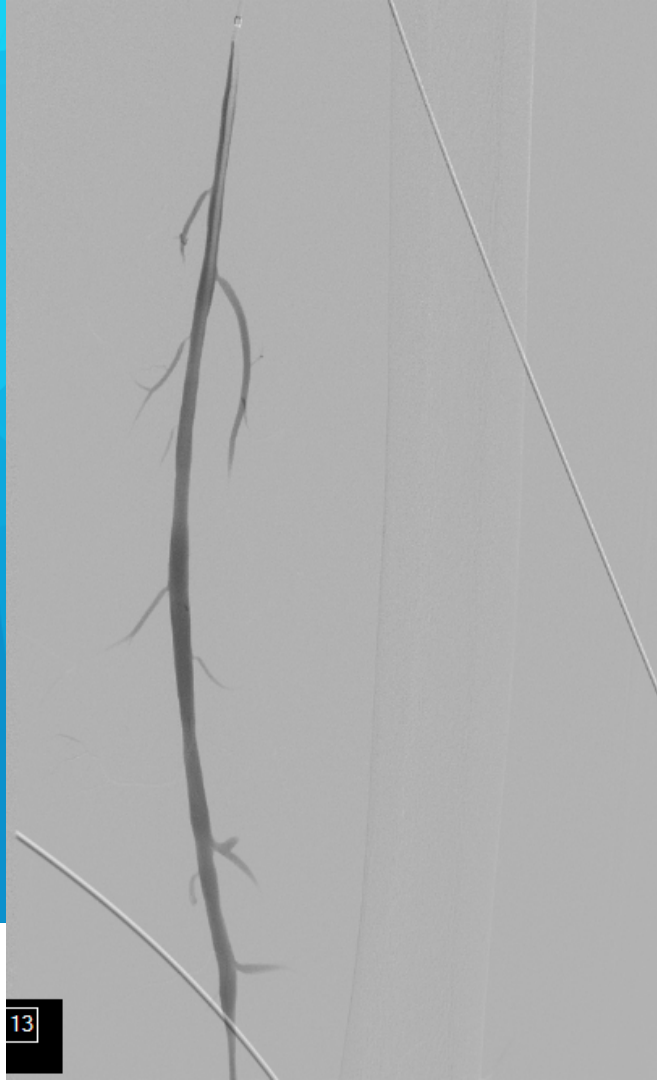


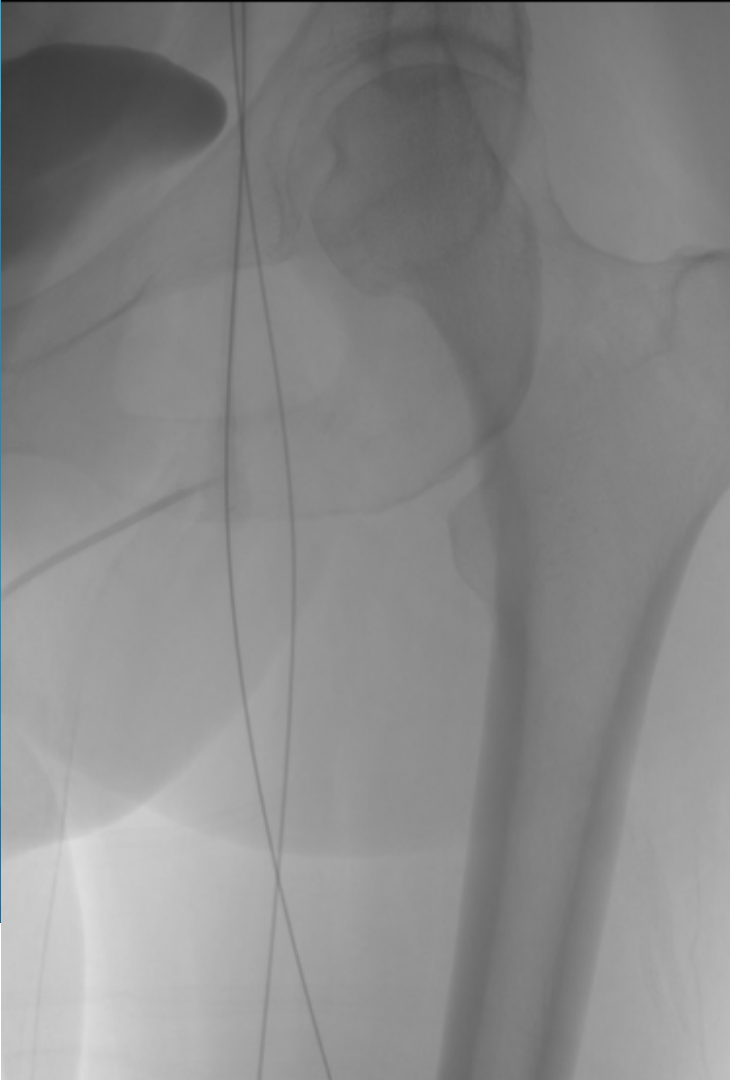
- Angio from LCFA access
- AngioJet via L CFA

- Acute pain in left leg
- Contacted vascular surgery but unavailable



- Glidewire through Omniflush up/over iliac bifurcation through clot into the LSFA
- Passed the LCFA sheath
- Chased by 0.035 Trailblazer
- 6F 45 cm over iliac bifurcation to LEIA
- 7.0 Spider EPD placed in distal LSFA





- AngioJet (passed the LCFA sheath) of the L CFA/SFA



- Immediate pain resolution with restoration of inline flow
- Residual large burden thrombus at distal CFA/SFA
- Suspicion for thrombus embolization into profunda

- Discussion with vascular surgery
- Plan for Viabahn covered stenting of proximal SFA residual thrombus
- Defect at stent ostia
- ?Thrombotic occlusion of profunda main branch
- Excellent runoff distal
- Spider captured



- Embolization/mobilization of further thrombus now lodged recurrent at CFA
- To OR

- Exploration of LCFA with endarterectomy/embolectomy and vein patch angioplasty
- Embolectomy of L profunda
- Removal of L SFA Viabahn



Special thanks...

Dr. Scott Seidel  
Vascular Surgery

# Conclusions – LE Distal Embolization

- Elevated index of suspicion for high risk disease
- Know your devices/techniques for prevention and bailout
- Regardless of expertise... life/limb-threatening challenges arise

# CARDIOVASCULAR INNOVATIONS DIGITAL 2020