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10th ANNUAL CURRENT CONCEPTS IN

VASCULAR THERAPIES

2022

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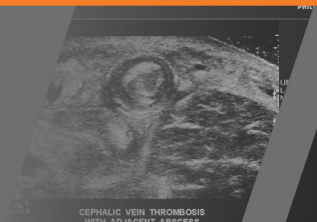
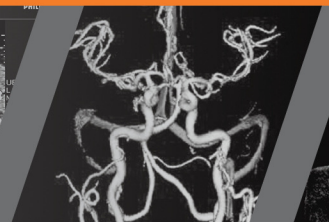
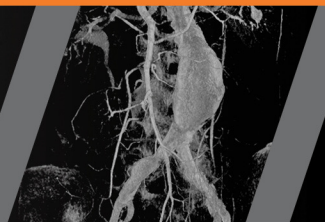
Virginia Beach, Virginia

APRIL 28-30







Sentara Vascular Specialists

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Pedal Access for PAD

Brandon C. Cain, MD

Vascular and Vein Specialists of Greensboro

No Financial Disclosures

Peripheral Arteries

Eur J Vasc Endovasc Surg (2021) 61, 270–279

SYSTEMATIC REVIEW

Technical Success and Complication Rates of Retrograde Arterial Access for Endovascular Therapy for Critical Limb Ischaemia: A Systematic Review and Meta-Analysis

Stefanos Giannopoulos [a], Luis M. Palena [b], Ehrin J. Armstrong [a,*]

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WHAT THIS PAPER ADDS

Antegrade crossing techniques via transfemoral access are often challenging and may be associated with technical and clinical failure when treating patients with critical limb ischaemia (CLI). The aim of this study was to summarise the available literature on retrograde endovascular treatment of CLI patients and to investigate the technical success and complication rate of retrograde access. Finally, an algorithm is proposed for preferred retrograde access site selection according to target lesion location.

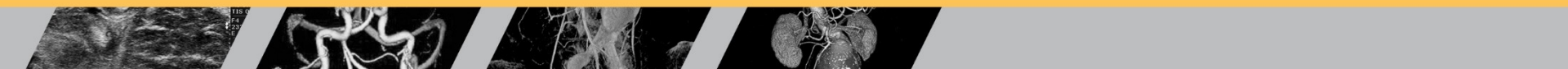
Objective: Antegrade crossing techniques via transfemoral access are often challenging and may be associated with technical and clinical failure when treating patients with critical limb ischaemia (CLI). The objective of this study was to summarise all available literature regarding retrograde endovascular treatment of patients with CLI and to investigate the technical success and complication rate of retrograde access.

Methods: A systematic literature search was performed in PubMed, Scopus, and Cochrane Central until May 2020. A meta-analysis of 31 observational studies (29 retrospective and two prospective; 26 and five studies with low and moderate risk of bias, respectively) was conducted with random effects modelling. The incidence of adverse events peri-procedurally and during follow up were calculated.

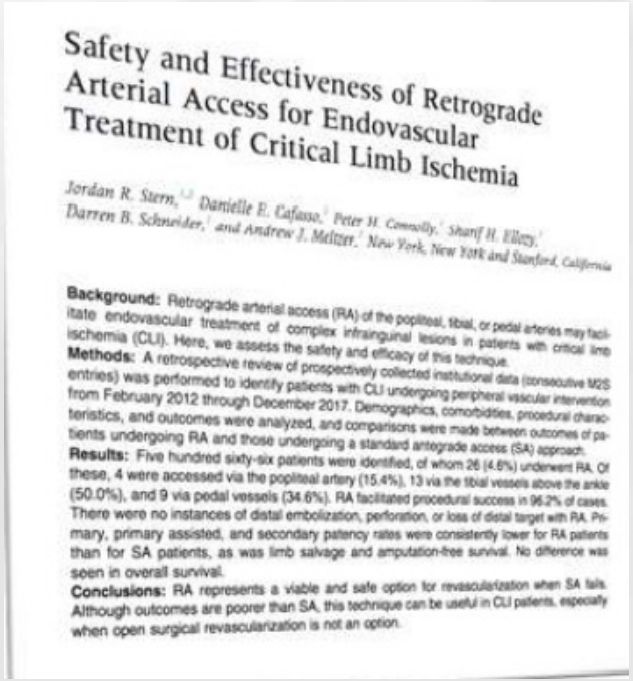
Results: The 31 studies enrolled 1 910 patients who were treated endovascularly for femoropopliteal and/or infrapopliteal lesions causing CLI. Most of the patients had diabetes while more than half of the overall population had coronary artery disease and dyslipidaemia. All lesions were located in the infra-inguinal segment and most were chronic total occlusions (96%; 95% CI 85%—100%). Seven studies reported moderate or severe calcification in approximately half of the cases (45%; 95% CI 30%—60%). The overall technical success of the retrograde approach was 96% (18 studies; 95% CI 92%—100%). Perforation, flow limiting dissection, distal embolisation, and local haematoma at the retrograde access site were infrequent and observed in 2.1%, 0.6%, 0.1%, and 1.3% of the patients, respectively. The six month primary patency rate was 78% (five studies; 95% CI 46%—99%), the six month limb salvage rate was 77% (four studies; 95% CI 70%—84%).

Conclusion: The results indicated that the retrograde or bidirectional antegrade/retrograde approach is safe and effective and facilitates angioplasty when antegrade treatment fails. However, prospective studies with standardised wound care and surveillance protocols are needed to investigate retrograde techniques in patients with CLI who failed antegrade revascularisation, to improve long term limb salvage and survival.

- 31 studies with 910 patients
- 96% lesions crossed
- 91% technical success
- Access site complications in 4.1%



Safety and Effectiveness



Safety and Effectiveness of Retrograde Arterial Access for Endovascular Treatment of Critical Limb Ischemia

Jordan R. Stern,[1,2] Danielle E. Cafasso,[1] Peter H. Connolly,[1] Sharif H. Ellozy,[1] Darren B. Schneider,[1] and Andrew J. Meltzer,[1] New York, New York and Stanford, California

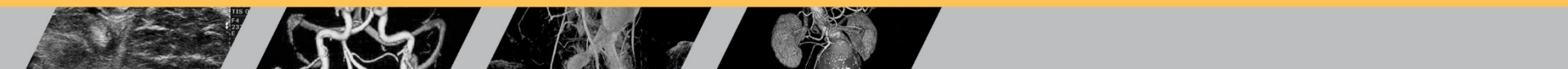
Background: Retrograde arterial access (RA) of the popliteal, tibial, or pedal arteries may facilitate endovascular treatment of complex infrainguinal lesions in patients with critical limb ischemia (CLI). Here, we assess the safety and efficacy of this technique.

Methods: A retrospective review of prospectively collected institutional data (consecutive M2S entries) was performed to identify patients with CLI undergoing peripheral vascular intervention from February 2012 through December 2017. Demographics, comorbidities, procedural characteristics, and outcomes were analyzed, and comparisons were made between outcomes of patients undergoing RA and those undergoing a standard antegrade access (SA) approach.

Results: Five hundred sixty-six patients were identified, of whom 26 (4.6%) underwent RA. Of these, 4 were accessed via the popliteal artery (15.4%), 13 via the tibial vessels above the ankle (50.0%), and 9 via pedal vessels (34.6%). RA facilitated procedural success in 96.2% of cases. There were no instances of distal embolization, perforation, or loss of distal target with RA. Primary, primary assisted, and secondary patency rates were consistently lower for RA patients than for SA patients, as was limb salvage and amputation-free survival. No difference was seen in overall survival.

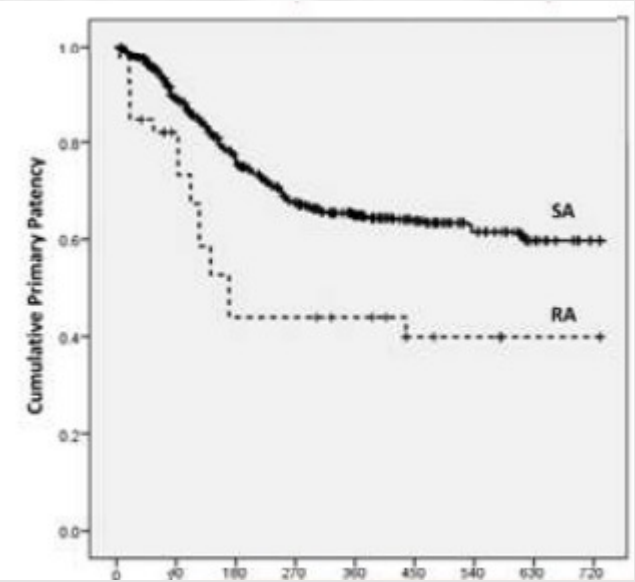
Conclusions: RA represents a viable and safe option for revascularization when SA fails. Although outcomes are poorer than SA, this technique can be useful in CLI patients, especially when open surgical revascularization is not an option.

- Retrospective review 2012-17
- 26/566 underwent RA
- Success in 96.2%
- 0% distal target complication
- Patency and limb salvage lower for RA than SA

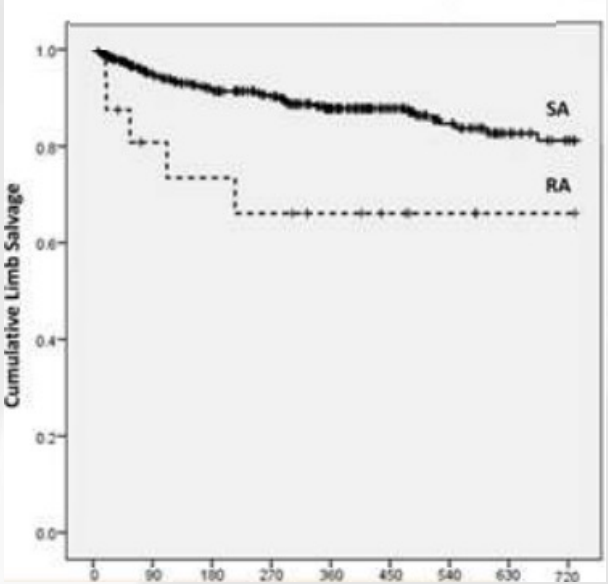


Safety and Effectiveness

Primary Patency



Limb Salvage



Safety and Effectiveness

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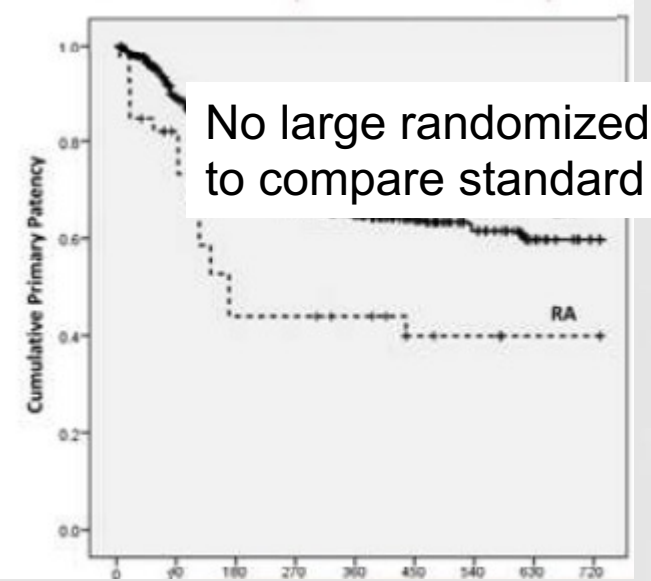
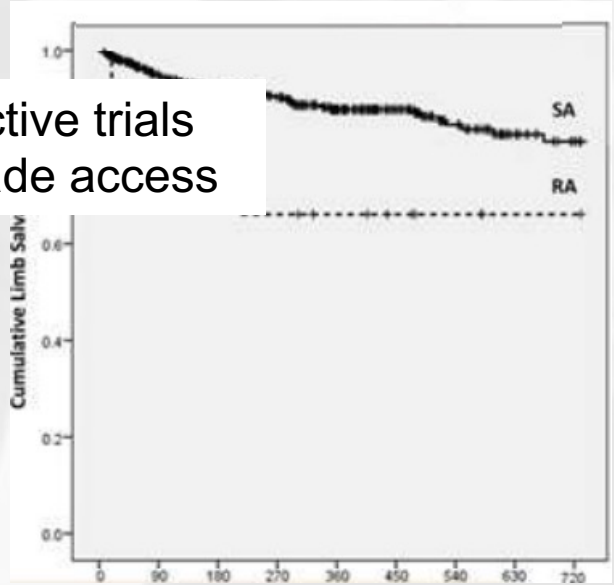


No large randomized or prospective trials to compare standard vs retrograde access

Limb Salvage



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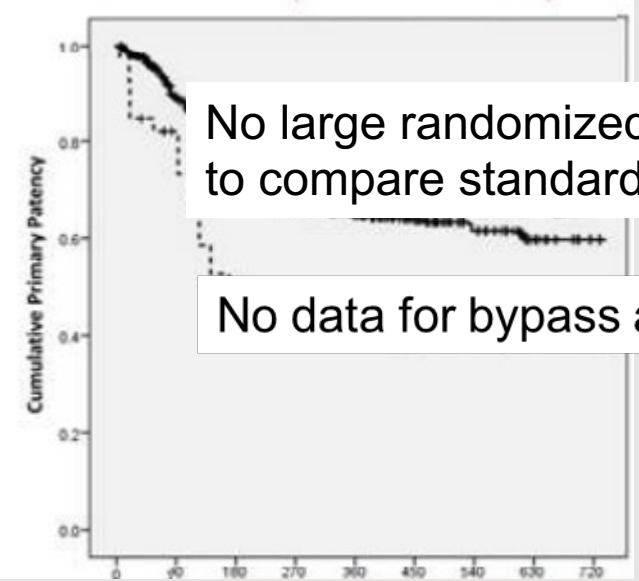
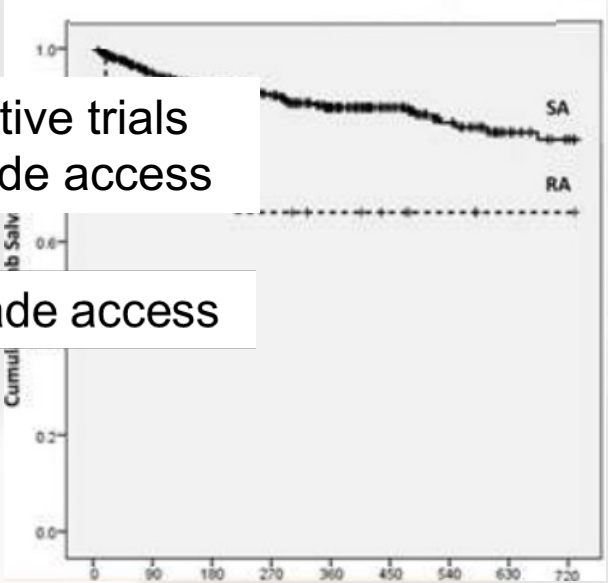


Limb Salvage



No large randomized or prospective trials to compare standard vs retrograde access

No data for bypass after retrogade access

Pitfalls

- Small vessels prone to spasm
- Risk of vessel injury/dissection/thrombosis/embolism
- AVF creation
- Loss of bypass target
- Bleeding, compartment syndrome
- Learning curve
- Increased procedural time/radiation exposure

Retrograde Pedal Access—Cutting Edge or Comical?

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Anahita Dua, MD, MS, MBA[1], and Venita Chandra, MD[1]

Abstract

Retrograde pedal access is a technique utilized with increasing frequency by many interventionists to address patients with advanced multilevel peripheral artery disease and significant comorbidities. This approach to revascularization is being used both in patients who fail traditional antegrade access and in some patients thought to be poor candidates for antegrade approach. However, the lack of randomized controlled trial data, or long-term results, coupled with the associated potential risks including dissection, spasm, and thrombosis have rendered retrograde pedal access a controversial topic. This article details the pros and cons associated with the debate surrounding retrograde pedal access and highlights the current literature and remaining questions regarding outcomes of this technique.

Keywords

pedal access, retrograde access, critical limb ischemia

Introduction

Twenty-eight years ago, Dr Iyer and colleagues[1] first described a retrograde pedal technique using a posterior tibial cutdown to facilitate the endovascular revascularization of occluded tibial arteries in 2 patients who had failed conventional antegrade crossing techniques.[1] Today, over 2 decades later, retrograde pedal access is a technique utilized with increasing frequency by many interventionists to address patients with advanced multilevel peripheral artery disease and significant comorbidities. This approach to revascularization is being used both in patients who fail traditional antegrade access and in some patients thought to be poor candidates for antegrade approach. However, the lack of randomized controlled trial data, or long-term results, coupled with the associated potential risks including dissection, spasm, and thrombosis have rendered retrograde pedal access a controversial topic. This article details the pros and cons associated with the debate surrounding retrograde pedal access and highlights the current literature and remaining questions regarding the outcomes of this technique.

Pros

The primary argument for retrograde pedal access is to facilitate the endovascular management of high-risk critical limb ischemia patients with infrainguinal or infrapopliteal chronic total occlusions (CTOs). The goal is to avoid traditional open bypass and the associated rates of major morbidity/mortality which can be significant. An analysis of the Bypass versus Angioplasty in Severe Ischaemia of the Leg (BASIL) trial, which randomized patients to either open bypass first or angioplasty for infra-inguinal lesions, reported that short-term clinical outcomes were similar in both groups, but that surgery was both significantly more morbid and expensive. Interestingly, the BASIL trial reported that more patients were alive in the open bypass group 2 years out from intervention, but this finding was based on a post hoc analysis with relatively small numbers.[2]

Since the BASIL trial results, there has been significant advancement and adoption of percutaneous, endovascular-first approaches to patients with critical limb ischemia (CLI). Technical success in a meta-analysis of studies using endovascular-first treatment modality noted the 3-year limb salvage rate to be 82.4% which is similar to open surgical results of 82.3%.[3,4] Hence, attempts to cross lesions endovascularly by any means necessary may prove to be a useful option for patients versus moving directly to open surgical bypass.

That being said, up to 20% of tibial lesions cannot be crossed with the traditional antegrade techniques.[5,6] In this patient cohort with classic CLI comorbidities that substantially increase open surgical risk, a retrograde pedal approach is a popular treatment option. There are several theories as to why the retrograde approach may result in a favorable crossing of an

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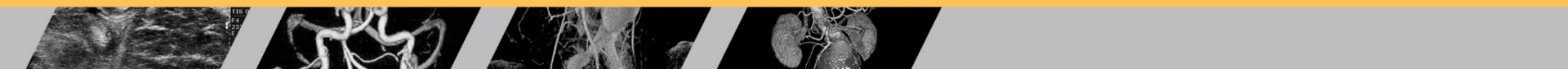

Editorial

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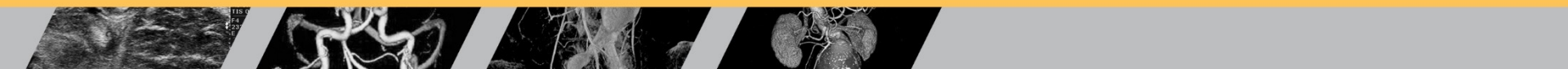

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PATIENT SELECTION

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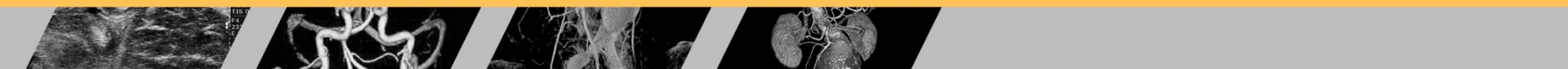

Benefits of Retrograde Access

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- Inability to cross antegrade – 15-20%

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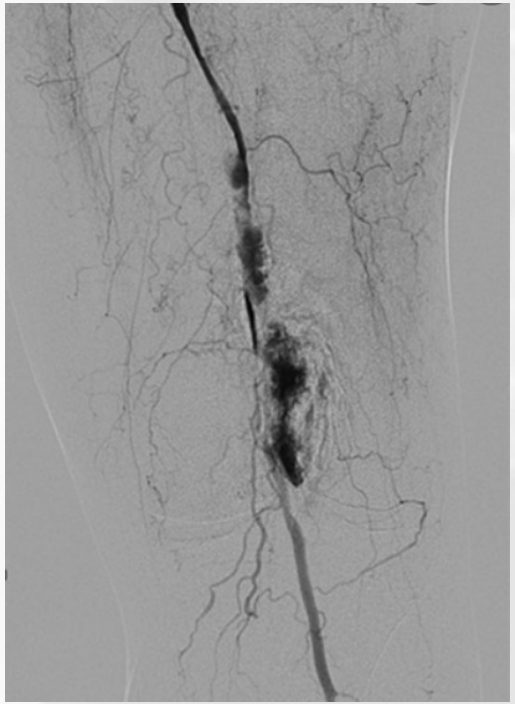
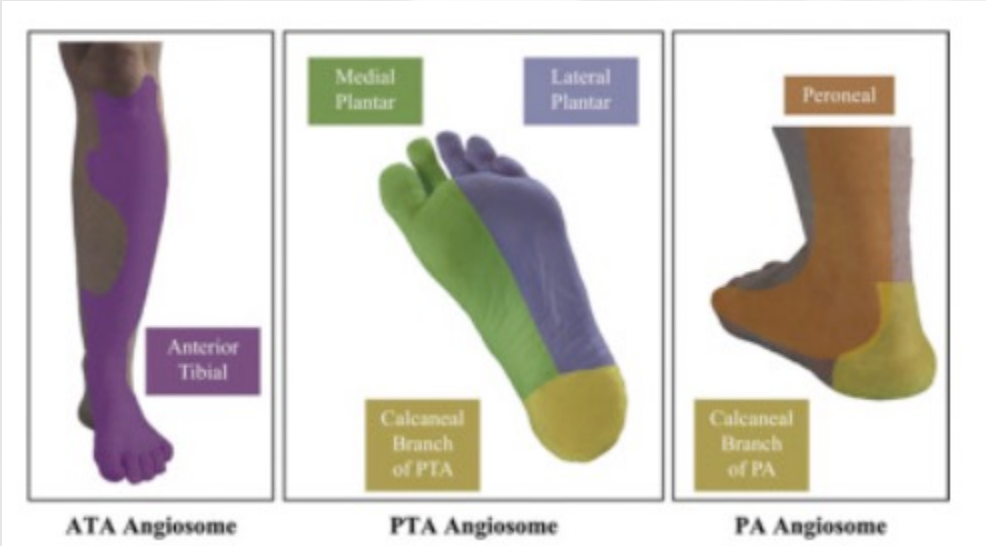


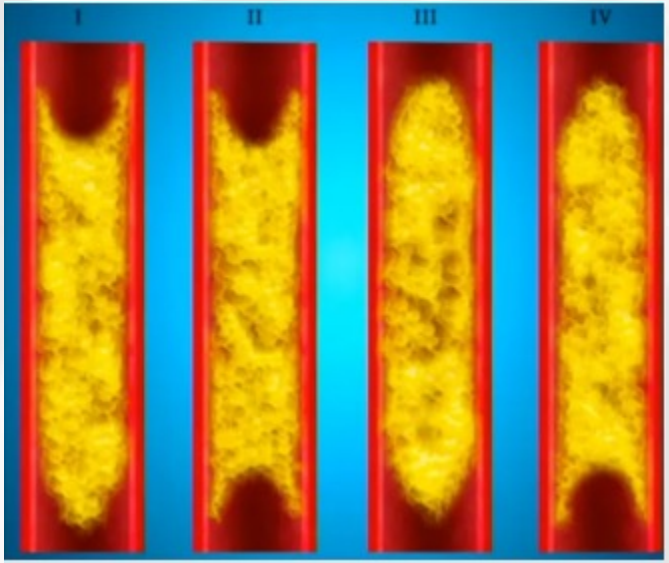
Benefits of Retrograde Access

- Inability to cross antegrade – 15-20%
- Target angiosome



Benefits of Retrograde Access

- Inability to cross antegrade – 15-20%
- Target angiosome
- More favorable cap morphology



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- Target angiosome
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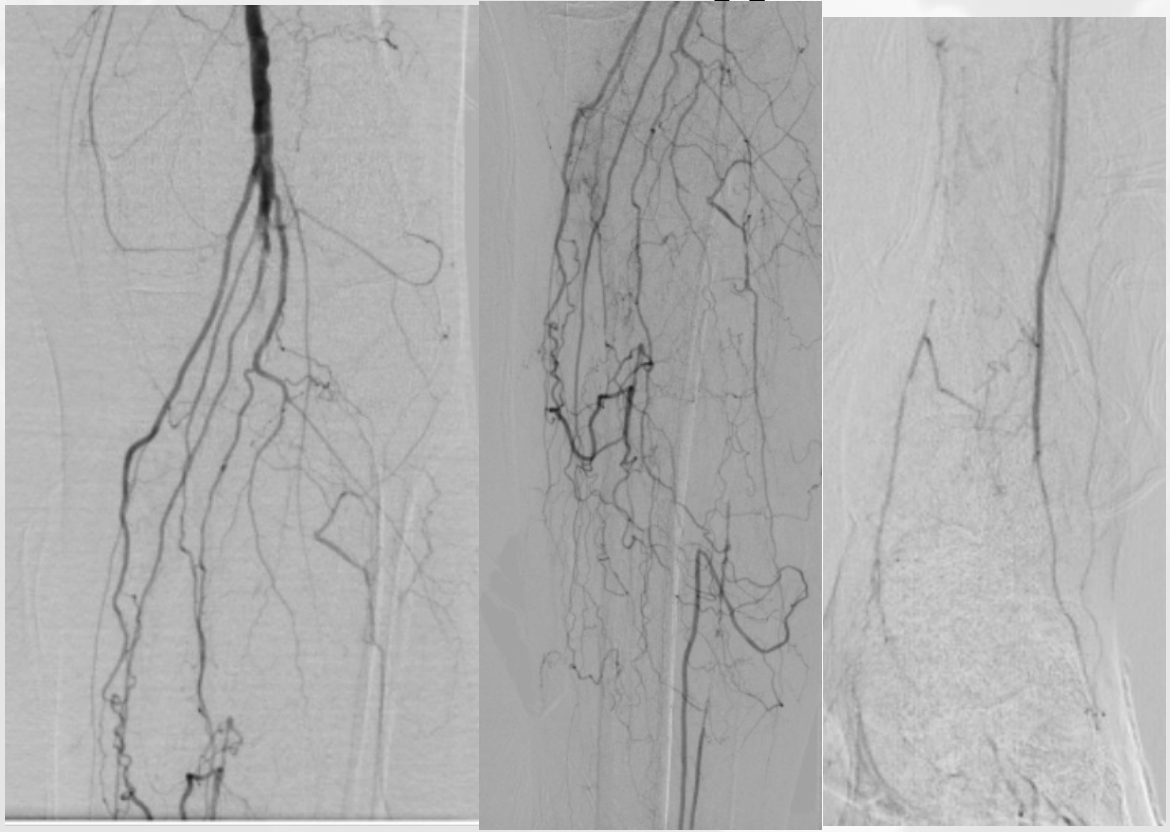
Benefits of Retrograde Access



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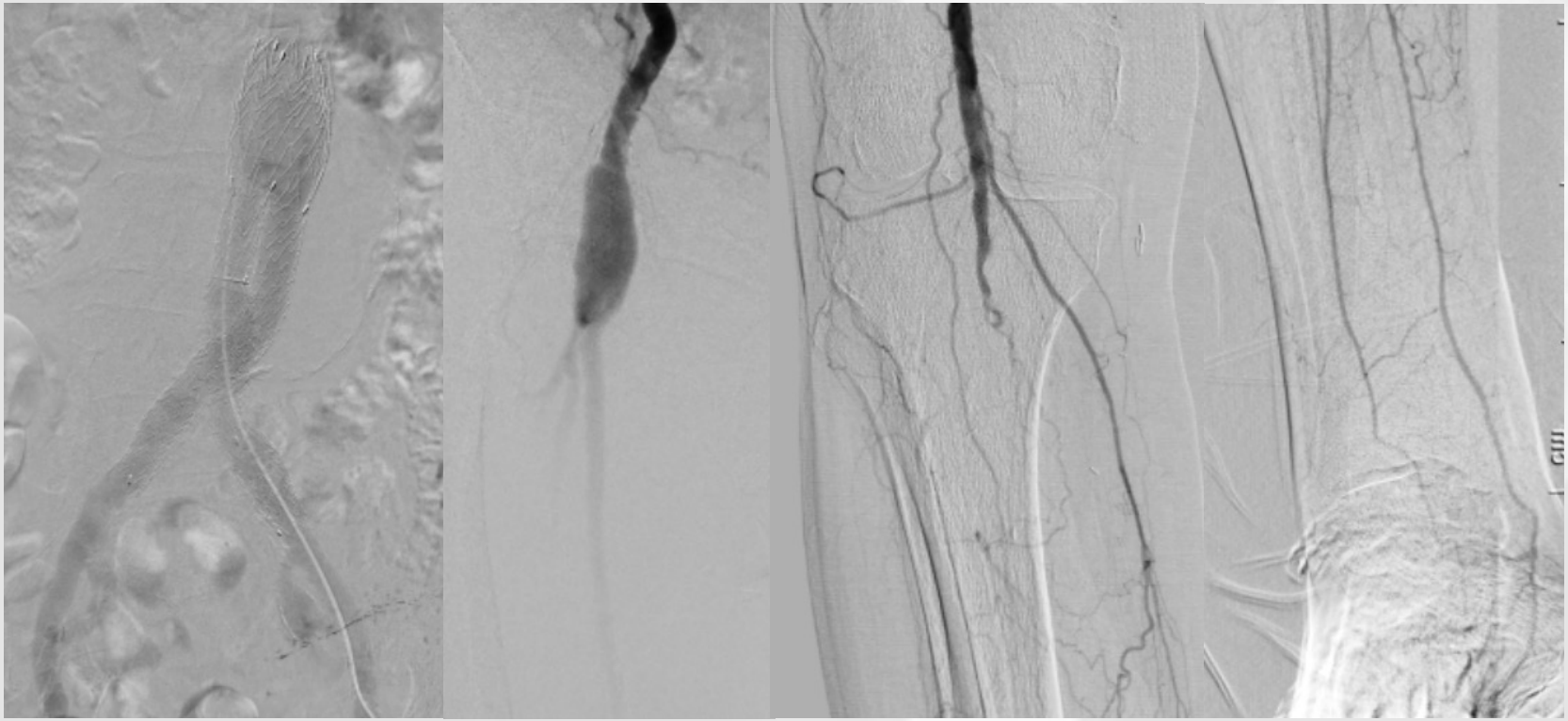


Benefits of Retrograde Access

- Inability to cross antegrade – 15-20%
- Target angiosome
- More favorable cap morphology
- Less collateral engagement
- Anatomic considerations
- Facilitate treatment of difficult lesions

Treating Retrograde

- 1. Accessing vessel
- 2. Crossing Lesion
- 3. Treatment

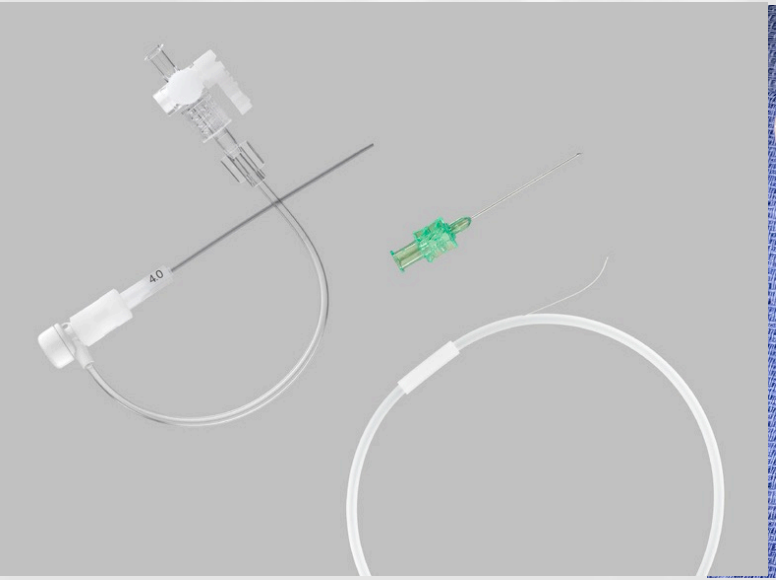
Treating Retrograde

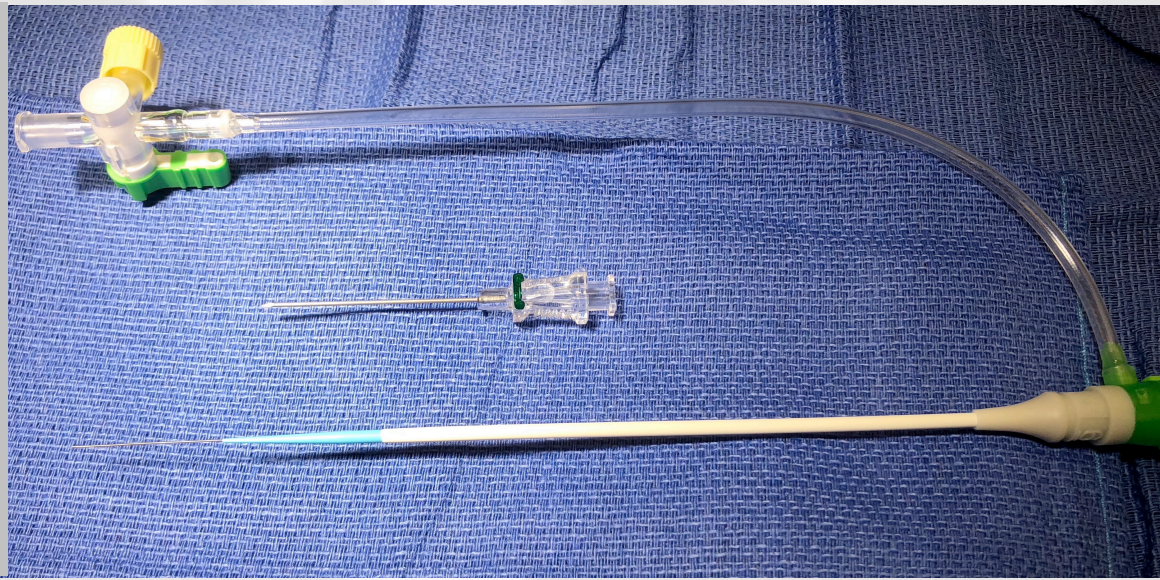
Accessing/Closing the Vessel

- 1.US 2. fluoroscopic guidance 3. surgical cutdown
- Lower 1/3 of leg or foot
- Micro and slender sheaths
- Closure with with/without balloon inflation, direct pressure, banding

Treating Retrograde

Accessing/Closing the Vessel





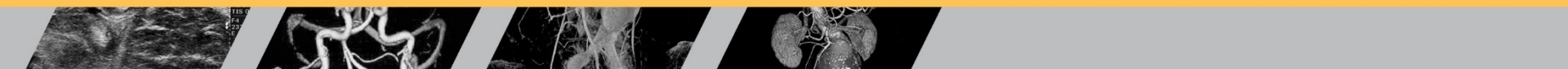
Treating Retrograde

Accessing/Closing the Vessel

Treating Retrograde

Crossing the lesion

- Standard wires and catheters (0.014 and 0.018 platforms)
- Crossing catheters
- double balloon or “CART” technique



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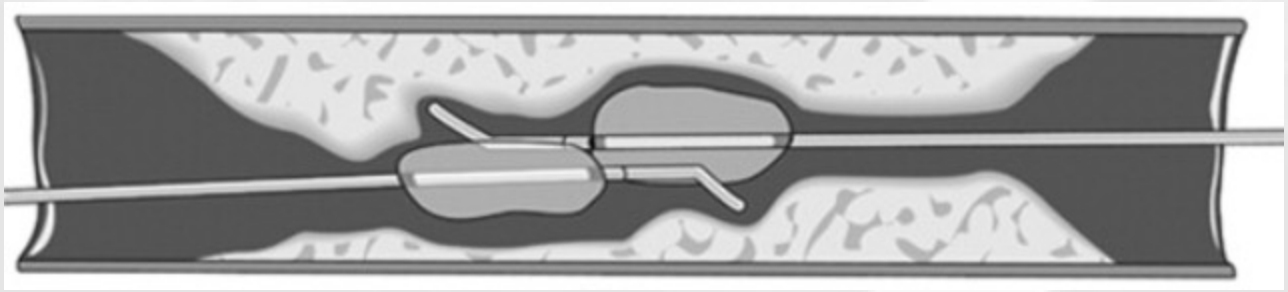
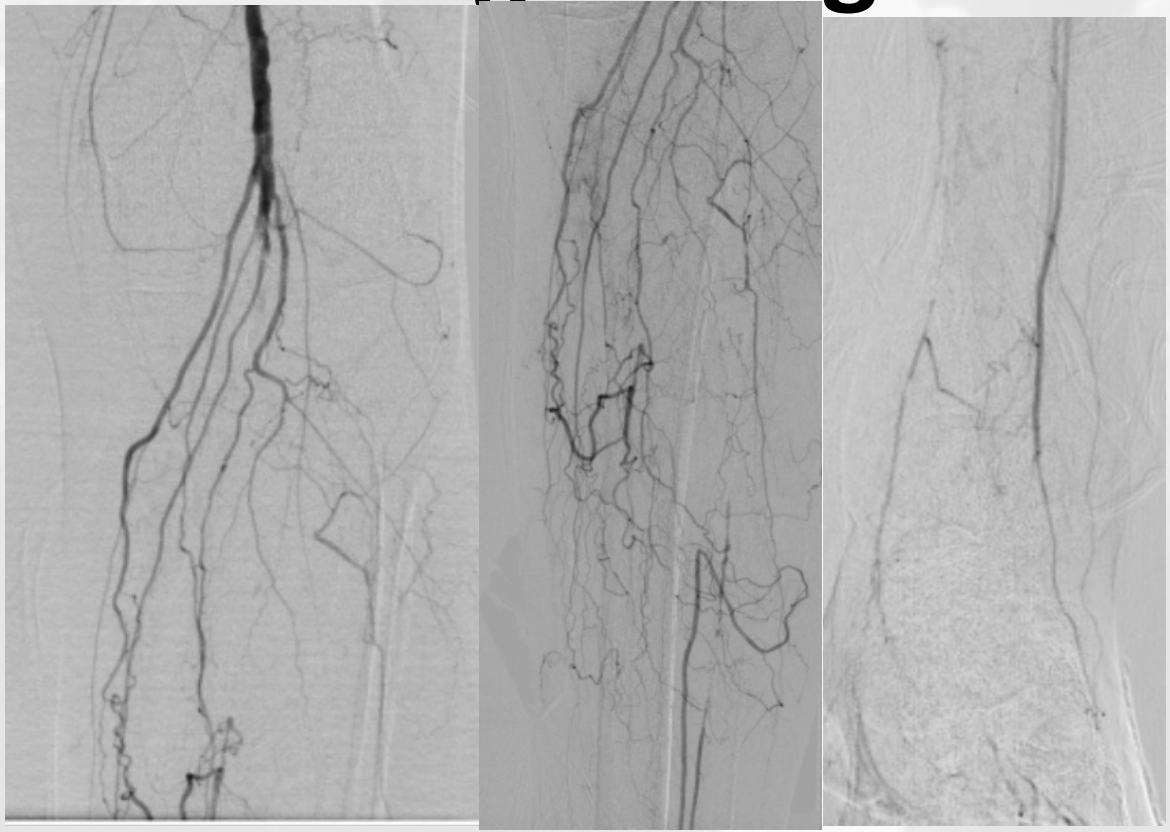


Treating Retrograde

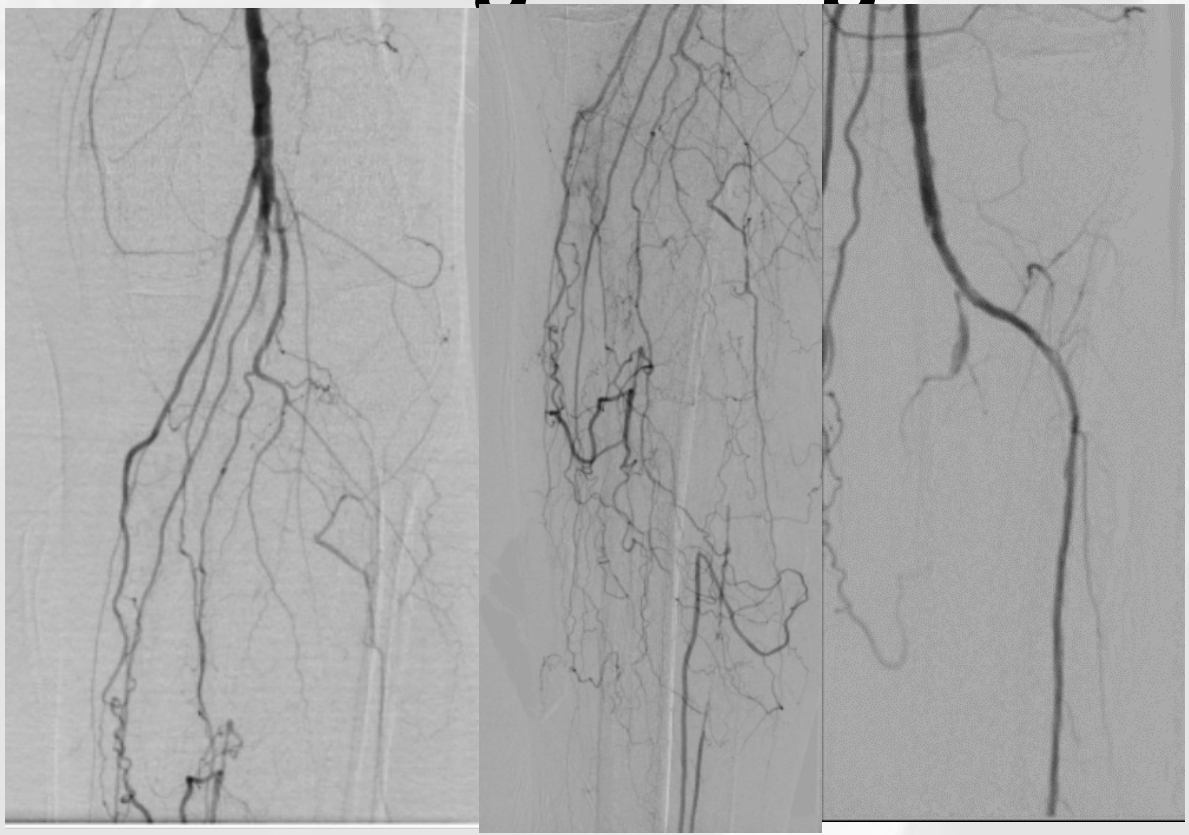
Treatment

- Atherectomy
  - True lumen
  - Antegrade or retrograde
- POBA or DCB
- Stent – BMS or DES
  - subintimal crossing location
  - bailout

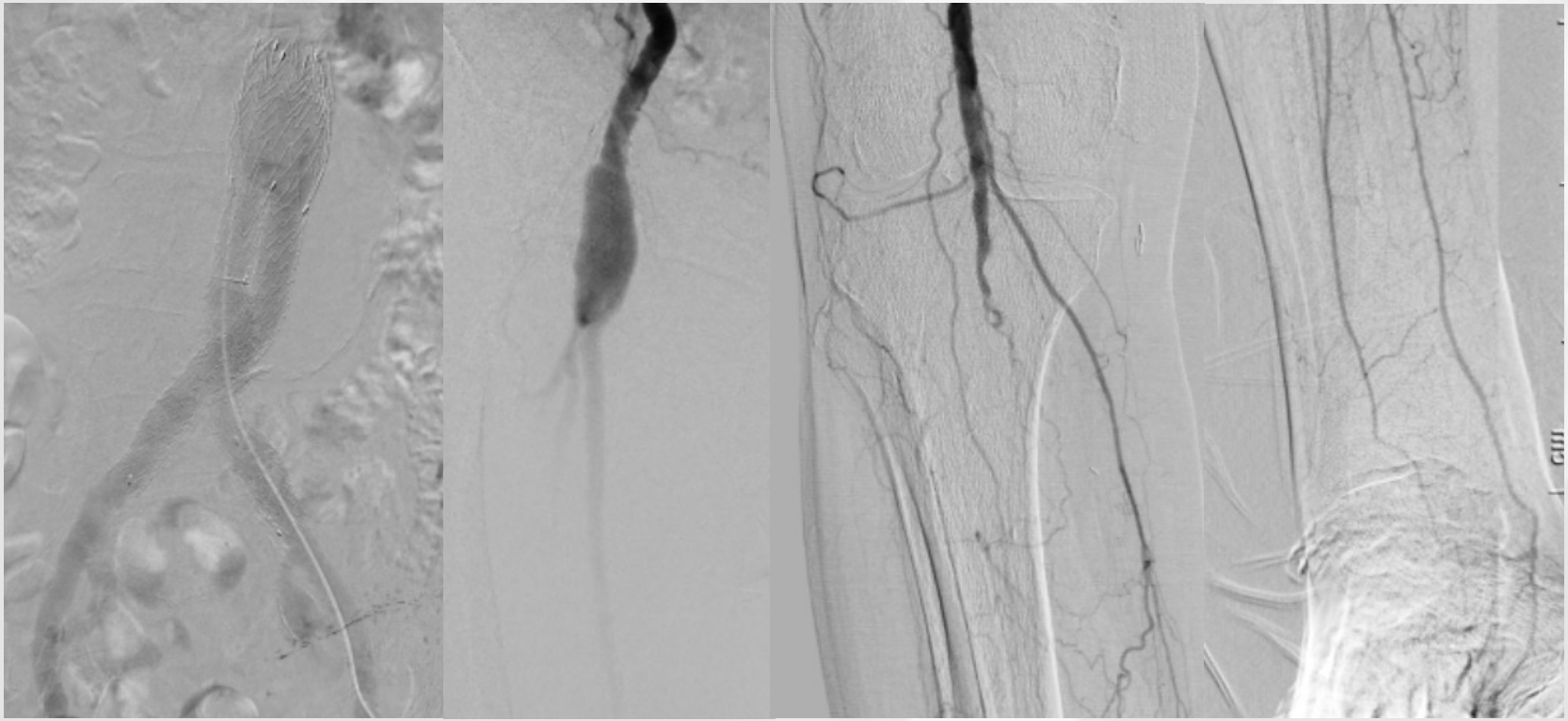
Treating Retrograde



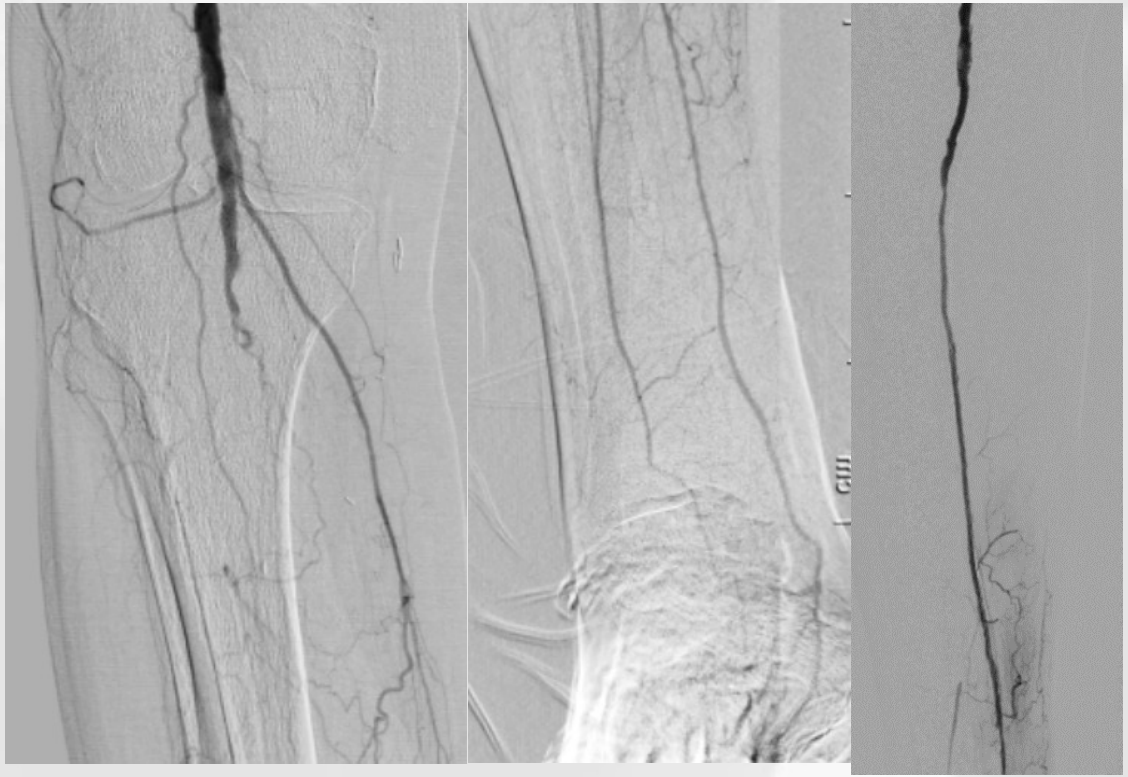
Treating Retrograde



Treating Retrograde



Treating Retrograde



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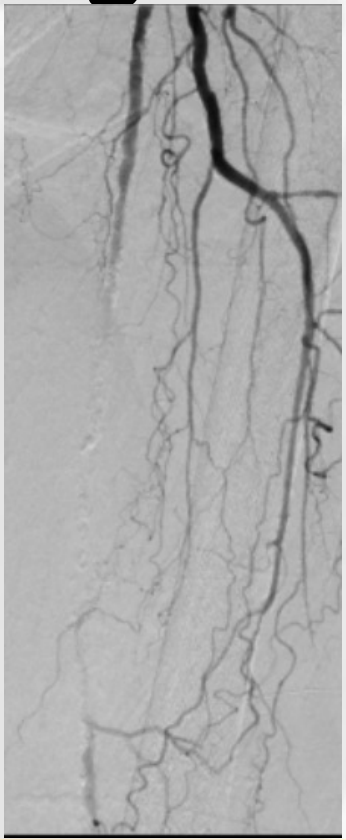
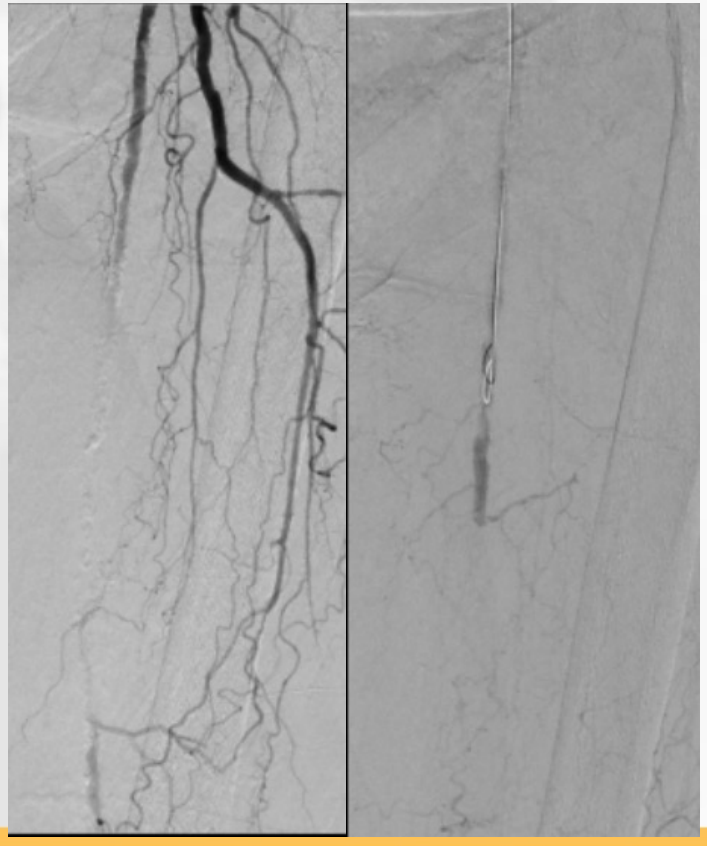
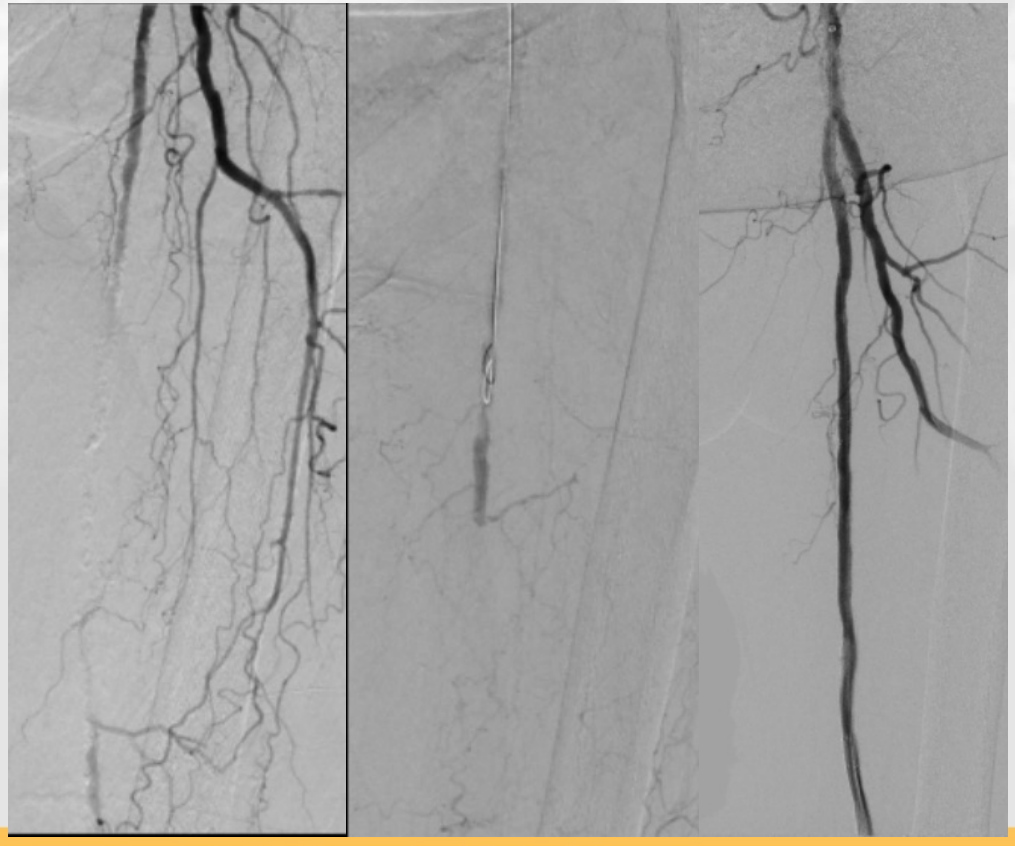


Treating Retrograde



Treating Retrograde



Conclusion

- Retrograde pedal access is technically feasible with reasonable success although not without pitfalls

- Patient selection of utmost importance

Thank You