

Use of IVUS in Atherectomy Device Selection

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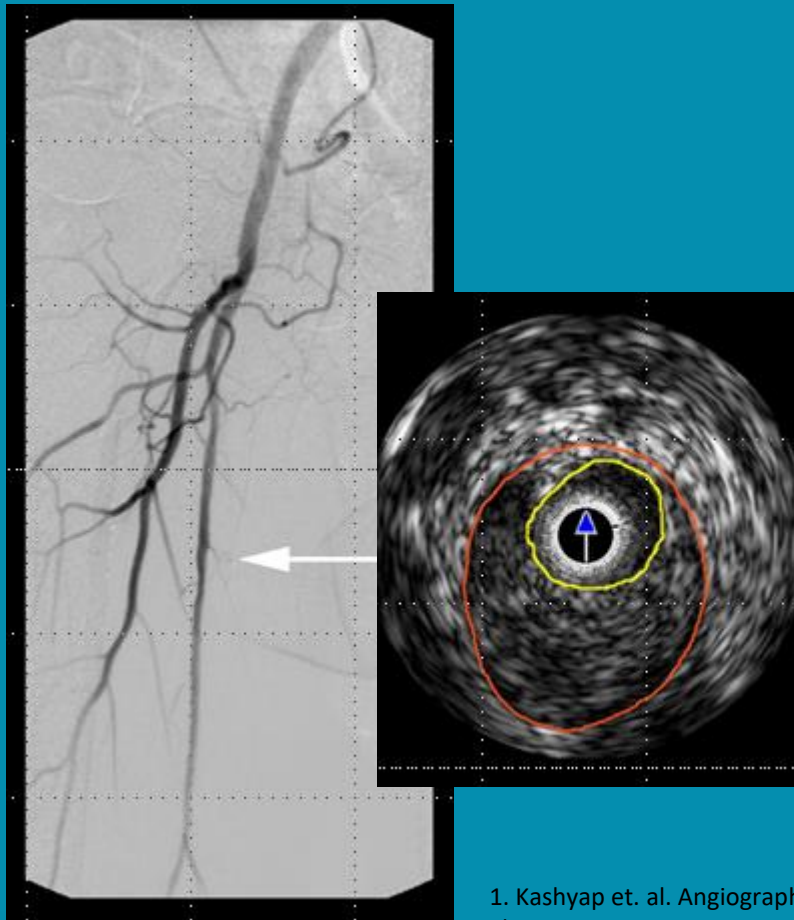
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Cors
at the
Shore

Disclosures

- Consultant
 - Abbott Vascular
 - Avinger
 - Boston Scientific
 - Medtronic
 - Philips
 - Siemens



Angio Alone is Not Enough



Angiography provides information on luminal characteristics of peripheral arteries but severely underestimates the extent of atherosclerosis in patients with PAD, even in “normal appearing” vessels.¹



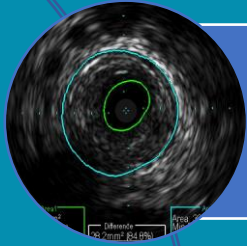
Angio Alone is Not Enough

Arthurs et. al. Study¹

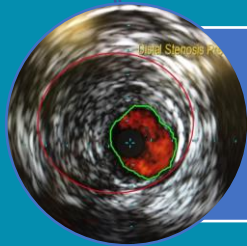


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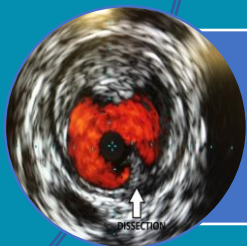
IVUS Guidance Benefits Patients



IVUS provides detailed information regarding measurements of lumen and vessel size, plaque area and volume, and the location of key anatomical landmarks.



Study data suggests that determination of overall vessel diameter and interpretation of plaque morphology by angiography are discordant from IVUS-derived data.¹



Study data suggests that IVUS is able to provide evidence that a significant portion of the plaque has been removed during atherectomy procedures.²



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1. Arthurs et. al. Evaluation of peripheral atherosclerosis: A comparative analysis of angiography and intravascular ultrasound imaging. J Vasc Surg 2010
2. Kashyap et. al. Angiography Underestimates Peripheral Atherosclerosis: Lumenography Revisited. J Endovasc Ther 2008;15:117–125.

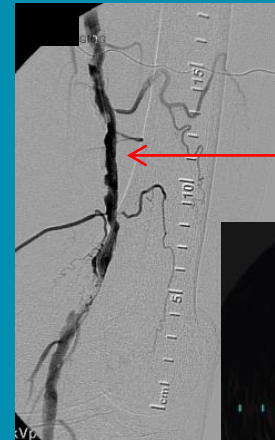
IVUS Assessment Pre-Atherectomy

Pre-Treatment Strategy

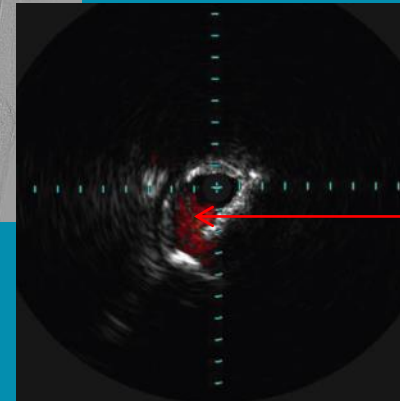
What is the size of the vessel to be treated?

What type of plaque morphology does the patient have?

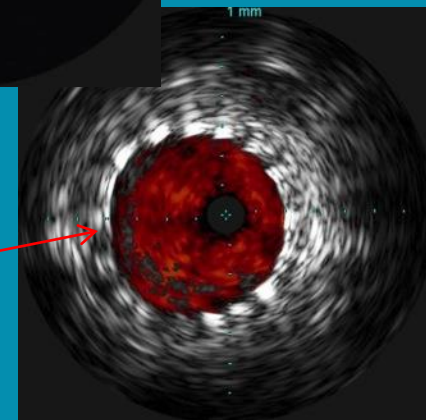
Where does the lesion start and end?



SFA



SFA



SFA
Post Stent



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IVUS Assessment Post-Atherectomy

Assess
Completeness
of Treatment

Is the stent fully
apposed?

Did I cover the area of
interest?

Did I achieve the
necessary luminal
gain?

Did I cut into the
adventitia?



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UTOPIA Study Overview

UTOPIA Study

(Comparing Intravascular Ultrasound Guided Atherectomy To Angiography Guided Atherectomy In Peripheral Vascular Interventions for TASC's A, B, C Lesions)

Source: UTOPIA abstract and poster presented by Prakash Krishnan, MD at the 61st Annual Scientific Session of the ACC in 2012 J Am Coll Cardiol 2012;59(13s1):E2083

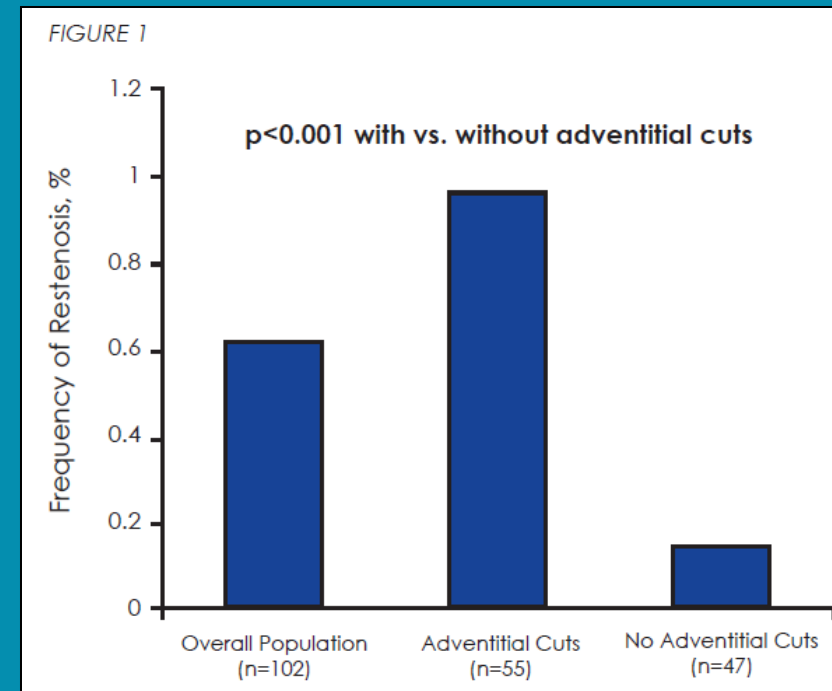
OBJECTIVES

- ▶ To determine the incidence and clinical correlates of restenosis following lower extremity atherectomy in patients with symptomatic PAD.
- ▶ To evaluate the correlation between histopathologic and IVUS detected adventitial cuts at the time of atherectomy.

UTOPIA Study Overview

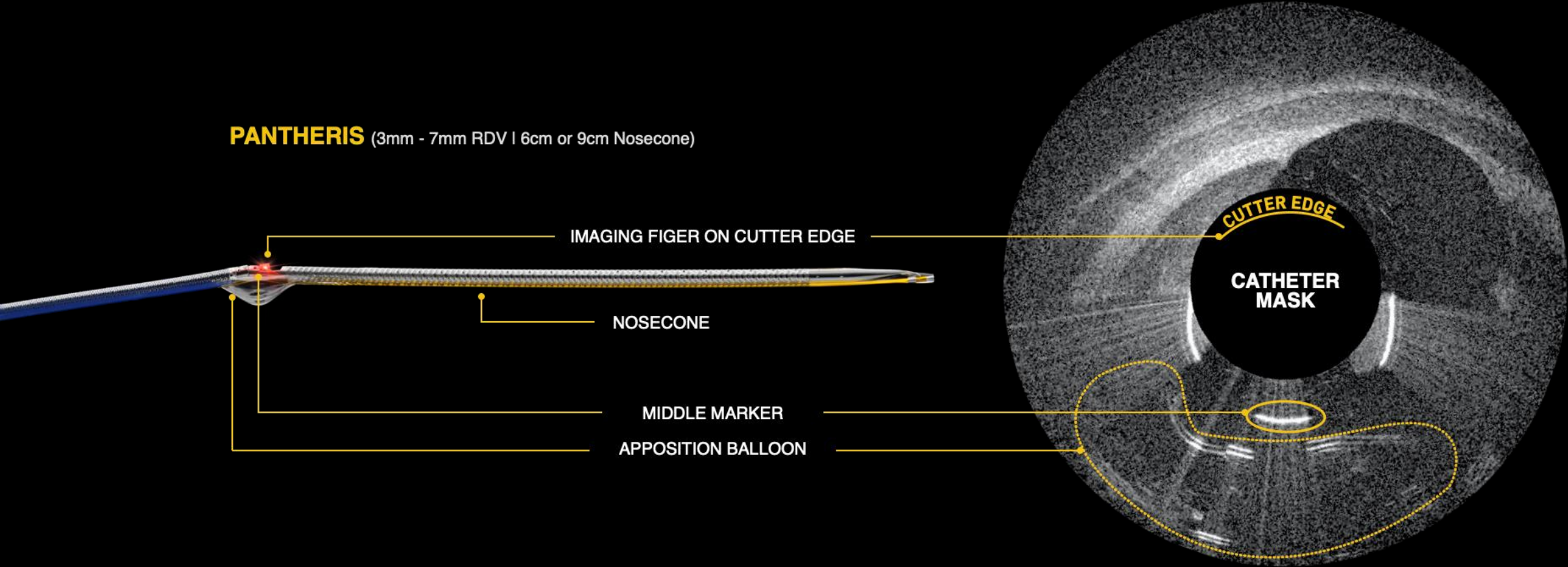
Results:

- Adventitial cuts identified in 54% of patients.
- One-year overall incidence of restenosis was 62%.
- **96.4%** restenosis rate was observed in patients with adventitial cuts vs. a **14.9%** restenosis rate without adventitial cuts ($p < 0.001$).



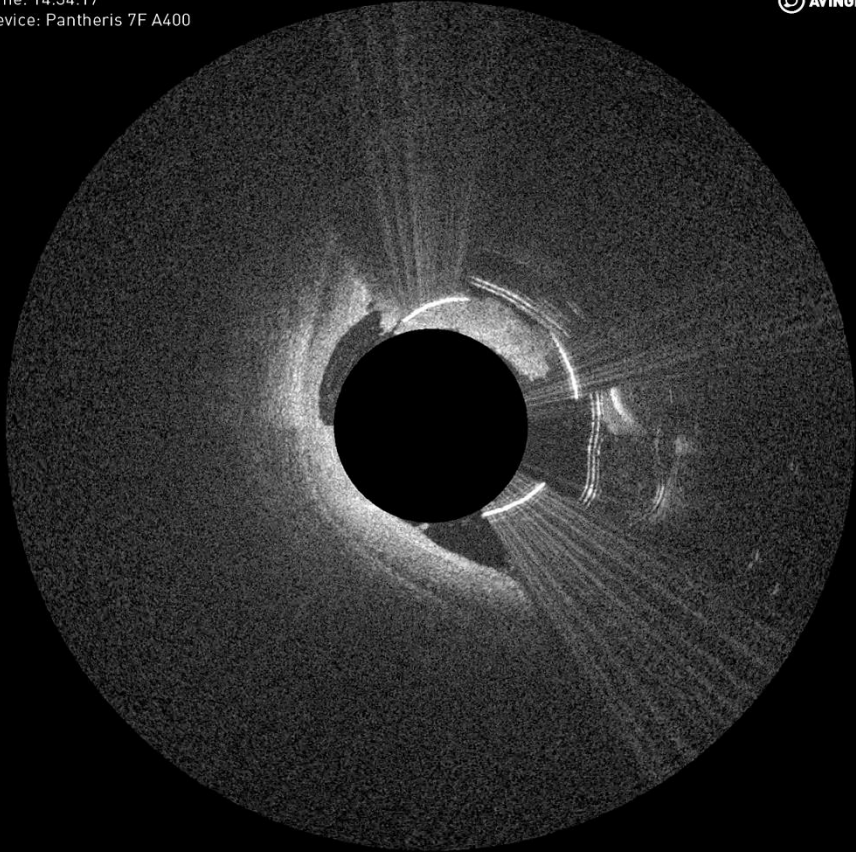
OCT-GUIDED ATHERECTOMY

PANTHERIS (3mm - 7mm RDV | 6cm or 9cm Nosecone)

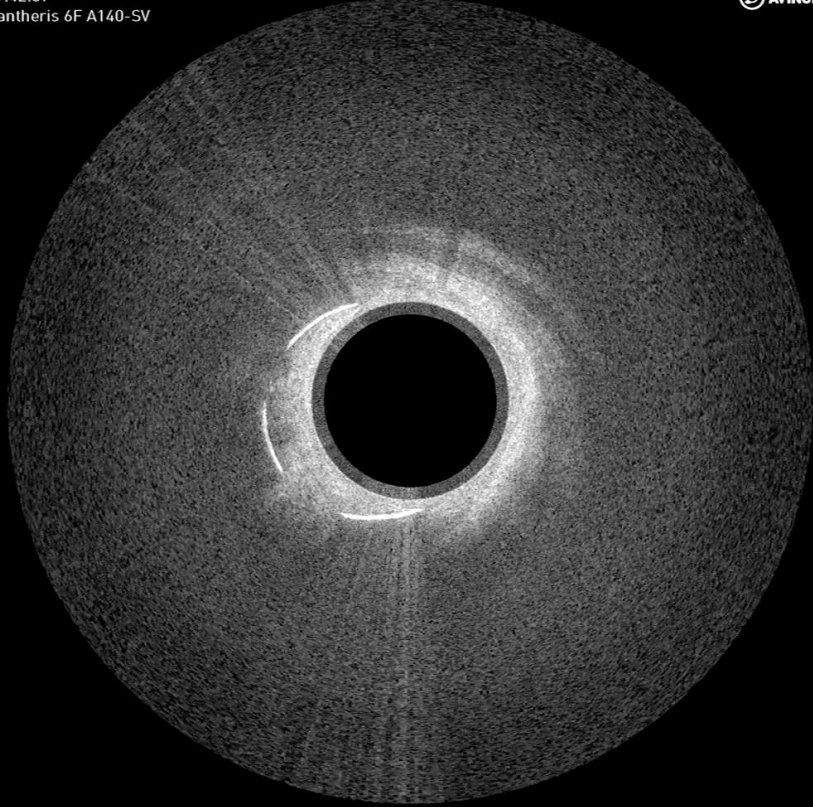


REAL-TIME OCT GUIDANCE

Time: 14:34:17
Device: Pantheris 7F A400



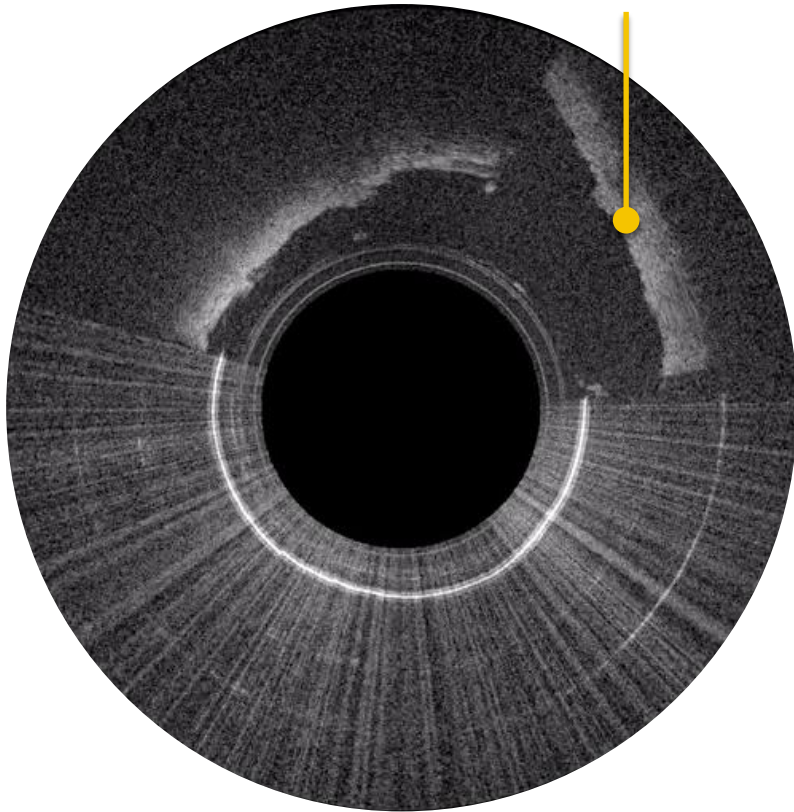
09:42:57
Pantheris 6F A140-SV



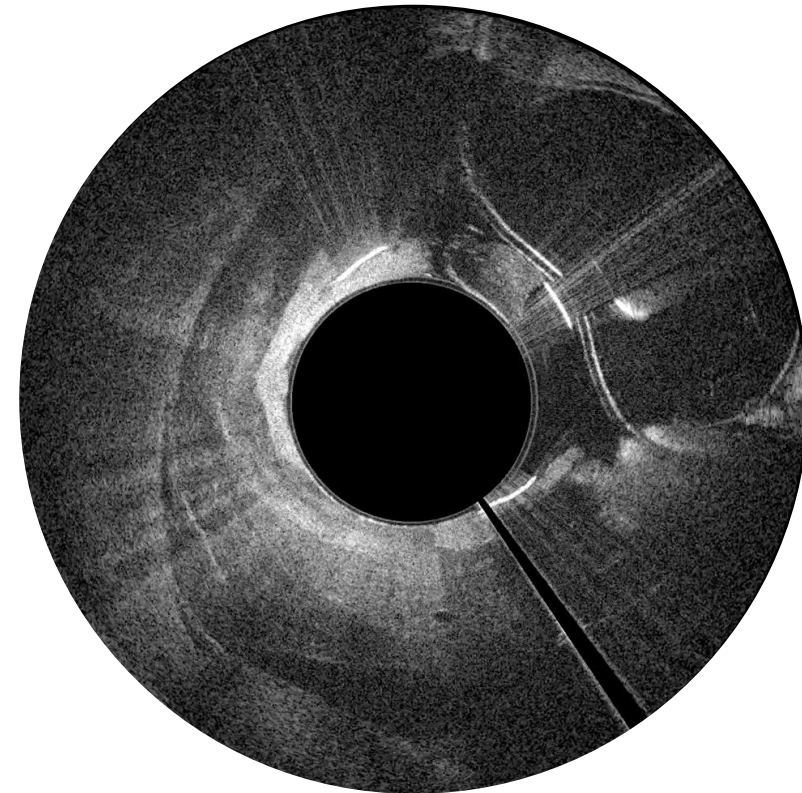
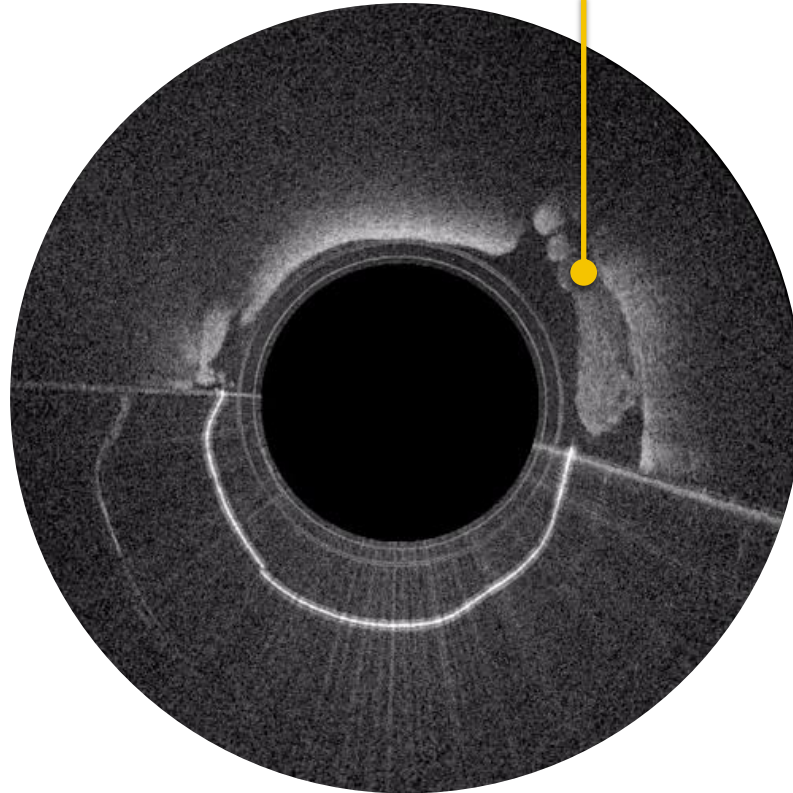
VISUALIZATION OF LESION CHARACTERISTICS

- IDENTIFYING THROMBUS

THROMBUS



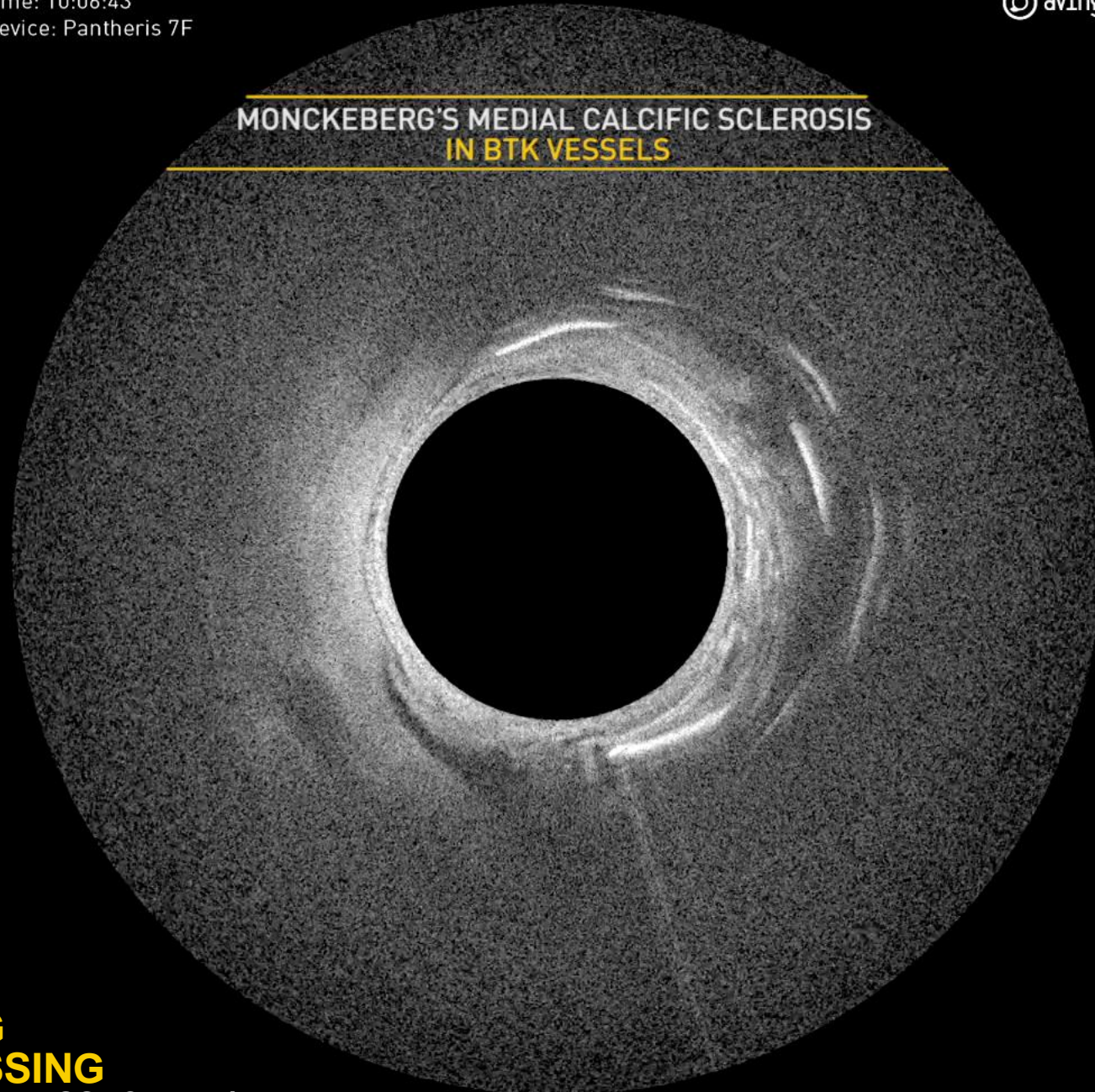
THROMBUS



Thrombus by OCT appears as a mass attached to luminal surface or floating within the lumen.

MONCKEBERG'S MEDIAL CALCIFIC SCLEROSIS
IN BTK VESSELS

CALCIUM NODULES



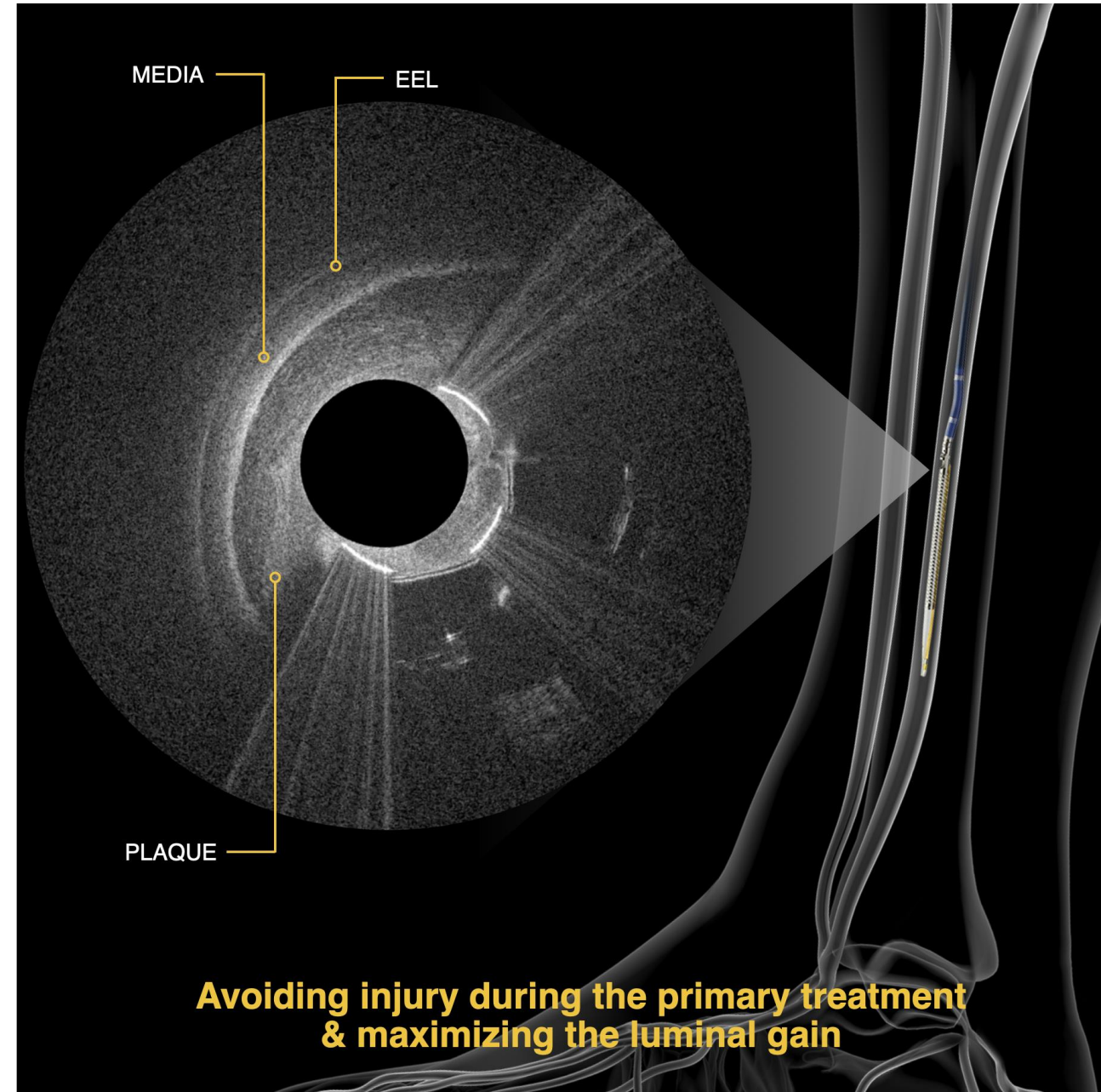
**PANTHERIS FOLLOWING
BTK TRUE LUMEN CROSSING**
HIGH SAFETY PROFILE TO AVOID DISSECTION / PERFORATION
BTK

COMBINING REAL-TIME IMAGING WITH THERAPY

OPTICAL COHERENCE TOMOGRAPHY (OCT)
VISUALIZATION AT THE POINT OF THERAPY



Precise guided-therapy
Enhanced Control
Increased Efficiency
Optimal Safety



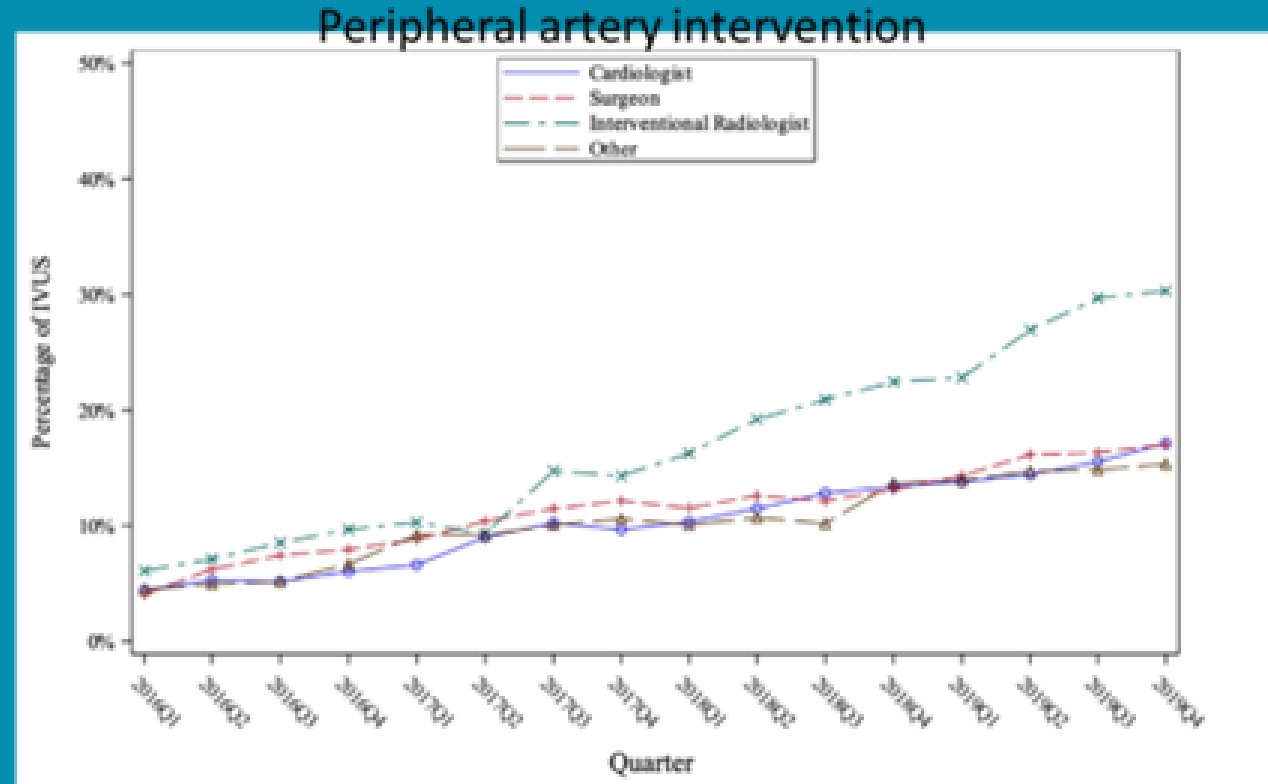
Summary of IVUS in PAD Studies

TABLE 2 | Summary of outcomes of the main studies assessing IVUS in the endovascular management of PAD.

References	Technical success	Patency rate	Clinical success	Complications rate	Reintervention rate
Buckley et al. (8)	N/A	100%	N/A	7%	0% with IVUS
Kawasaki et al. (9)	100%	N/A	N/A	0%	5.6%, no amputation
Araki et al. (10)	N/A	96.5%	N/A	2.4%	No amputation
Iida et al. (11)	N/A	N/A	N/A	N/A	Significantly lower in IVUS group
Baker et al. (12)	90%	62%	N/A	0%	5%
Kumakura et al. (13)	97.2%	89%	N/A	4%	Significantly lower in IVUS group
Panaich et al. (14)	N/A	N/A	N/A	11.8%	IVUS predictive of lower amputation rate
Yin et al. (15)	100%	N/A	N/A	N/A	N/A
Krishnan et al. (16)	100%	82.1%	N/A	0%	Significantly lower in IVUS group
Shammas et al. (17)	100%	100%	N/A	N/A	Dissections better appreciated with IVUS
Fujihara et al. (18)	100%	100%	N/A	N/A	IVUS predictive of lumen gain
Miki et al. (19)	100%	82.5%	N/A	15%	14.6%

PAD, peripheral arterial disease; IVUS, intravascular ultrasound; N/A, not described.

IVUS Utilization



Divakaran S, Meissner MH, Kohi MP, Chen S, Song Y, Hawkins BM, Rosenfield K, Parikh SA, Secemsky EA. Utilization of and Outcomes Associated with Intravascular Ultrasound during Deep Venous Stent Placement among Medicare Beneficiaries. *J Vasc Interv Radiol.* 2022;33:1476-1484.e2.



Coming Soon!

Intravascular Ultrasound in Peripheral Interventions: Proceedings from an Expert Consensus Roundtable Sponsored by SCAI/AVF/AVLS/SIR/SVM/SVS

Eric A. Secemsky, MD, MSc^{1,2}, Herbert D. Aronow, MD, MPH³, Mark Meissner, MD⁴, Patrick E. Muck, MD⁵, Christopher J. Kwolek, MD, MBA^{2, 6}, Sahil A. Parikh, MD⁷, Ronald Winokur, MD⁸, Jon C. George, MD⁹, Gloria Salazar, MD¹⁰, Erin H. Murphy, MD¹¹, Mary M. Costantino, MD¹², Wei Zhou, MD¹³, Jun Li, MD¹⁴, Robert Lookstein, MD¹⁵, Kush R. Desai, MD¹⁶



Summit



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Base Camp



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Summary

- Angiography alone is inadequate for assessing lesions
- Intravascular imaging adds significant value to assess lesion morphology and guide intervention
- Imaging adds value to guide atherectomy based on morphology
- IVUS imaging adoption remains suboptimal despite data

