IVUS AND DIALYSIS?

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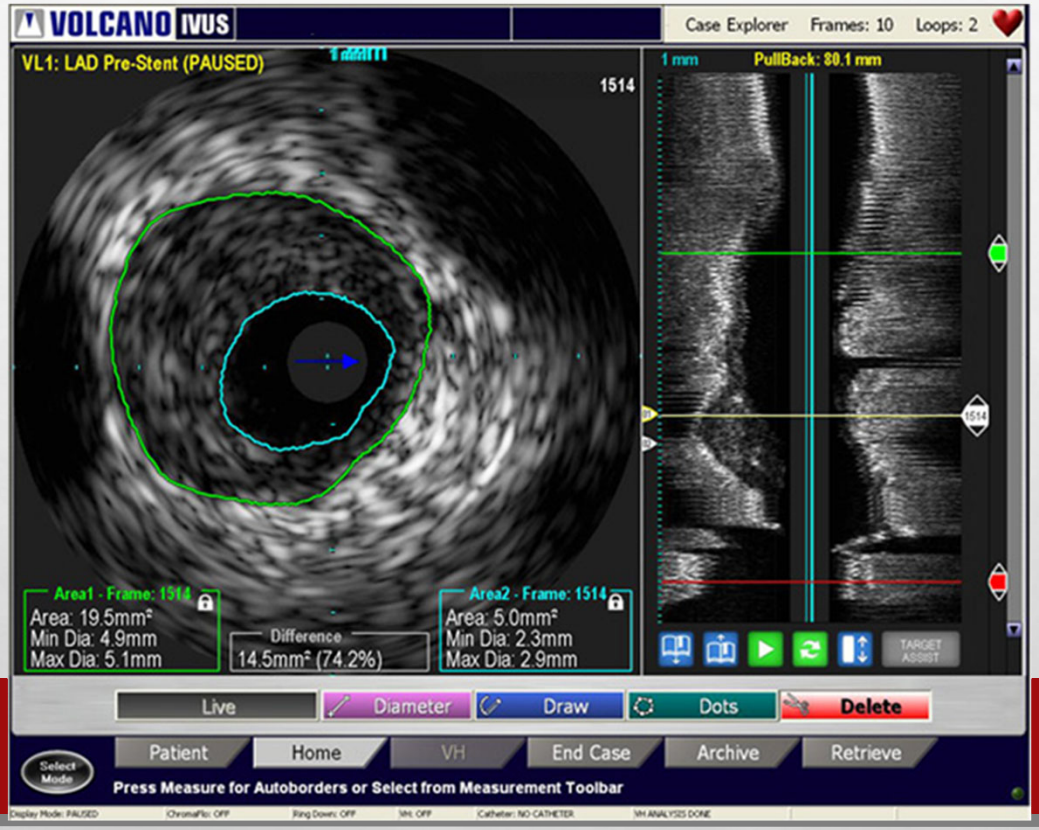
DISCLOSURES

- SPEAKER FOR MERIT MEDICAL
- SPEAKER FOR W.L. GORE
- SPEAKER FOR B.D. (BARD)
- MEDTRONIC ADVISORY BOARD

REALLY – IVUS


VOLCANO IVUS
Case Explorer
Frames: 10
Loops: 2
VL1: LAD Pre-Stent (PAUSED)
1514
1 mm
PullBack: 80.1 mm
Area1 - Frame: 1514
Area: 19.5mm²
Min Dia: 4.9mm
Max Dia: 5.1mm
Difference
14.5mm² (74.2%)
Area2 - Frame: 1514
Area: 5.0mm²
Min Dia: 2.3mm
Max Dia: 2.9mm
TARGET ASSIST
Live
Diameter
Draw
Dots
Delete
Patient
Home
VH
End Case
Archive
Retrieve
Select Mode
Press Measure for Autoborders or Select from Measurement Toolbar

WHY AND WHY NOT?

WHY

BEST WAY TO LOOK AT THE CENTRAL VENOUS SYSTEM

IF IT IS THE GOLD STANDARD FOR VEINS EVERYWHERE ELSE IN THE BODY WHY NOT DIALYSIS!!

THREE (NOT TWO) DIMENSIONAL!

PATIENT'S HAVE CONTRAST ALLERGIES

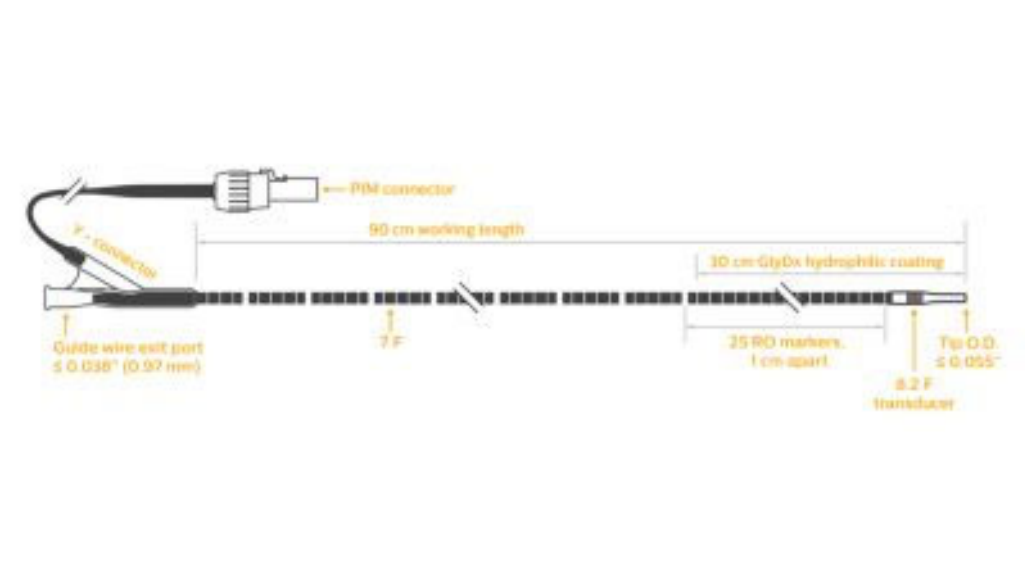
WHY NOT

$

Familiarity

Time

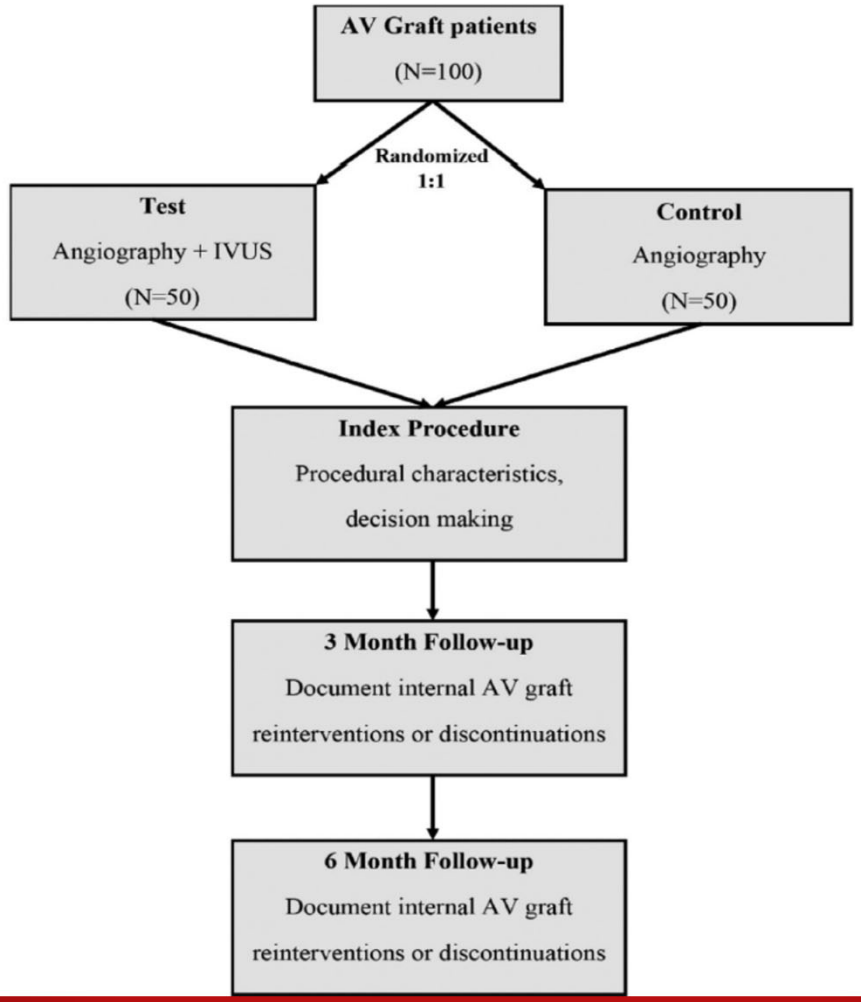
THE SET - UP


PIM connector
Y - connector
90 cm working length
30 cm GlyDx hydrophilic coating
Guide wire exit port
≤ 0.038" (0.97 mm)
7 F
25 RO markers,
1 cm apart
Tip O.D.
≤ 0.055"
6.2 F
transducer

LITERATURE?

Role of intravascular ultrasound imaging during endovascular interventions of failing hemodialysis access grafts

John R. Ross, MD,[a] Dion L. Franga, MD, FACS, RPVI,[b] Michael Gallichio, MD,[a] Ankur J. Patel, MD, MBA, MS,[c] *and* Kenneth Ouriel, MD, MBA,[c] *Orangeburg, SC; and New York, NY*


AV Graft patients
(N=100)
Randomized
1:1
Test
Angiography + IVUS
(N=50)
Control
Angiography
(N=50)
Index Procedure
Procedural characteristics,
decision making
3 Month Follow-up
Document internal AV graft
reinterventions or discontinuations
6 Month Follow-up
Document internal AV graft
reinterventions or discontinuations

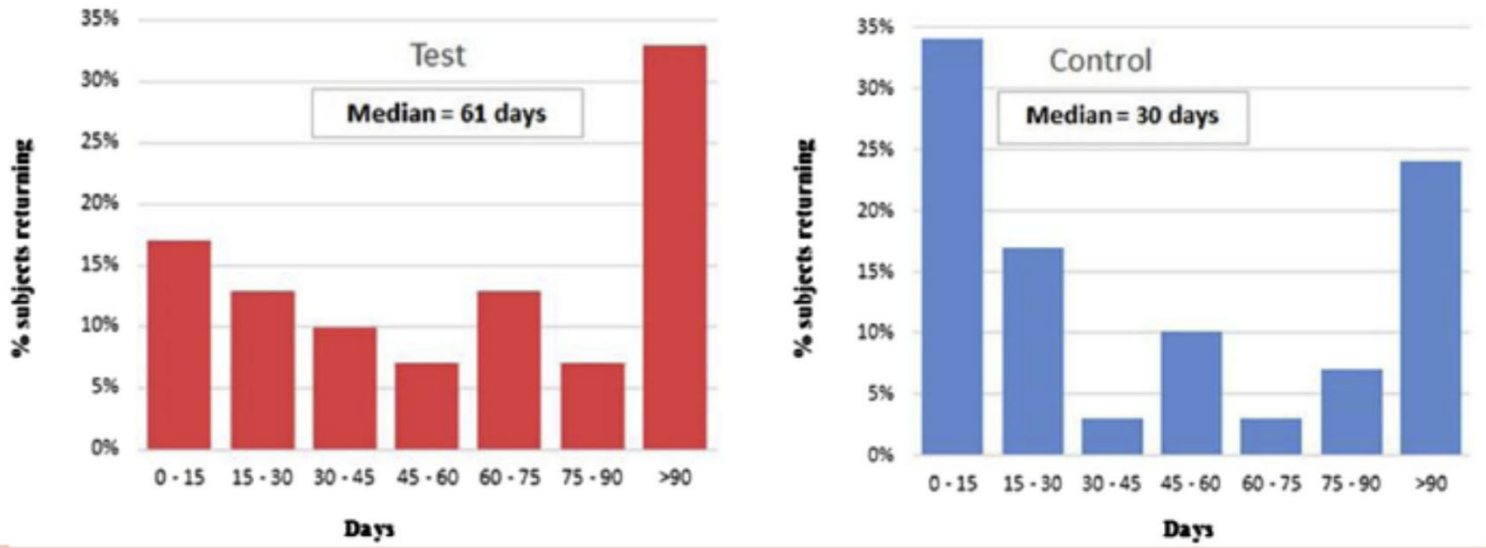


Fig 2. Time to first arteriovenous (AV) graft reintervention or discontinuation after index procedure.

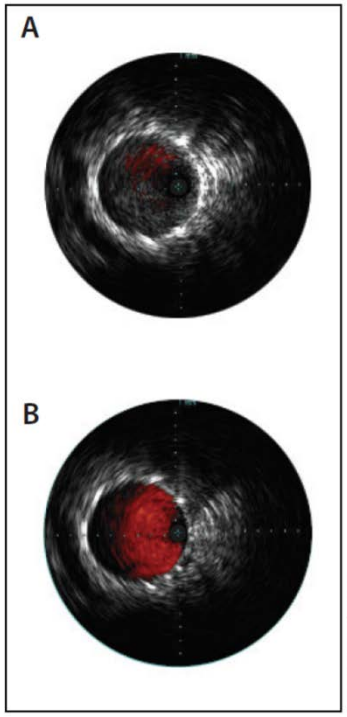
CONCLUSIONS

This study provides further evidence that supports addition of IVUS to standard angiography during endovascular interventions of failing hemodialysis access grafts. As previously published work has noted, IVUS can also play an important role in identifying central venous outflow obstruction and devising treatment plans for patients who suffer from this condition.[12] Results of this study suggest that addition of IVUS to standard angiography during endovascular interventions of failing hemodialysis access grafts may extend time to first reintervention. Longer term follow-up and a more comprehensive study design would be recommended to further investigate the use of IVUS in this context.

OTHER LITERATURE

FEATURED TECHNOLOGY
INTRAVASCULAR ULTRASOUND
Sponsored by Philips Volcano

The Value of Intravascular Ultrasound Use in Hemodialysis Arteriovenous Access



Courtesy of Dr. Pavillard.

Figure 1. Example of ChromaFlo before and after thrombus removal. Extensive thrombus, minimal blood flow shown by ChromaFlo (A). Minimal residual thrombus increased blood flow (B).

JOURNAL OF VASCULAR ACCESS

- **THE VALUE OF INTRAVASCULAR ULTRASOUND IN THE TREATMENT OF CENTRAL VENOUS OBSTRUCTIONS IN HEMODIALYSIS PATIENTS**
- SHOW ALL AUTHORSRICK DE GRAAF, MD, PHD, JORINDE VAN LAANEN, NOUD PEPPELENBOSCH, ...
- FIRST PUBLISHED JUNE 3, 2016 RESEARCH ARTICLE

SO WHAT?

RESULTS

CONVENTIONAL PLAIN ANGIOGRAPHY DETE
OBSTRUCTION, I.E., COLLATERAL FILLING,
OBSERVED IN 3 OUT OF 12 PATIENTS. IVUS
SHOWED A MEDIAN CROSS-SECTIONAL ARE
SHOWED SIGNS OF INTRALUMINAL FIBROTIC TR
>50% LUMEN REDUCTION ON IVUS AFTER PTA.

Conventional angiography seems unreliable to identify all significant aspects of a central venous outflow obstruction

CONCLUSIONS

CONVENTIONAL ANGIOGRAPHY SEEMS UNRELIABLE TO IDENTIFY ALL SIGNIFICANT ASPECTS OF A CENTRAL VENOUS OUTFLOW OBSTRUCTION. ADDITIONAL USE OF IVUS MIGHT AID IN THE DECISION-MAKING PROCESS AND SELECT THE OPTIMAL TREATMENT STRATEGY.

DO I USE IT?

YES

EVERY ENDOVASCULAR AAA, MAY THURNER SYNDROME, VENA CAVA INTERVENTION AND BEDSIDE IVC FILERS – WHY NOT MORE IN ACCESS??

WHERE'S THE BEEF?

NOT SURE WHAT TO SAY

WHY DO WE NOT LOOK WITH IVUS?

TIME

EXPENSE

EXPERIENCE

DATA

EXPECTATIONS

Intravascular Ultrasound

Optimizing Visualization of Dialysis Access

DANIEL V. PATEL, M.D
INTERVENTIONAL NEPHROLOGY
DAYTONA BEACH, FL

Disclosures

- SPEAKER AND CONSULTANT FOR W.L.GORE & ASSOCIATES, INC.
- CONSULTANT FOR PHILIPS HEALTHCARE

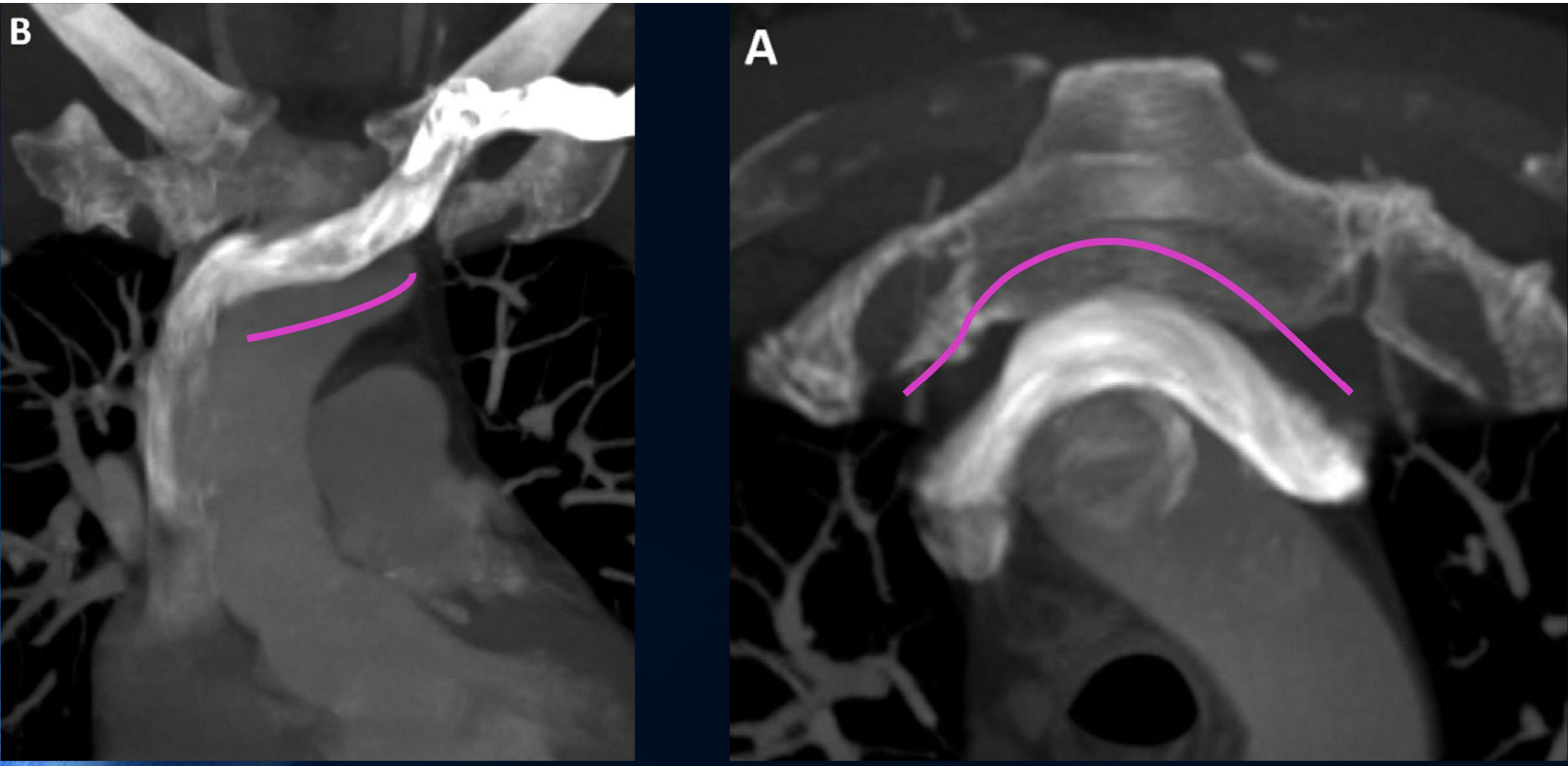
Intravascular Ultrasound in AV Access

- Overcomes limitations of 2D imaging from fluoroscopy
- More accurate representation of the anatomy
  - Precise measurements of the anatomy, instead of "best guess" sizing
- Recognition of recoil and intra-luminal obstruction not seen with angiography
- Reduction in radiation exposure and contrast use

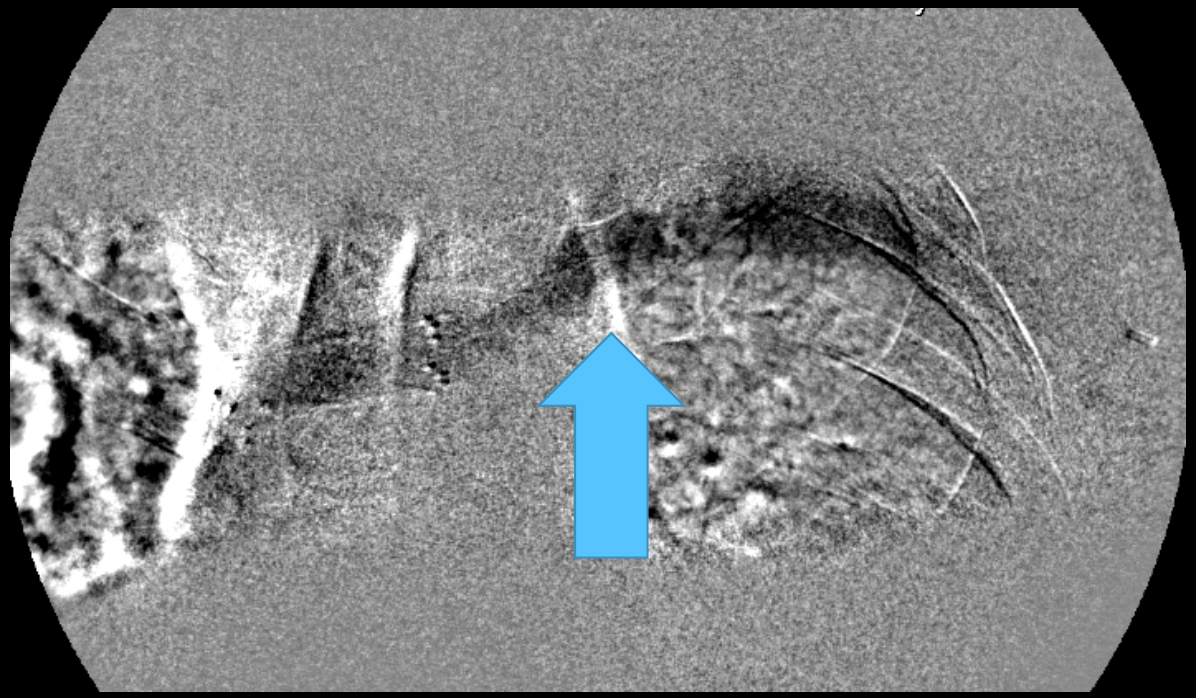
Central Venous Anatomy

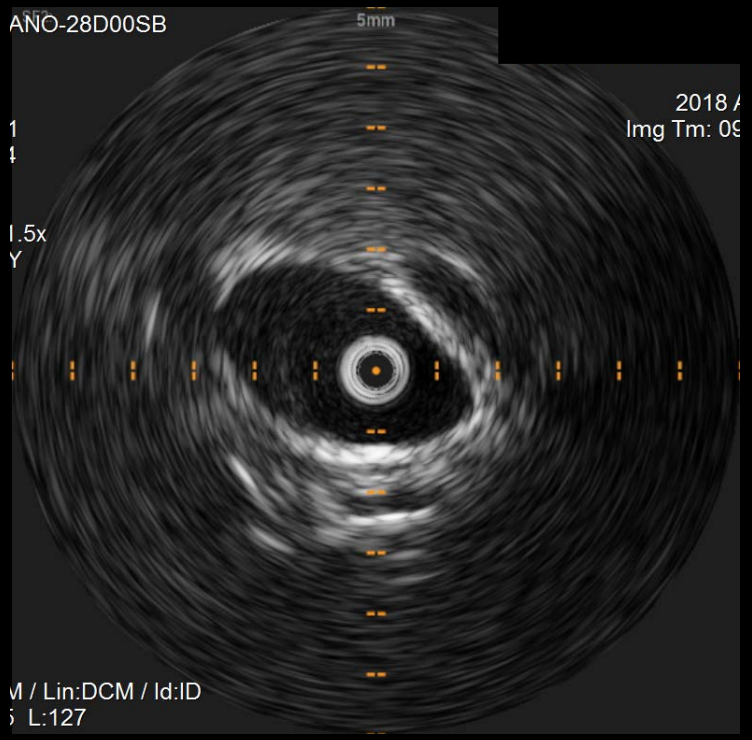
What are we treating!?!?

- Neointimal hyperplasia?
- Fibrosis?
- Thrombus
- Calcification?
- Extrinsic compression?
- Scar tissue from catheters/ cardiac leads?
- Quality of 2-D Fluoroscopy in evaluation of central vessels?



Erez Salik, Aditya Daftary, Michael G. Tal, "Three-dimensional Anatomy of the Left Central Veins: Implications for Dialysis Catheter Placement" *Journal of Vascular and Interventional Radiology*, Volume 18, Issue 3, 2007, Pages 361-364

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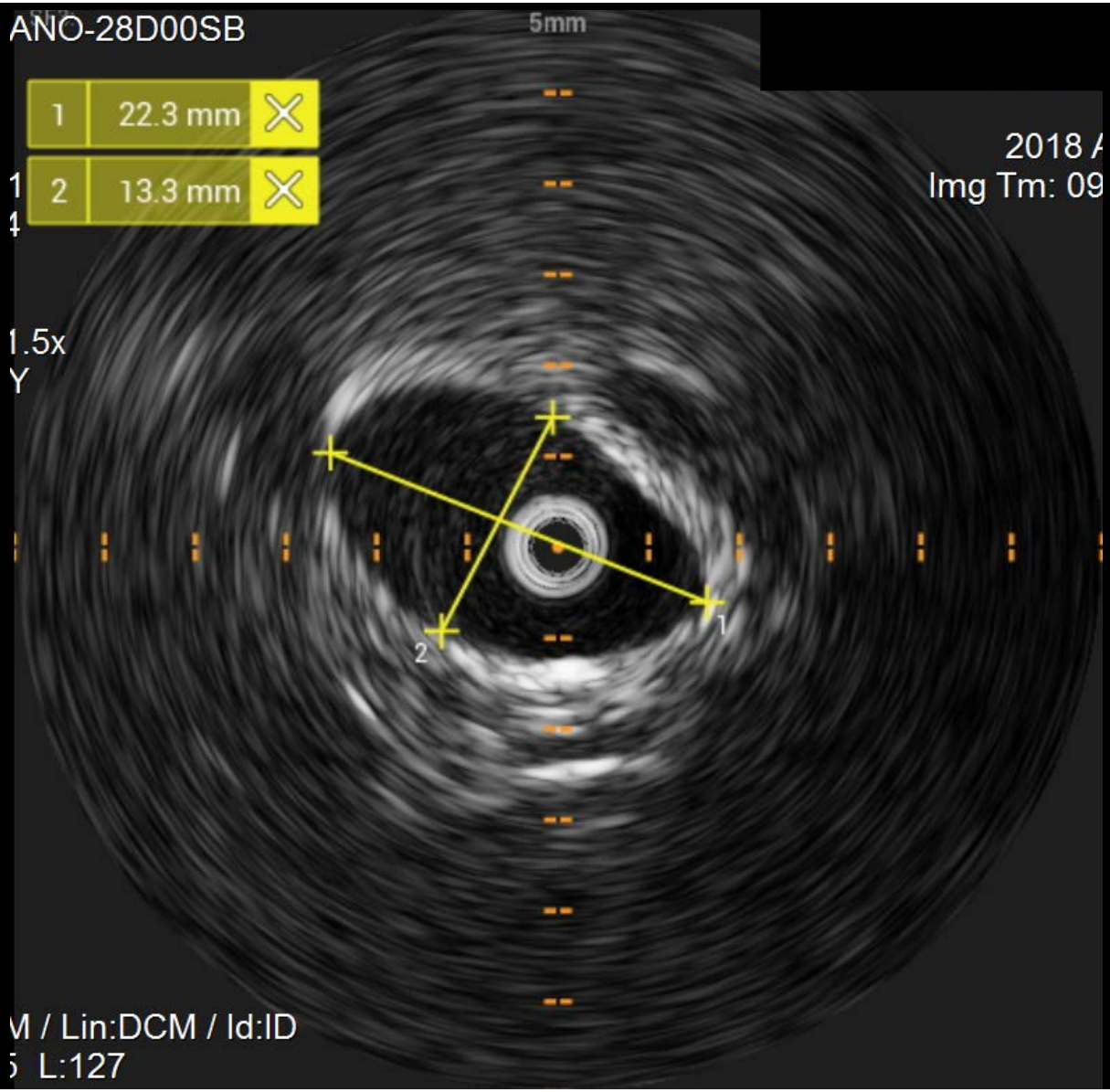
2018 A
Img Tm: 09
1
4
I.5x
Y
M / Lin:DCM / Id:ID
5 L:127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1 22.3 mm
2 13.3 mm
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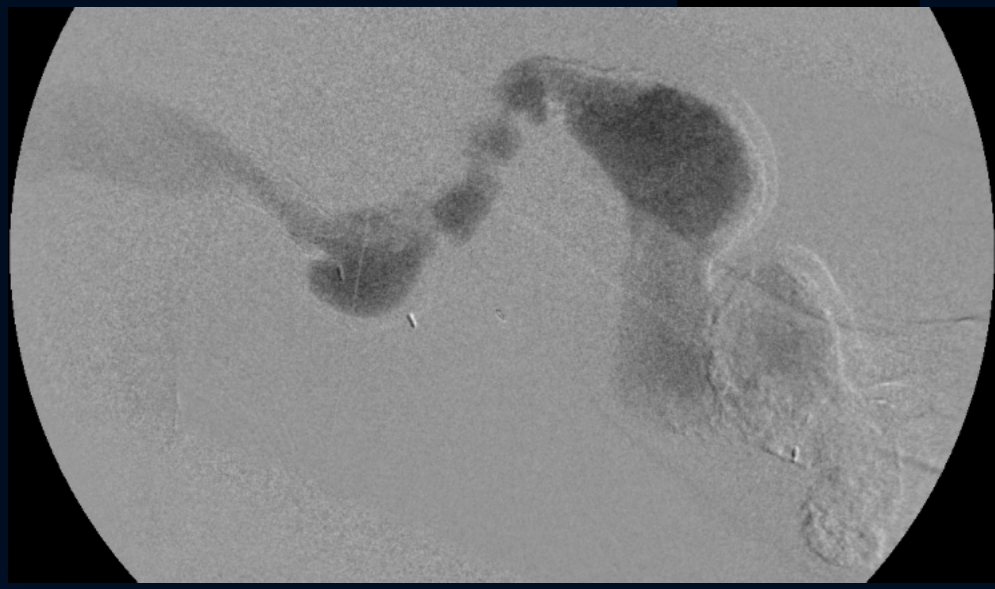
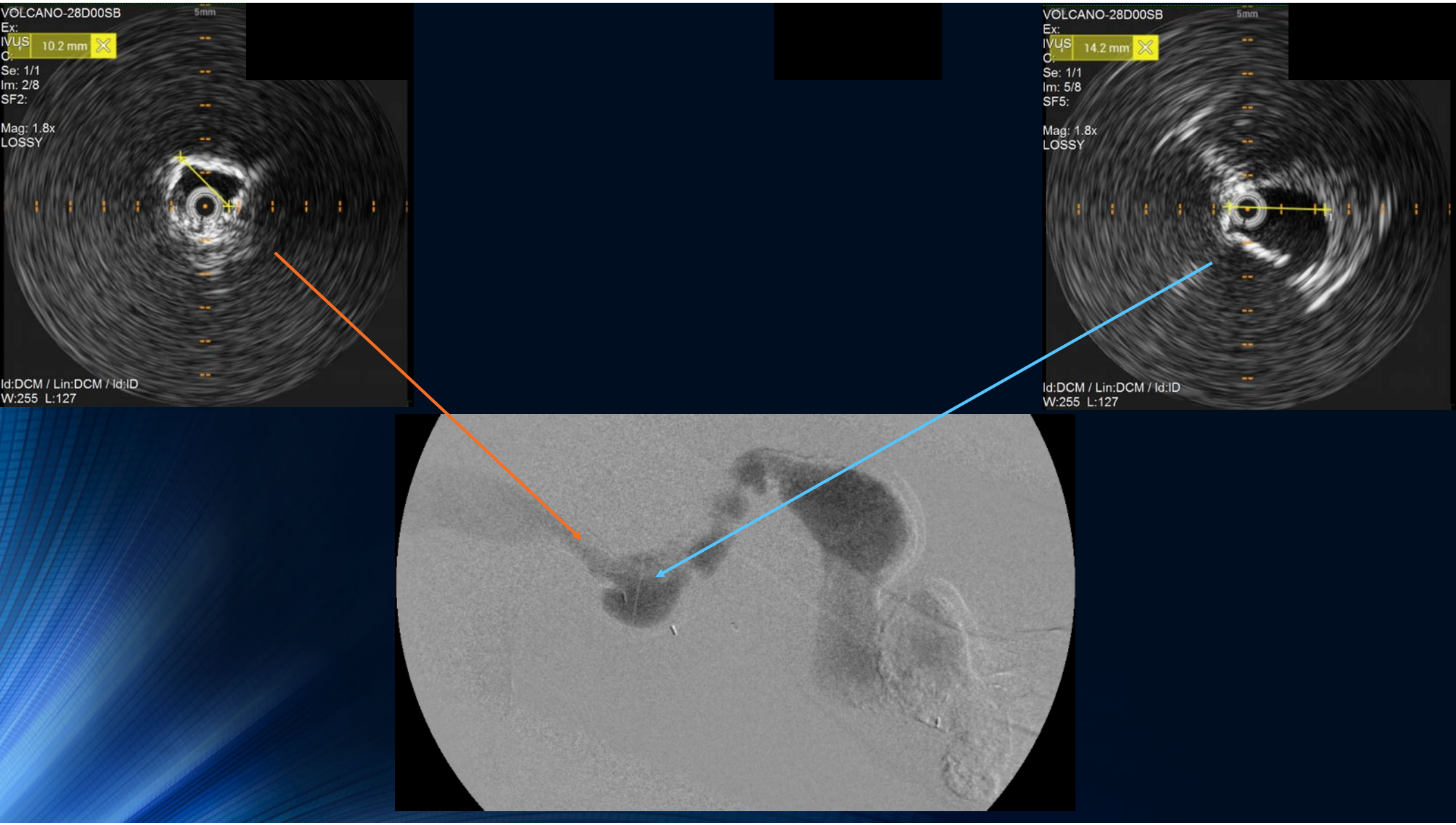
Calcified Brachiobasilic AVF

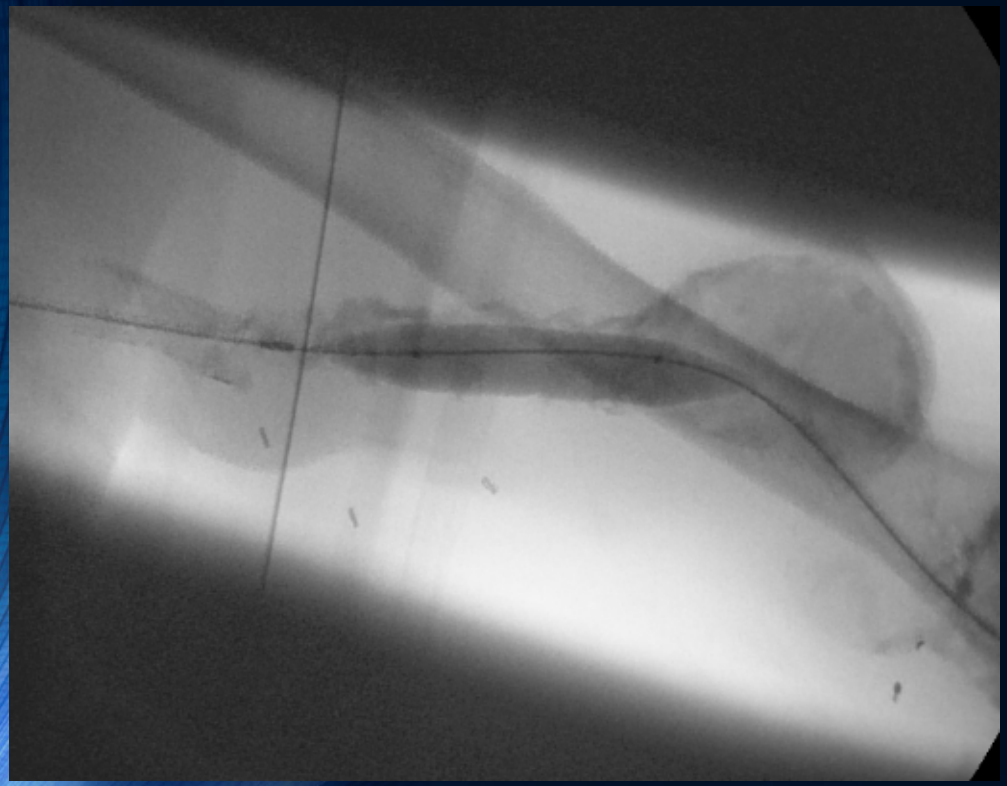
Left brachiobasilic AVF

- Created 2005: In use for 14 years
- Previous proximal swing site bare metal stent (NY)
- Presents with prolonged bleeding

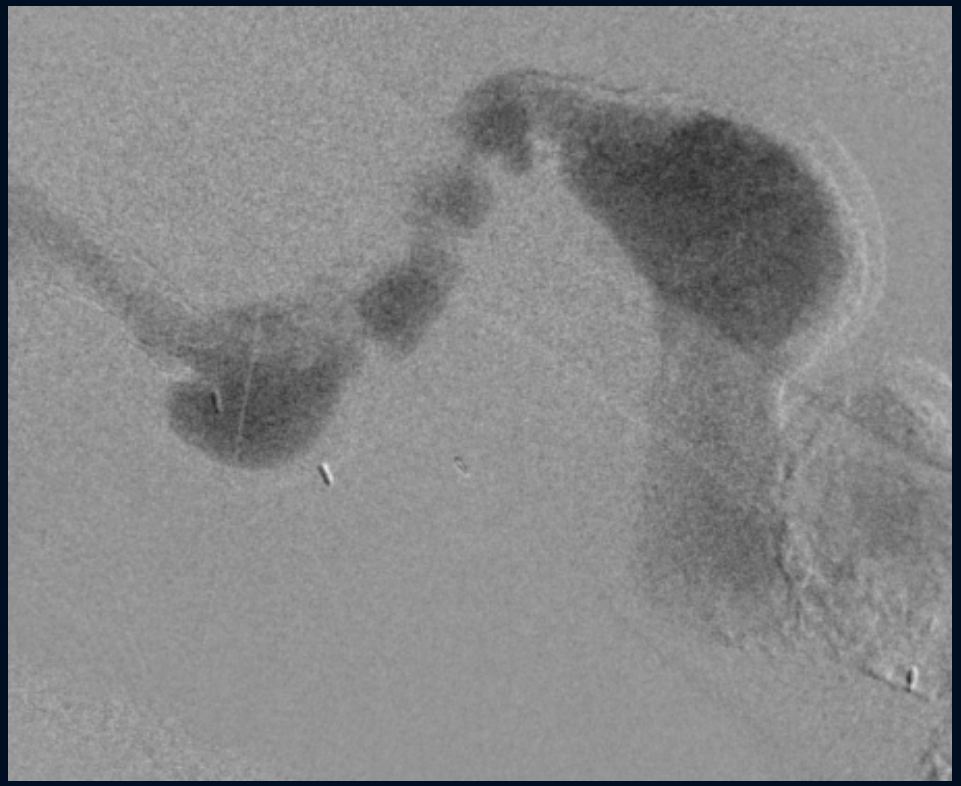


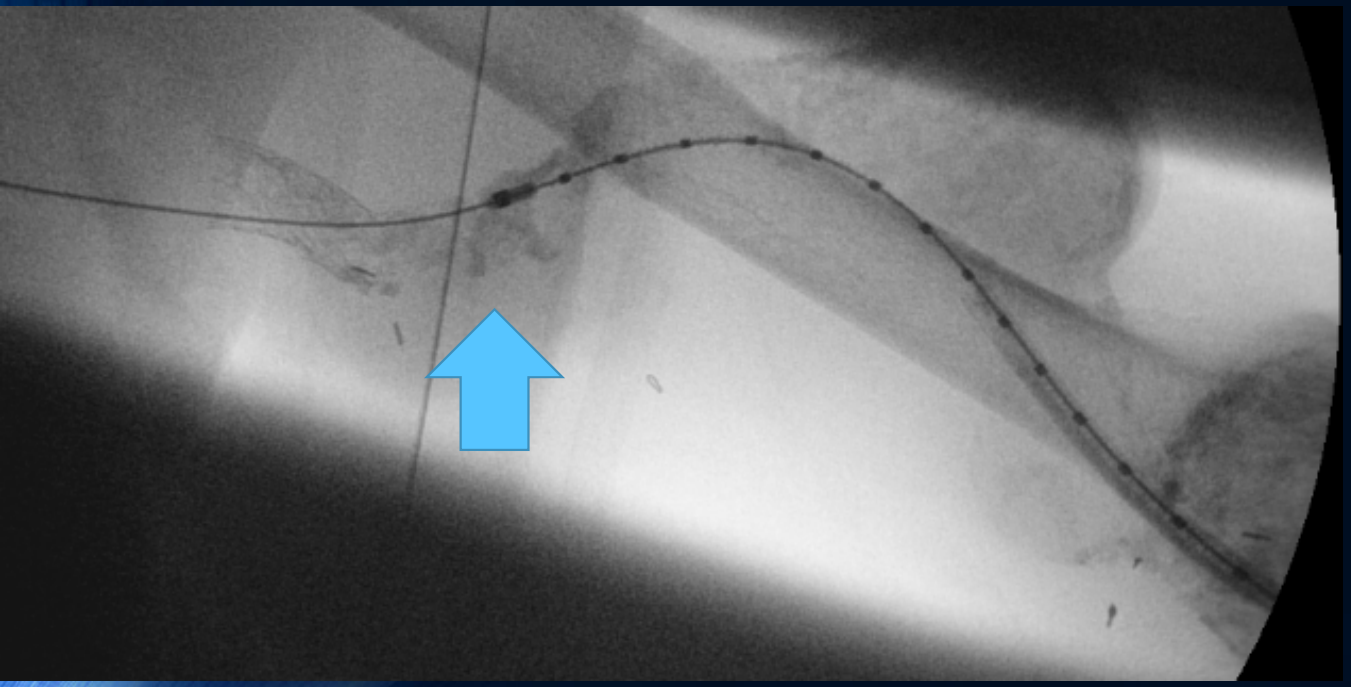

VOLCANO-28D00SB
Ex:
IVUS
C:
Se: 1/1
Im: 2/8
SF2:
Mag: 1.8x
LOSSY
10.2 mm
5mm
Id:DCM / Lin:DCM / Id:ID
W:255 L:127
VOLCANO-28D00SB
Ex:
IVUS
C:
Se: 1/1
Im: 5/8
SF5:
Mag: 1.8x
LOSSY
14.2 mm
5mm
Id:DCM / Lin:DCM / Id:ID
W:255 L:127

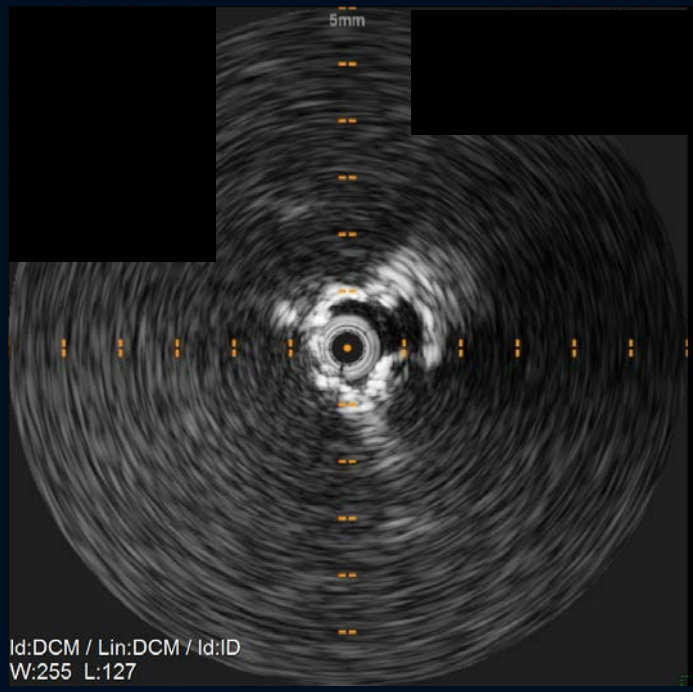
12mm Conquest PTA



Post Angioplasty



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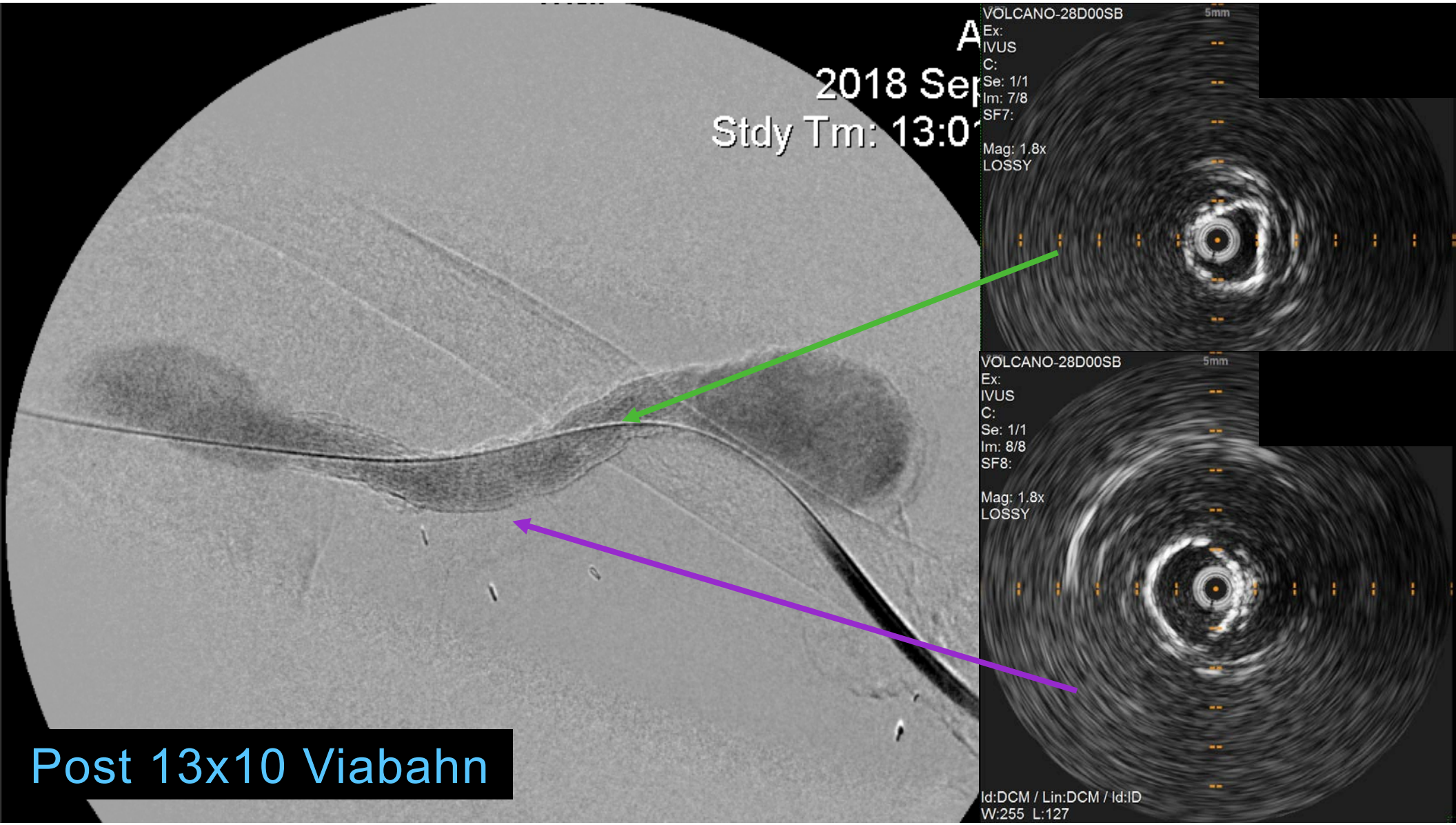
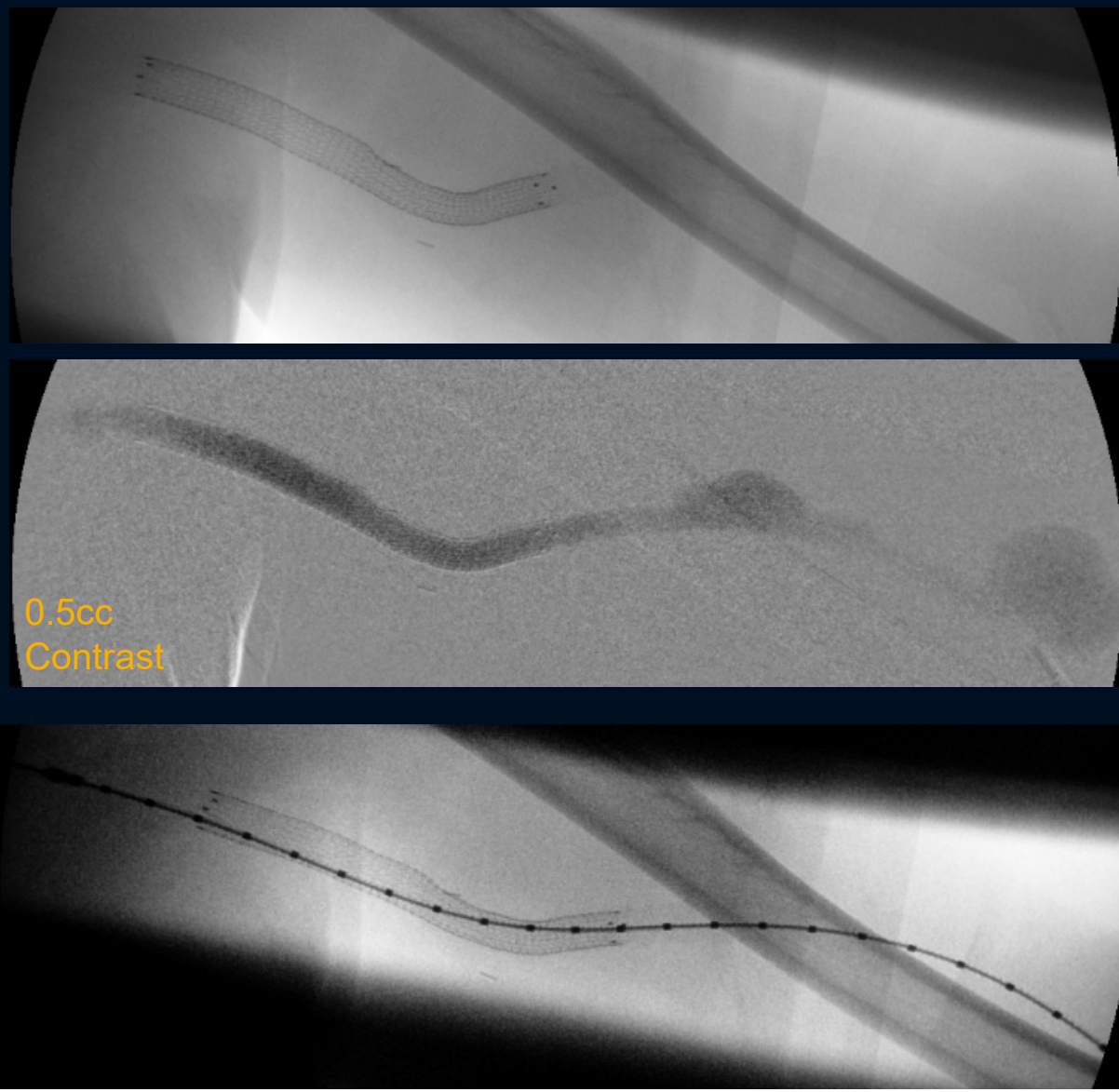

2018 Sep
Stdy Tm: 13:0
VOLCANO-28D00SB
Ex:
IVUS
C:
Se: 1/1
Im: 7/8
SF7:
Mag: 1.8x
LOSSY
5mm
VOLCANO-28D00SB
Ex:
IVUS
C:
Se: 1/1
Im: 8/8
SF8:
Mag: 1.8x
LOSSY
5mm
Id:DCM / Lin:DCM / Id:ID
W:255 L:127
Post 13x10 Viabahn

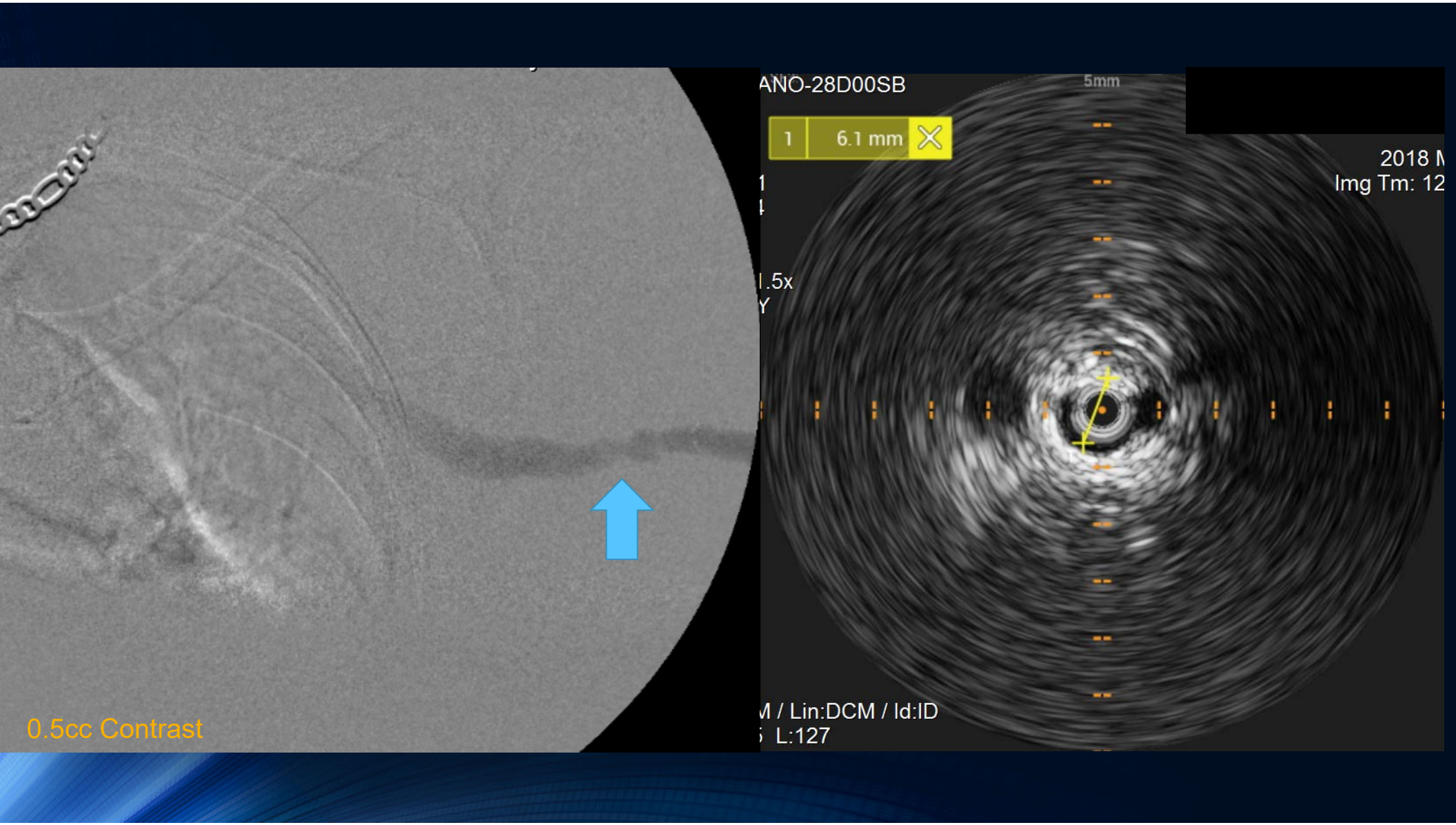
Contrast Allergy

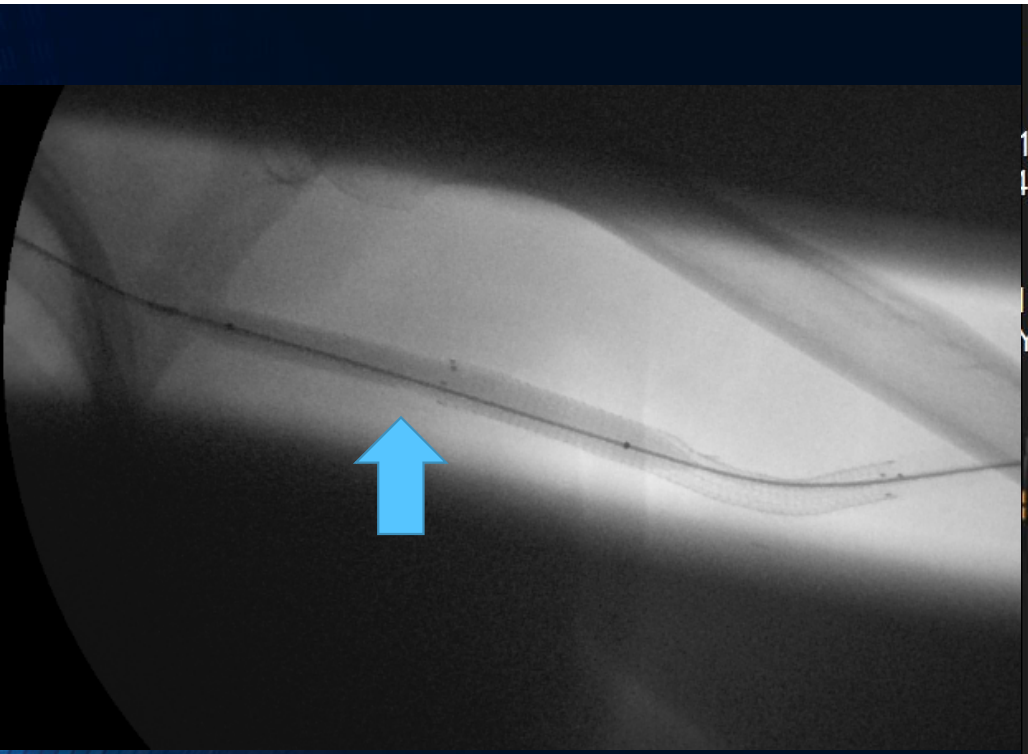
Left upper arm AV Graft

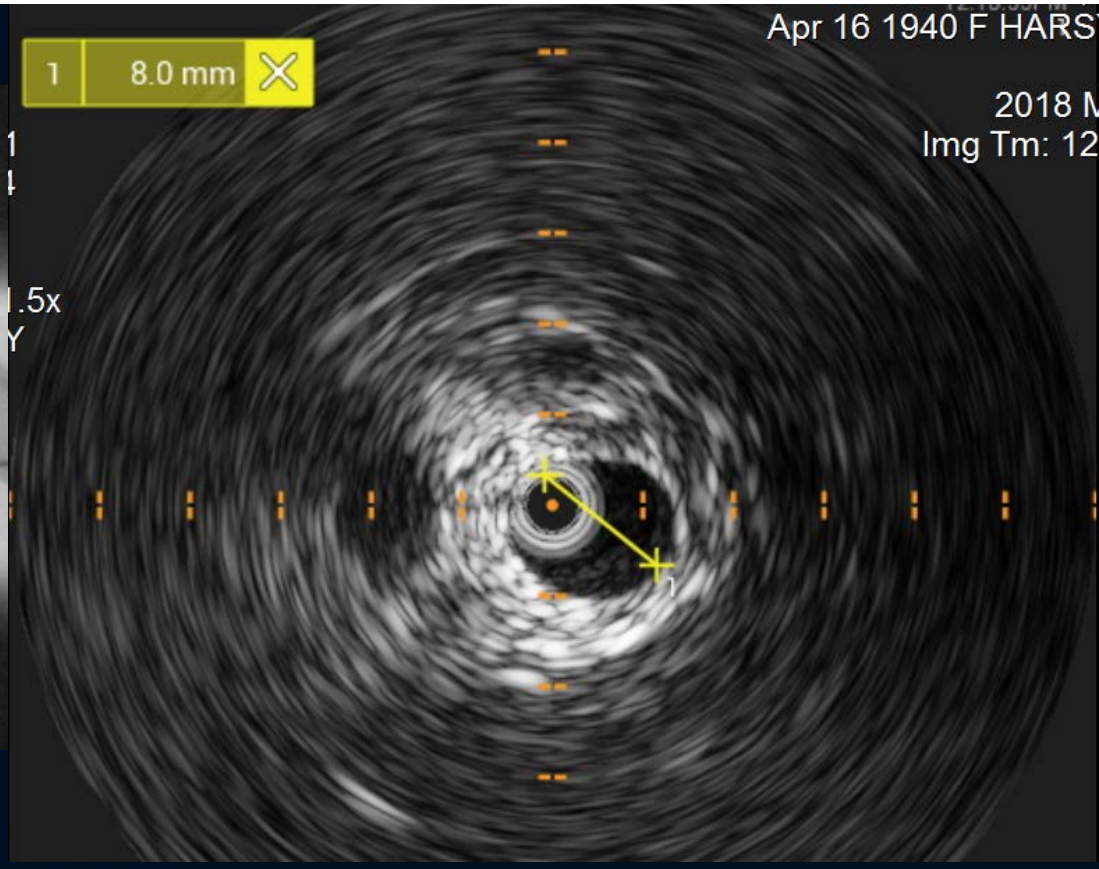
- Contrast Allergy (Itching)
- Brittle DM
  - Hyperglycemia with pre-procedure prednisone/Benadryl and intra-procedure Solumedrol/Benadryl in past (Glucose 400-500)
- Previous venous anastomosis 8x10 Viabahn stent-graft during thrombectomy 2017
- Stable pseudoaneurysms with good skin thickness
- Presents with prolonged bleeding, elevated venous pressures
- Given Benadryl only for pre-medications for this presentation

- Pre-medicated with Benadryl only
- Given IV Benadryl with procedure
- PTA with IVUS guidance




ANO-28D00SB
5mm
1
6.1 mm
2018 M
Img Tm: 12
.5x
Y
M / Lin:DCM / Id:ID
L:127
0.5cc Contrast



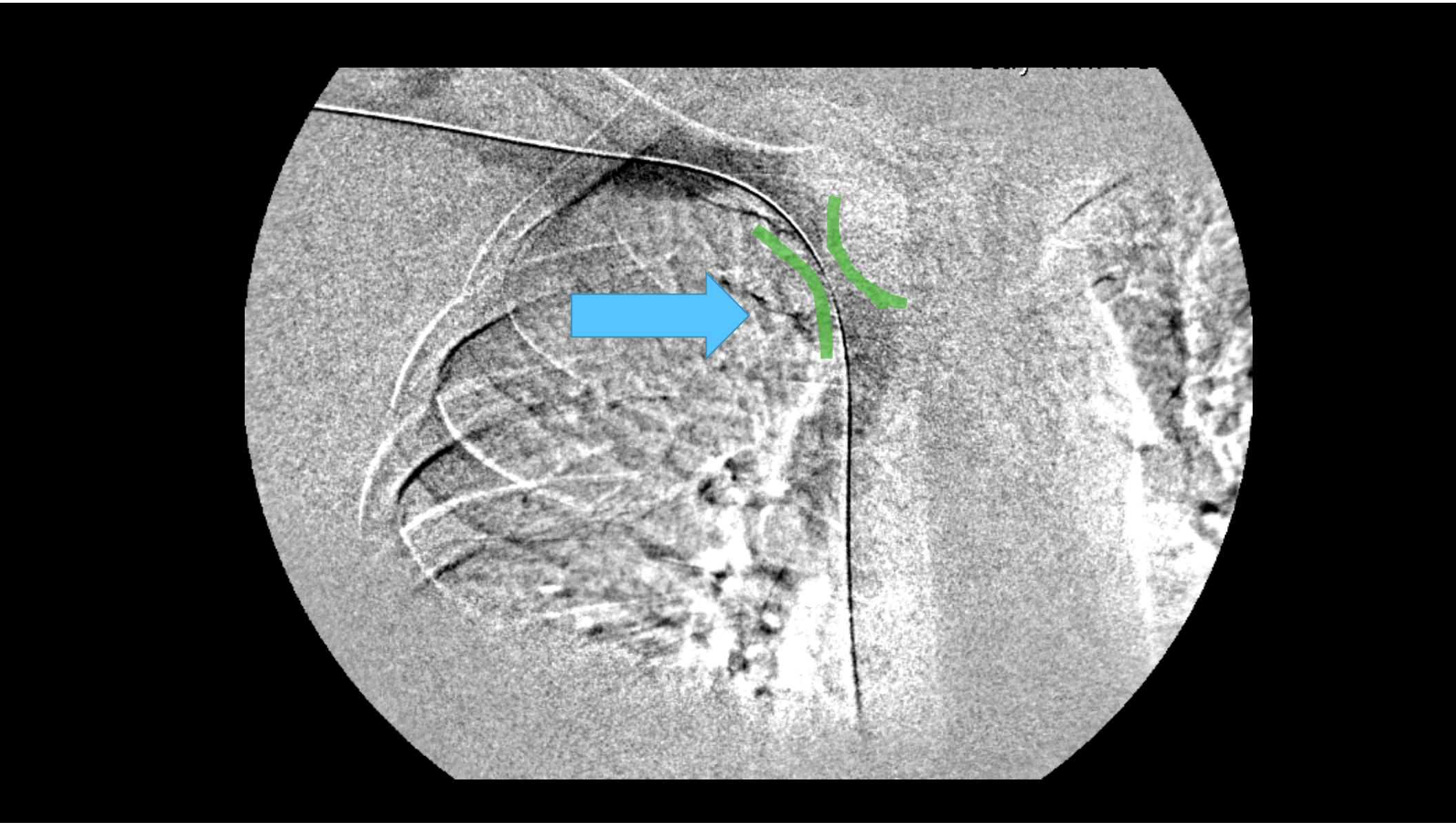


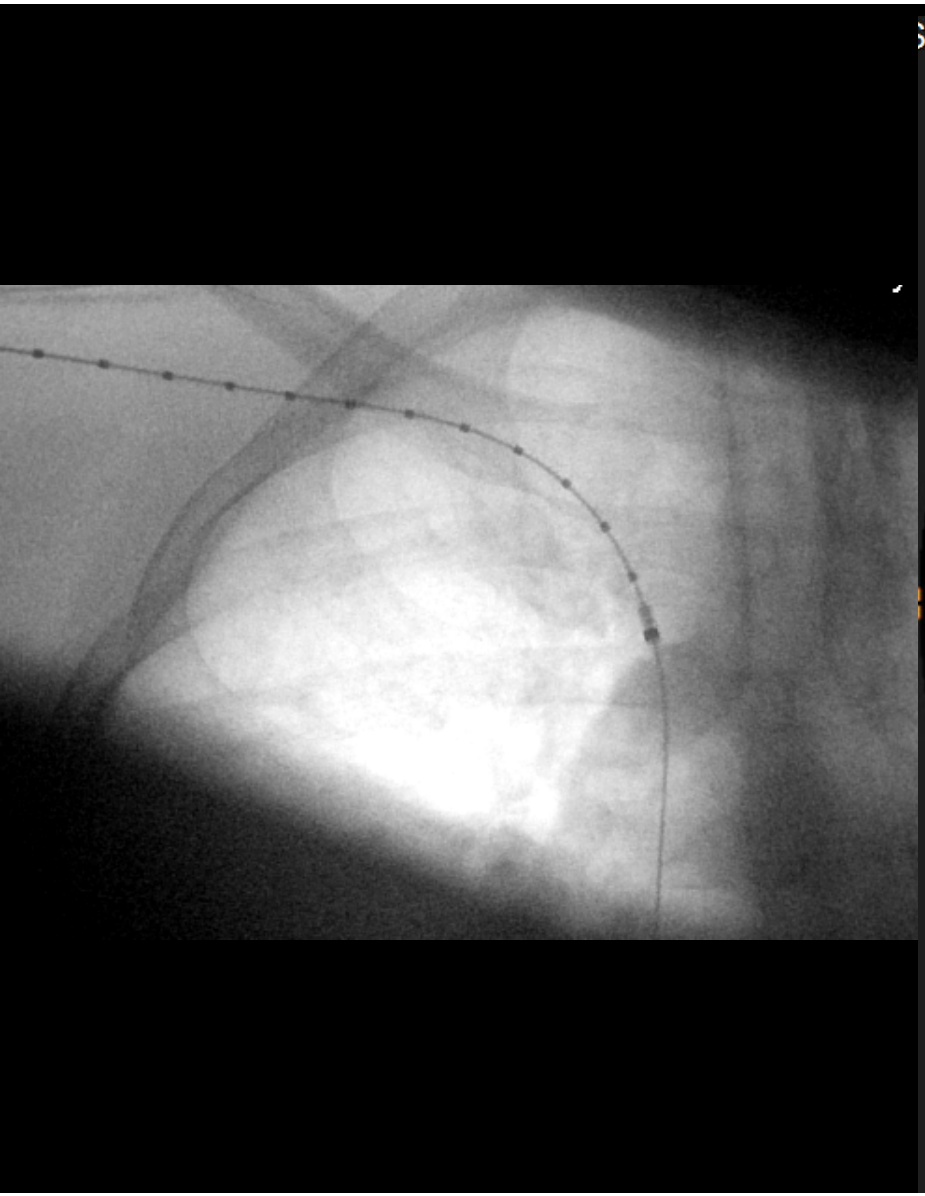
- Lesion dilated from 6mm to 8mm post IVUS guided PTA
- No post PTA contrast given – results confirmed with IVUS
- Tolerated procedure without side effects, 1cc total contrast
- Resolution of prolonged bleeding post procedure

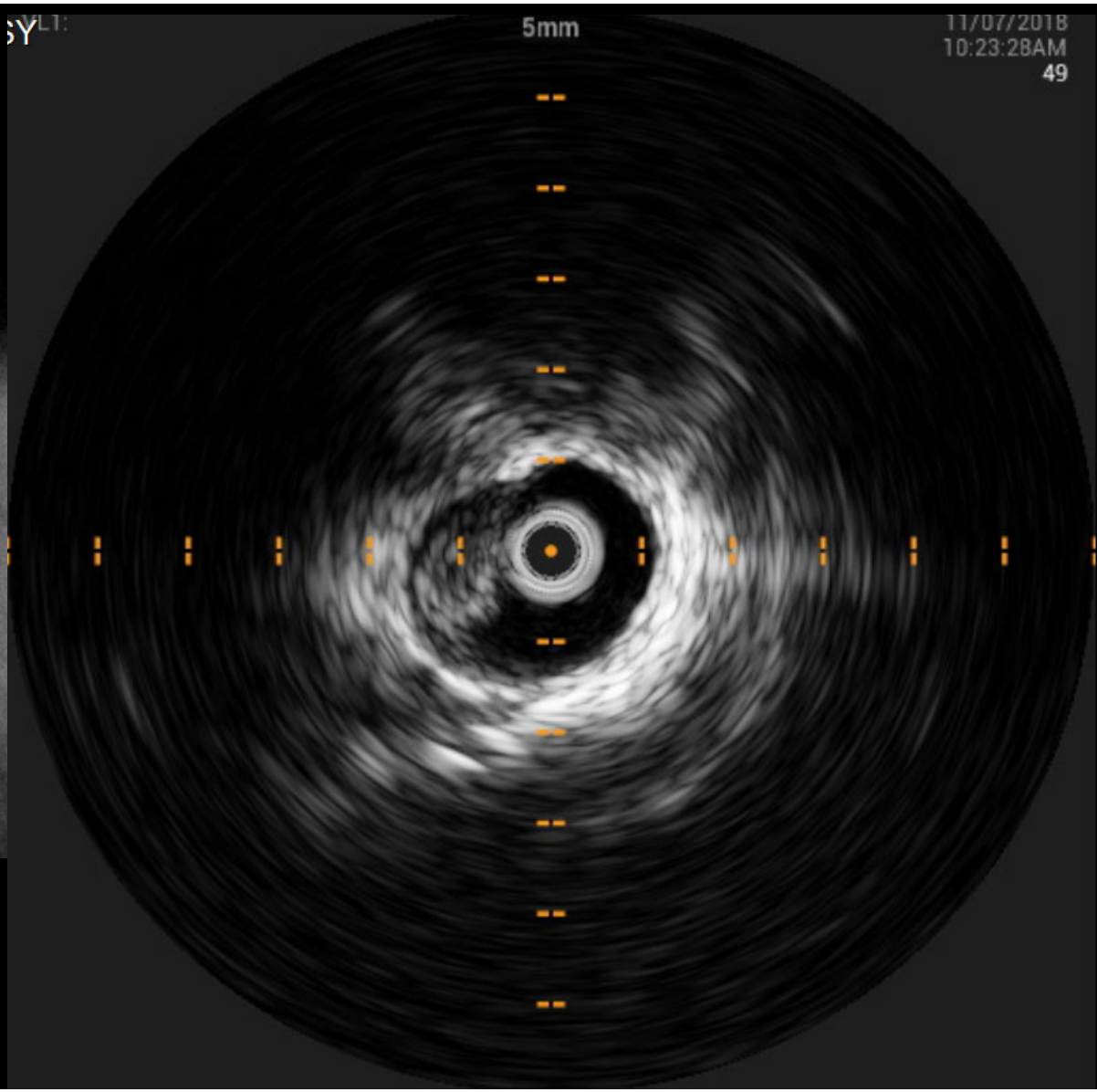
Questionable Imaging

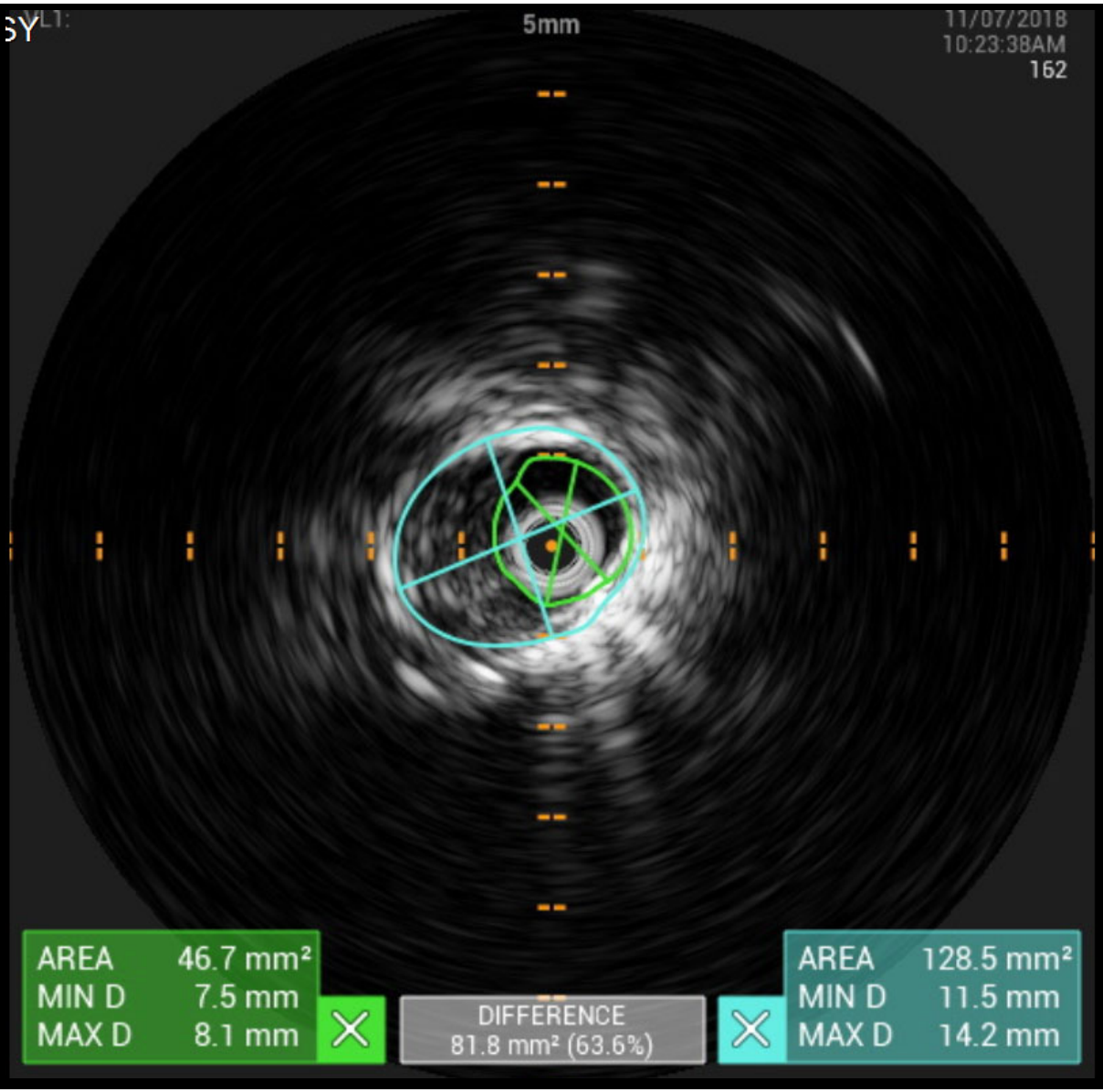

ANO-28D00SB
5mm
1
16.7 mm
2018 A
Img Tm: 09
1.5x
Y
M / Lin:DCM / Id:ID
L:127
1.5x
Y
M / Lin:DCM / Id:ID
L:127

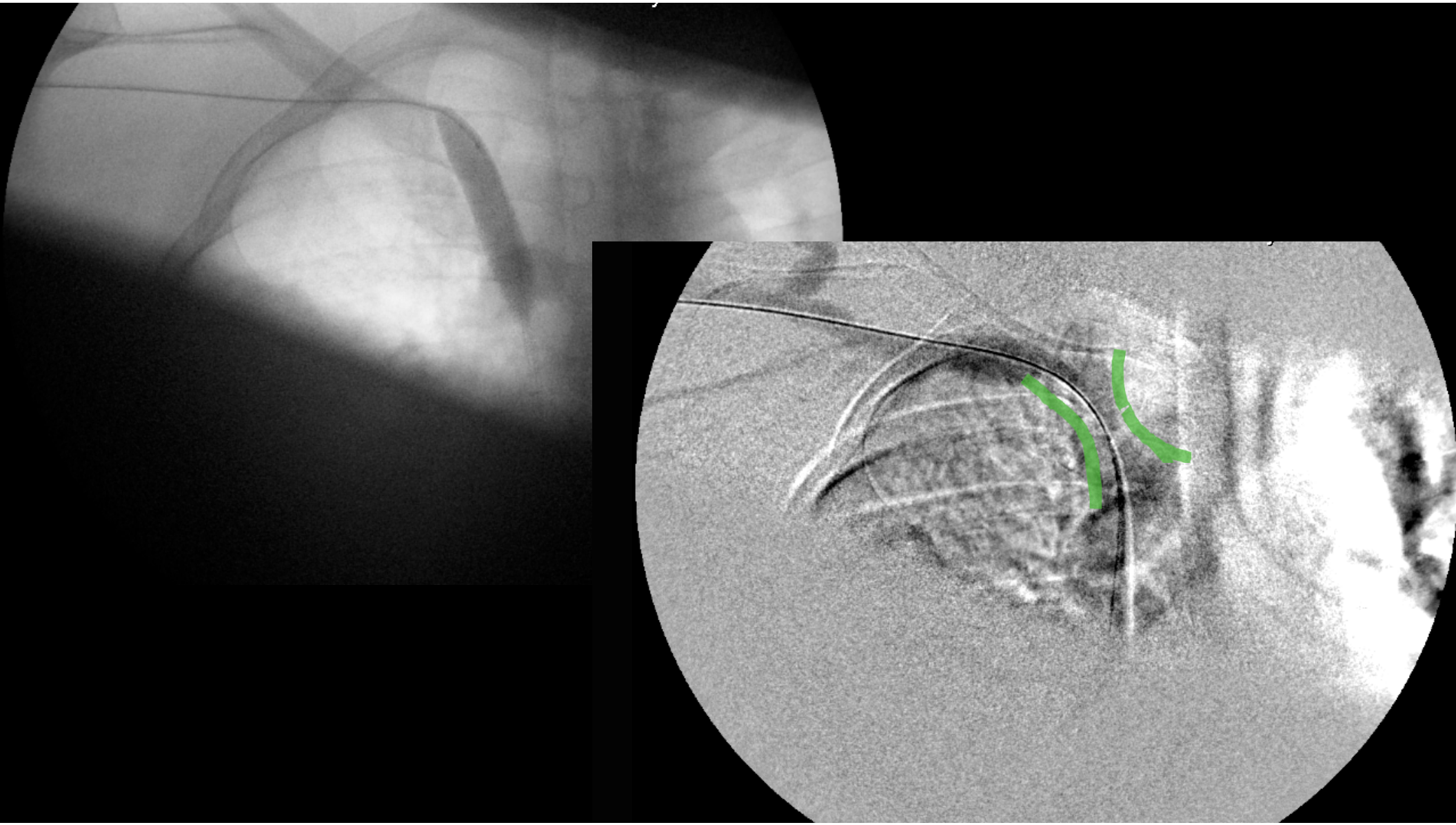
Central Stenosis Management



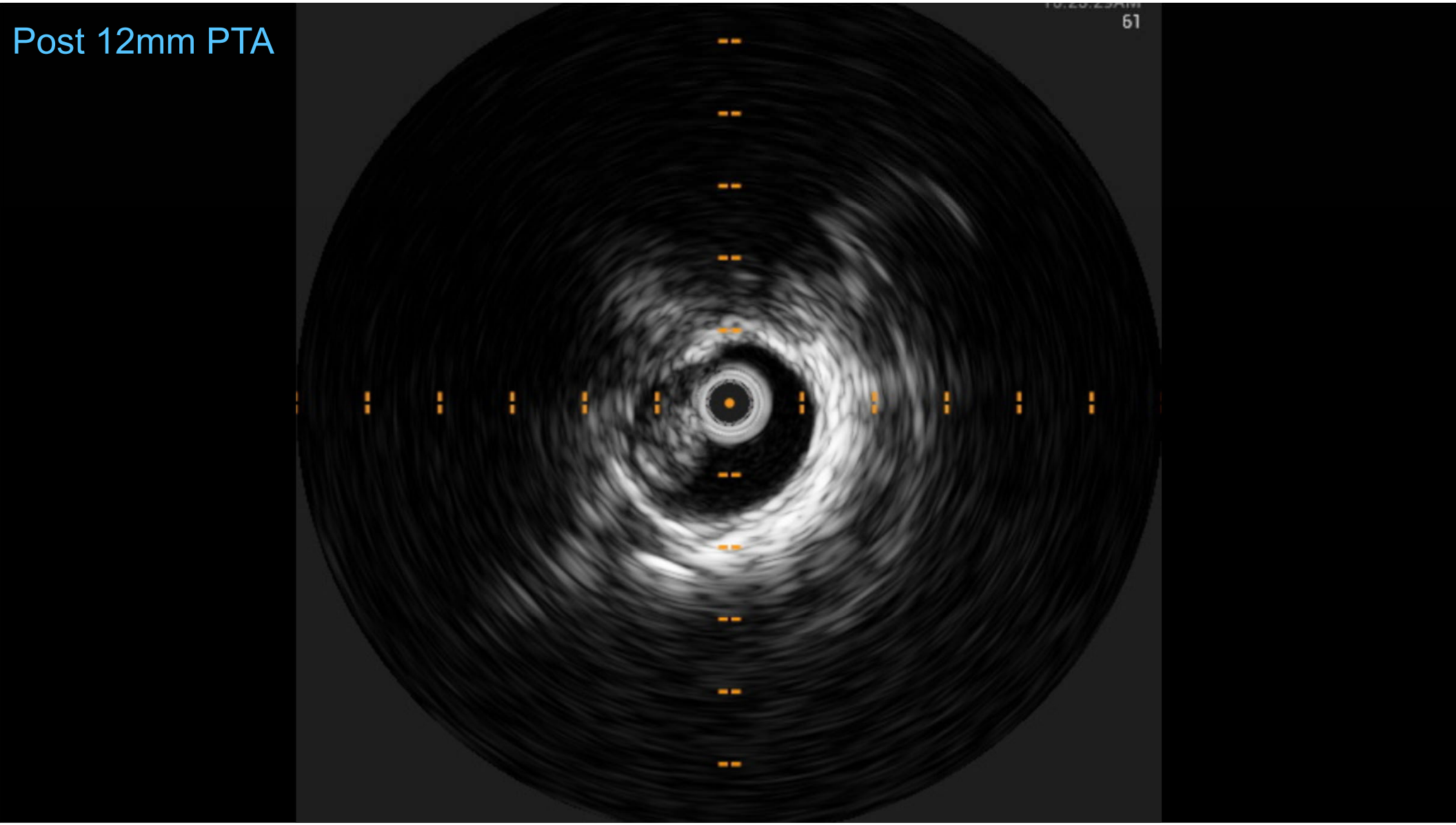


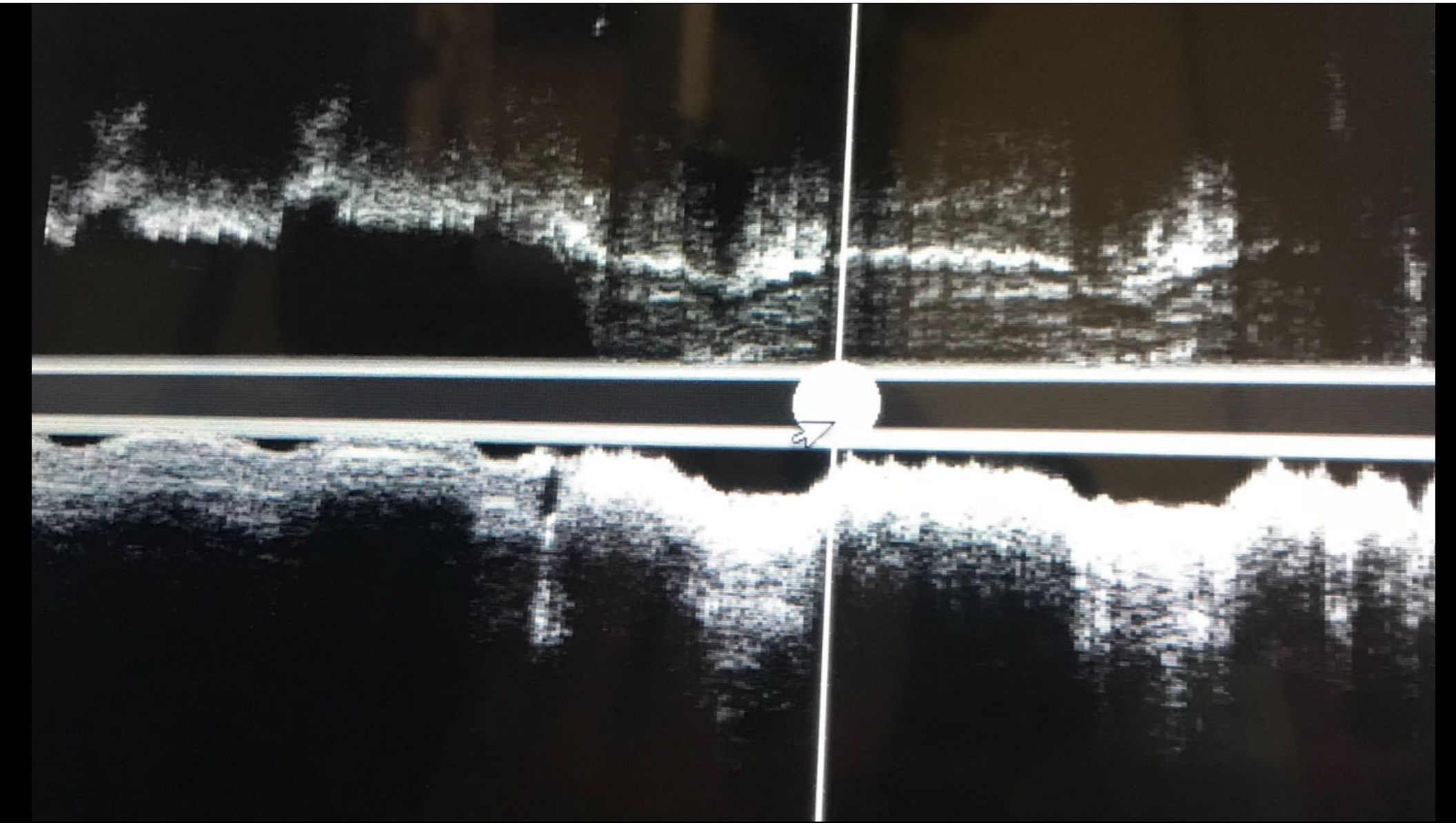

5mm
11/07/2018
10:23:28AM
49

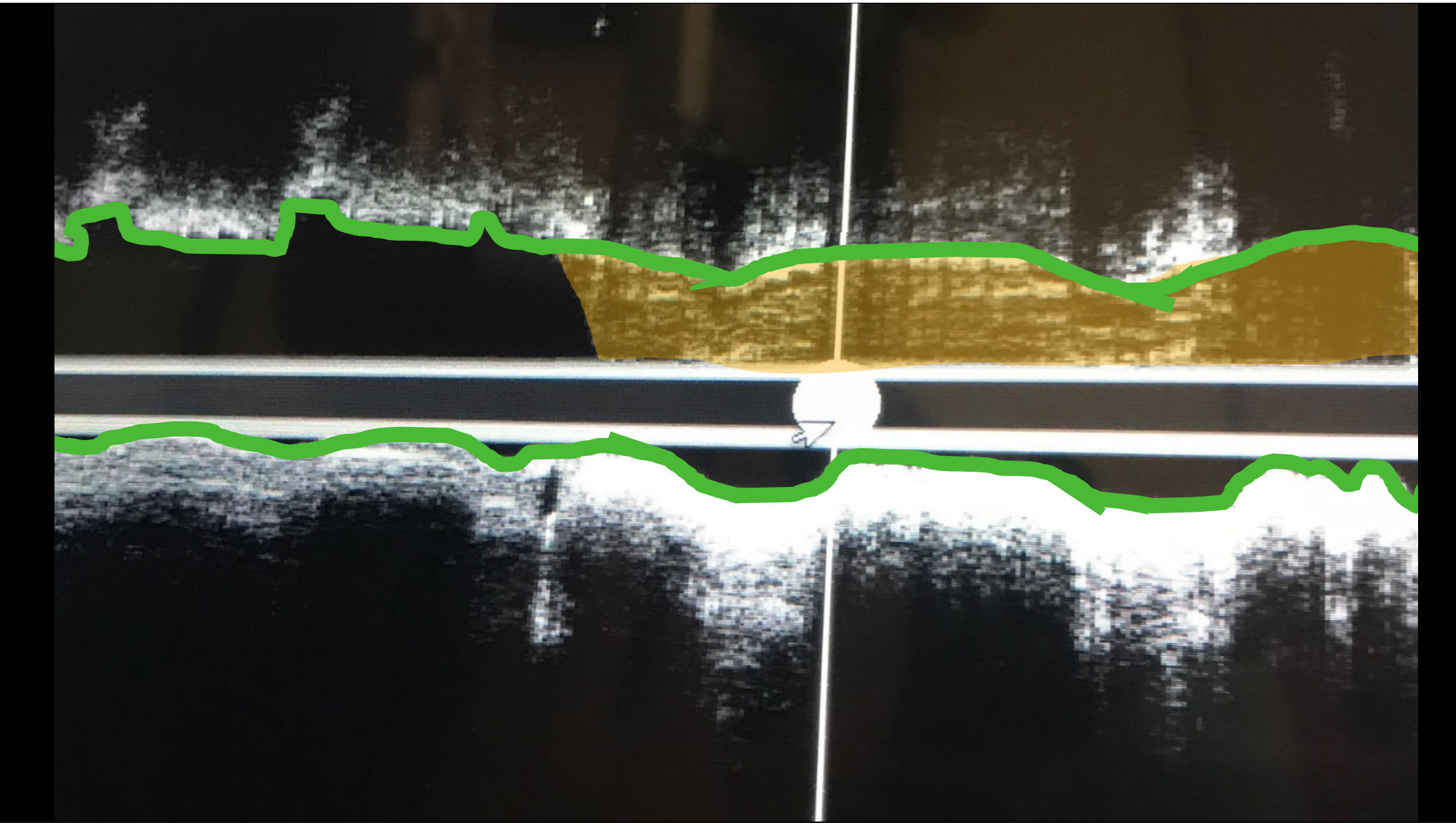

5mm
11/07/2018
10:23:38AM
162
AREA 46.7 mm²
MIN D 7.5 mm
MAX D 8.1 mm
DIFFERENCE
81.8 mm² (63.6%)
AREA 128.5 mm²
MIN D 11.5 mm
MAX D 14.2 mm

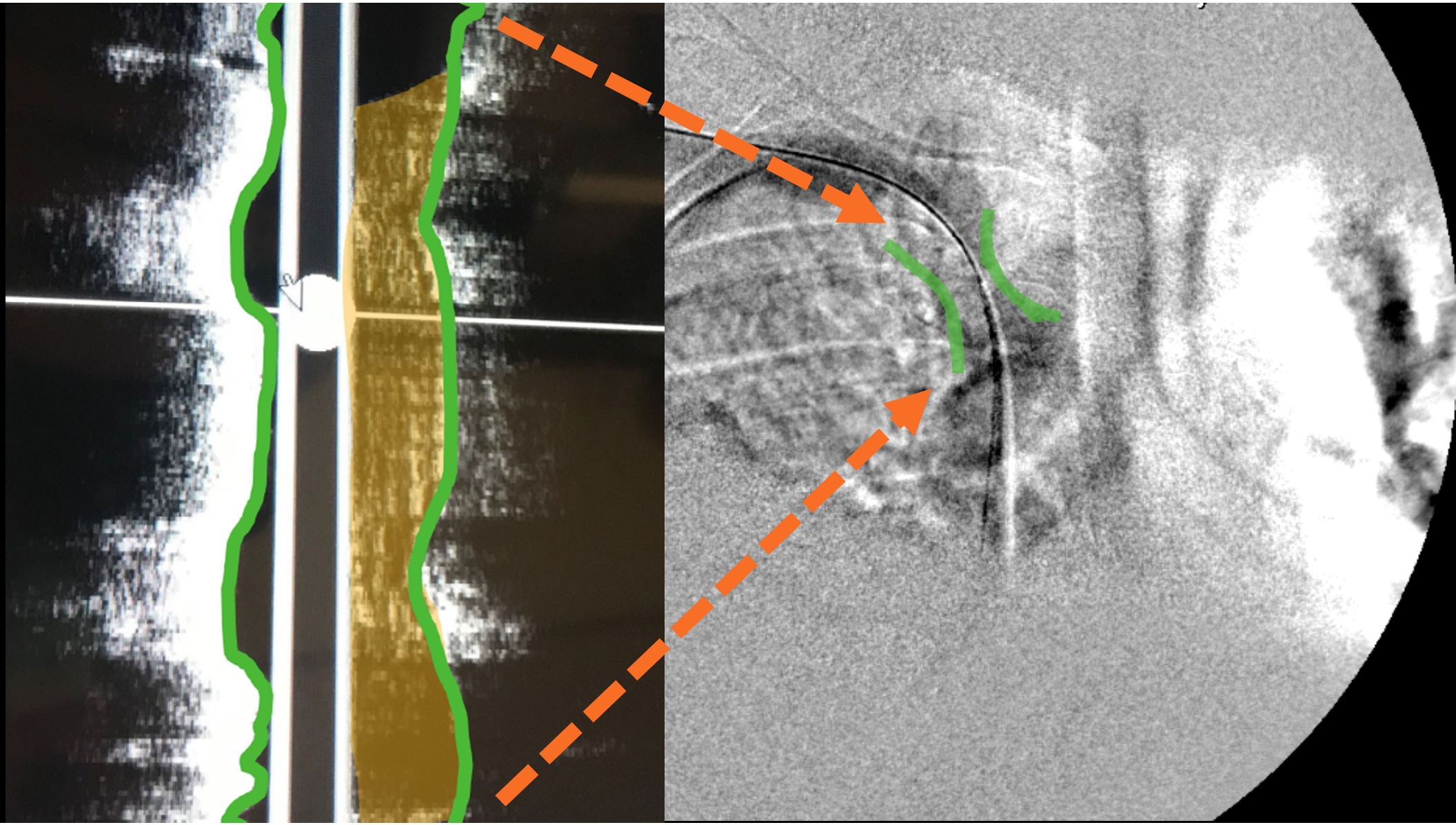


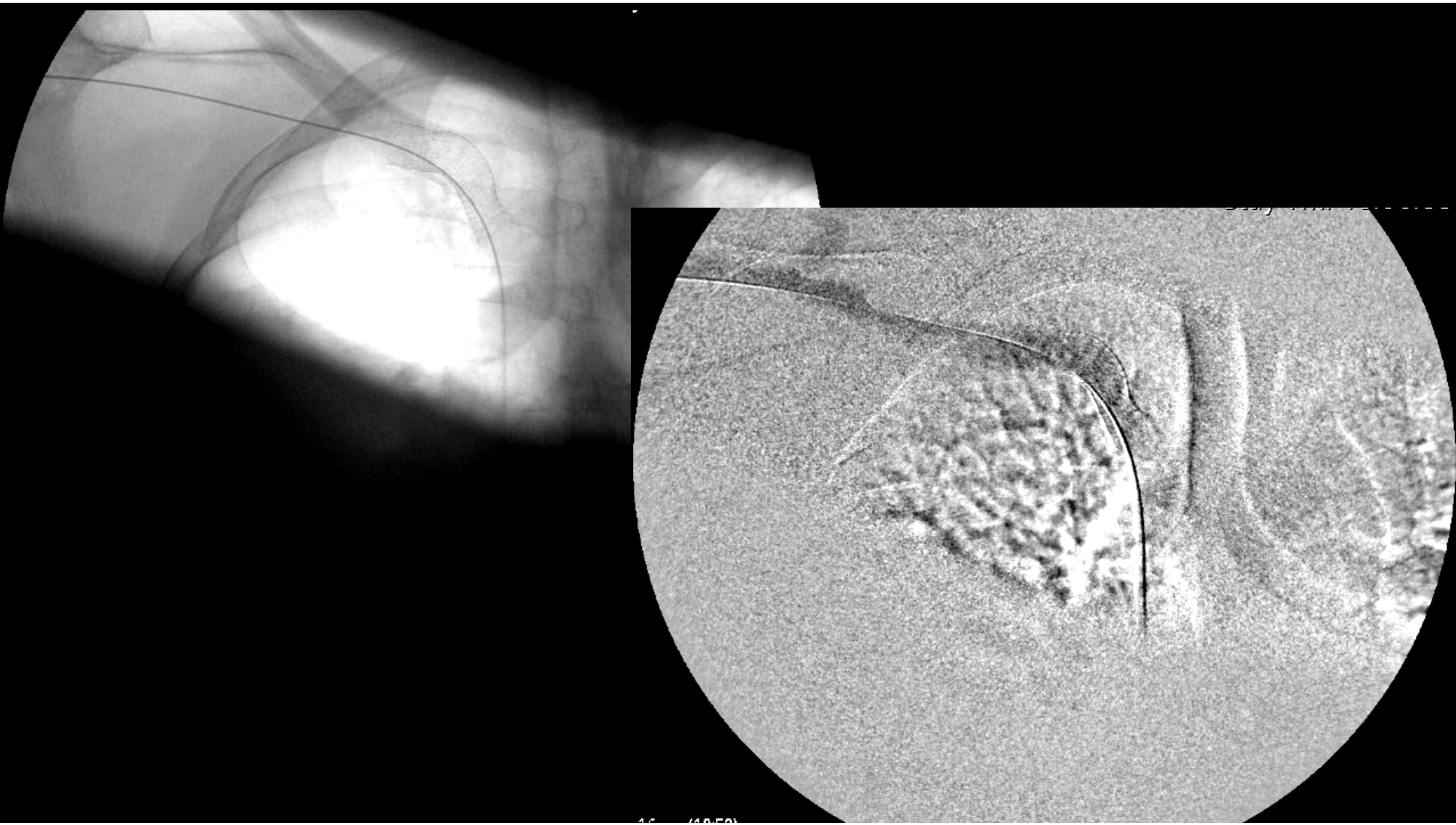
Post 12mm PTA

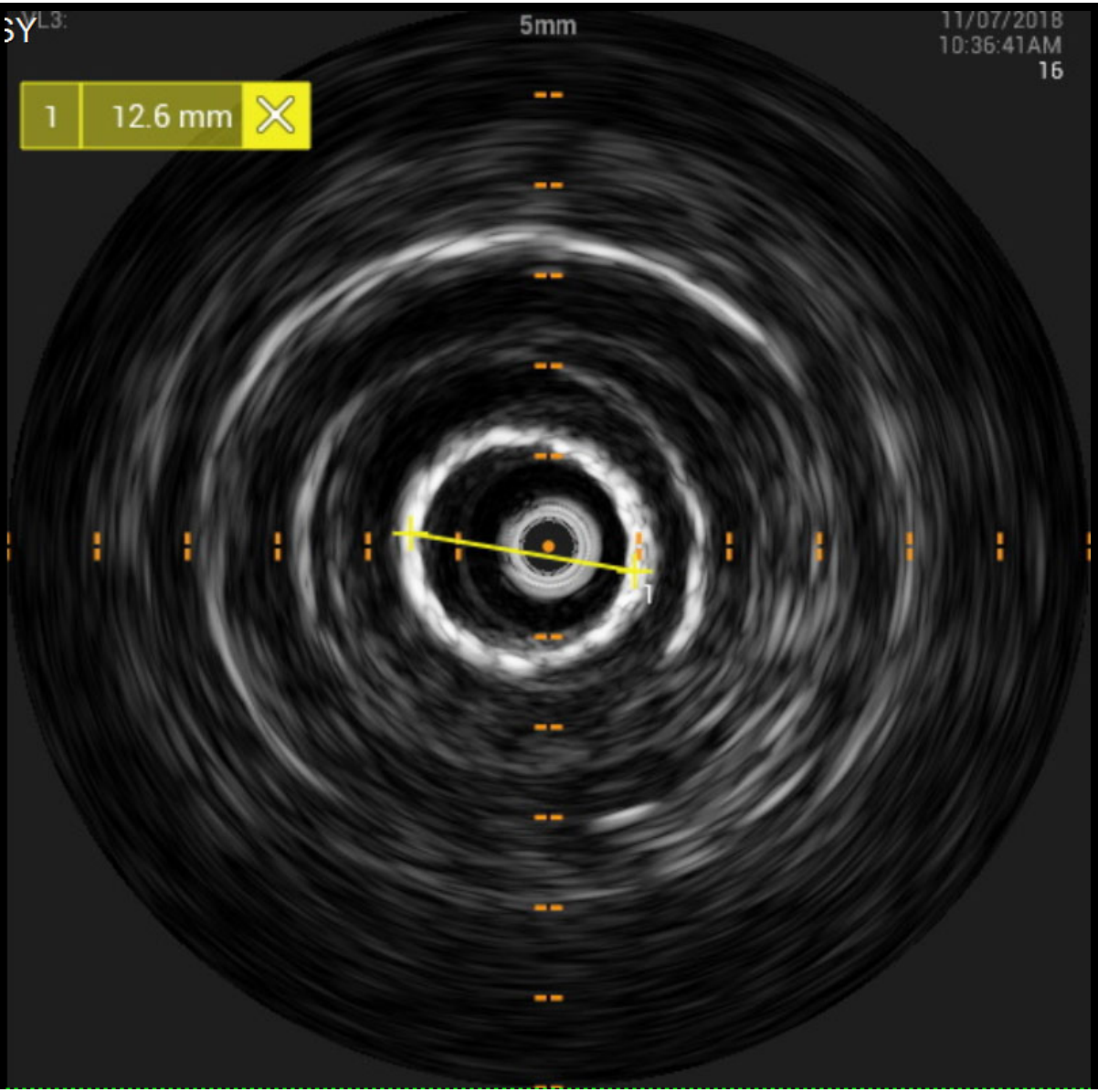











5mm
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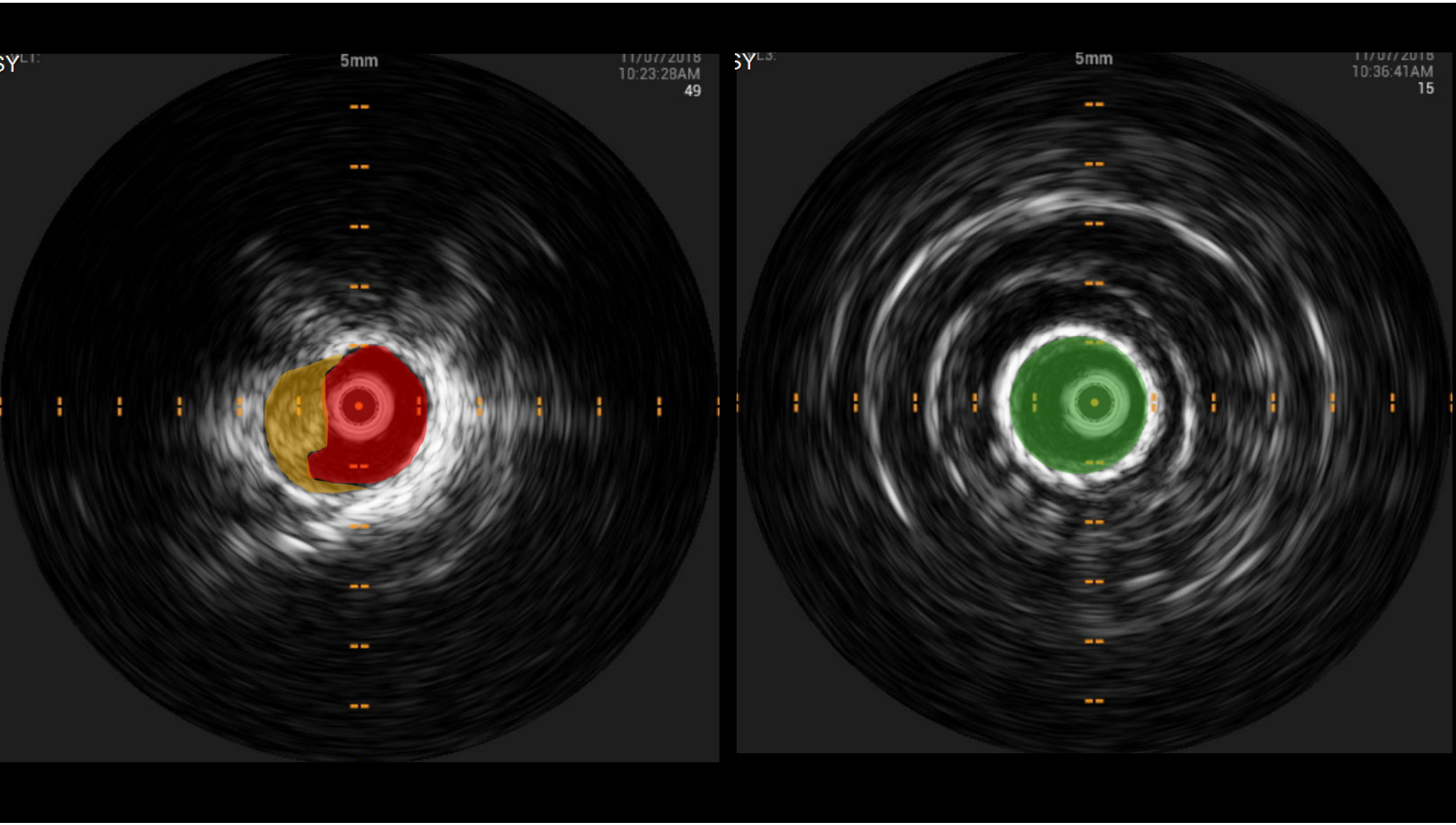
16
1
12.6 mm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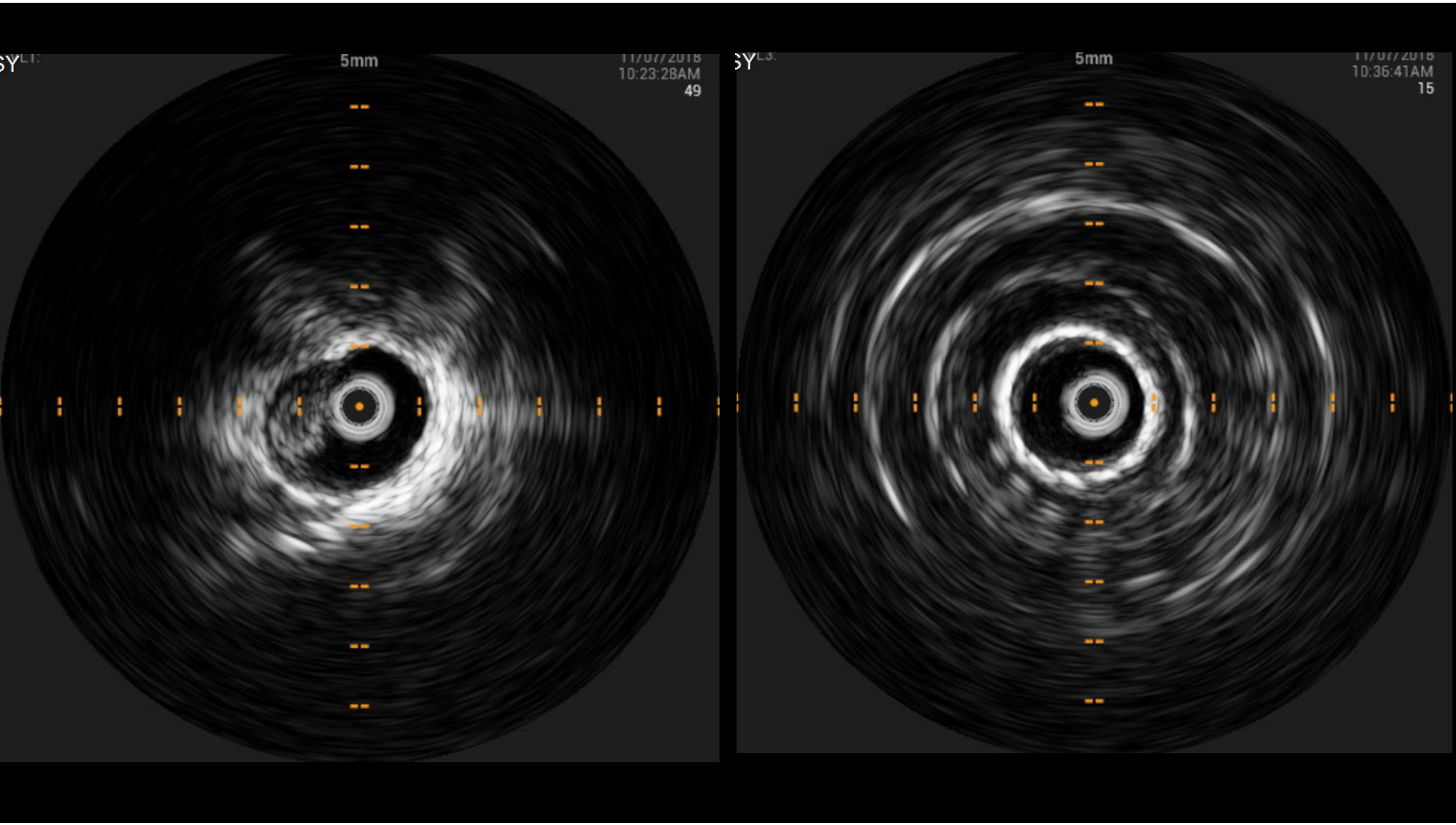
15


5mm
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49
5mm
10:36:41AM
15

Intravascular Ultrasound in AV Access

- Accurate anatomical evaluation
- Precise measurement for balloon/stent sizing
- Feedback post intervention
  - Recoil
  - Evaluation of intra-luminal obstructions not seen with angiography
- Reduction in radiation and contrast exposure

- Safer procedures with improved patient outcomes

MORE QUESTIONS THAN ANSWERS