Abbott
A Promise for Life

The future is now - symposium

Beyond Intervention: how technology can transform patient care, latest update

The future is now – Abbott vascular symposium

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Institute for cardiovascular diseases Dedinje Belgrade, Serbia

UNIVERZITET u BEOGRADU
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- **This course and presentation is organized and sponsored by Abbott Vascular**

14:15-15:15 **Abbott vascular simpozijum: "The Future is Now"**

14:15-14:20 **Uvodno predavanje – Više od intervencije: Kako tehnologija utiče na lečenje, najnoviji podaci /** ***Introductory lecture – Beyond Intervention: how technology can transform patient care, latest update***
Ivan Ilić

14:20-14:35 **Uloga imidžinga i fiziologije u PKI /** ***Role of Imaging and Physiology in PCI***
Ivan Ilić, Milenko Čanković

14:35-14:50 **Bolest koronarne mikrocirkulacije – Napravi razliku adekvatnom dijagnostikom /** ***Coronary microvascular disease - make a difference with proper diagnosis***
Dejan Milašinović

14:50-15:15 **Moj pristup u lečenju /** ***How did I treat – my way***
Carlos Collet

15:15-17:00 **Prenos intervencija uživo iz sale za kateterizaciju srca IKVBV /** ***Live cases from ICVDV Cath lab***
Predsedavajući / Chairmen: Ivan Ilić, Dejan Milašinović, Milenko Čanković
Slučaj br. 3 / Case #3 – Carlos Collet

PATIENTS HAVE CONFIDENCE IN PHYSICIANS' DECISION-MAKING, BUT SEE ROOM FOR IMPROVEMENT

What would give you confidence that the doctor is making the absolute best decisions?

[TOP-2 BOX: "EXTREMELY + VERY VALUABLE"] COUNTS	US	Brazil	EMEA	UK	France	Germany	Italy	APAC	China	India	Japan
His/her being up-to-date on all the latest research	70%	60%	54%	56%	42%	55%	58%	44%	50%	41%	38%
His/her personal experience with similar situations	63%	53%	55%	62%	58%	47%	53%	45%	55%	41%	36%
His/her use of new technologies that monitor my progress and provide information to show that treatment is working	63%	73%	57%	54%	52%	68%	52%	61%	74%	66%	31%
Data on outcomes for specific procedures or treatments my doctor is recommending	58%	61%	45%	59%	42%	38%	44%	51%	58%	52%	38%
His/her reliance on data that shows how others have been treated successfully	46%	47%	42%	40%	49%	33%	48%	46%	51%	54%	25%
A grading system that shows how successful he/she has been in treating others in my situation	32%	51%	32%	32%	20%	33%	41%	47%	51%	49%	38%
Recommendations from other patients	22%	32%	20%	18%	26%	21%	18%	20%	14%	27%	20%

How physicians can improve patients' confidence:

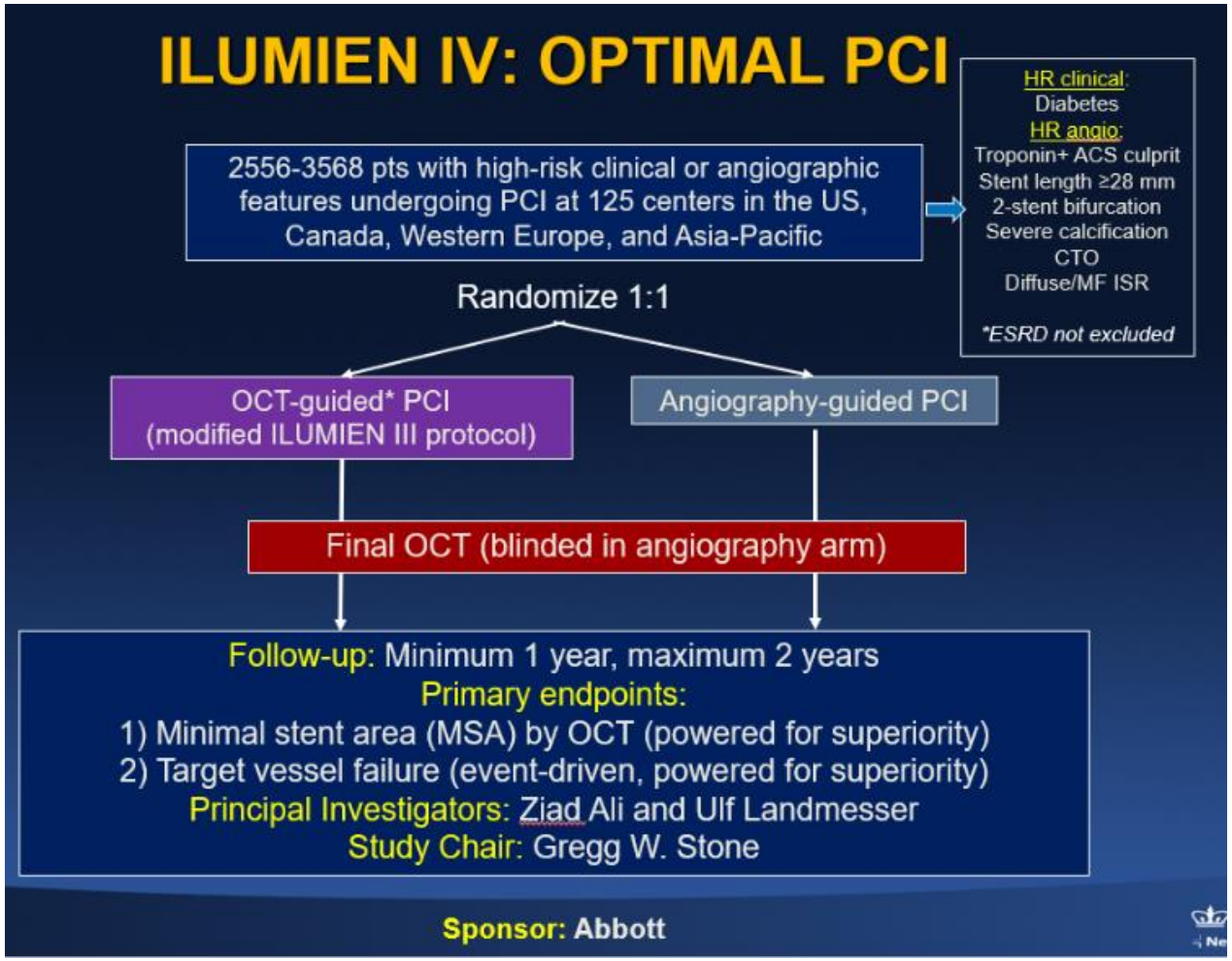
61% "Use new technologies that monitor my progress and provide information to show that the treatment is working"

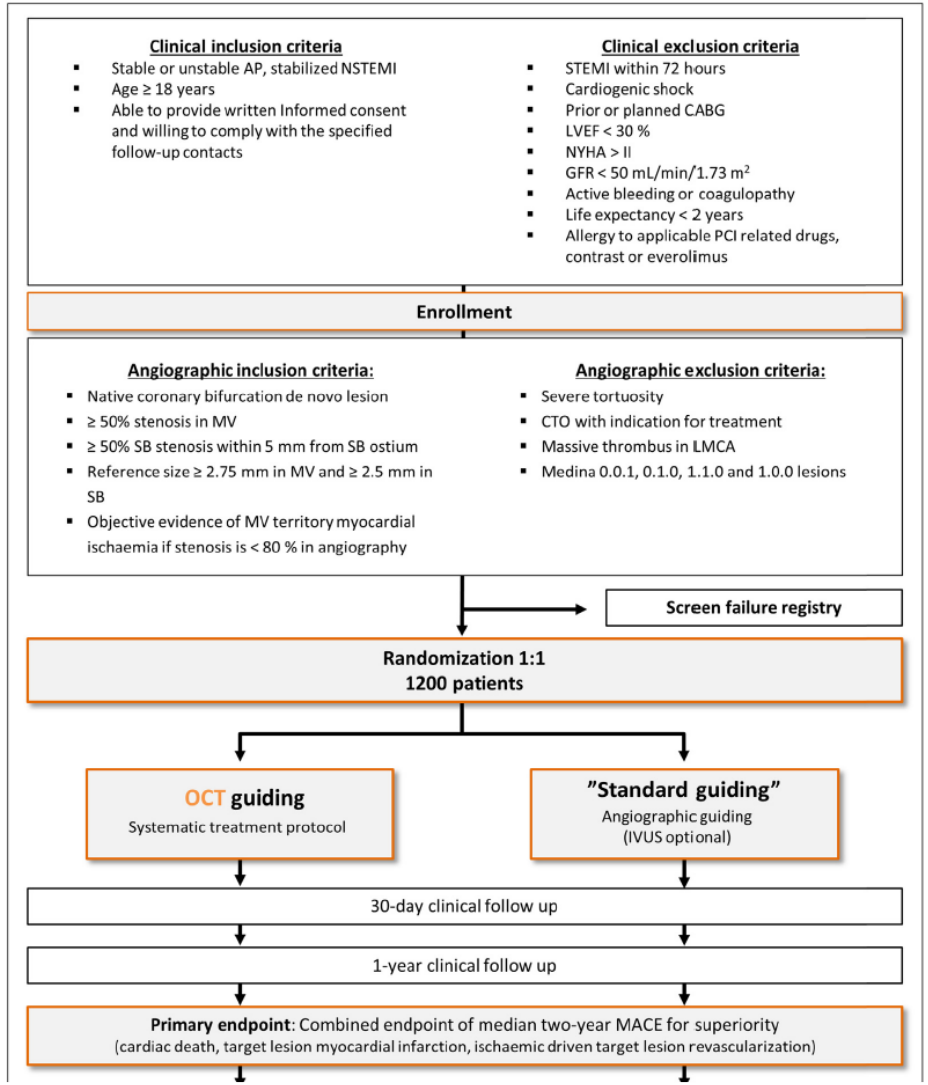
55% "Keep up to date on the latest research"

54% Have "experience with similar situations"

79% "strongly" or "somewhat" agree that their "doctor usually knows the treatment plan for me is absolutely correct"

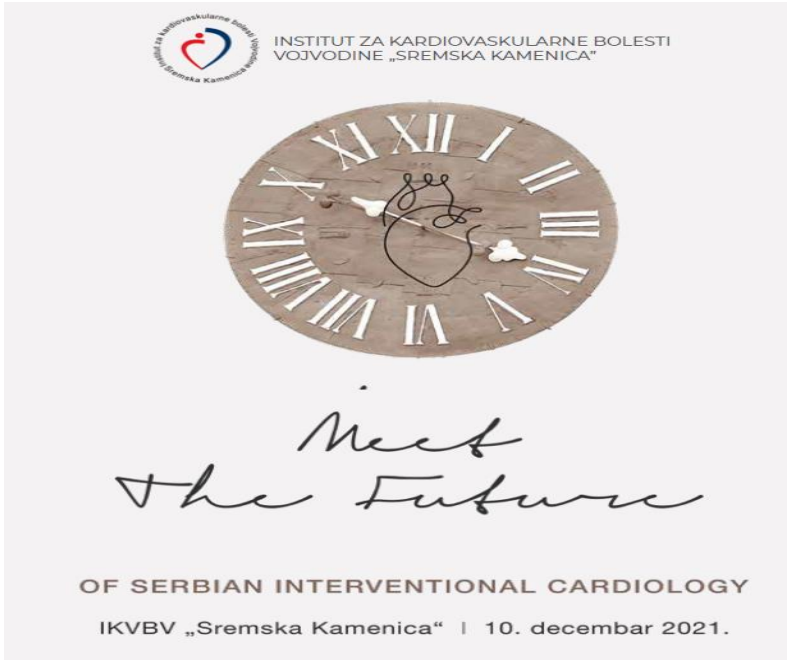
OCT guidance in PCI – future trials





OCTOBER trial

Ali Z. et al., EuroIntervention 2021;16:1092-1099; Holm NR. et al., Am Heart J 2018;205:97-109.



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Role of imaging in PCI

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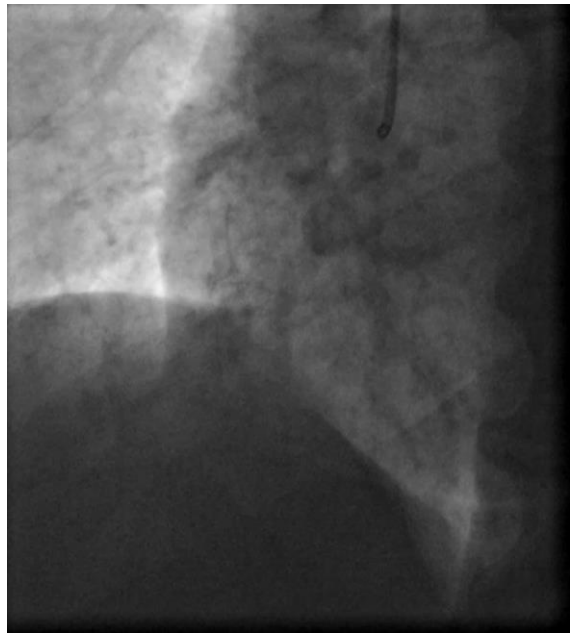
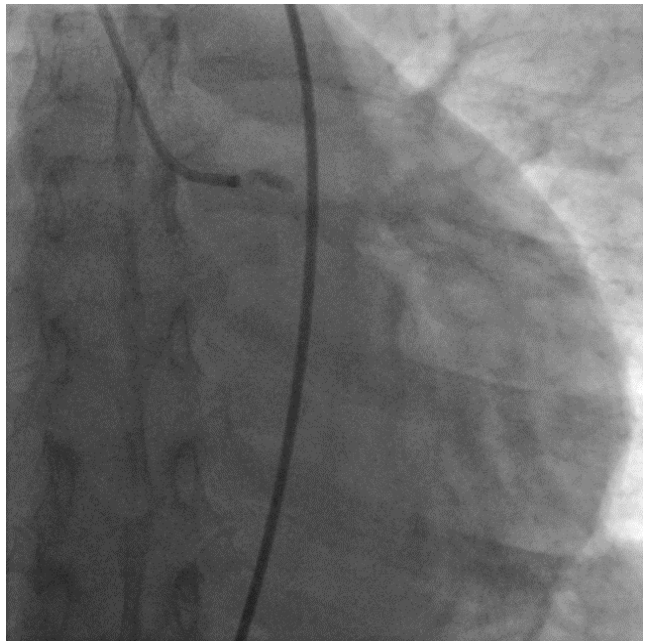
What coronary angio can do?

Thrombus



Occlusion

Coronary dissection



Critical stenosis

Courtesy of Cardiology Clinic ICVD Dedinje

Why imaging in interventional cardiology?

- Confirm the diagnosis
- Distribution of coronary artery disease
- Choose appropriate therapeutic modality
- Improve PCI
- Assess outcomes and complications

Table 2 Recommendations on the adjunctive use of intravascular imaging for diagnostic evaluation of coronary artery disease, guidance and optimization of PCIs

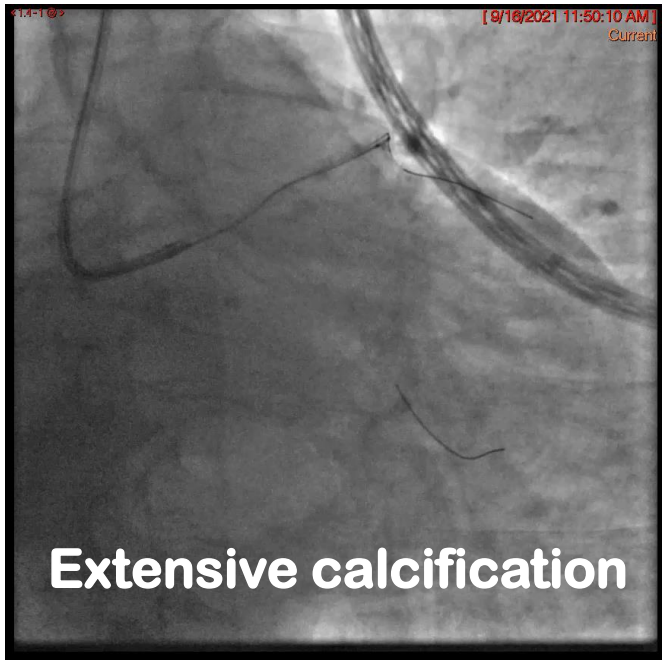
• **Diagnostic assessment of coronary lesions**
Consensus opinion
Angiographically unclear/ambiguous findings (e.g. dissection, thrombus, calcified nodule)
Assessment of left main stenosis
Complex bifurcation lesions
Suspected culprit lesion of ACS
• **PCI guidance and optimization**
RCT evidence
Long lesions
Chronic total occlusions
Consensus opinion
Patients with acute coronary syndromes
Left main coronary artery lesions
Two stents bifurcation
Implantation of bioresorbable scaffolds
Patients with renal dysfunction (IVUS)
• **Identification of mechanism of stent failure**
Restenosis
Stent thrombosis

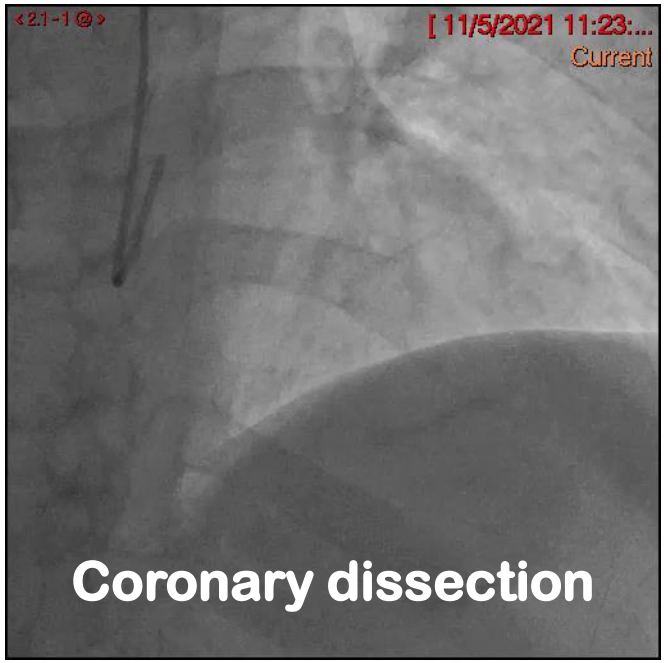
Raber et al. Clinical use of intracoronary imaging. Part 1 European Heart Journal (2018) 0, 1–20

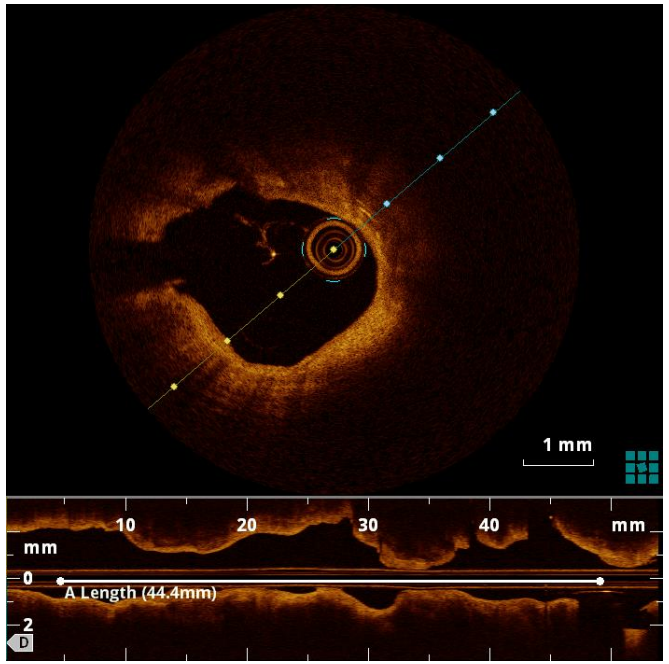
Comparison between IVUS and OCT

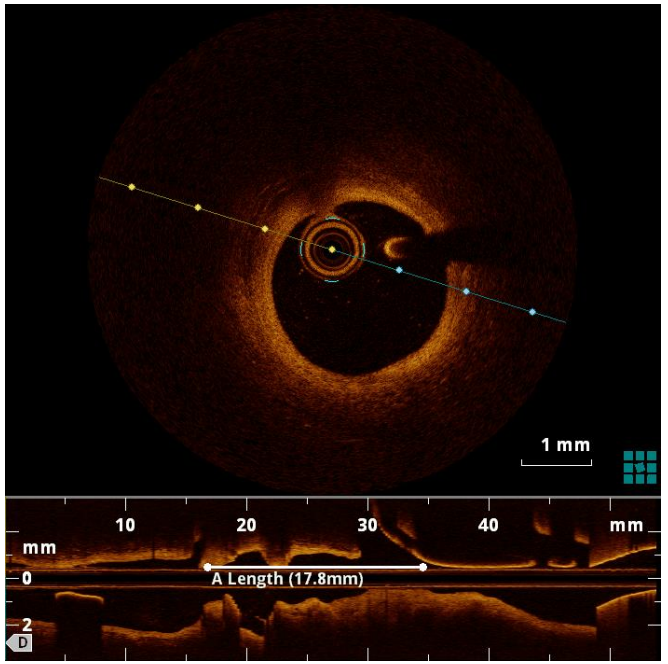
IVUS	OCT
Advantages – Extensive clinical experience → IVUS has been used clinically for almost three decades – Pre-intervention imaging is possible in most patients without pre-dilation – Penetration to the adventitia allows mid-wall or true vessel stent sizing – Extensive research regarding impact of IVUS guidance of the procedural result as well as clinical outcomes – IVUS predictors of restenosis are well established – Better guidance for CTO techniques (e.g. wire re-entry)	**Advantages** – 10× higher resolution compared with IVUS → OCT can detect fine details which are missed by IVUS (edge dissections, tissue coverage of stent struts, and malapposition that is below the resolution of IVUS) – Better tissue characterization (calcium) – Better suited for thrombus detection – Images are clearer and easier to interpret – OCT predictors of restenosis and stent thrombosis are well established – More user friendly due to rapid availability of reliable automatic analyses (i.e. accurate lumen profile)
Disadvantages – Images can be difficult to interpret – Tissue characterization is limited – Thrombus detection is challenging – Assessment of stent-strut tissue coverage not possible (low resolution) – Assessment of strut malapposition is limited – Low-resolution of the longitudinal view	**Disadvantages** – Additional contrast – Flushing is necessary to clear the lumen of blood to visualize the vessel wall – Pre-dilation may be necessary pre-intervention to allow blood to be flushed from the lumen – Limited penetration of OCT – Compared with IVUS, there is limited research evidence on OCT-guided vs. angiography-guided PCI with respect to surrogate endpoints and no RCT powered for clinical outcomes

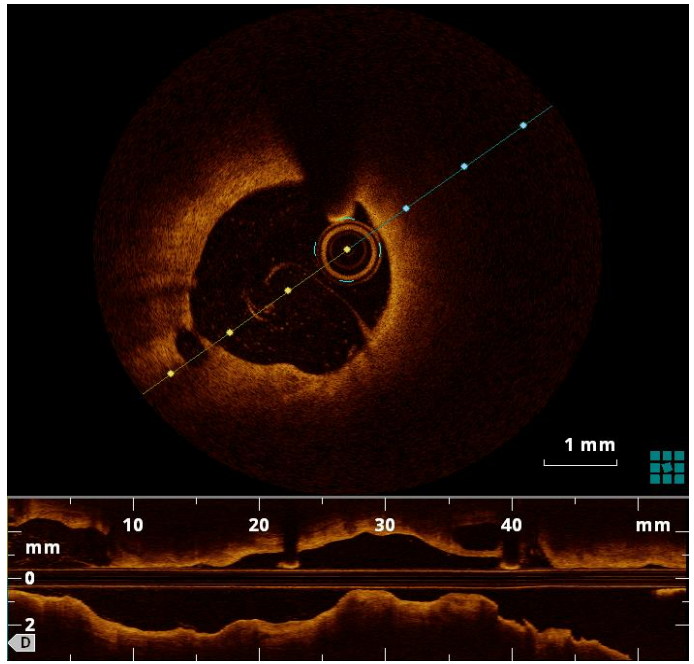
Raber et al. Clinical use of intracoronary imaging. Part 1 European Heart Journal (2018) 0, 1–20







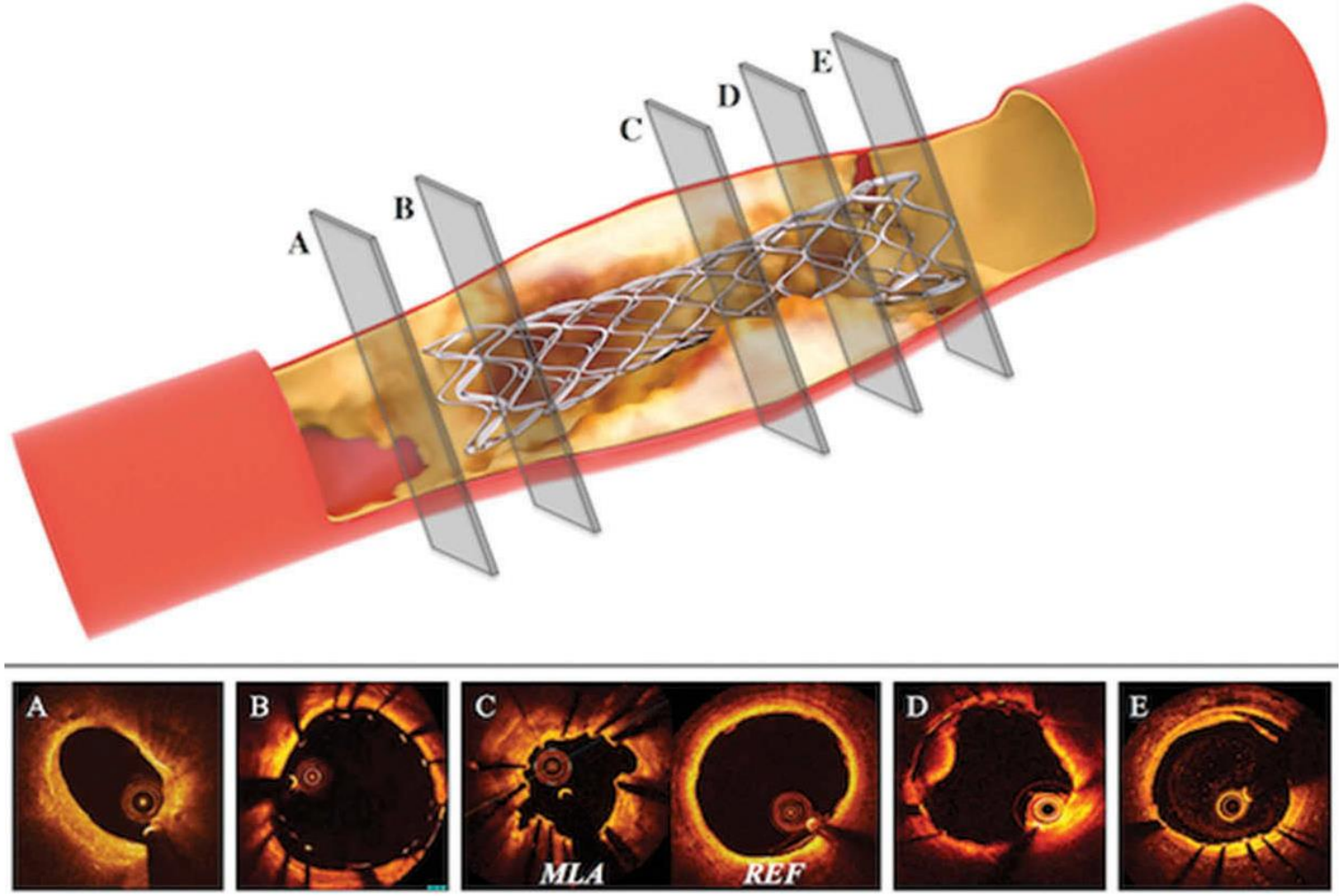




Courtesy of Cardiology Clinic ICVD Dedinje

OCT to evaluate stent implantation

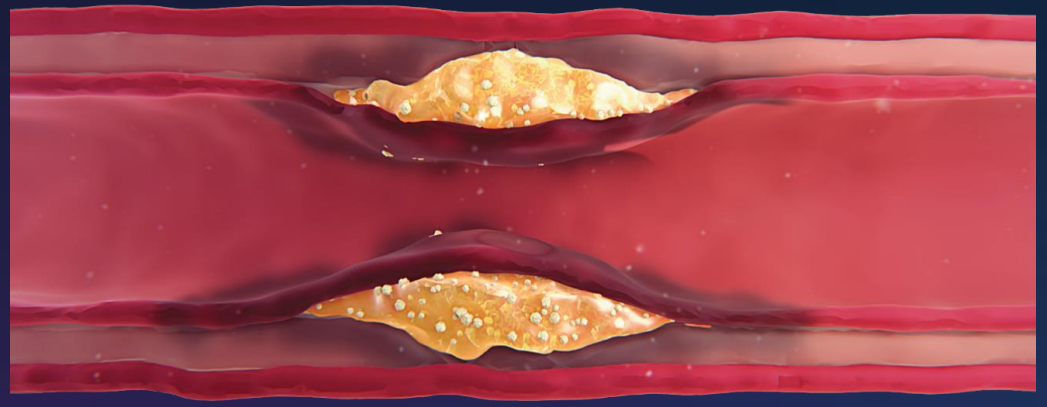
Even with optimal angiographic result OCT can identify issues that require further intervention after stent implantation



A – geographical miss
B – stent malapposition
C – stent underexpansion
D – plaque/thrombus protrusion
E – edge dissection

Wolfrum M et al. Expert Rev Cardiovasc Ther. 2017;15(9):705-713

Pre-PCI OCT | Strategize



M — Morphology

Search for High Calcium[1]

Criteria:
> 180 degrees, and
> 0.5 mm thickness, and
> 5 mm in length

L — Length

Select Landing Zones Based on Healthy Tissue/ EEL Visualization[2]

Place landing zones in healthy tissue (i.e. EEL visualization)

Note: In the absence of EEL to represent healthy tissue find the largest lumen to avoid areas of TCFA or lipid pools so as to not land your stent edge in these high-risk areas[3]

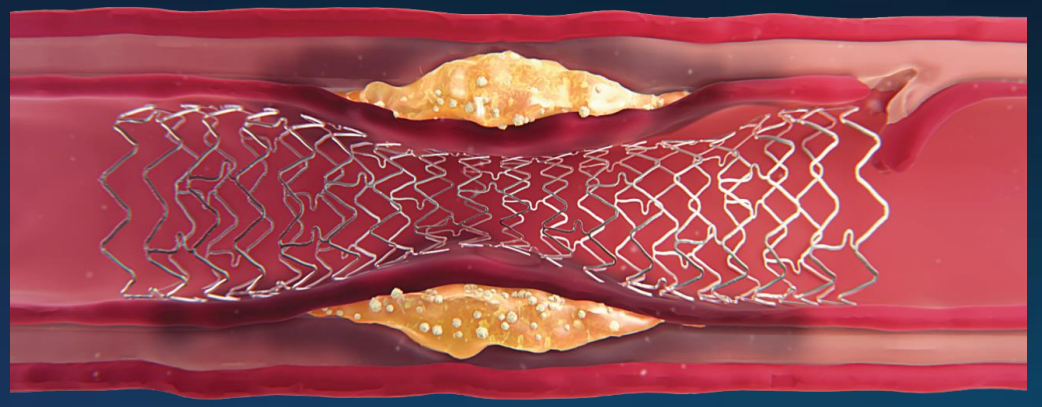
D — Diameter

Measure Vessel, Stent, Balloon Diameters[4]

Use distal reference measurements to select stent diameter

Use distal reference measurement for distal balloons or proximal reference measurements for proximal balloons

Post-PCI OCT | Optimize



M — Medial Dissection

Address Significant Dissection[3]

Criteria:
Dissection penetrates medial layer, and is greater than 1 quadrant arc

A — Apposition

Address Gross Malapposition

Criteria:
Malapposition indicator shows longer than 3 mm[4] of significant (≥ 0.3 mm from wall[5]) apposition

X — Xpansion

Confirm Expansion[3,6]

Criteria:
≥ 80% acceptable,
≥ 90% expansion is optimal

1. Fujino, A. et al. A new optical coherence tomography-based calcium scoring system to predict stent under expansion. *EuroIntervention,* April 2018; 13(18):e2182-e2189. 2. Prati, F. et al. The CLI-OPCI II Study. JACC: Cardiovascular Imaging, 2015: Vol 8, No. 11:1297-305. 3. Kubo, T. et al. Application of Optical Coherence Tomography in Percutaneous Coronary Intervention. *Circulation Journal,* September 2012: Vol. 76, 2076-2083. 4. Ali, Z. et al. ILUMIEN III: Optimize PCI. Lancet 2016, 388:2618-2628. 5. Souteyrand, G. et al. PESTO French Registry. *European Heart Journal,* 2016:37:1208-1216. 6. Meneveau, N. et al. DOCTORS Study. Circulation, September 2016, 134:906-917.; Zhang, J. et al. The ULTIMATE Trial. Journal of the American College of Cardiology, Dec 2018: Vol 72, No 24:3126-37.; Russo, R. et al. The AVID Trial. Circ Cardiovasc Intervent, April 2009; 2:113-123.; De Jaegere, P. et al. MUSIC Study. *European Heart Journal,* February 1998:19,1214-1223.

What does MLD MAX stands for?

Look for Calcium
Criteria:> 180 degrees, and> 0.5 mm thickness, and> 5 mm in length

Select Landing Zones
Based on Healthy Tissue/ EEL Visualization[2]

Diameter
Measure Vessel, Stent, Balloon Diameters

Address Significant Dissection
Criteria: Dissection penetrates medial layer greater than 1 quadrant arc

Address Gross Malapposition
Criteria: Malapposition longer than 3 mm of significant (≥ 0.3 mm from wall)

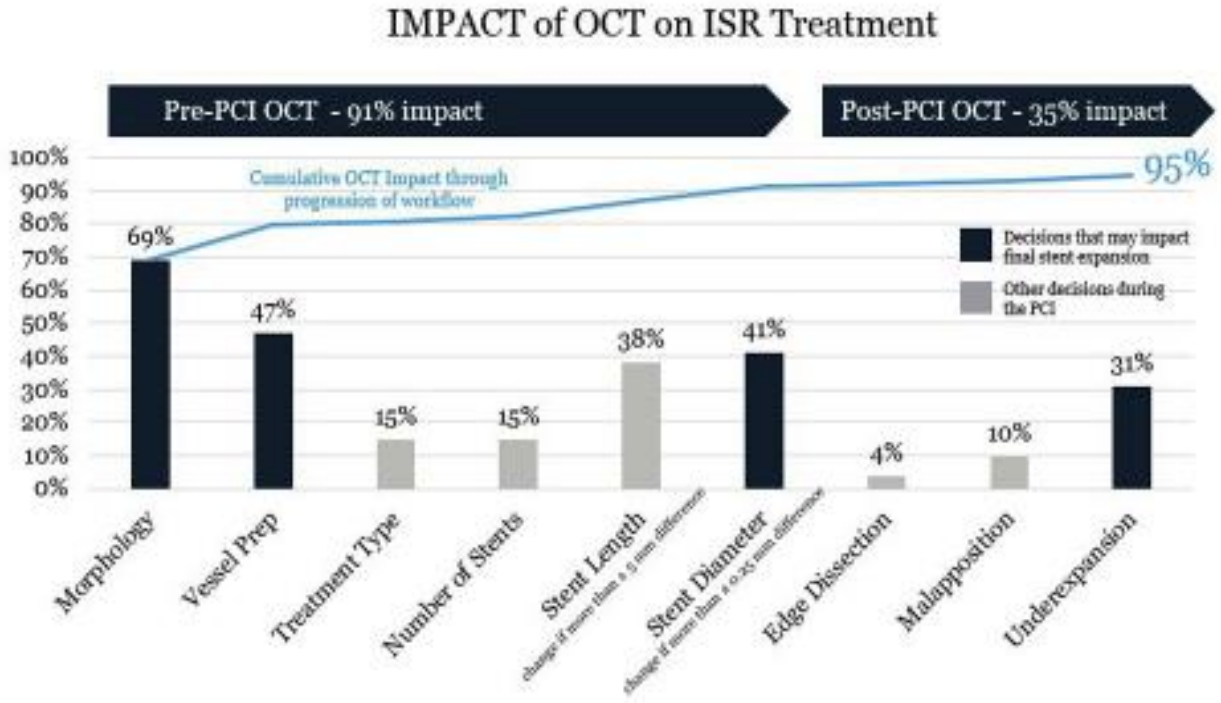
Confirm Expansion
Criteria:≥ 80% acceptable, ≥ 90% expansion is optimal

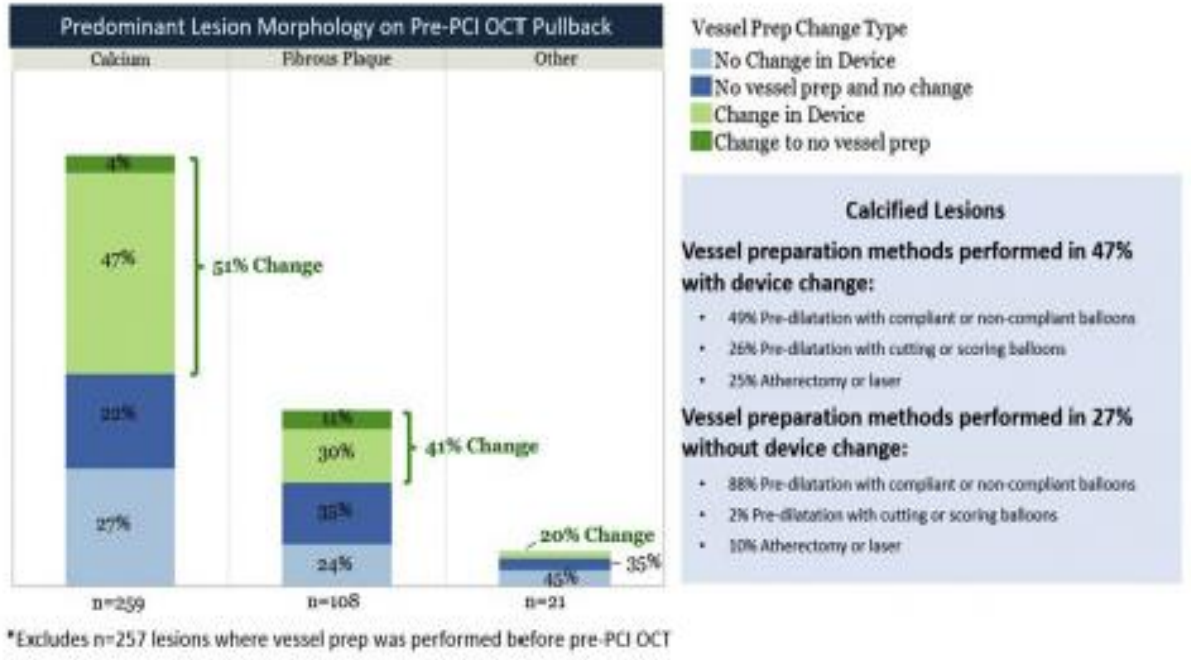
Impact of MLD MAX algorithm on PCI

Light Lab initiative
41 US physicians, 16 hospitals use of OCT
PCI planning and execution
Real time data collection on MLDMAX algorithm use

Pre-PCI OCT | Strategize—83% impact

Post-PCI OCT | Optimize—31% impact

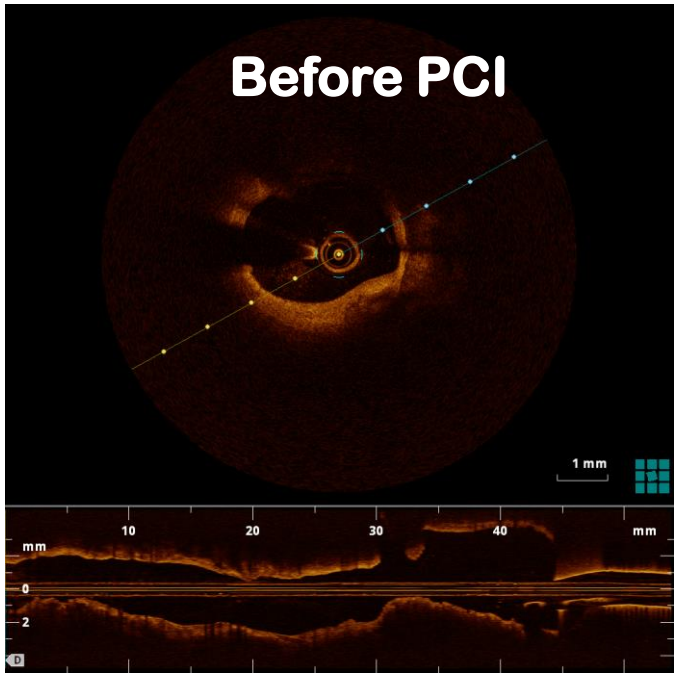


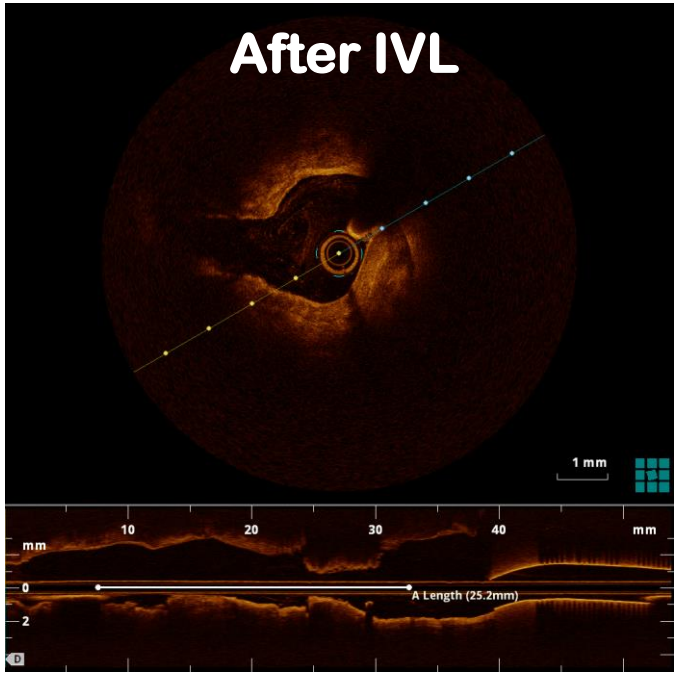


Croce K., et al. TCT Connect 406, 407; 2020

STRATEGIZE

- PG male, 71yrs old
- Unstable angina
- HF, NYHA III, LVEF 20%
- HTA, Dyslipidemia, heredity
- AF, non-sustained VT
- BMI 22.4kg/m2; eGFR 44ml/min/kg

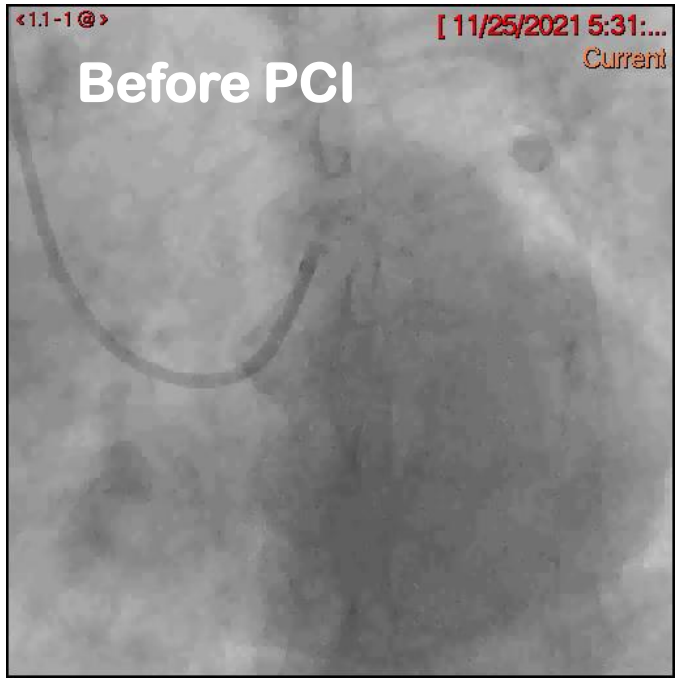


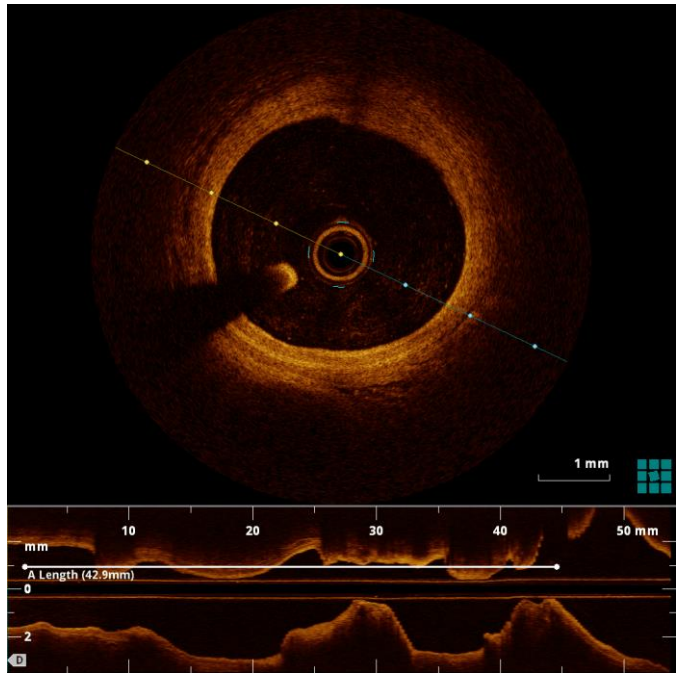


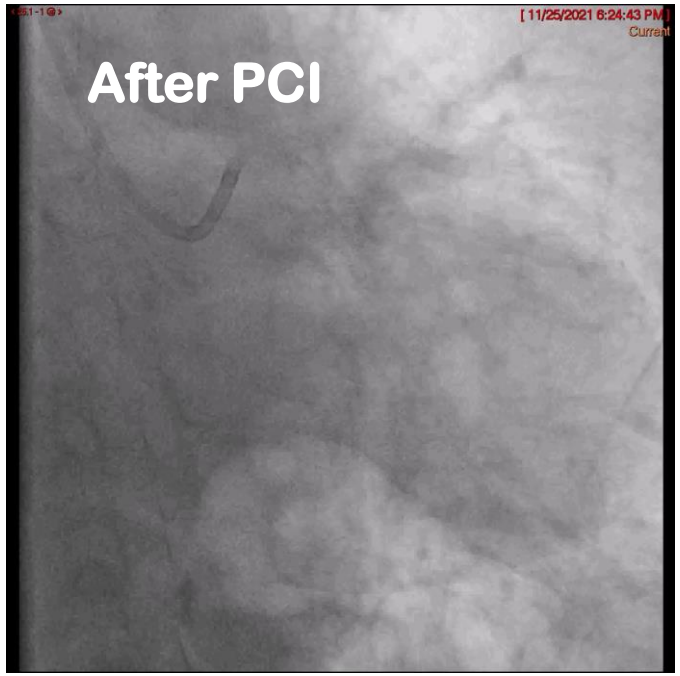
Courtesy of Cardiology Clinic ICVD Dedinje

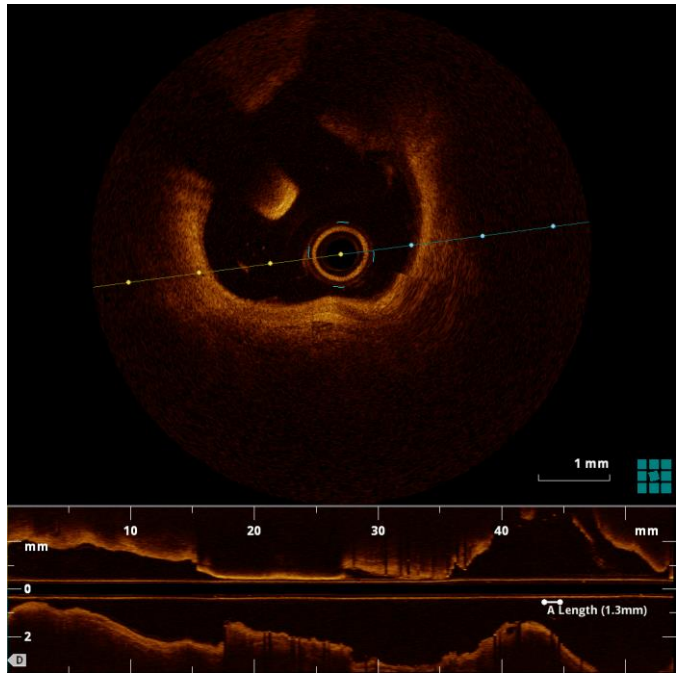
OPTIMIZE

- SK female, 75yrs old
- Stable angina
- CCS II LVEF 60%
- HTA, Dyslipidemia, heredity
- Thyroid disease
- BMI 25.7kg/m2; eGFR 78ml/min/kg









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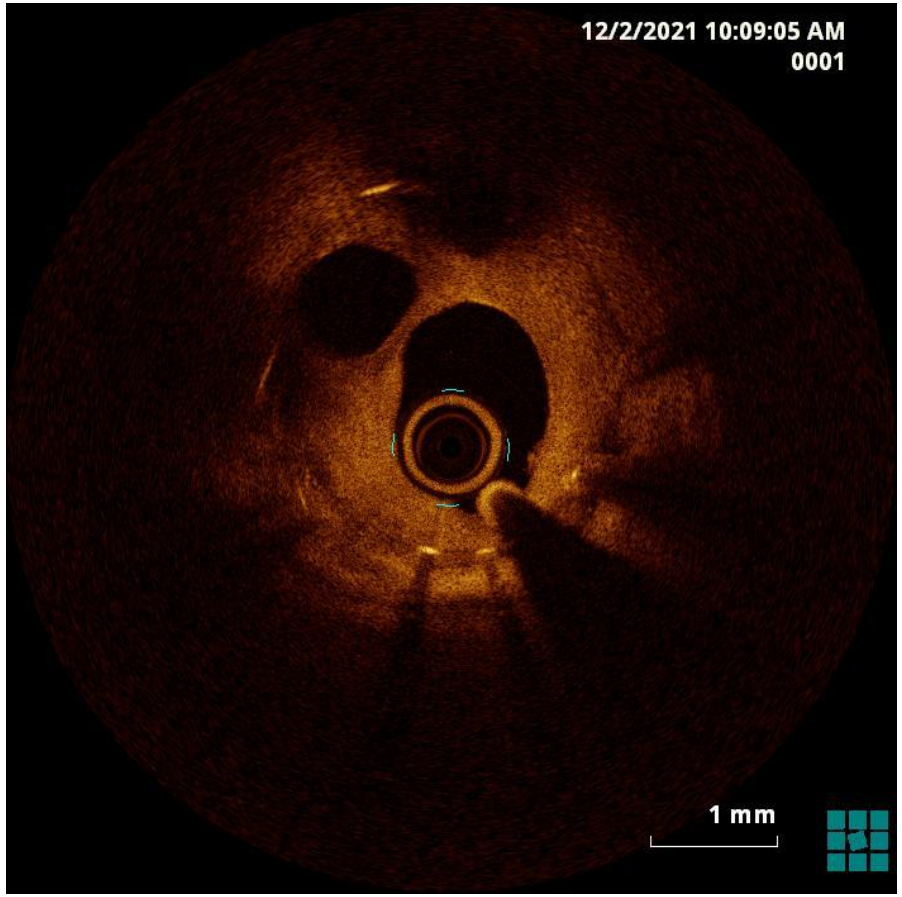
Take home message…

- Learn imaging application and interpretation
- Apply imaging in appropriate indication
- Have uniform approach to image interpretation
- Use imaging to guide intervention, instead as an adjunct to usual mode of PCI



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