

TCTAP2024
Coronary Imaging: Brand New Issues
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OCT-guided Primary PCI for ACS: Is It Easily Applicable in Practice?

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Disclosure Statement of Financial Interest 2024

Junichi Yamaguchi, MD, PhD,

Within the past 12 months, I or my spouse/partner have a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation / Financial Relationship

- Affiliation with Endowed Department
- Research support
- Consulting fee / Honoraria
- Shareholder / Equity

Company

Abbott Medical Japan, Boston Scientific, Terumo

Abbott Medical Japan, Boehringer-Ingelheim, Dai-ichi Sankyo, Otsuka Pharmaceutical, Tanabe Mitsubishi Pharmaceutical, Terumo

Abbott Medical Japan, Amgen, Angen, AstraZeneca, Bayer, Bristol-Myers Squibb, Boehringer-Ingelheim, Boston Scientific, Dai-ichi Sankyo, Kowa, Medtronic, Novartis, Ono Pharmaceutical, Otsuka Pharmaceutical, Takeda Pharmaceutical

None

OCT-guided Primary PCI for ACS

- **Question:**

Is It Easily Applicable in Practice?

OCT-guided Primary PCI for ACS

- **Question:**

Is It Easily Applicable in Practice?

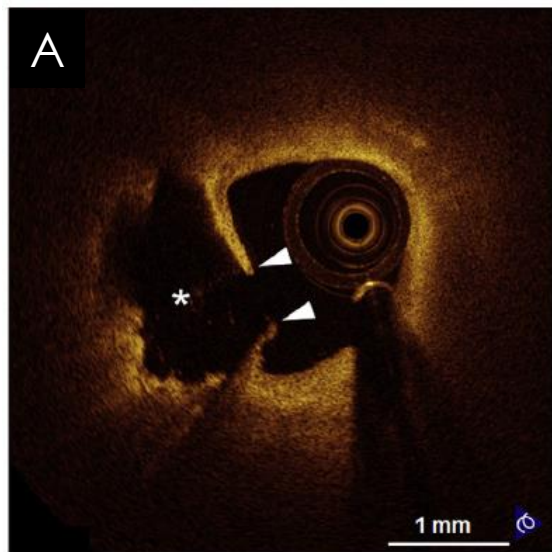
My answer is...

Yes!

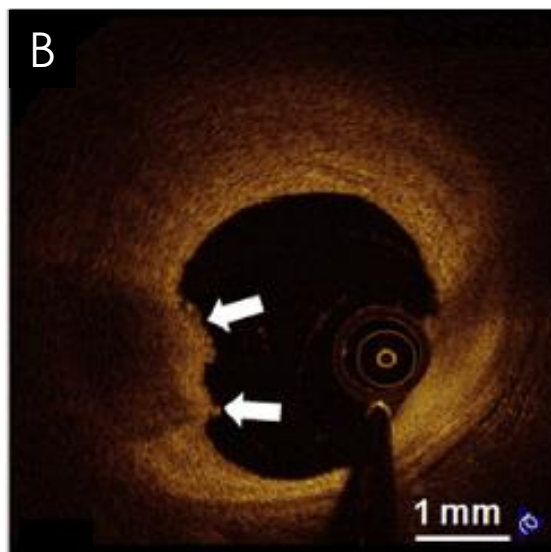
The advantage of OCT-guided Primary PCI for ACS

- **High resolution image** can identify the cause of ACS
- Advantage in optimizing the primary PCI result, **leading to better clinical outcomes.**
- Sufficient information for the whole PCI strategy with just **one pull back.**

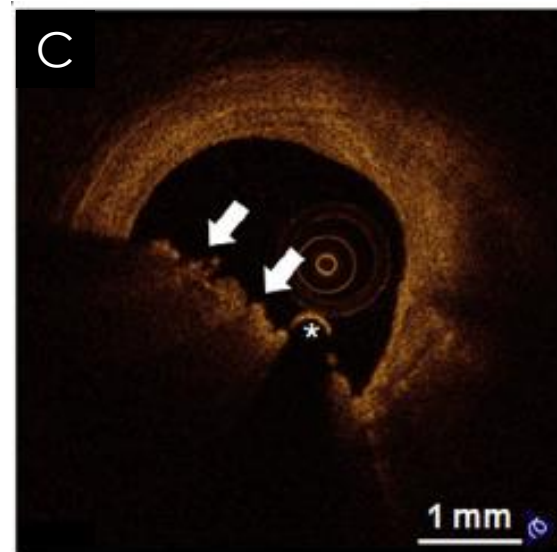
ACS cause diagnosis with OCT



Plaque Rupture



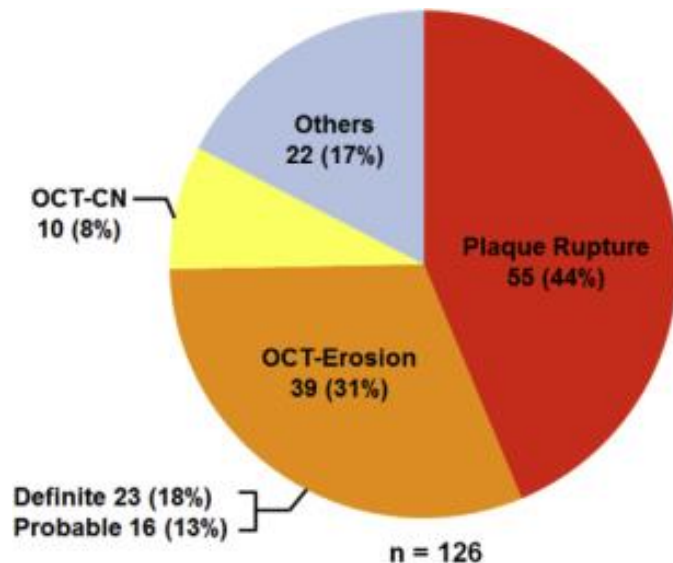
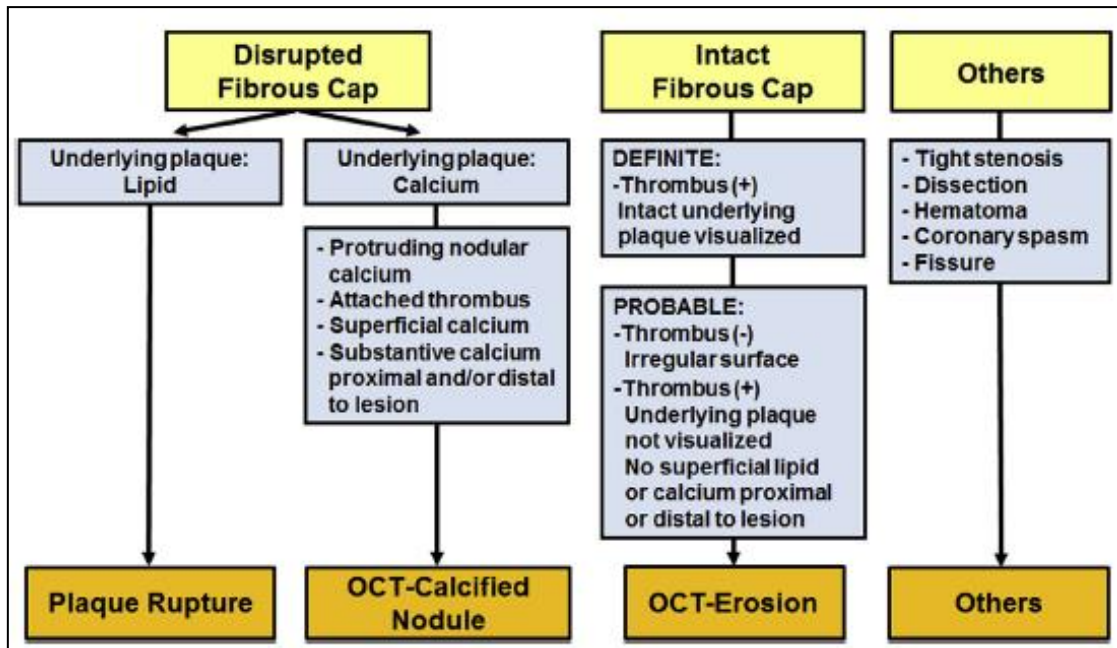
Erosion



Calcific Nodule

- **MGH OCT Registry Data showed OCT could differentiate ACS causes *in vivo*.**
- Distribution aligned with findings from previous histological studies

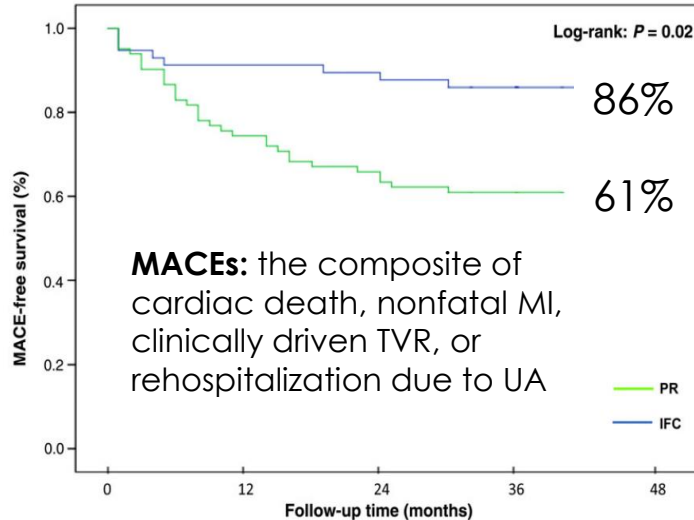
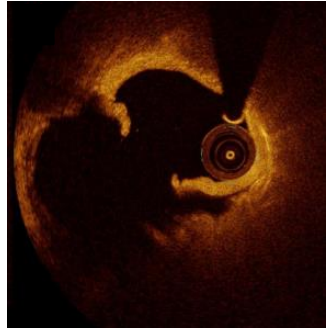
ACS cause diagnosis with OCT



- MGH OCT Registry Data showed OCT could differentiate ACS causes *in vivo*.
- **Distribution aligned with findings from previous histological studies**

ACS Prognosis: Plaque rupture

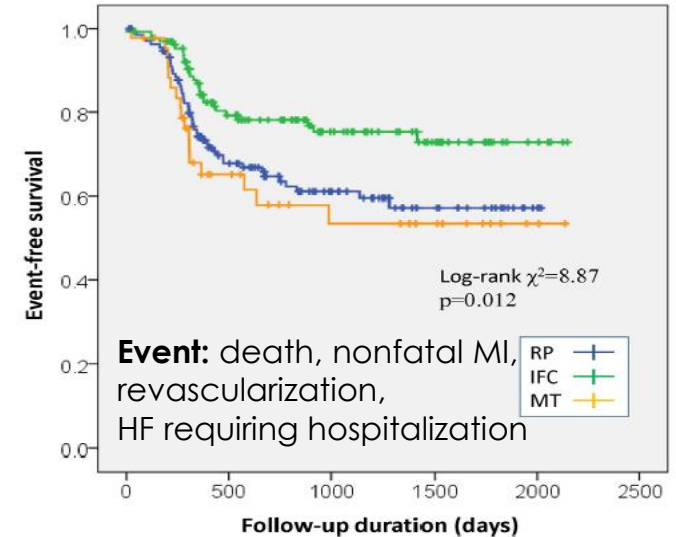
- Subsequent data demonstrated significantly higher event risk from treated plaque rupture vs intact fibrous cap.
- Emerging hypothesis about utilizing OCT for post ACS event risk stratiation.**



No. at risk

	0	12	24	36	48
Intact fibrous cap	57	52	51	49	
Plaque rupture	82	61	54	50	

Niccoli et al. Eur Heart J. 2015; 36: 1377-84



Yonetsu et al. Int J Cardiol. 2016: 203: 766-74

Pathological features of eroded plaque and ruptured plaque



Plaque erosion

1. Intact/thick fibrous cap
2. Less/deep necrotic core
3. Platelet-rich white thrombus
4. Rich in hyaluronan
5. Amount of smooth muscle cell
6. Non-occlusive thrombus
7. Neutrophil cells involved
8. More frequent in Non-STEMI
9. Younger age



Plaque rupture

1. Ruptured/thin fibrous cap
2. Large necrotic core
3. Red blood cells-rich red thrombus
4. Lack of collagen
5. Few smooth muscle cell
6. Occlusive thrombus
7. Macrophage prominent
8. Expansive remodeling
9. More frequent in STEMI

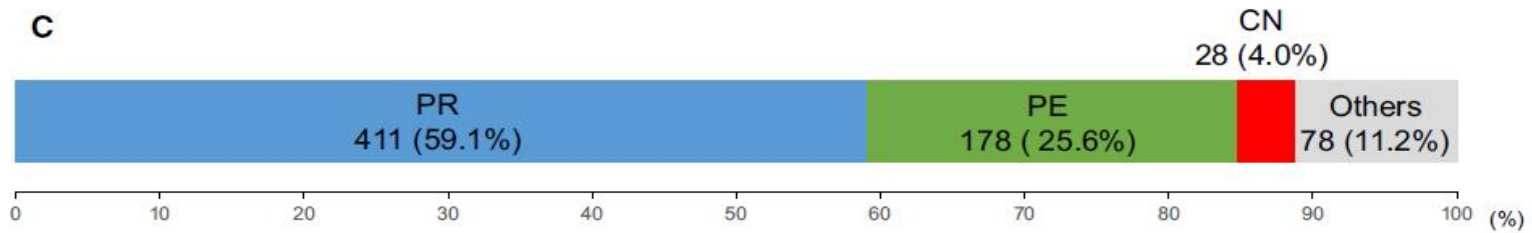
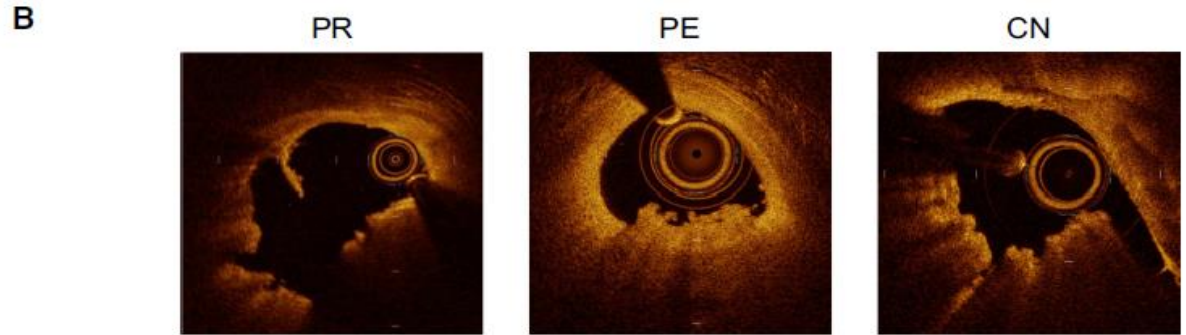
- External elastic
- Media
- Intima
- Necrotic core
- White thrombus
- Red thrombus

- **Plaque erosion** is an essential mechanism of ACS. The emergence of OCT has shed new light on the identification of **Plaque erosion** in vivo: it has **well-preserved vessel lumen, less pan-vascular vulnerability and relatively large lumen area.**

- Patients with **Plaque erosion** will benefit from antithrombotic therapy alone, **avoiding the implantation of stents.**

TACTICS Registry

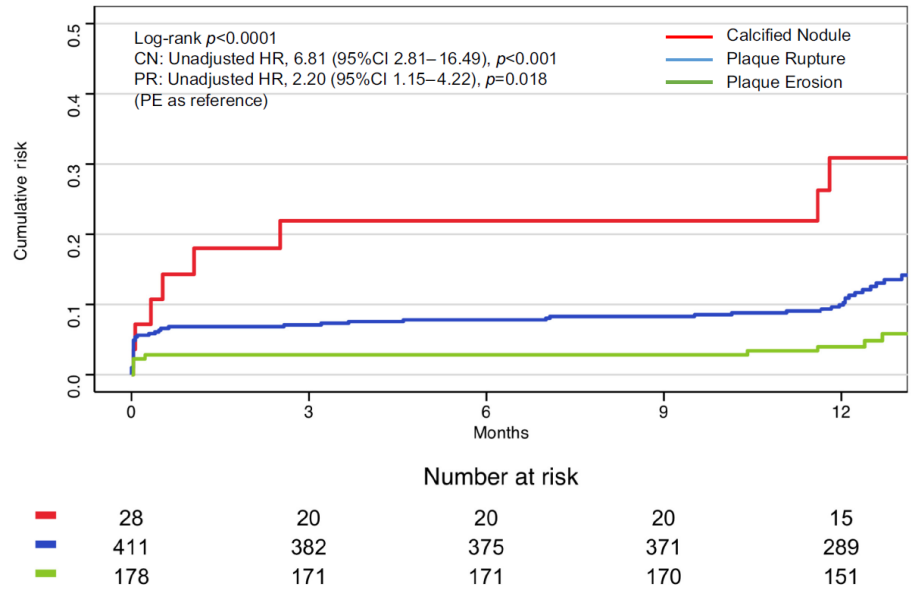
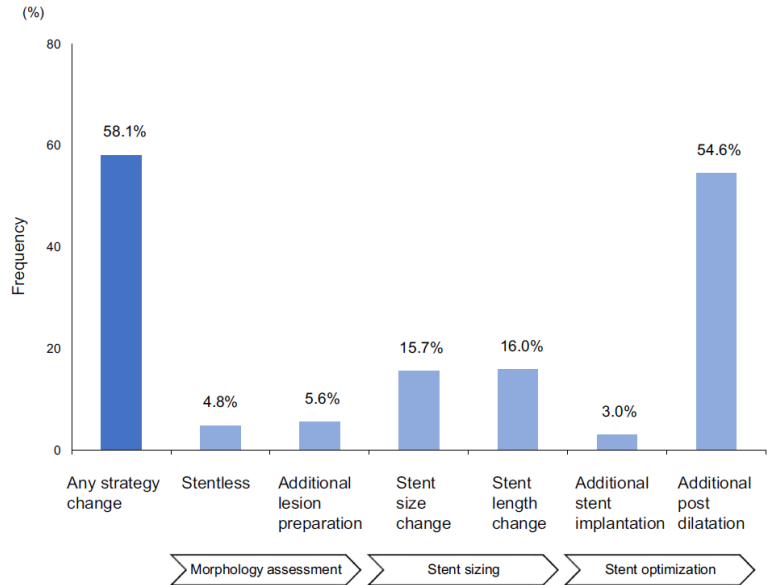
- Prospective, multicenter, observational OCT study conducted @ 22 sites in Japan.
- Patients diagnosed with ACS <24hrs of onset enrolled.
- 40% (n=702) of ACS subjects enrolled for OCT guidance at operator discretion
 - Remainder (n=987) enrolled as background registry



cf. MGH OCT registry: PR 44%, PE 38% CN 8%, Jia et al, J Am Coll Cardiol 2013;62:1748-58

TACTICS Registry

- OCT guidance for ACS leads to strategy changes in 58% of cases.
- **CN was shown to develop significantly higher 1-year MACE rates (32.1%), followed by PR (12.4%) and PE (6.2%) (P<0.0001)**, primarily driven by increased cardiovascular death (CN, 25.0%; PR, 0.7%; PE, 1.1%; P<0.0001) and heart failure trend (CN, 7.1%; PR, 6.8%; PE, 2.2%; P<0.075).



OCTIVUS

- OCT showed comparable results vs IVUS and lower procedural complications.
- OCT showed lower PCI time and equal nephropathy, despite higher contrast.

OCT resulted in fewer procedural complications

- OCT 2.2% vs IVUS 3.7%, $p=0.047$

OCT was associated with shorter total PCI time (minutes)

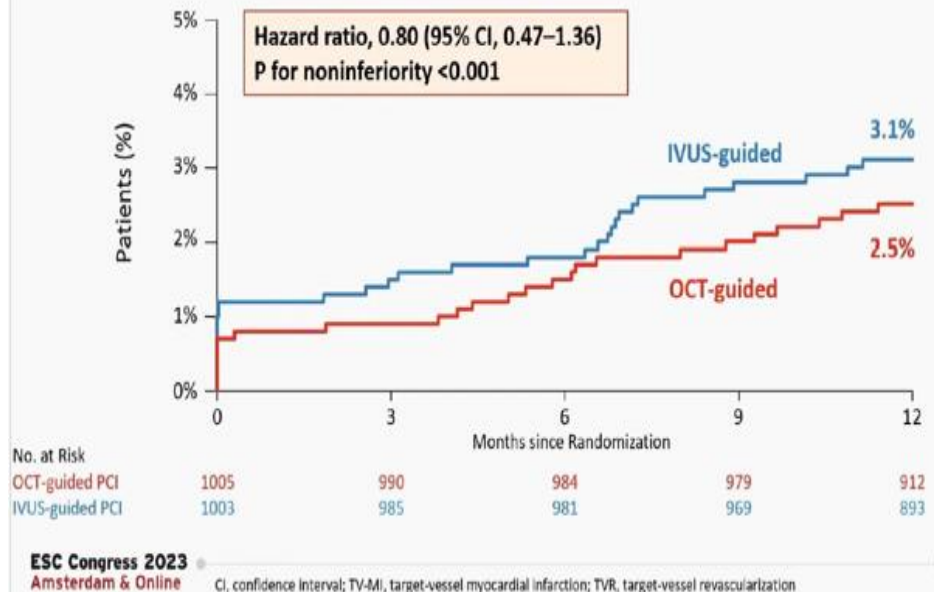
- OCT 46.1min vs IVUS 48.9min, $p<0.001$

ACS Patients

- OCT: 236 (23.5%) IVUS: 234 (23.3%)

“...since OCT pullback speed was **faster than IVUS** and a **real-time angiographic co-registration and automatic measurements** with OCT can facilitate a **rapid comprehensive evaluation** of long segment of treated vessels, OCT guidance was associated with a **shorter PCI time.**” – Dr. D-W Park

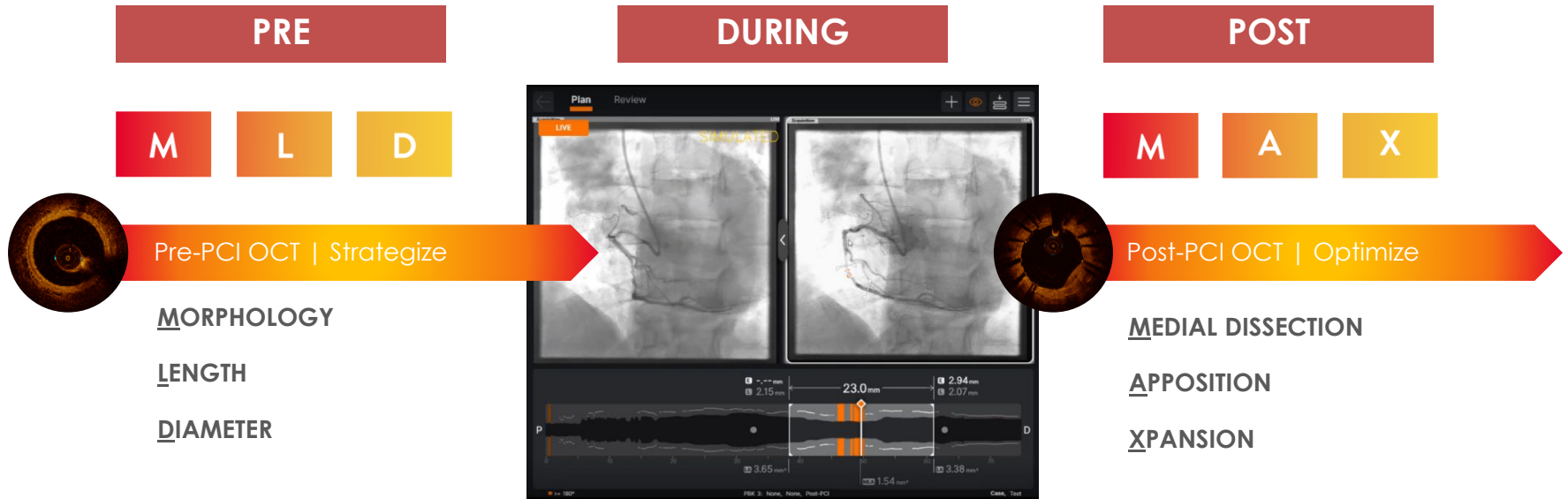
Primary Endpoint of TVF: Cardiac Death, TV-MI, or TVR



MLD-MAX & Ultreon 2.0 with User Friendly Interface

Each OCT run serves a separate purpose.

- The pre-PCI run helps determine the PCI strategy.
- The post-PCI run allows for optimization of stent deployment as needed.

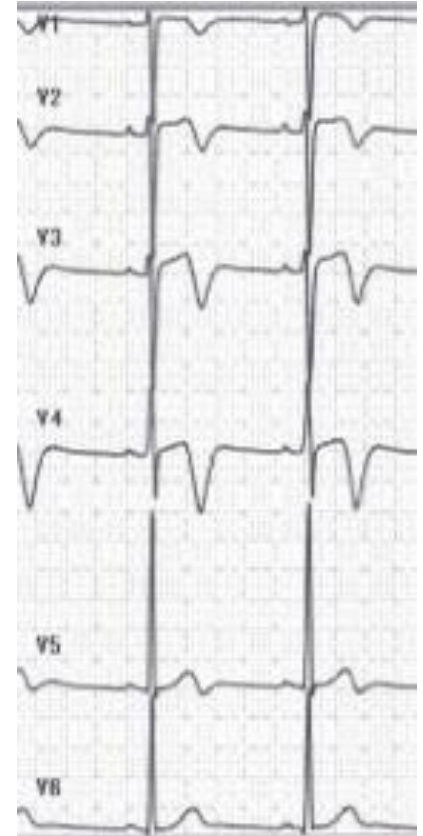
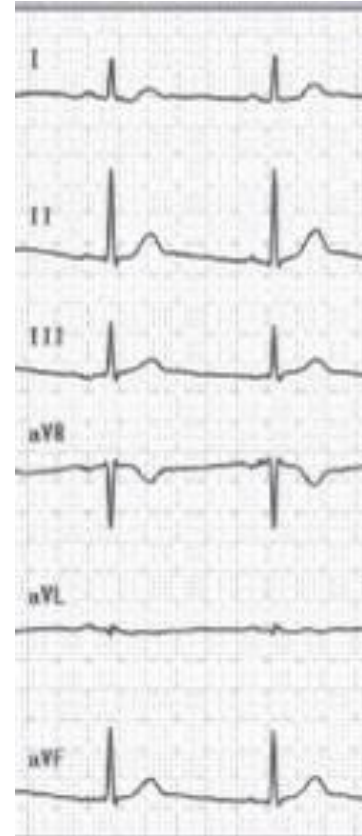


OCT-guided ACS Case

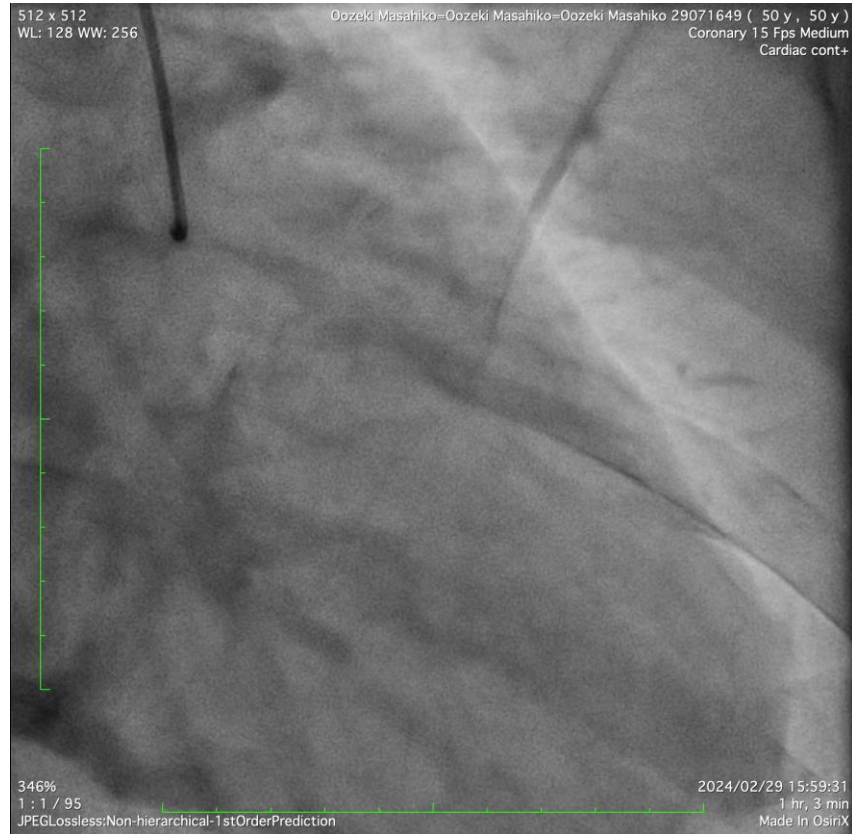
- 50's male
- NSTEMI-ACS

Worsening effort angina
→ Rest heart attack

- Coronary risk factors:
Hypertension, Dyslipidemia
- Height 167.0cm Body weight 59.5kg
BP134/83 PR57/min
- WBC 5750 Hb14.5 Plt. 43.2x10⁴ AST22
ALT25 CK83
- TropT 0.0009 Tropl 15.3



Baseline Angiography



Pre-PCI OCT & Strategy: MLD

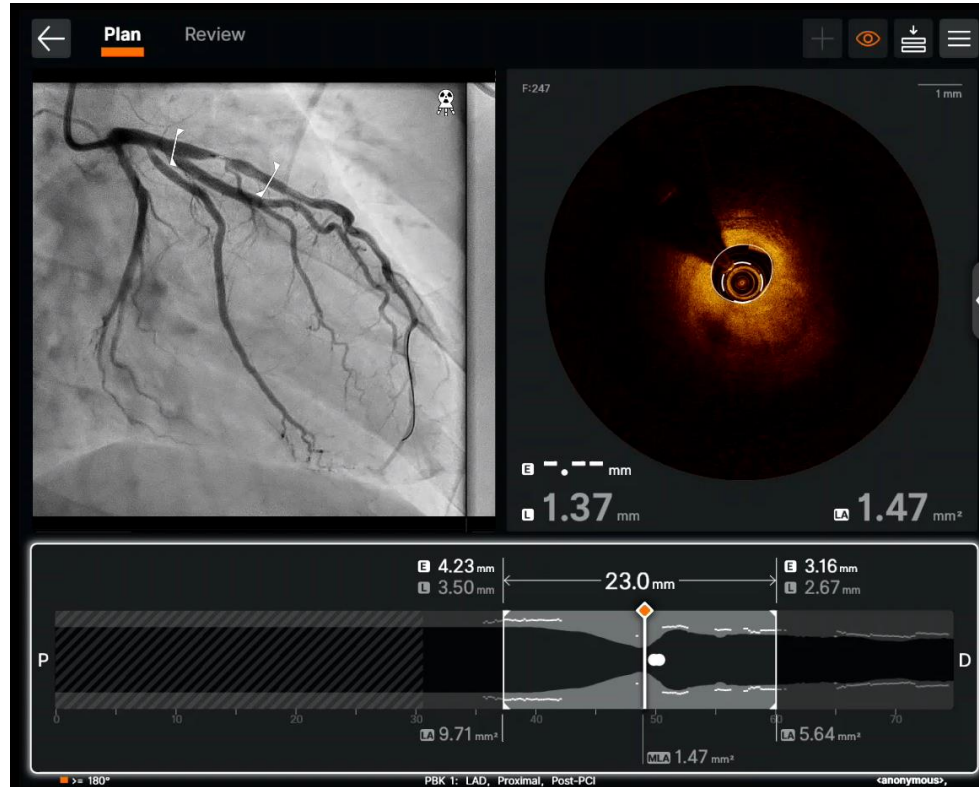
MMORPHOLOGY, LLENGTH, DDIAMETER



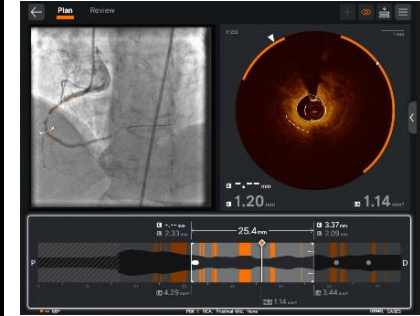
Morphology:
Fibrofatty plaque
No CN
No obvious plaque
rupture

Length: 15mm

Diameter: 3.5mm



See calcium severity clearly



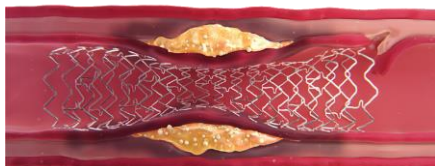
See EEL severity clearly



Post-PCI OCT: MAX

MEDIAL DISSECTION, APPPOSITION, XPANSION

Post-PCI OCT | Optimize



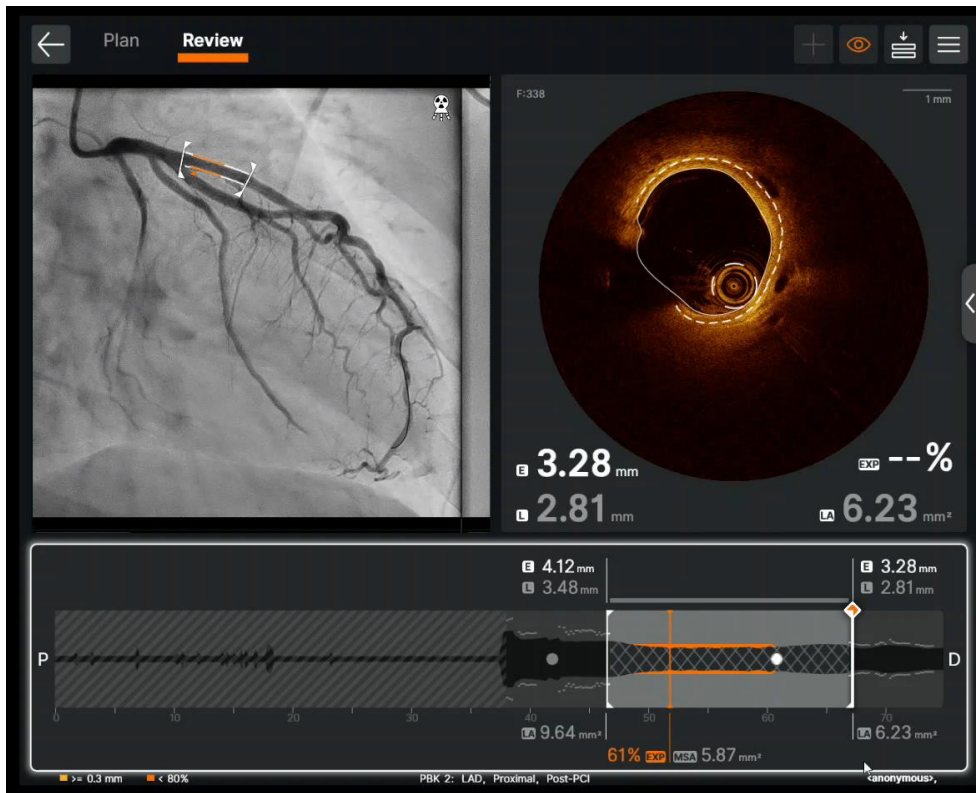
M **A** **X**

Direct Stenting
3.5x15mm EES

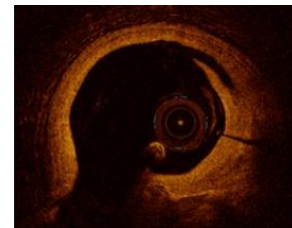
No medial dissection

Good apposition

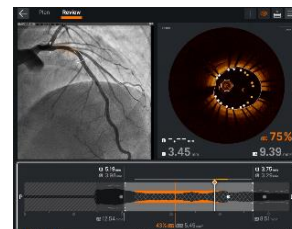
Insufficient Expansion



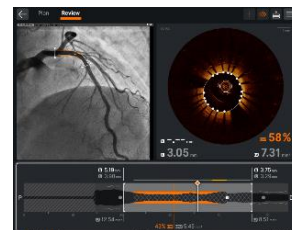
See medial dissection clearly



See apposition clearly



See expansion clearly



Final OCT

Post-PCI OCT | Optimize



M

A

X

Post dilatation with
3.5mm NC balloon

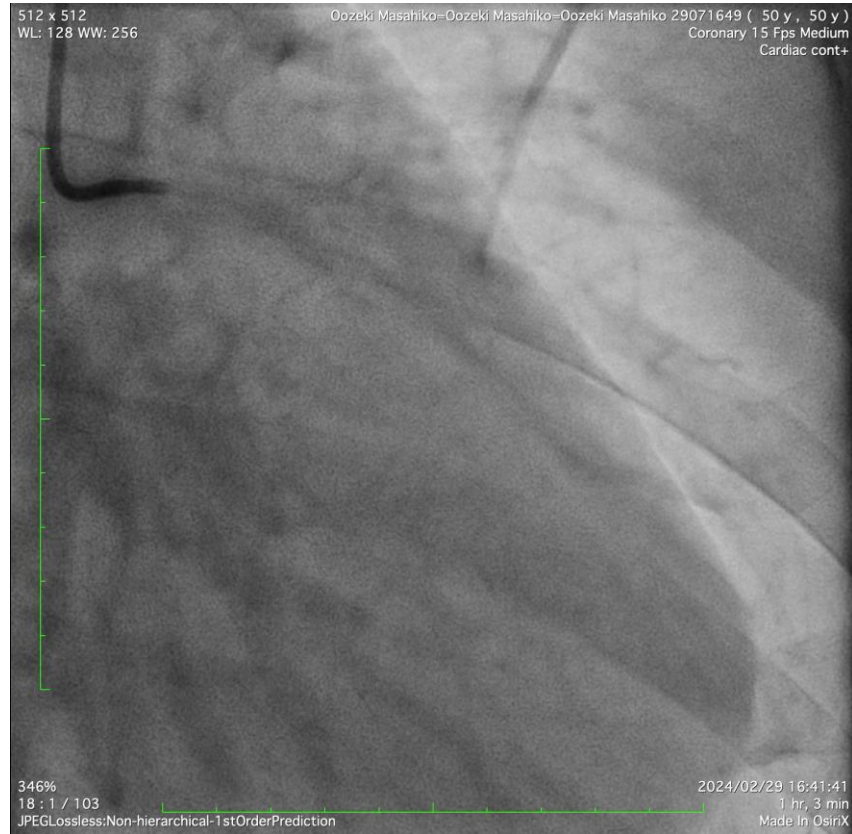
No medial dissection

Good apposition

Sufficient Expansion




Final Angiography




Procedure Time


Physician:



OCT Pullback 1
16:24:08
Before stent
implantation



OCT Pullback 2
16:31:59
After stent
implantation

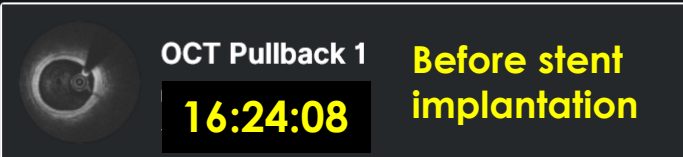


OCT Pullback 3
16:39:11
After post
dilatation

- Pre-PCI pullback to stent implantation:
5-6 mins

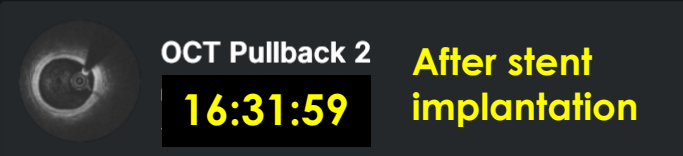
Procedure Time

Physician:



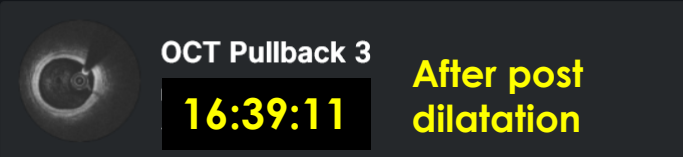
OCT Pullback 1
16:24:08
Before stent implantation

This block contains an OCT image of a coronary artery with a stent, a timestamp of 16:24:08, and the text 'Before stent implantation'.



OCT Pullback 2
16:31:59
After stent implantation

This block contains an OCT image of a coronary artery with a stent, a timestamp of 16:31:59, and the text 'After stent implantation'.



OCT Pullback 3
16:39:11
After post dilatation

This block contains an OCT image of a coronary artery with a stent, a timestamp of 16:39:11, and the text 'After post dilatation'.

- Pre-PCI pullback to stent implantation:
5-6 mins
- Pre-PCI pullback to final pullback:
15 mins

Take Home Messages

- OCT-guided emergent PCI can identify the underlying causes of ACS and enable future MACE risk stratification.
- OCT guidance enables faster, safer procedures with comparable results to IVUS.
- MLD-MAX synthesizes information into a smooth workflow and Ultreon 2.0 streamlines operation with automatic and actionable insights.