

OCT-guided Bifurcation PCI: Lessons learned from **OCTOBER** - and what is next?

Niels Ramsing Holm

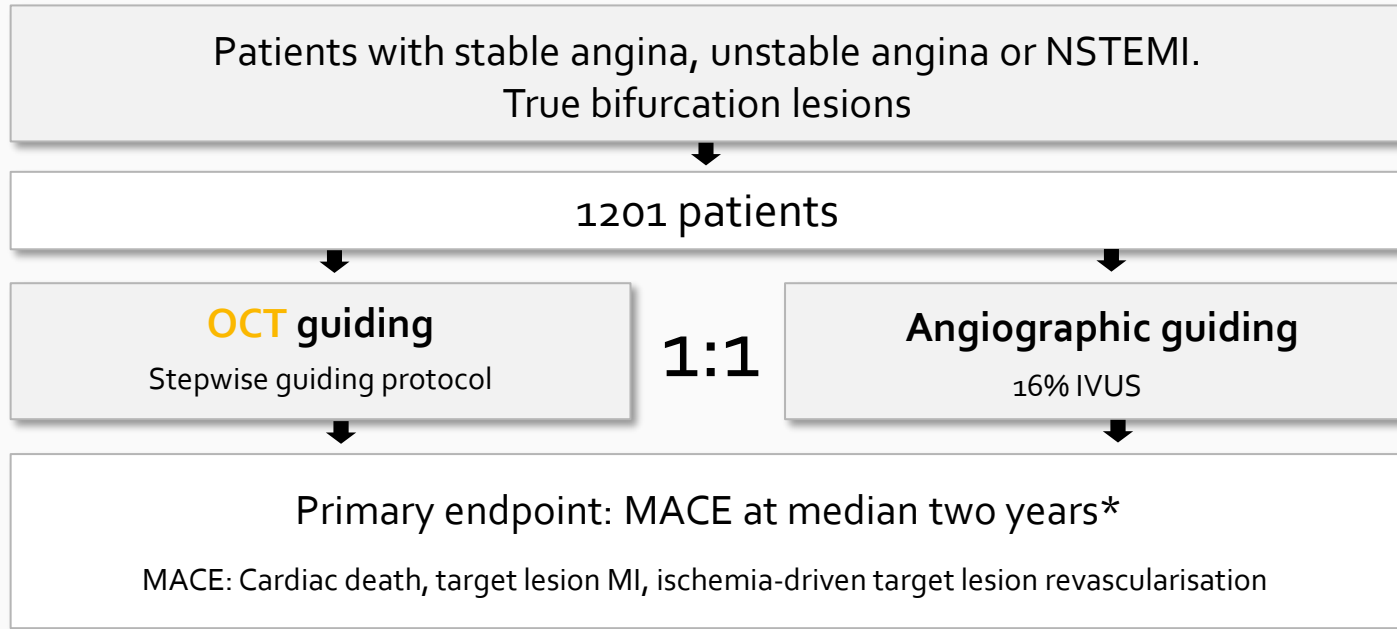
Dr. Lene Nyhus Andreasen contributed in preparation of this talk

On behalf of the **OCTOBER** trial investigators

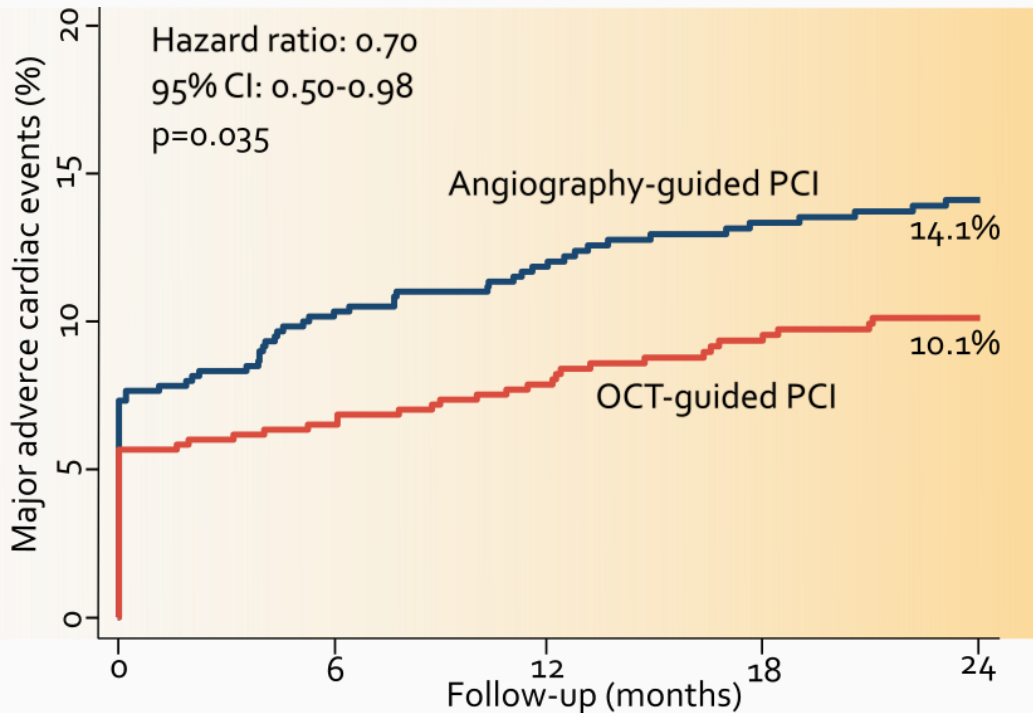
Disclosures

- Institutional research grants from Abbott, Biosensors, Boston Scientific, Medis medical imaging, Reva medical
- Speaker fees from Abbott, Terumo and Cardirad

OCTOBER trial overview

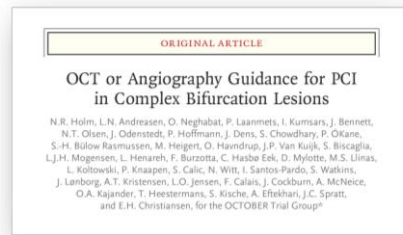


Lesson 1: OCT reduced 2-year MACE



30% RR reduction

The NEW ENGLAND
JOURNAL of MEDICINE



MACE: cardiac death, target lesion myocardial infarction, ischemia-driven target lesion revascularization

Kaplan Meier estimates

Comparison by unadjusted Cox analysis

Confirmed by adjusted Cox analysis

No. At Risk:

OCT-guided PCI	600	553	537	472	439
Angiography-guided PCI	601	534	509	452	408

OCT guiding: Five treatment goals



Optimal lesion coverage



No unintended stent deformation



Optimal stent expansion



No luminal masses



No stent malapposition?

Adapted from Holm NR et al., Am Heart J 2018

OCT protocol – Timing

1

Before stent implantation

Evaluation of plaque preparation
Landing zone
Stent sizing

2

After rewiring

Wire position
Accidental abluminal rewiring

3

Final result

Lesion coverage
Expansion
Apposition
Stent deformation
Luminal masses

Holm NR et al. Rational and design of the European randomized Optical Coherence Tomography Optimized Bifurcation Event Reduction Trial (OCTOBER), Am Heart J 2018

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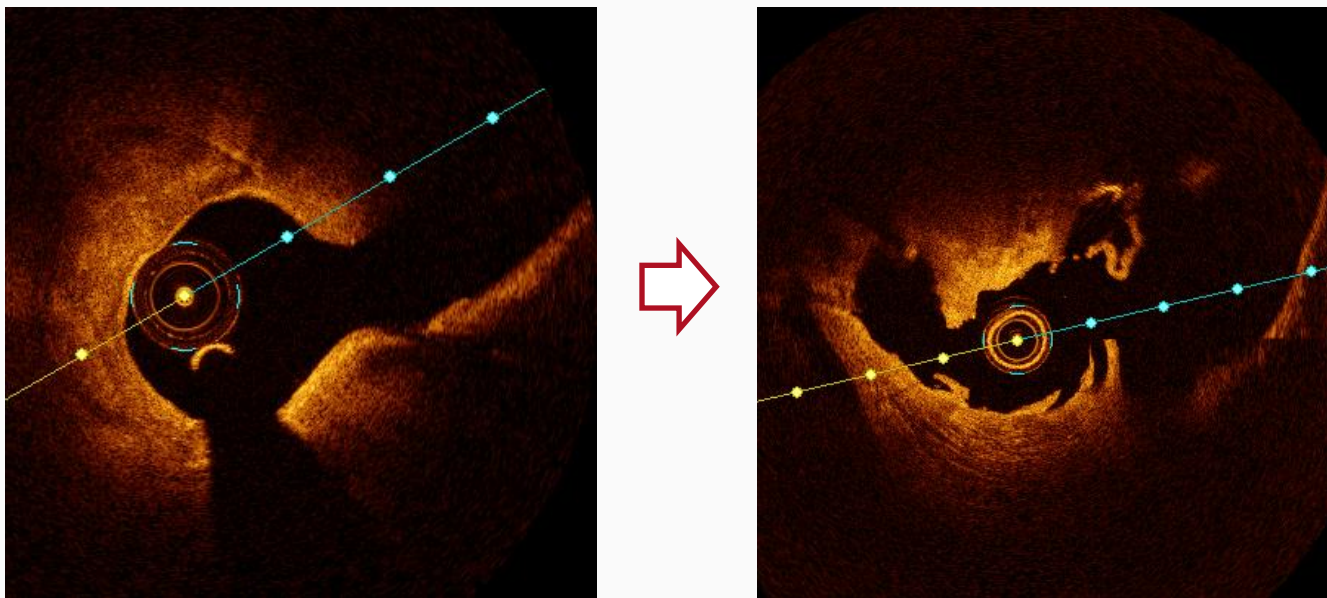
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Holm NR et al. Rational and design of the European randomized Optical Coherence Tomography Optimized Bifurcation Event Reduction Trial (OCTOBER), Am Heart J 2018

Lesson 2: Good OCT timing – More training?



1/3 of cases needed more plaque preparation based on 1st OCT pullback.

Was actually performed in 43% of cases with indication

Jujo et al. International Journal of Cardiology 221 (2016)23–31
Fujino et al. EuroIntervention 2017

OCTOBER substudy
Neghabat et al in submission

Lesson 3: Safe expansion

Stent sizing

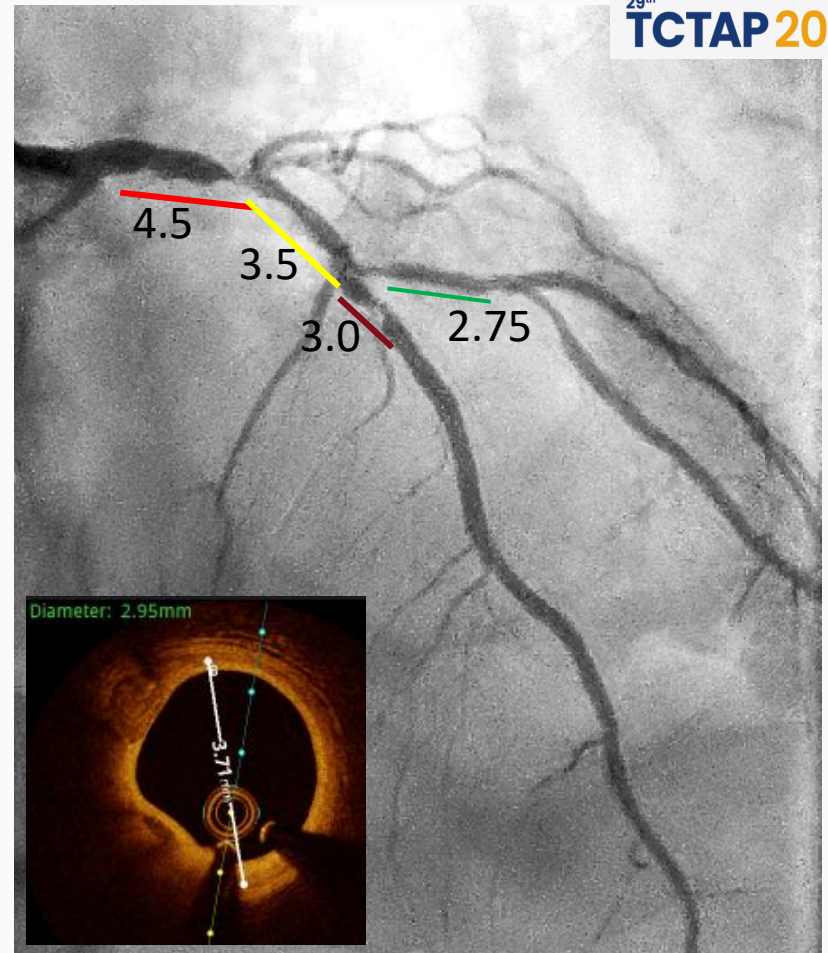
Ref diam was limit for largest balloon

Largest balloon

- OCT: 4.2 ± 0.03 mm
- Angio: 4.0 ± 0.02 mm

Perforations

- OCT: 0.8%
- Angio: 1.0%



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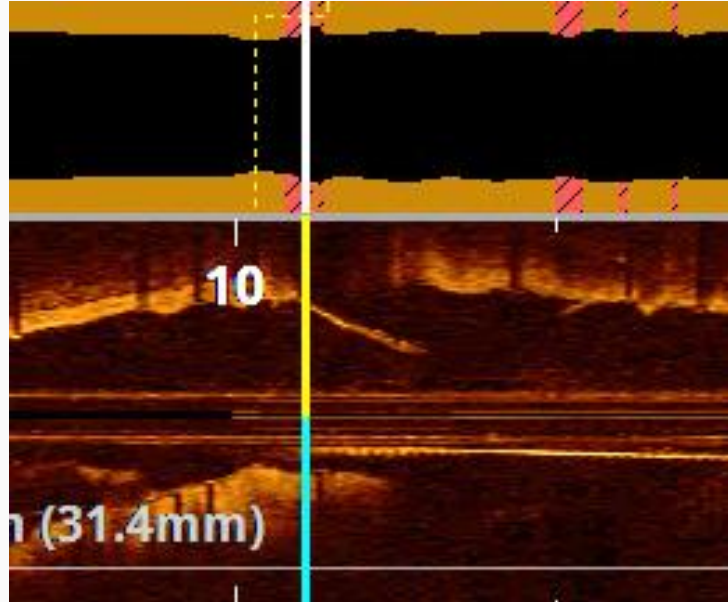
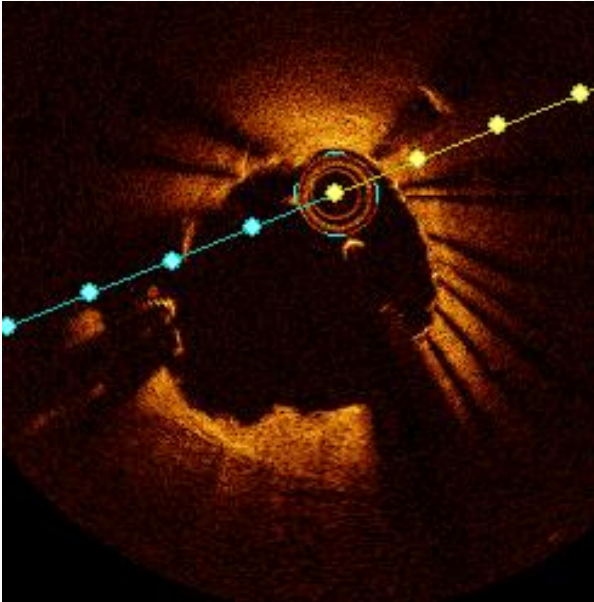
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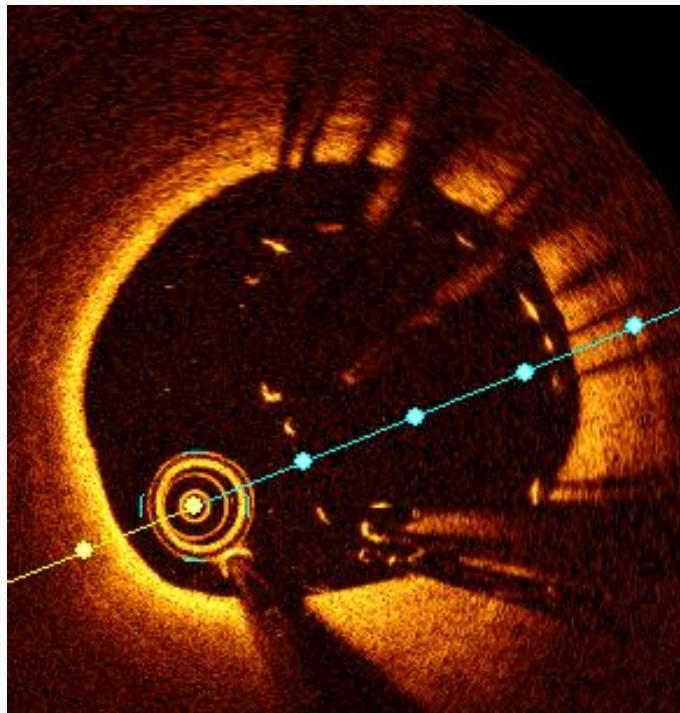
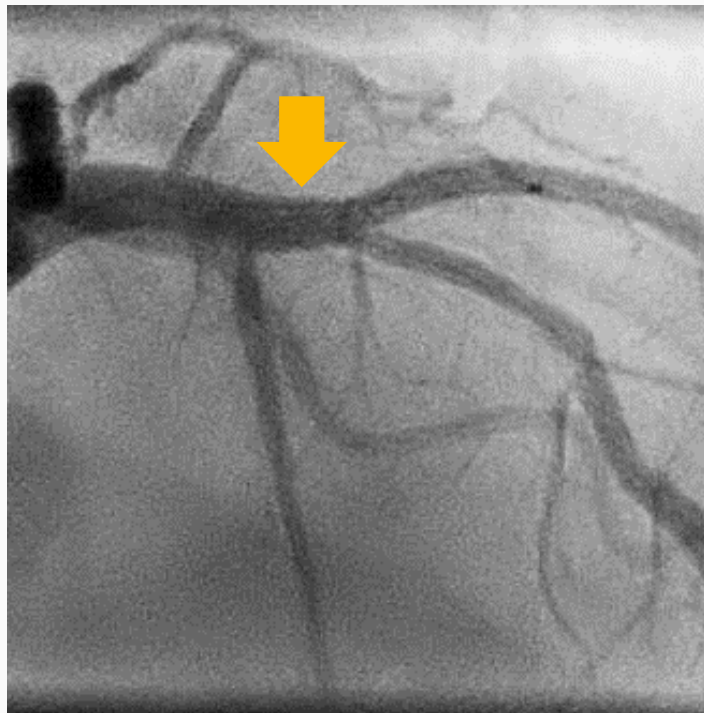
Optimal rewiring – TCT2024



Foin et al. Int J Card 2013
Alegria-Barrero et al. EuroIntv 2012
Foin et al. Circ J 2012
Viceconte N et al. CCI 2012
Holm et al EuroIntv 2011
Okamura et al EuroIntv 2014

Using 75 mm highspeed pullback to save contrast – 3D required 54mm pullback (optional)

Accidental abluminal rewiring

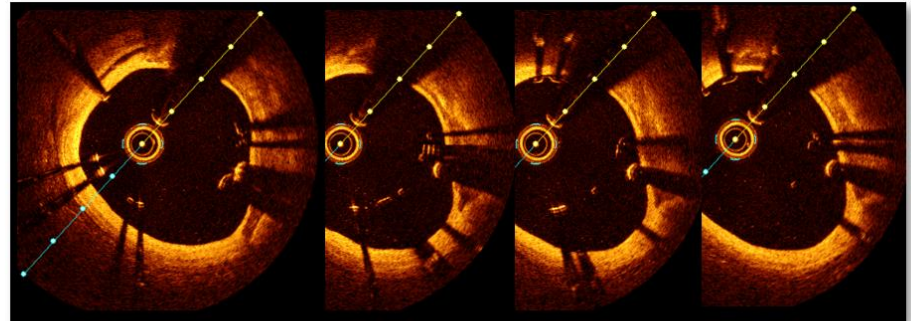
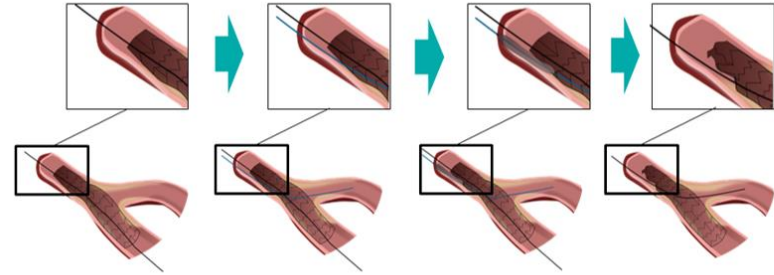


Würtz et al. Int J Card 2015
Abdou et al. CCI 2011
Zhang et al Chin Med J 2009

Lesson 4: Abluminal rewiring occurs in >5%

	No. total cases (%)
Abluminal rewiring	32/589 (5.4%)
- After 1st stent	19/521*
- After 2nd stent	14/268*
Cases with ≥ 1 incidence	1/589 (0.2%)
Seen and corrected during procedure	18/33 (54.5%)
Unnoticed during procedure	15/33 (45.5%)

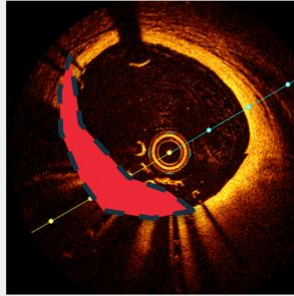
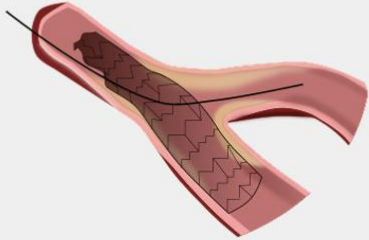
*Total number of cases available for wire evaluation



Andreasen et al. 2023. In review

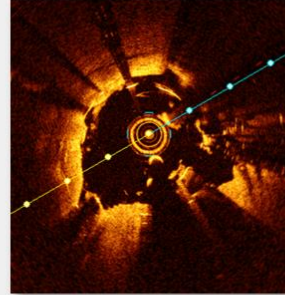
Lesson 5: Mechanisms of USD

Abluminal rewiring



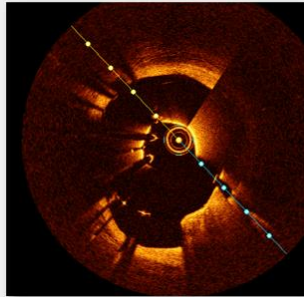
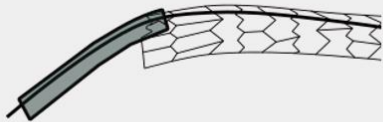
24/55 (44%)

Fractured wire



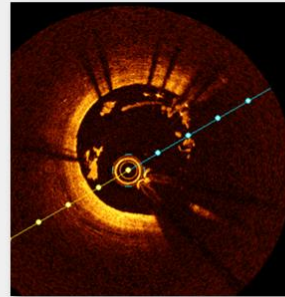
2/55 (3.6%)

Guide catheter collision



20/55 (40%)

Uncertain mechanism



9/55 (16.4%)

Andreasen et al. 2024. Accepted JACC Interv.

Lesson 6: Important to correct USD

- Two-year MACE occurred in 7 of 30 untreated USD cases

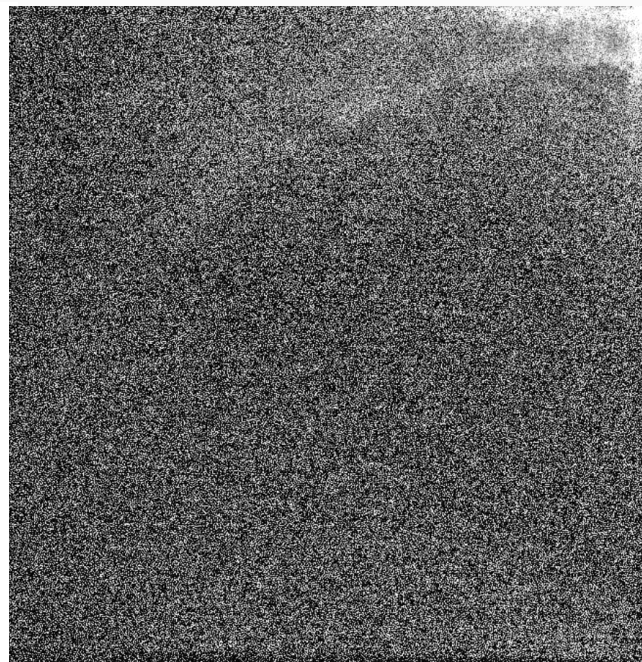
n=589

USD left untreated (n=30)	No USD or unknown (n=559)	Log Rank
23.3%	9.4%	0.007

n=55

USD left untreated (n=30)	Treated or unknown final USD (n=25)	Log Rank
23.3%	0.0%	0.014

Andreasen et al. 2023. In review



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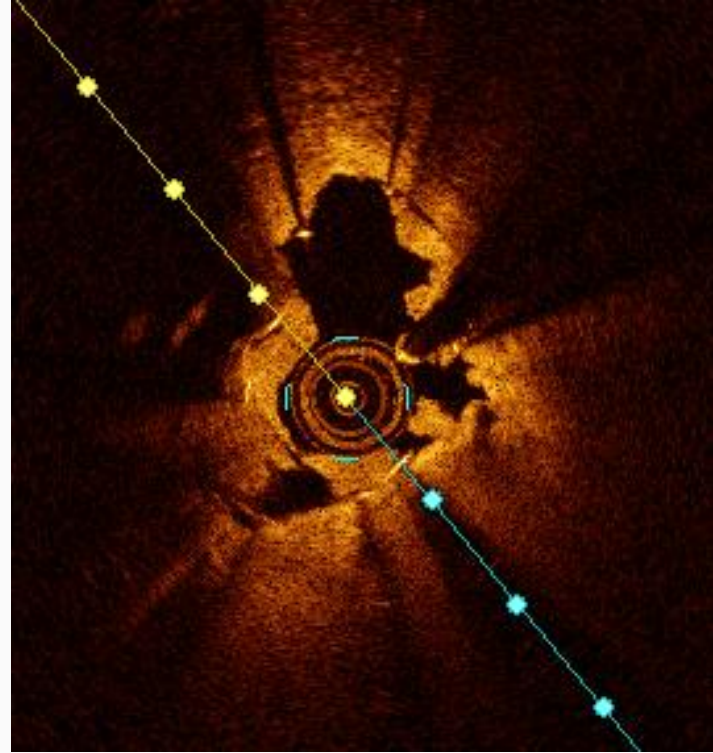
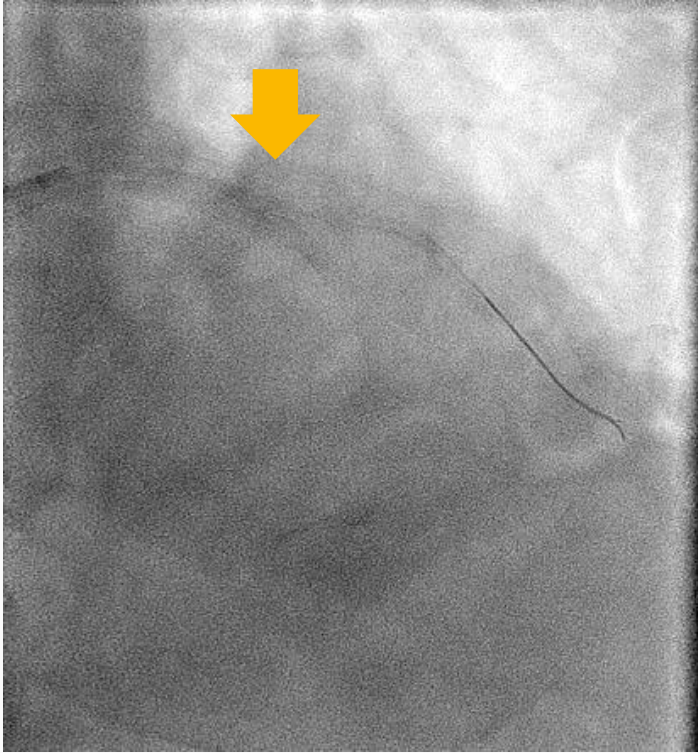
Holm NR et al. Rational and design of the European randomized Optical Coherence Tomography Optimized Bifurcation Event Reduction Trial (OCTOBER), Am Heart J 2018

The patient leaves the cathlab with the “Final result”



Case: OCTOBER trial

The patient leaves the cathlab with the “Final result”



Case: OCTOBER trial

Lesson 7: Systematic edge strategy works

Avoid leaving edges with:

- Residual stenosis > 30% DS
- Major fibroatheroma
- Major dissections

Kang et al. AJC 2013

Fedele et al. AJC 2012

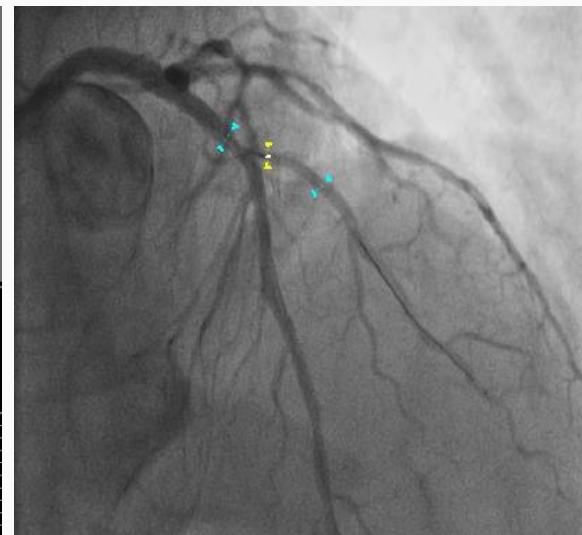
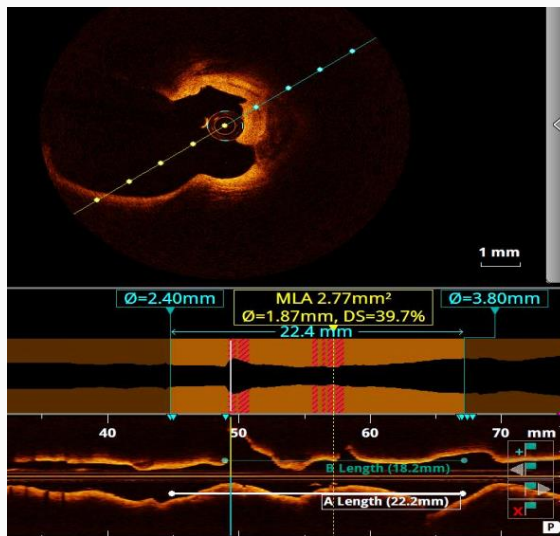
Prati et al. EuroIntervention 2012

Sheris et al. AHJ 2000

All edges (5mm) evaluated by OCT

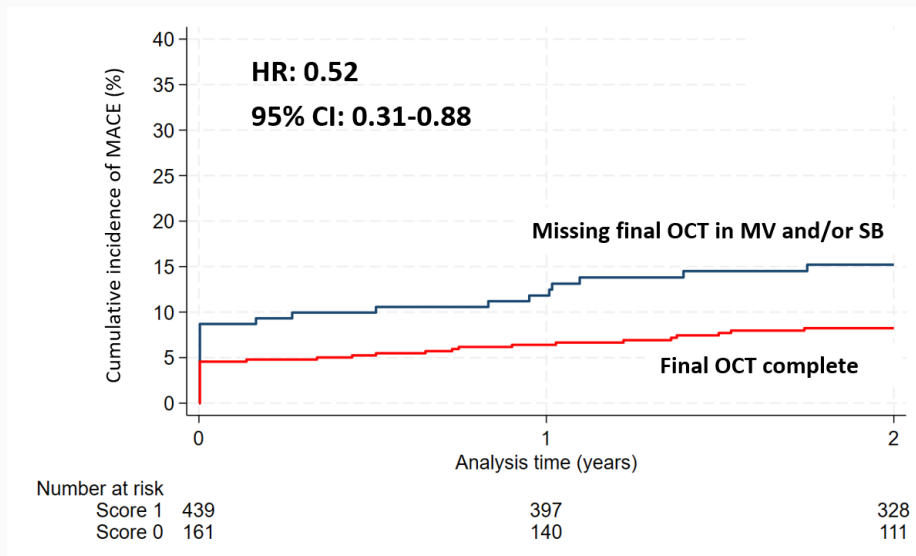
One-stent technique: 78%

Two-stent techniques: 45%



Only 2 (0.3%) angio-verified events in OCT evaluated edges

Lesson 8: Importance of the final OCT pullback



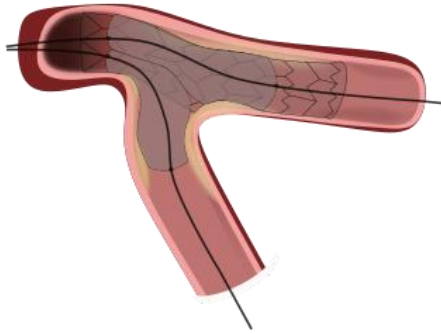
- The patient leaves the cathlab with the "Final result"
- Image all treated segments + edges
- If you cannot pass the OCT catheter: Postdilute

Neghabat et al TCT2023

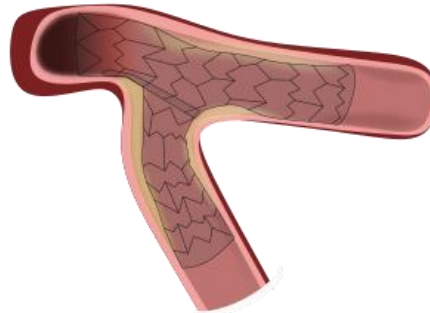
Final OCT was mandatory in MV for provisional one-stent technique, and in both MV and SB for all two-stent techniques

Lesson 9: Stent techniques in OCTOBER

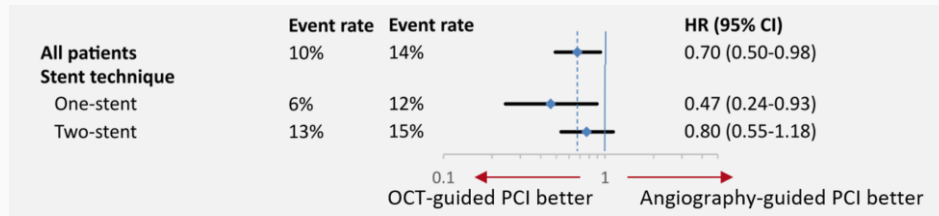
35% and 36% had one-stent with KBI



65% and 64% had a two-stent strategy

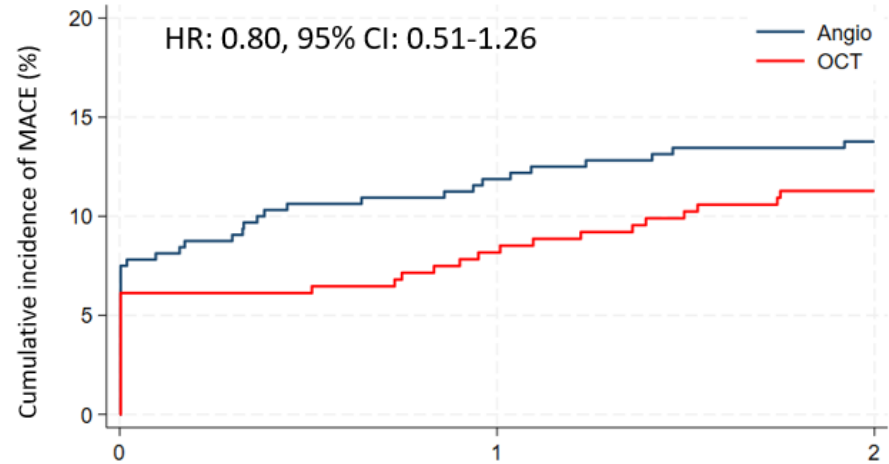
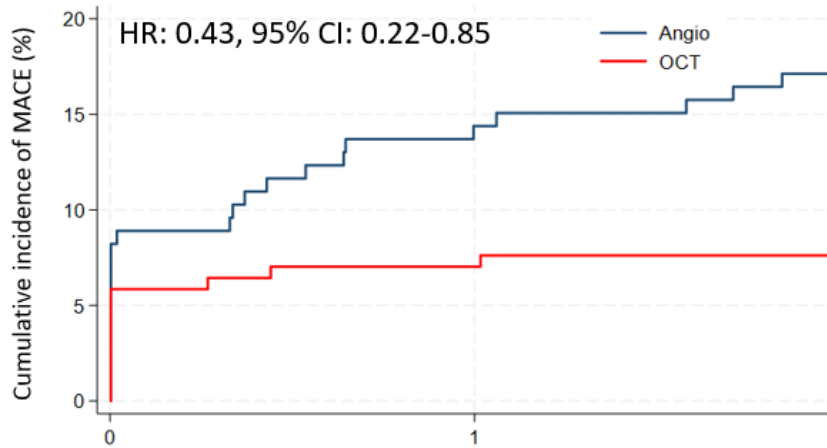


	OCT	Angio
■ Culotte	43%	42%
■ DK Crush	34%	38%
■ TAP	13%	12%
■ T-stent	9%	8%



Holm et al NEJM 2023

Lesson 10: Avoid pandemics



Explorative post hoc analysis similar to analysis presented at ESC2023 for ILUMIEN IV. Patients enrolled before and after 13. March 2019

Dr. Omeed Neghabat
TCT2023

What is next? More evidence

PLOS ONE

STUDY PROTOCOL

A multi-center, international, randomized, 2-year, parallel-group study to assess the superiority of IVUS-guided PCI versus qualitative angio-guided PCI in unprotected left main coronary artery (ULMCA) disease: Study protocol for OPTIMAL trial



Giovanni Luigi De Maria¹, Luca Testa², Jose M. de la Torre Hernandez³, Dimitrios Terentes-Printzos⁴, Maria Emfietzoglou¹, Roberto Scarsini¹, Francesco Bedogni², Ernest Spitzer^{4,5}, Adrian Banning^{1*}

1 Heart Centre, John Radcliffe Hospital, Oxford University Hospitals, NHS Foundation Trust, Oxford, United Kingdom, **2** Coronary Revascularisation Unit, IRCCS Policlinico S. Donato, San Donato Milanese, Milan, Italy, **3** Cardiology Department, Hospital Universitario Marques de Valdecilla, IDIVAL, Santander, Spain, **4** European Cardiovascular Research Institute, Rotterdam, The Netherlands, **5** Department of Cardiology, Thoraxcenter, Erasmus Medical Centre, Rotterdam, The Netherlands

* Adrian.Banning@ouh.nhs.uk

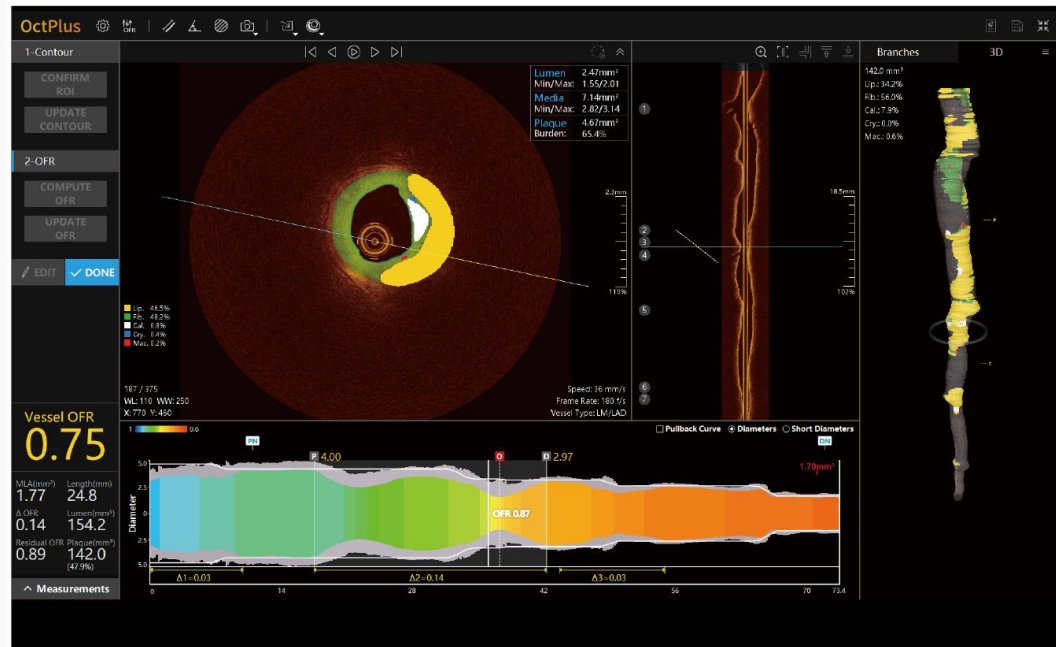
OPEN ACCESS

Citation: De Maria GL, Testa L, de la Torre Hernandez JM, Terentes-Printzos D, Emfietzoglou

- Optimal use of IVI
- Focus on LMCA PCI
- Redo PCI vs CABG – when we are ready
- New technology

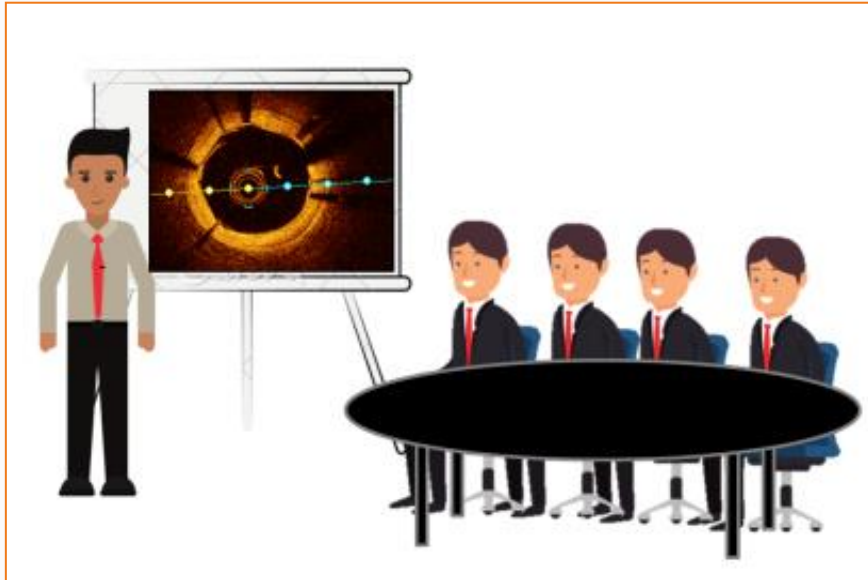
What is next?

- Automation of analysis
- Plaque analysis
- A.I. based planning
- OCT based functional evaluation

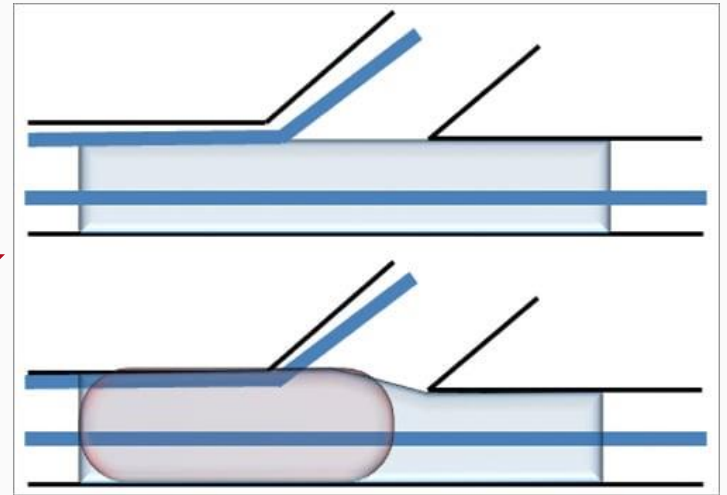


Pulse Medical

What is next? More training



Holm et al. AHJ 2018



Lassen et al. EuroIntv 2014

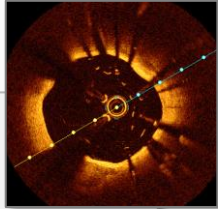
32%

E-Ultimaster Registry

378 sites world-wide

Doolub et al. CCI 2023

Conclusion



- Routine OCT guiding improved clinical outcome after bifurcation PCI
- Physicians reacted adequately to roughly half of actionable OCT findings in OCTOBER. The actions were enough for a positive trial, but full potential of OCT remain to be shown
- Unintended stent deformation (USD) was associated with higher MACE. Corrected USD -> offset increased risk
- Performing final OCT in all treated segments - including edges – appears to be very important
- New developments and automations may improve adoption and quality
- Training remains important