CUORE E NON SOLO
INTERVENTIONAL CARDIOLOGY
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Intravascular Imaging to guide Antiplatelet Therapy Duration

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Disclosures: *I have no conclict of interest to declare*

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Roadmap

Rationale

- Intracoronary Imaging Type
- How IC imaging inform Tx

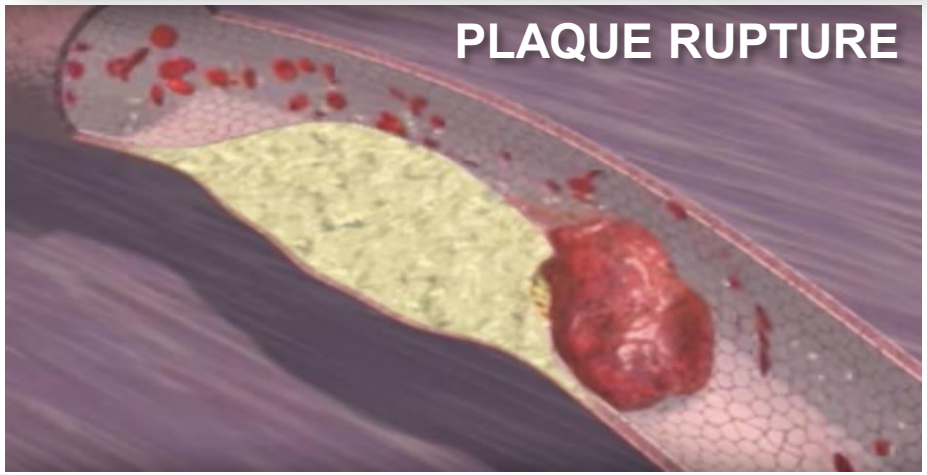
Imaging to Guide Tx

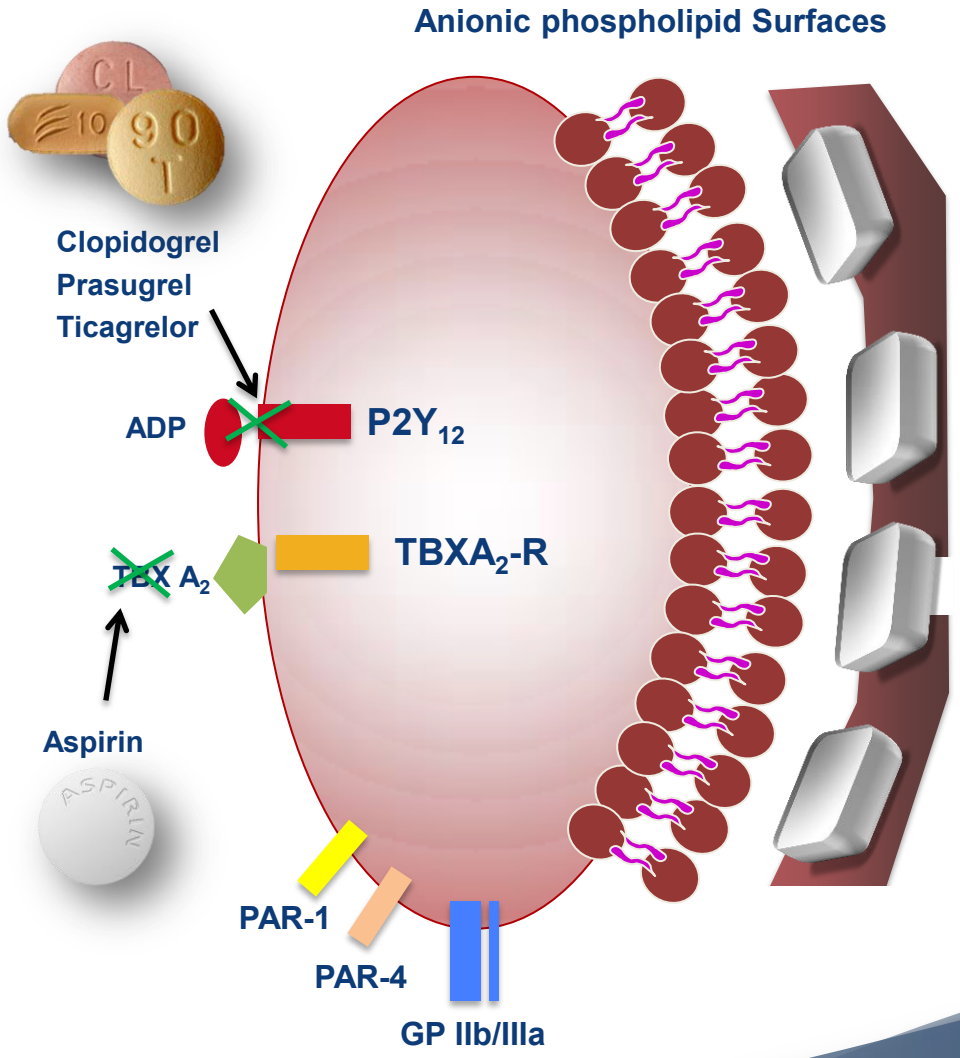
- Optimize Stent Implantation
- Check Stent-Strut Coverage

Future Perspectives

- Imaging Limitations
- Open Questions

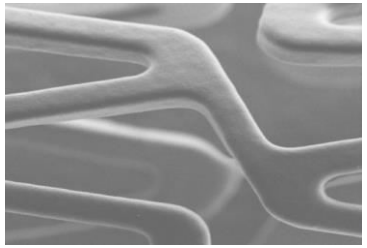
Dual antiplatelet therapy – Secondary prevention



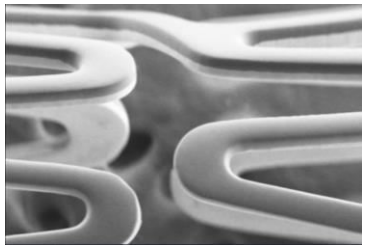


Drug-Eluting Stents and Short DAPT

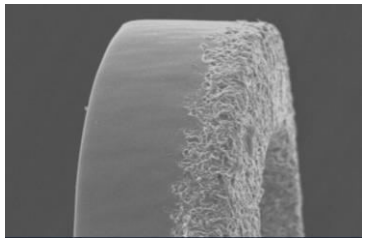
Durable Polymer DES

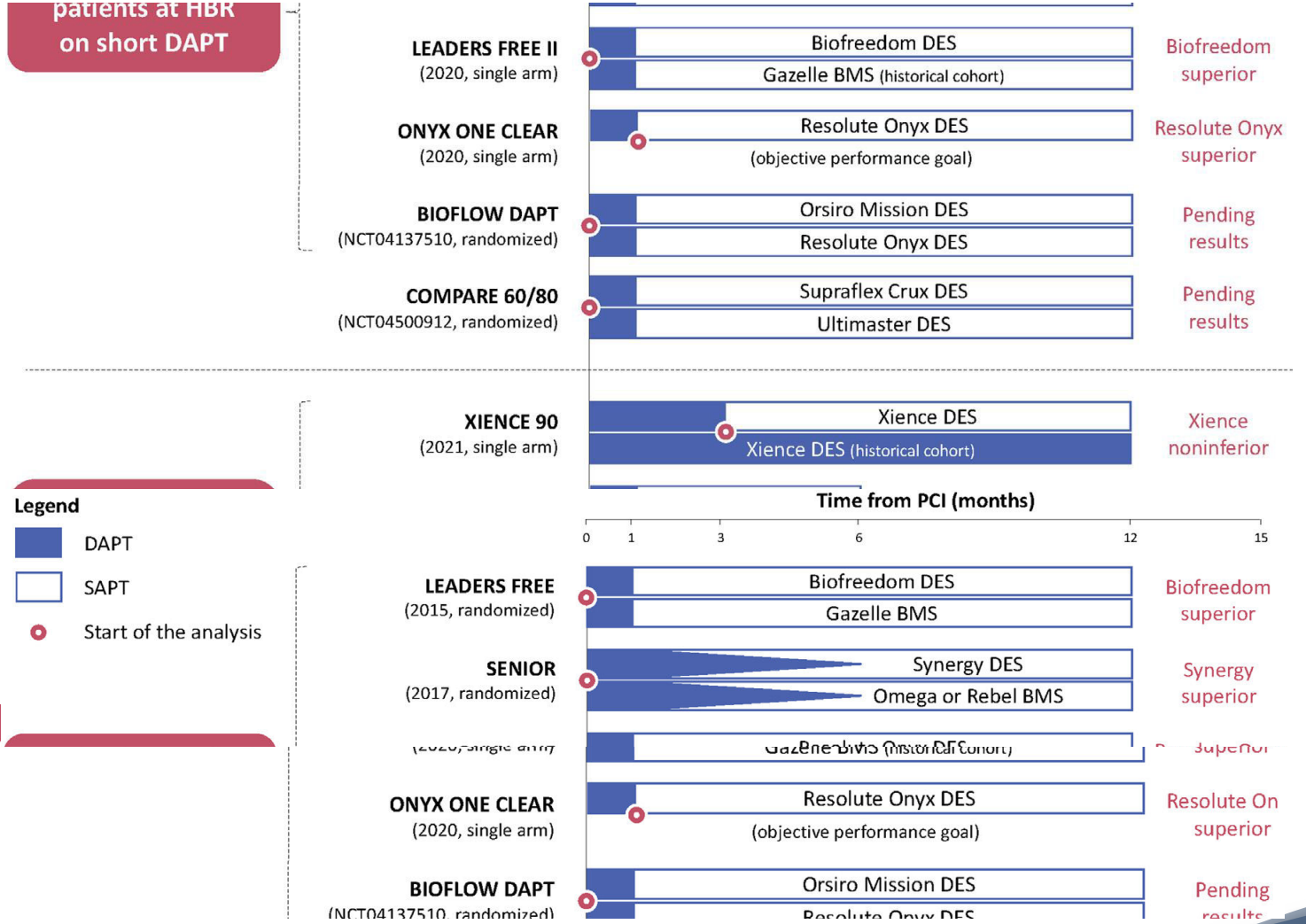


Biodegradable Polymer DES



Polymer-Free DES





Modified from Capodanno D et al. JACC intv 2021

Intravascular Imaging to Guide Antithrombotic Approach after Stenting

Circulation
Volume 91, Issue 6, 15 March 1995; Pages 1676-1688
https://doi.org/10.1161/01.CIR.91.6.1676

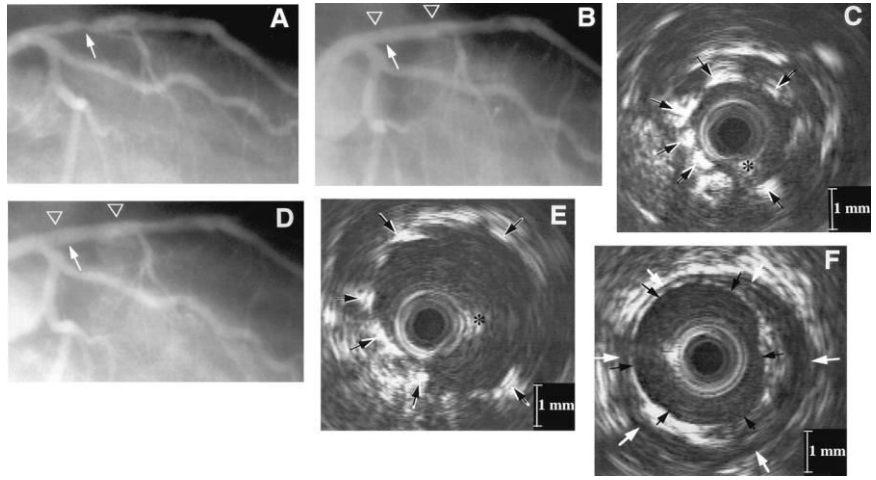
American Heart Association.

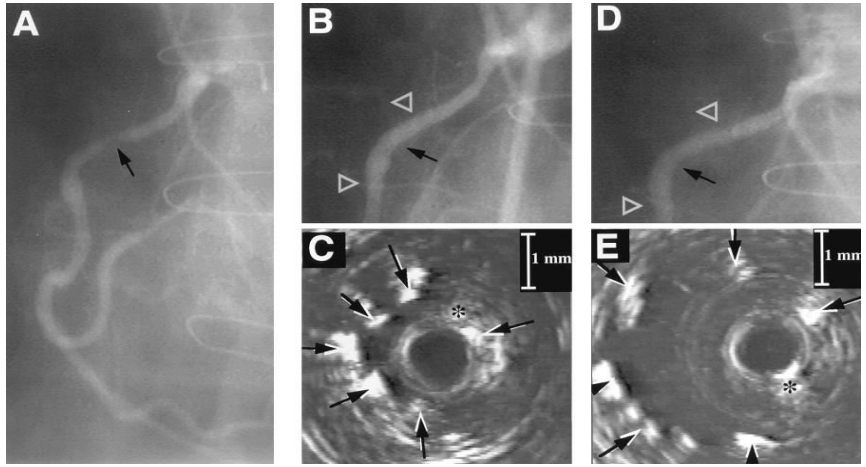
ARTICLE

Intracoronary Stenting Without Anticoagulation Accomplished With Intravascular Ultrasound Guidance

Antonio Colombo, Patrick Hall, Shigeru Nakamura, Yaron Almagor, Luigi Maiello, Giovanni Martini, Antonio Gaglione, Steven L. Goldberg, and Jonathan M. Tobis

ABSTRACT: *Background* The placement of stents in coronary arteries has been shown to reduce restenosis in comparison to balloon angioplasty. However, clinical use of intracoronary stents is impeded by the risk of subacute stent thrombosis and complications associated with the anticoagulant regimen. To reduce these complications, the hypothesis that systemic anticoagulation is not necessary when adequate stent expansion is achieved was prospectively evaluated on a consecutive series of patients who received intracoronary stents. *Methods and Results* From March 1993 to January 1994, 359 patients underwent Palmaz-Schatz coronary stent





Colombo A et al. Circulation 1995

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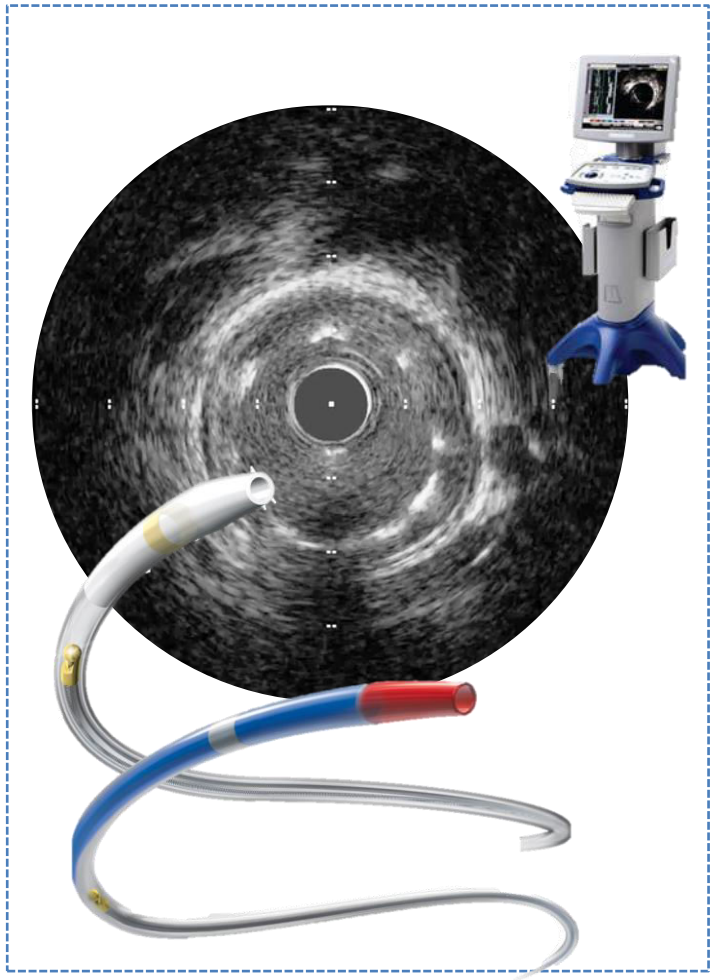
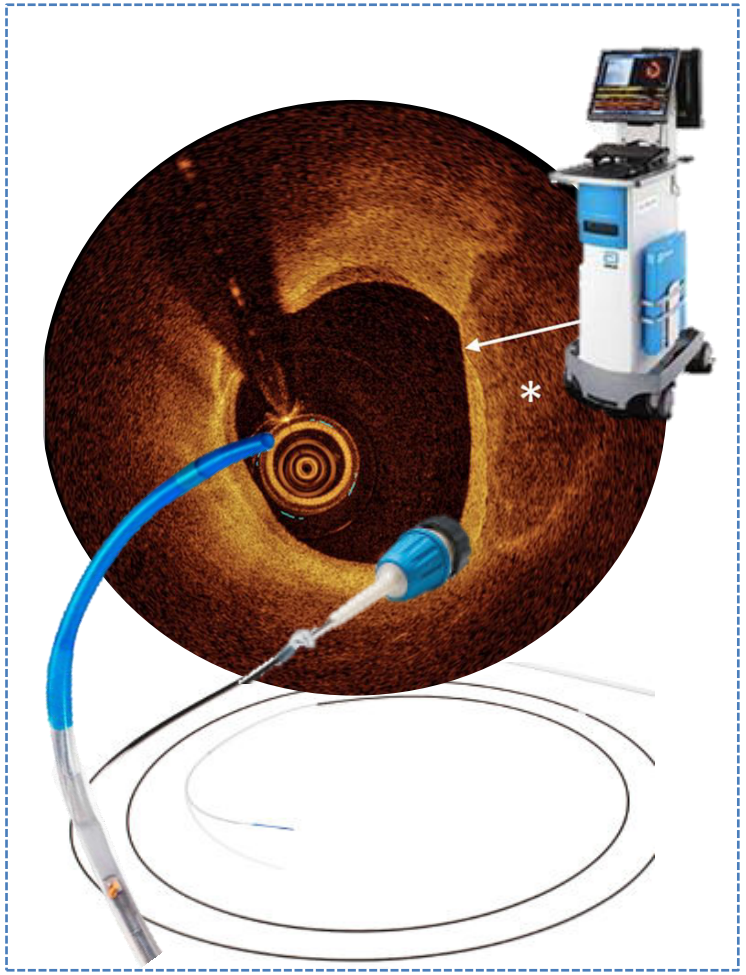
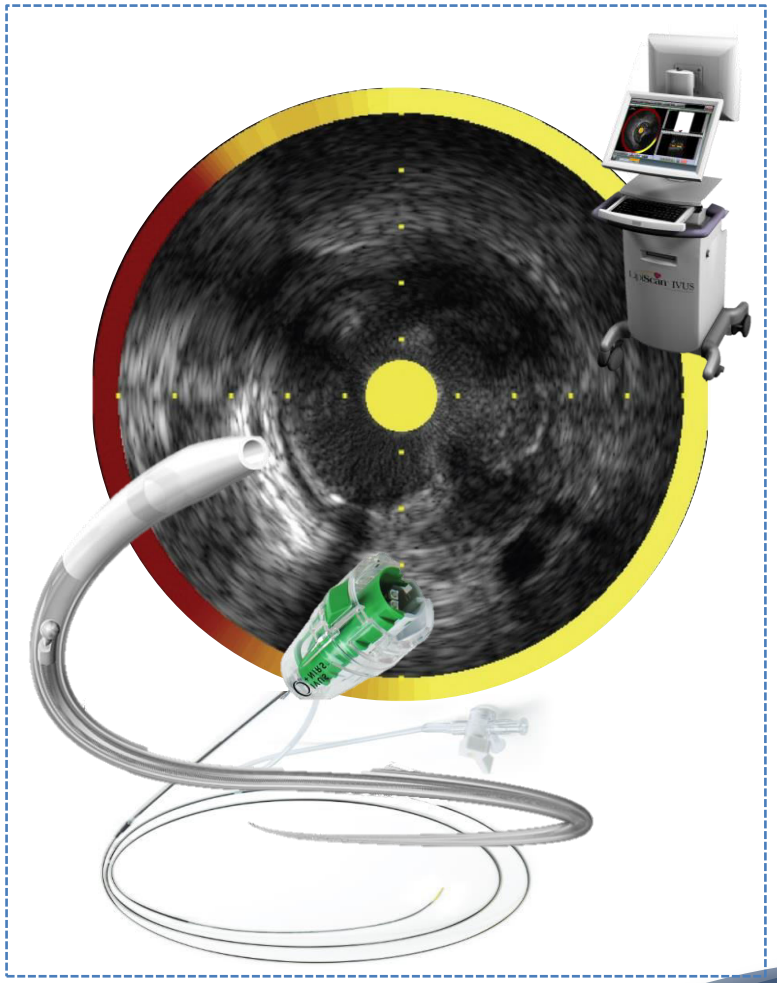
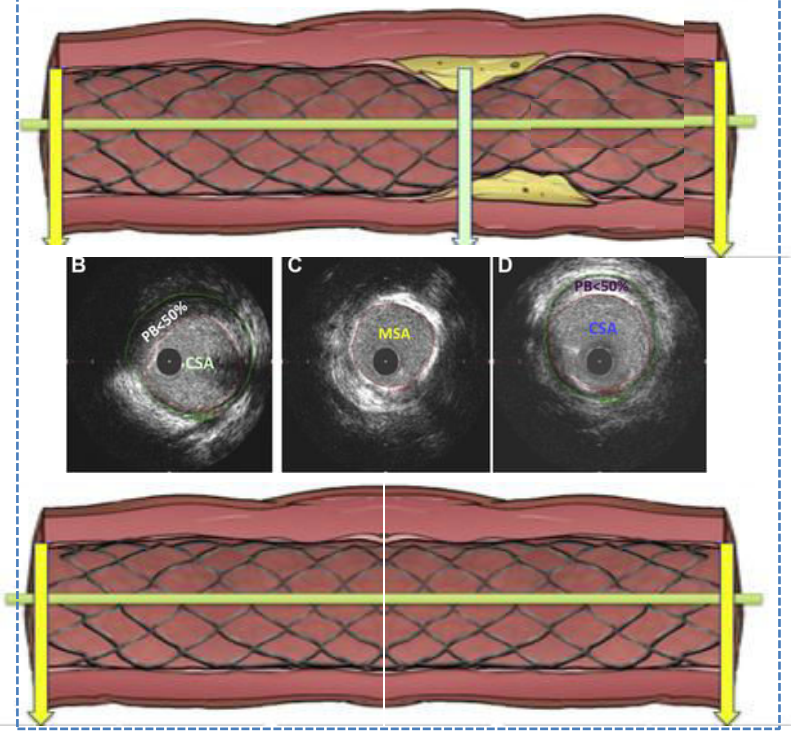




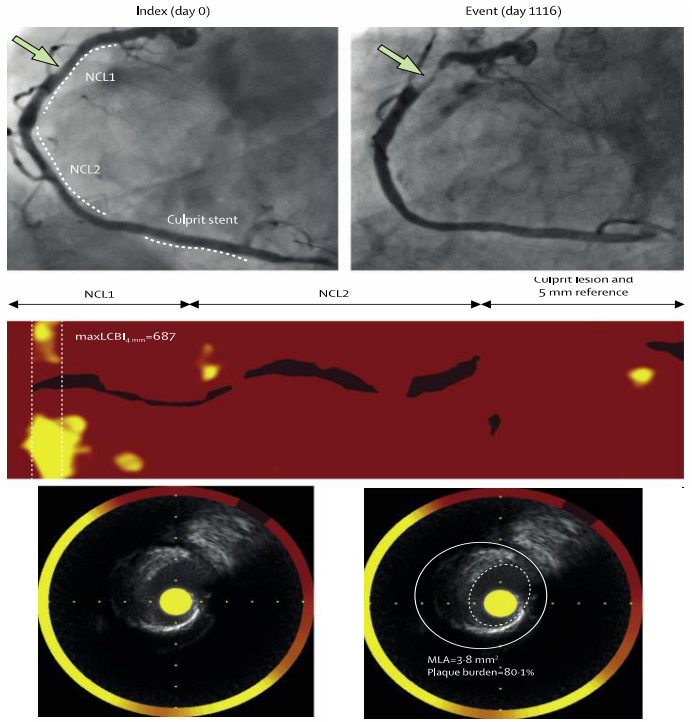


Intravascular Imaging to Guide Antithrombotic Therapy

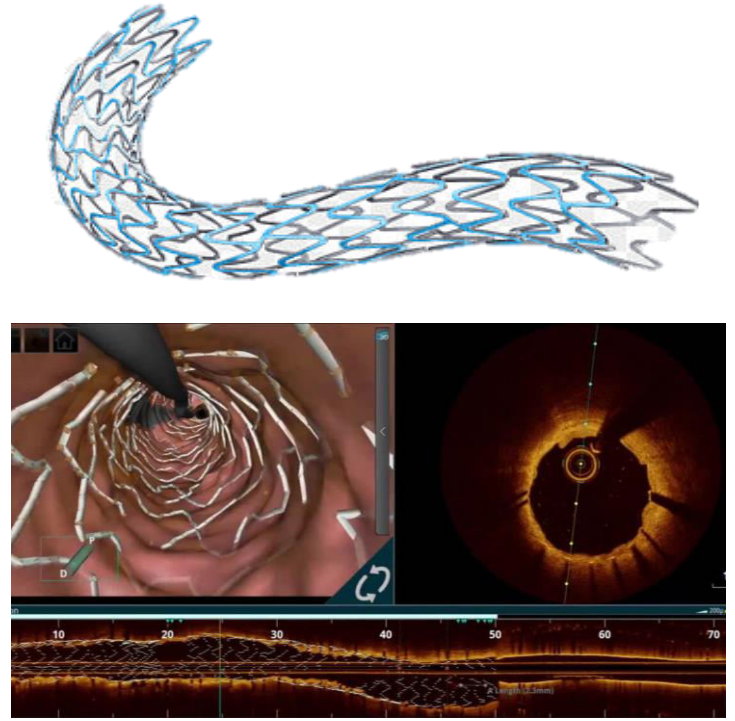
Optimize Stent Omplantation



Identify Vulnerable Plaques



Evaluate Strut Coverage



AT INDEX PROCEDURE (0-7 days)

AT FOLLOW-UP (1-3-6 mo.)

Time forme index PCI

Raber L et al. Eur Heart J 2018
Erlinge D et al. Lancet 2021

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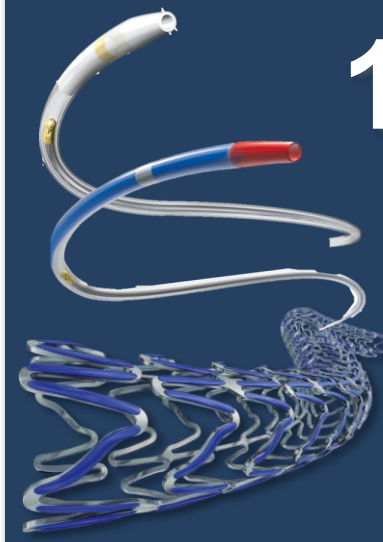
Optimize Stent Implantation

DAPT Duration and IVUS: IVUS-XPL

RCT

IVUS vs. Angio & Short vs. Long DAPT for coronary stenting

IVUS-XPL: MULTICENTER, RANDOMIZED TRIAL



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Patients treated Long Stents (>45mm)

Short (6 mo.)

N=699

Long (12 mo.)

N=701

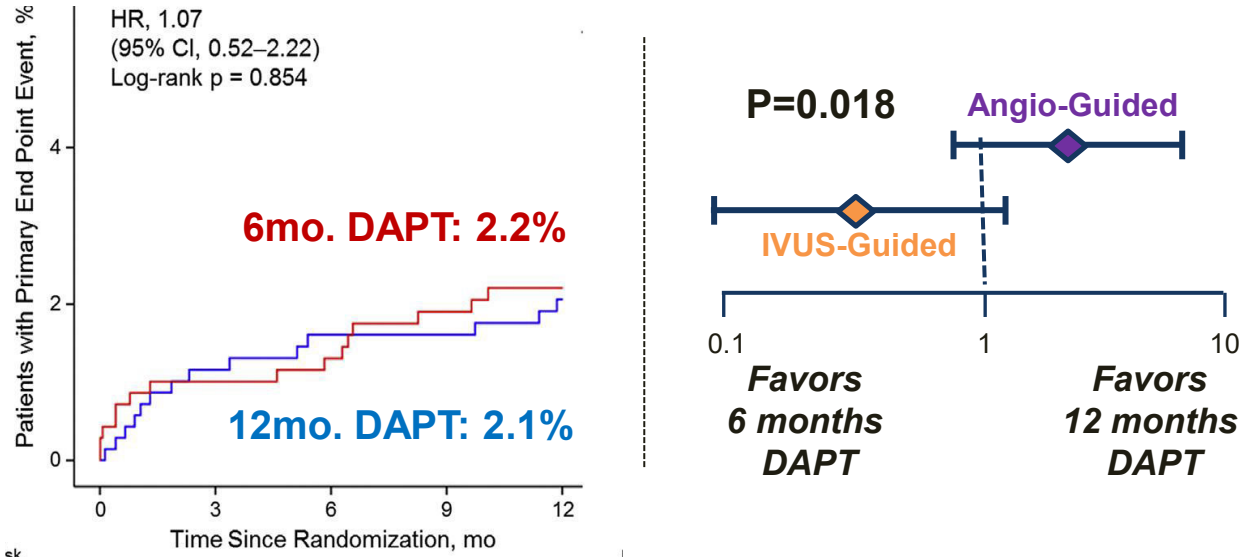
Cardiac death, MI, stroke, or TIMI major bleeding

Hong SJ et al. JACC Intv. 2016

DAPT Duration and IVUS: IVUS-XPL

RCT

Primary Endpoint: NACE



Outcome	6 mo. DAPT	12 mo. DAPT	p
MACE	5.2%	3.8%	P=0.19
TIMI Major	0.7%	1.0%	P=0.56

Study Design:

- Factorial Design 2:2
- Randomized IVUS- vs. Angio-Guided (700 vs. 700)
- Randomized 6mo. DAPT vs. 12 mo. DAPT (699 vs. 701)

Primary and secondary endpoints:

- IVUS reduced by 52% MACE (driven by TLR, no diff MI and cardiac Death).
- No difference for NACE, MACE and TIMI major between 6 and 12 mo. DAPT
- **Significant interaction** for the primary endpoint of NACE of DAPT duration and IVUS-guided PCI: IVUS better with short DAPT – Angio better with long DAPT.

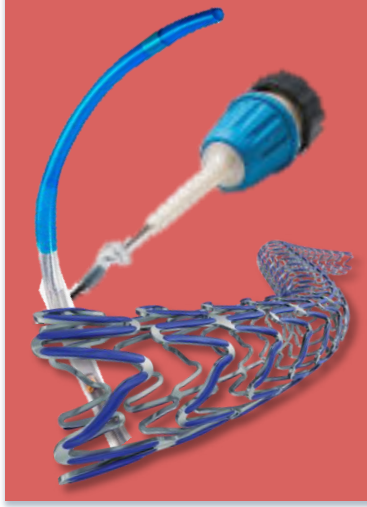
Hong SJ et al. JACC Intv. 2016

Periprocedural DAPT only: OPTICA

OS

Pilot Study of P2Y12i Monotherapy after OCT-Guided PCI

OPTICA: SINGLE CENTER, SINGLE-ARM TRIAL



70

NSTEMI Patients treated with PCI

P2Y12i Monotherapy

Tica 90mg bid or Prasu 10mg qd
Patients tested for adequate Platelet inhibition.
No Aspirin or Discontinued day of PCI

Death, MI, def or prob stent thrombosis or stroke within 6 months

RESULTS → **Primary Endpoint 4% - <u>0 Stent Thrombosis</u>**

van der Sangen NMR et al. Eurointervention 2023

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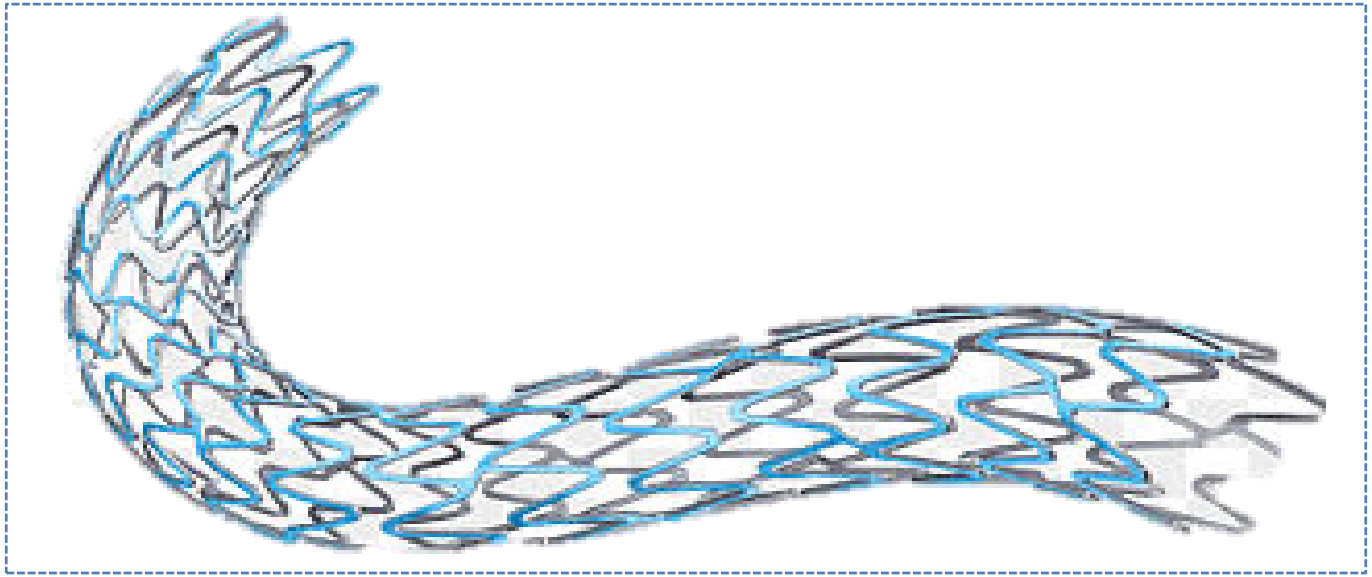
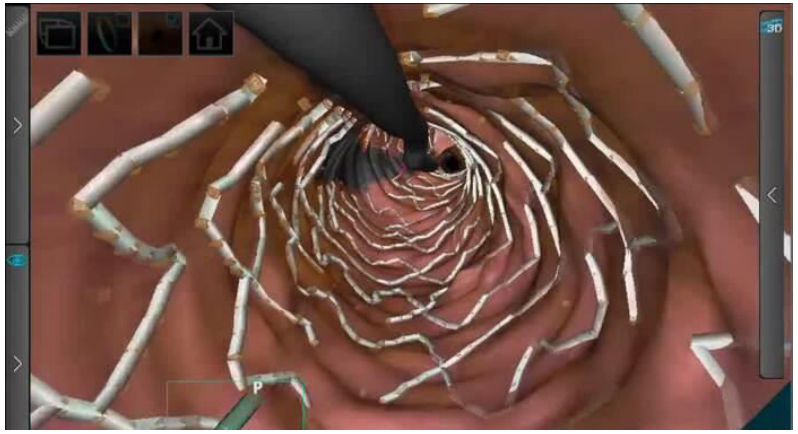
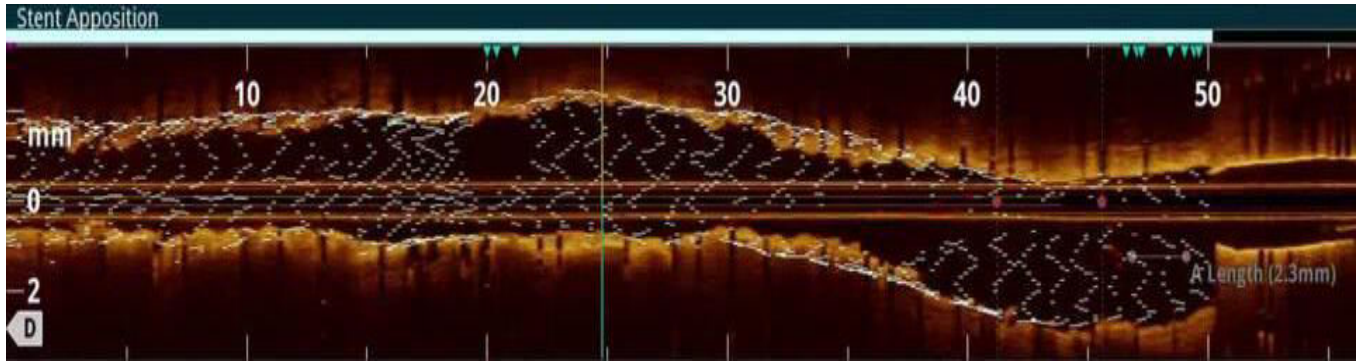
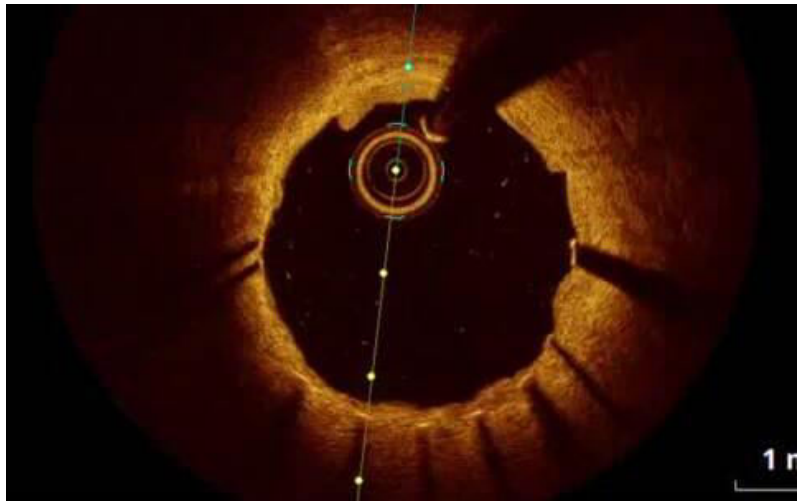
Stent-Strut Converage For Treatment Decisions

Evaluate Stent-Strut Coverage for Therapy Decisions



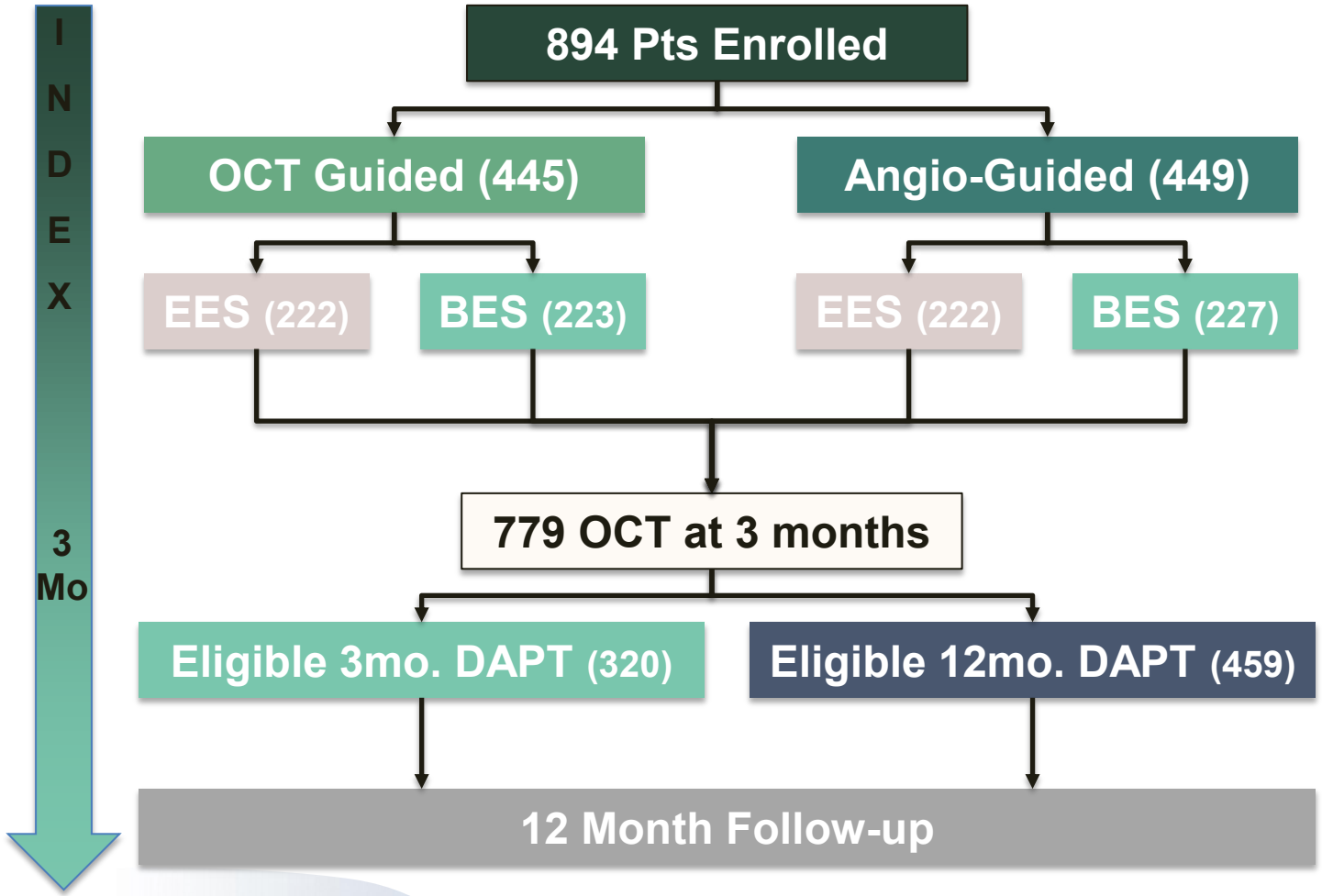






DETECT-OCT Trial

RCT



Study Design:

- Multicenter Trial, Factorial Design 2:2
- Randomized OCT vs. Angio-Guided
- Randomized EES vs. BES
- OCT Check at 3mo: if ≤6% uncovered struts short DAPT (3mo.) if not long DAPT (12mo.).

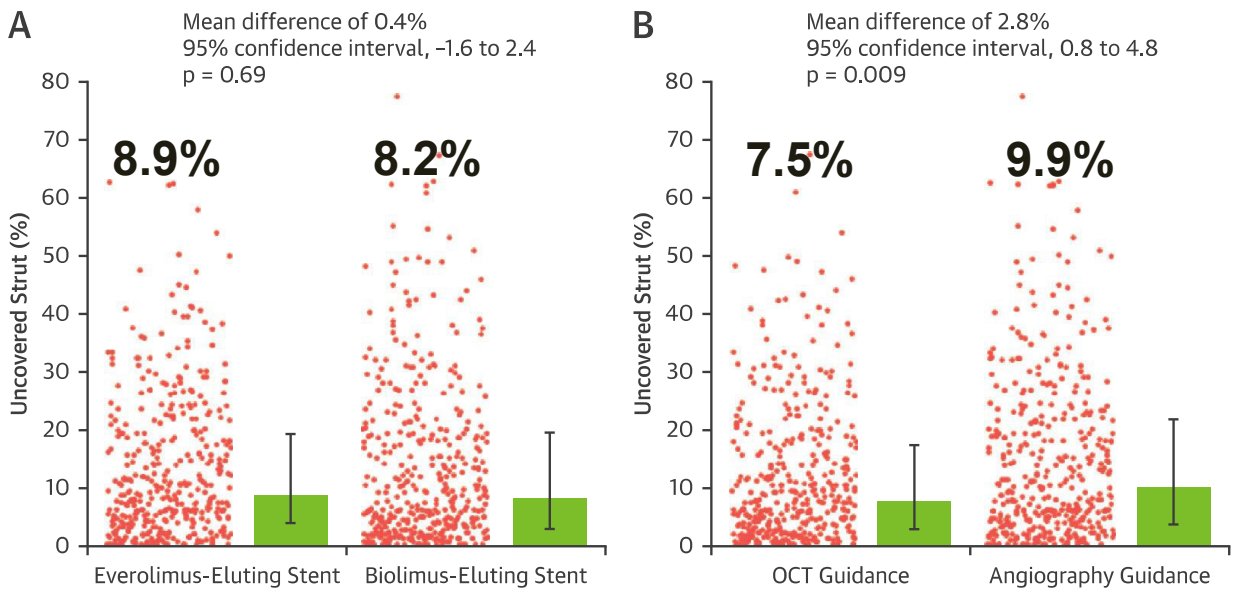
Study Objective:

- Primary Objective: early strut coverage at 3 months (EES vs. BES / OCT vs. Angio)
- Secondary Objective:cardiac death, MI, stent thrombosis, and major bleeding at 12 months for the comparison of 3 vs. 12mo. DAPT
- **Study Prematurely Interrupted (894/1100pts)**

Lee SY et al. JACC: Cardiovasc Imaging 2018

DETECT-OCT Trial

RCT



Outcome	Total	3. mo. DAPT	12 mo. DAPT	p
NACE	0.3%	0.3%	0.2%	P=0.80
Def Prob Stent Thrombosis	0.1%	0.3%	0.0%	P=0.41
Myocardial Infarction	0.1%	0.3%	0.0%	P=0.41
Maj or Min Bleeding	0.5%	0.3%	0.7%	P=0.51

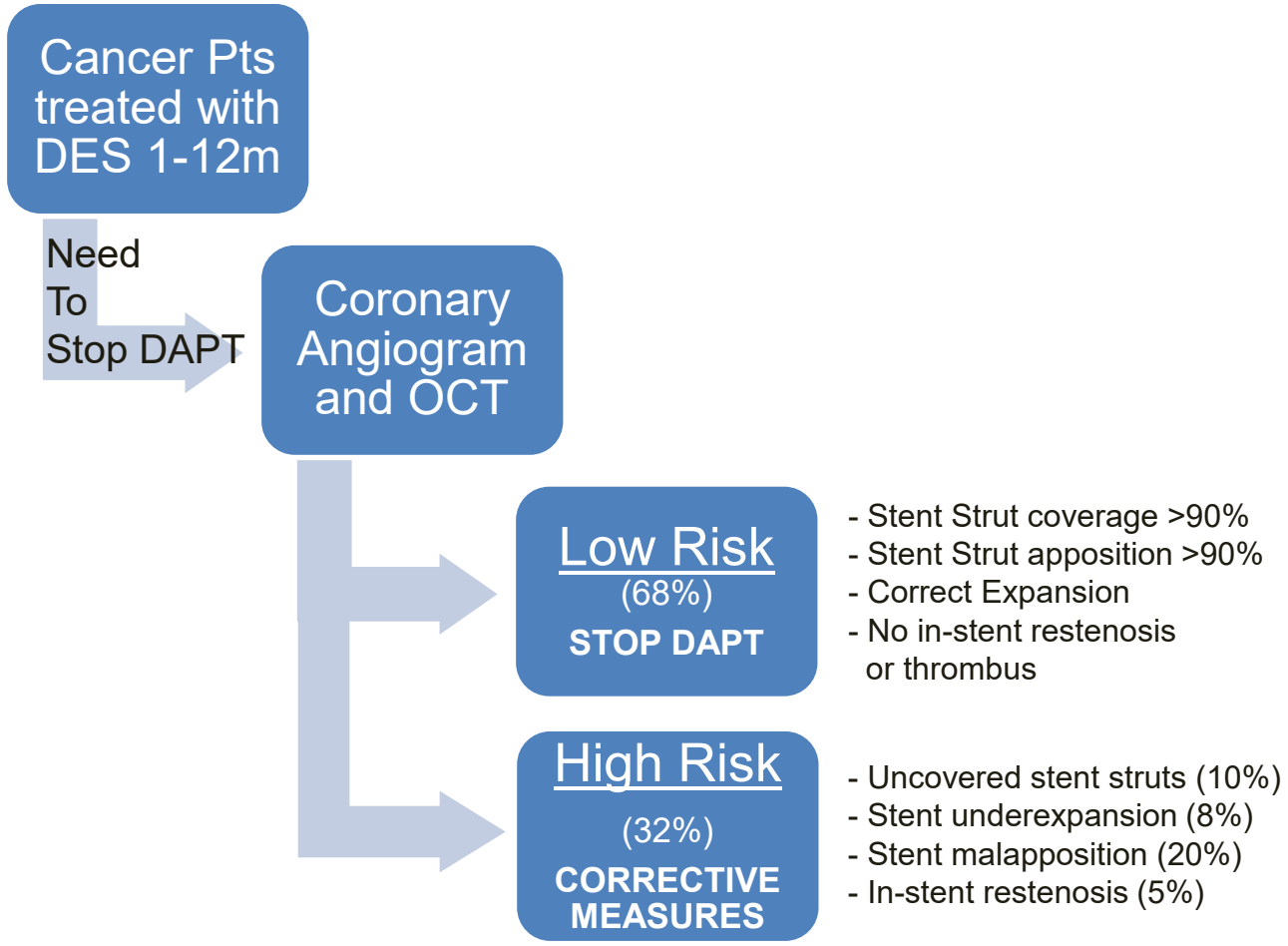
Study Results:

- OCT follow-up at 3 mo. In 87.1%
- Uncovered struts similar between EES and BES (8.9% vs. 8.2%)
- OCT-guided DES implantation reduced the percentage of uncovered struts compared to angio-guided procedure (7.5% vs. 9.9% - MD 2.8%)
- Study defined “favorable early strut coverage” at 3mo OCT (≤6% uncovered struts) was observed in 41.1% of patients
- OCT informed short DAPT (3mo.) or long DAPT (12mo.) associated with low event rates and no difference between short and long DAPT

Lee SY et al. JACC: Cardiovasc Imaging 2018

PROTECT-OCT Study: OCT– guided discontinuation of antiplatelet therapy in cancer patients with CAD

OS



Study Design:

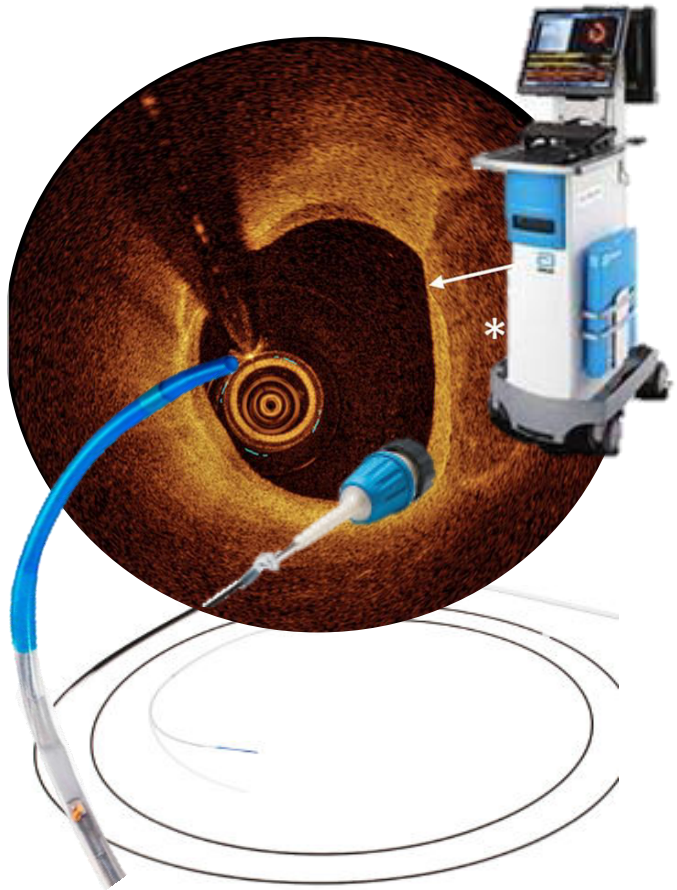
- Single Center, Prospective study
- 40 Cancer pts recent stenting (1-12m) and indication to prematurely stop DAPT
- DAPT was interrupted 5 days before surgery in Low-Risk pts
- High-risk pts: corrective measures (eg. Post-dilation and LMWH bridging)

Study Results:

- Median time off-DAPT 6 days (low-risk group)
- No CV death or Stent Thrombosis
- Death were all cancer related
- High-risk group worse outcome than low-risk group

Iliescu CA et al. Am Heart J 2017

Limitations of Strut-Coverage for Antithrombotic Treatment Decisions



Tissue Characterization

Current commercial OCT devices cannot determine the characteristics of strut coverage tissue (neointima vs. fibrin)

Uncovered Strut Distribution

Rather than simple %of uncovered strut, uncovered strut Clustering and distribution might have an important role

Need for Automation

Extremely high number of stent struts, especially in complex
Need for accurate/automatic evaluation in clinical practice

Sensitivity/Specificity

Uncovered struts not responsible for all stent thrombosis.
Stent thrombosis not responsible for all recurrent MI.

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Intravascular Imaging & Antiplatelet Tx

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Intravascular Imaging & Antiplatelet Tx

- Imaging-guided PCI reduce MACE, and may make stent more «DAPT forgiving»
- Patients undergoing OCT follow-up for stent-strut coverage evaluation with a low-risk profile have a low risk of adverse events after DAPT interruption, but more data is needed to overcome current OCT limitations
- Intracoronary imaging to detect «vulnerable plaque» may have a role for intensified antithrombotic therapy in the future, but trials are needed

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Intravascular Imaging & Antiplatelet Tx: OPEN QUESTIONS

- More accurate marker of stent thrombosis based on stent defect clustering?
- OCT tissue characterization: novel intravascular imaging technologies will shed more light on tissue characterization to better inform treatment decisions?
- Is detection of vulnerable plaques useful to inform treatment decisions?
- Ideal treatment of vulnerable plaques: stenting? Antiplatelet? Other secondary prevention?