CARDIOVASCULAR SUMMIT
TCTAP 2015

Future of BRS

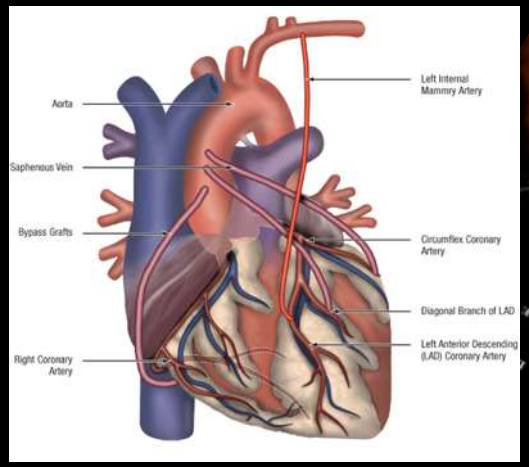
Patrick W. Serruys MD, PhD
Erasmus MC, Rotterdam, NL
Imperial College, London

Yoshinobu Onuma MD, PhD
Erasmus MC, Rotterdam, NL

Why BRS may change the landscape of coronary intervention ?

Trifecta in coronary revascularization

Endoluminal bypass (vs. conventional bypass)



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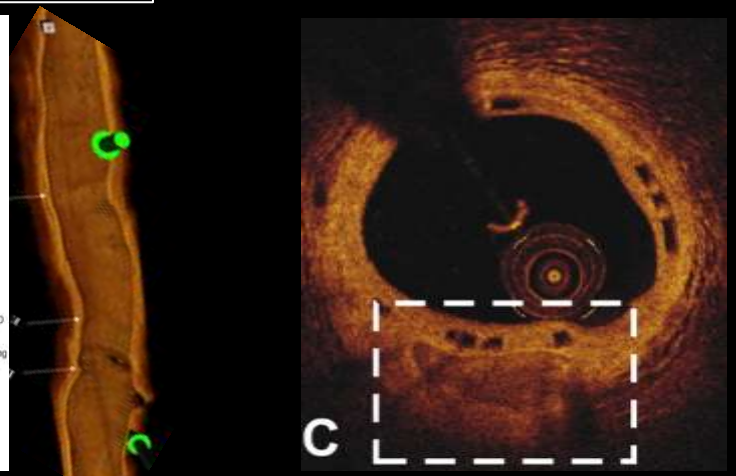

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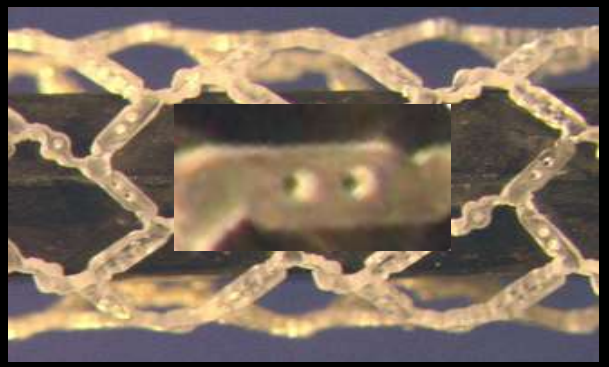
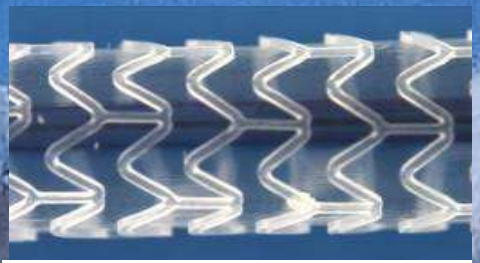


2014, ESC in Barcelona "master prophecy" lecture by P. W. Serruys

By 2020, only a minority of patients will receive a permanent metallic implant

Bioresorbable scaffold

WHY?

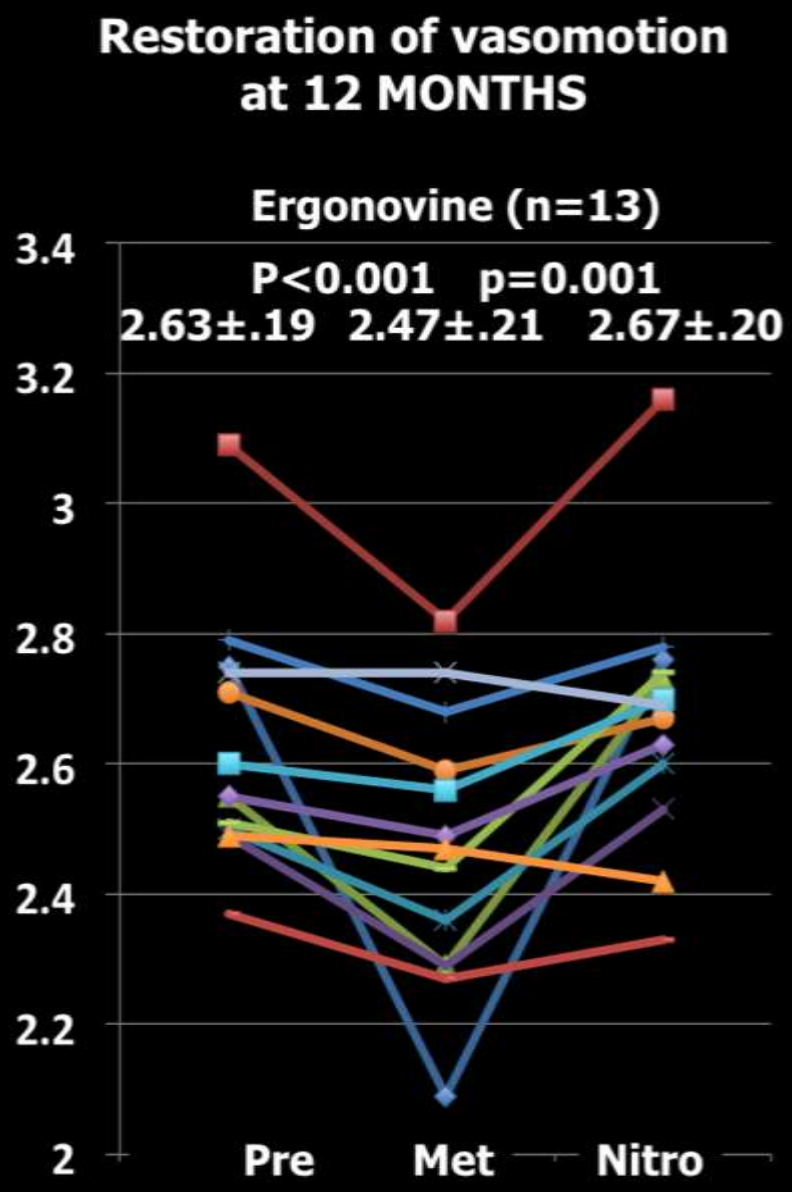


PLLA

Magnesium

Tyrosine polycarbonate

- **Disappearance of mechanical integrity and return of vasomotion (6 to 12 months)**
- Return of cyclic strain and mechanotransduction
- Normalization of endothelial shear stress
- Potential for non-invasive imaging
- Restoration of contractile phenotype of smooth muscle cells (SMC) with normalized gene expression of endothelium and SMC
- Shielding and recapping of plaque
- Late lumen enlargement and remodelling
- Plaque media regression



Lancet 2009, JACC 2011

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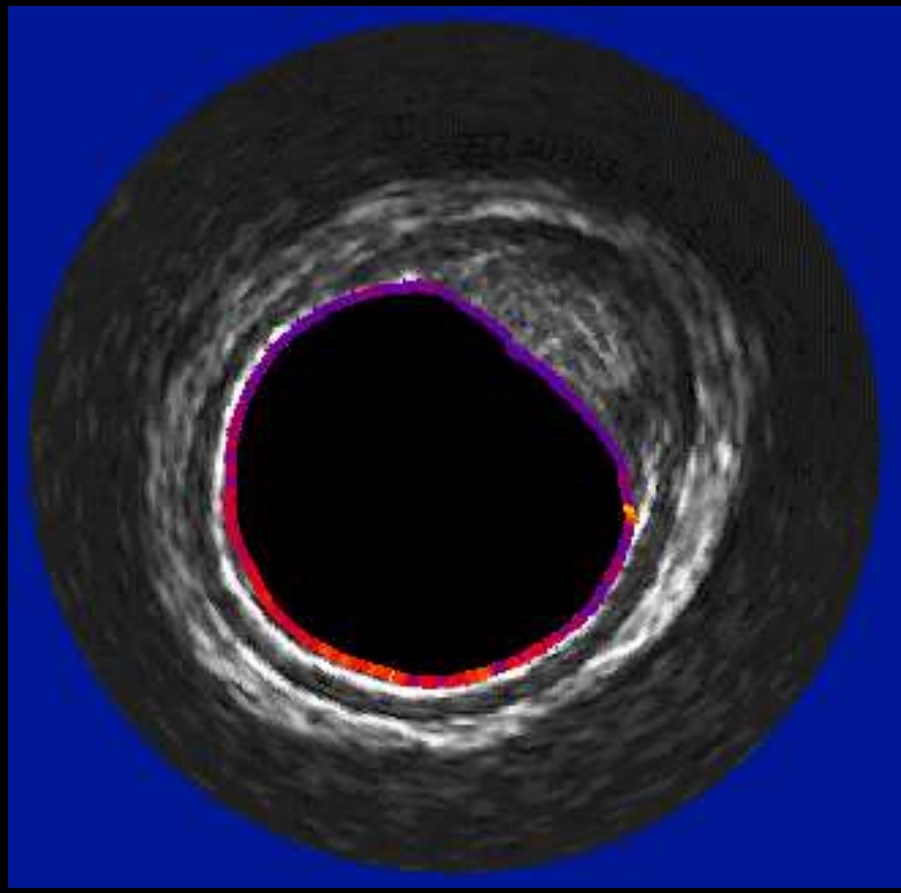

Circulation Journal 2012, Lancet 2009

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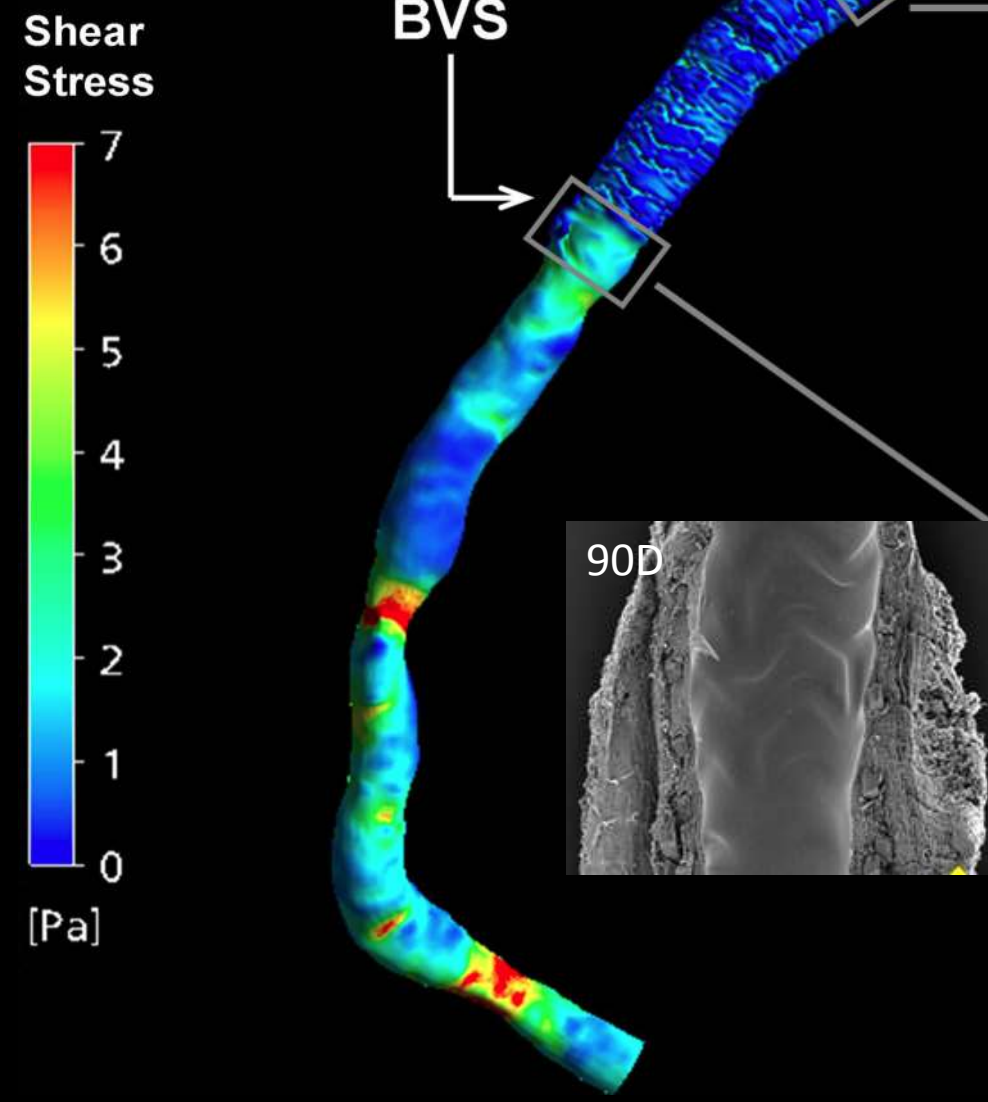

JACC intervention 2014

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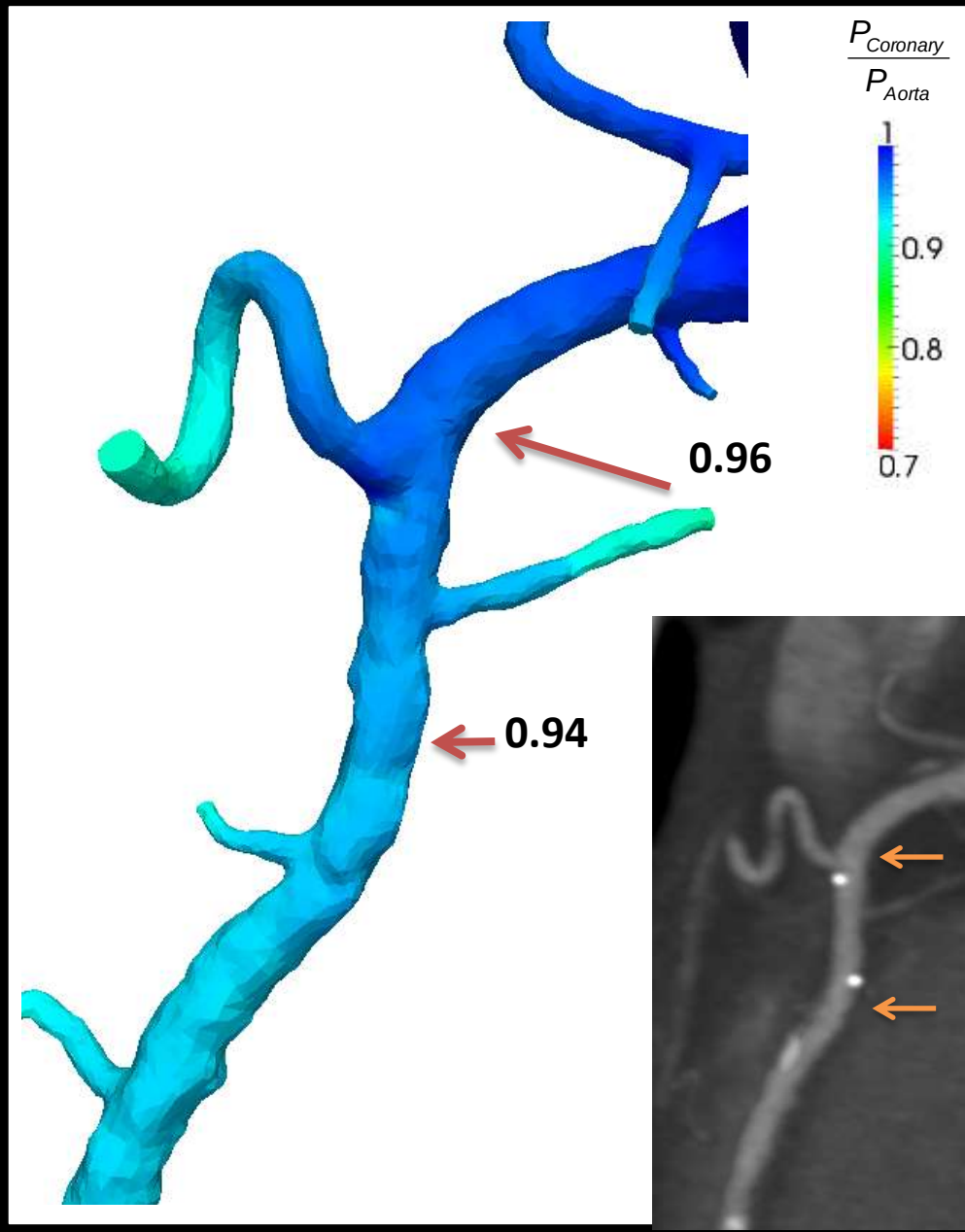

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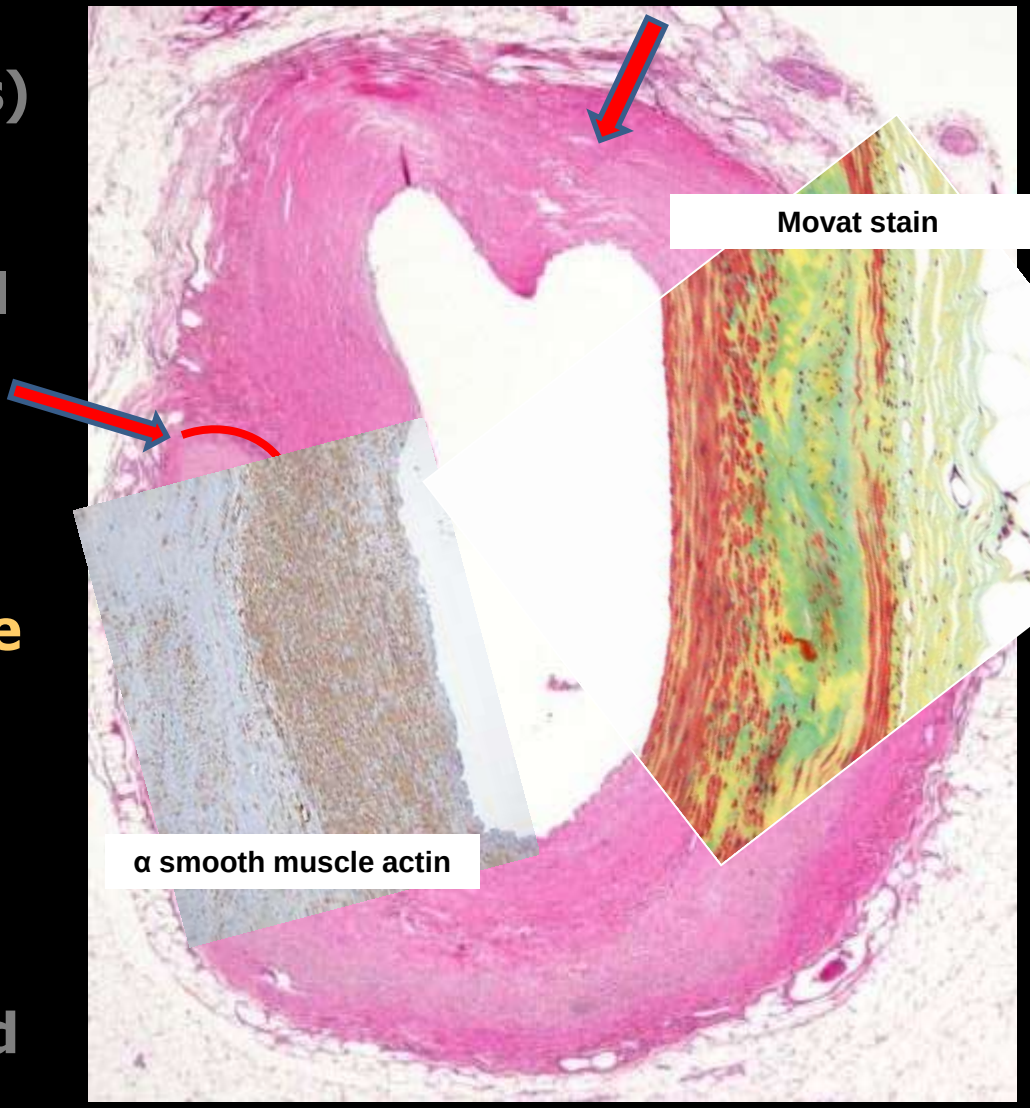

Neomedia?

Circulation 2014

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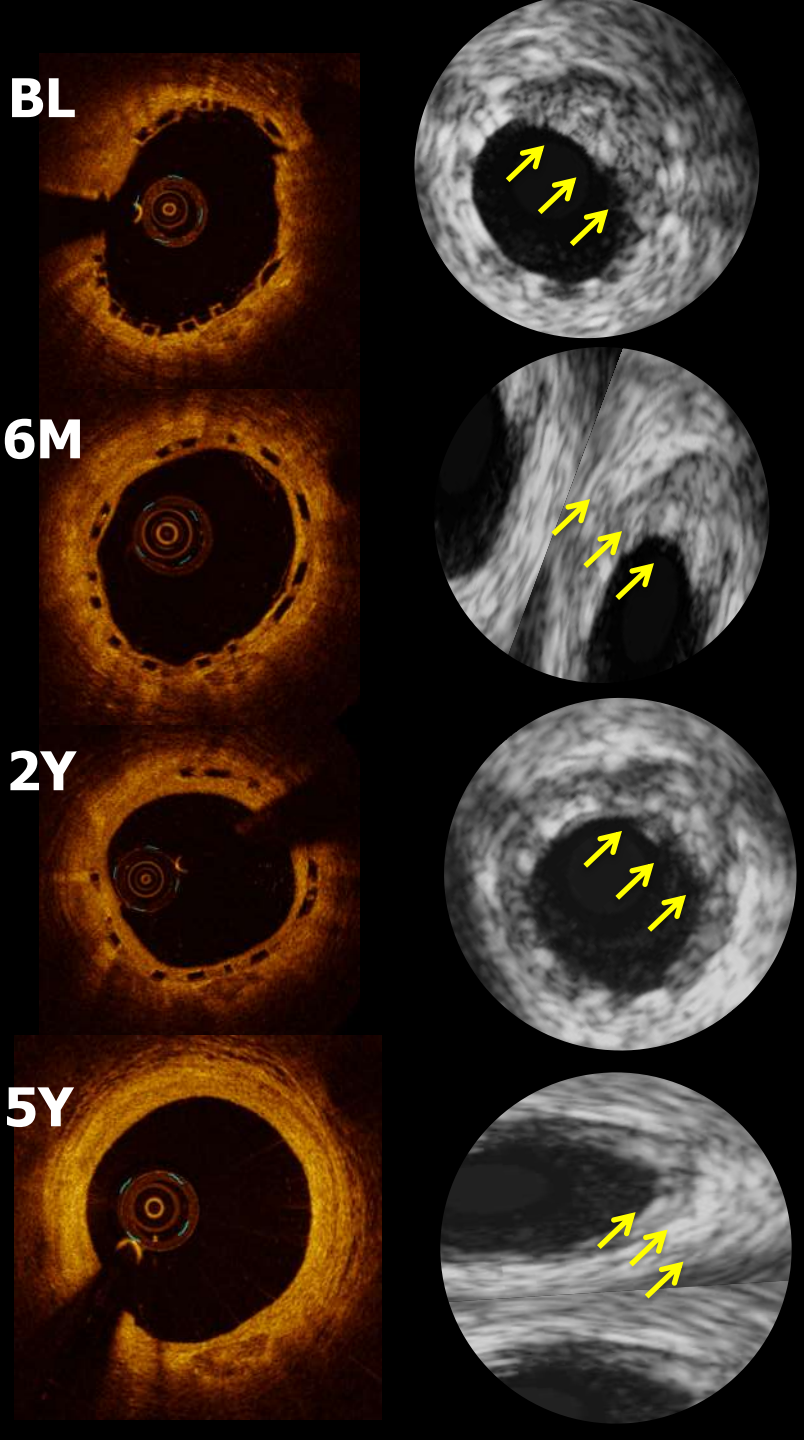

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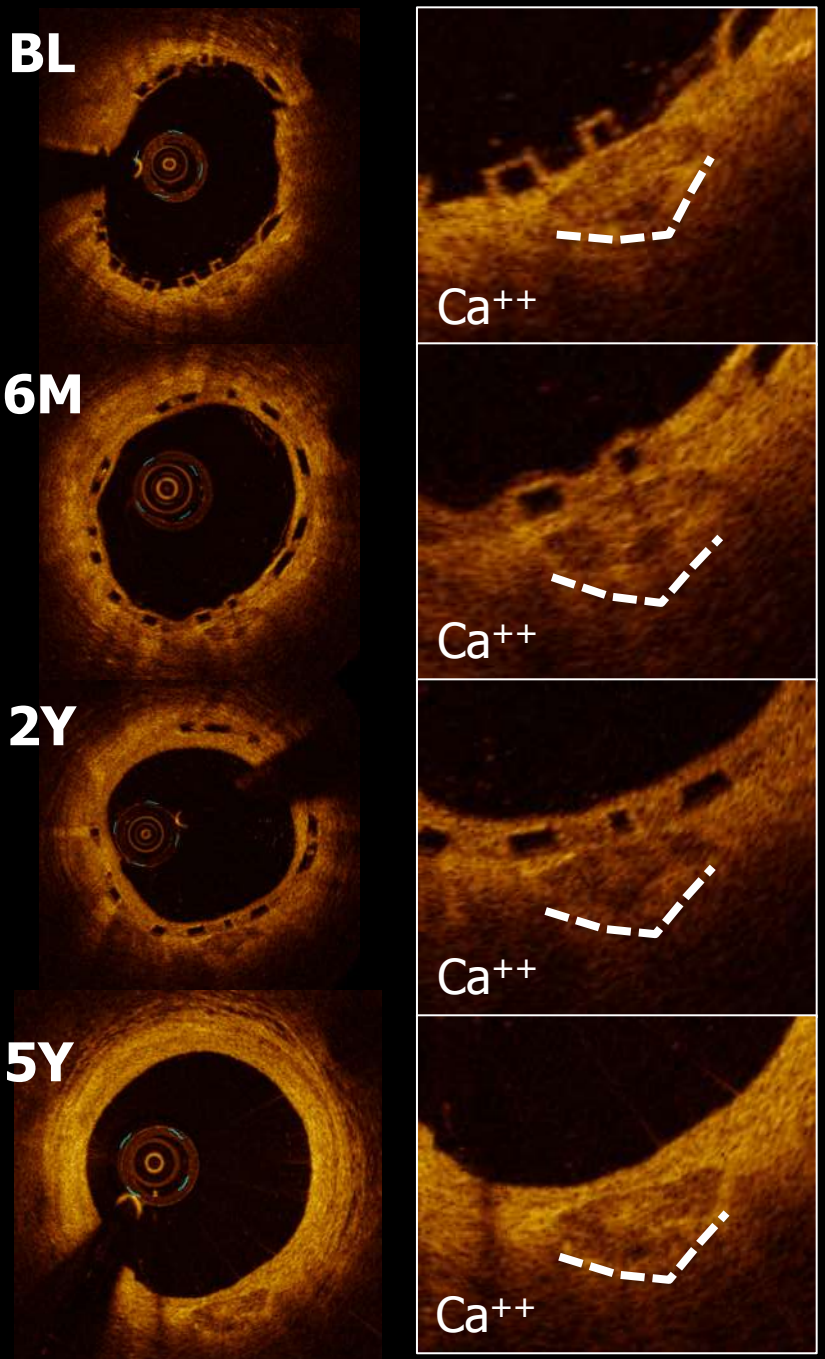
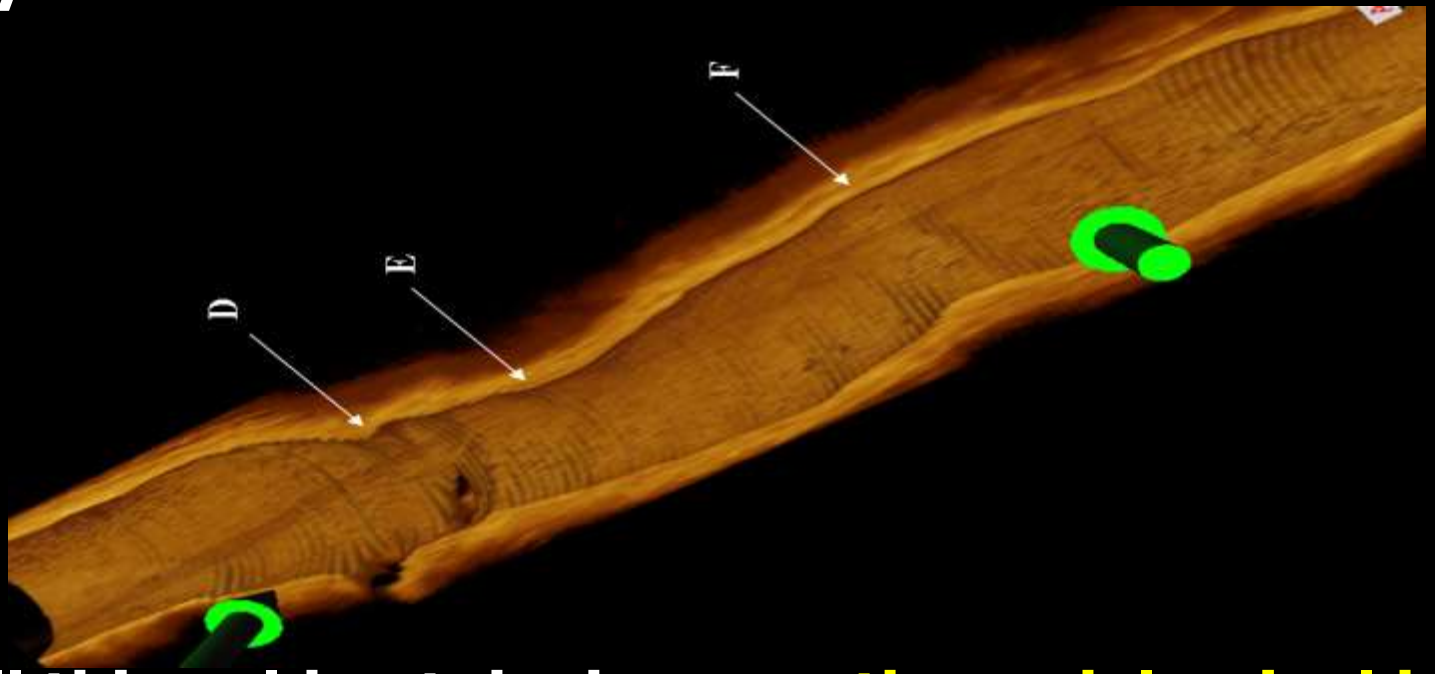
- **Shielding and recapping of plaque**
- **"Golden tube"?**



"Golden tube"

Vessel with strong homogeneous light reflectivity on OCT = refurbished endoluminal lining, capping underlying plaques with late lumen enlargement, vasomotion and cyclic strain



Will this golden tube become the endoluminal bypass that interventional cardiologists have been waiting for so long?

Why BRS may change the landscape of coronary intervention ?

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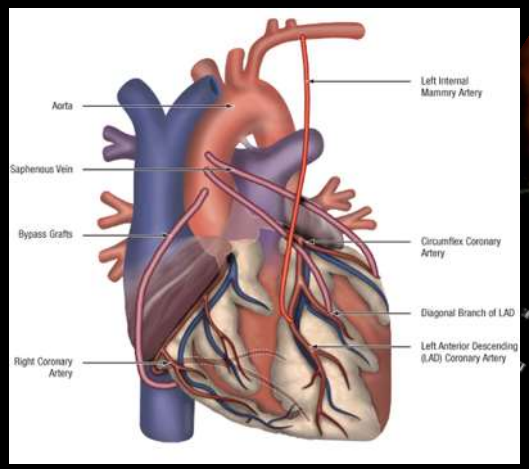
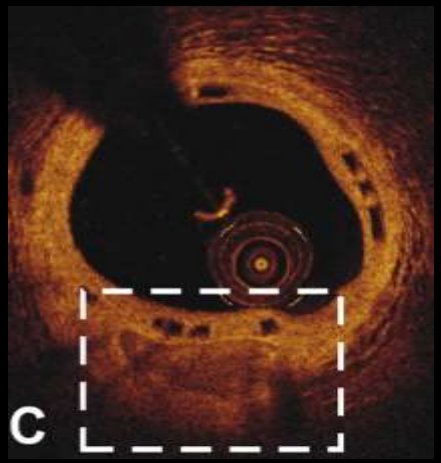
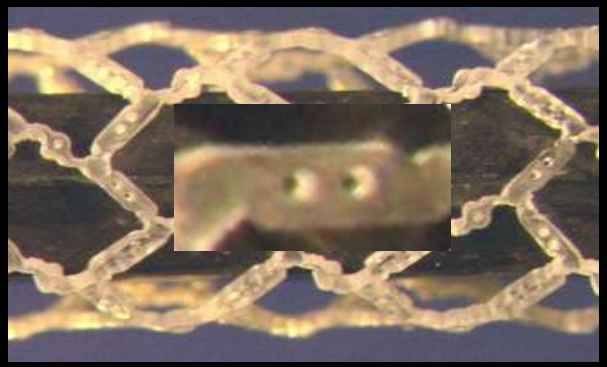
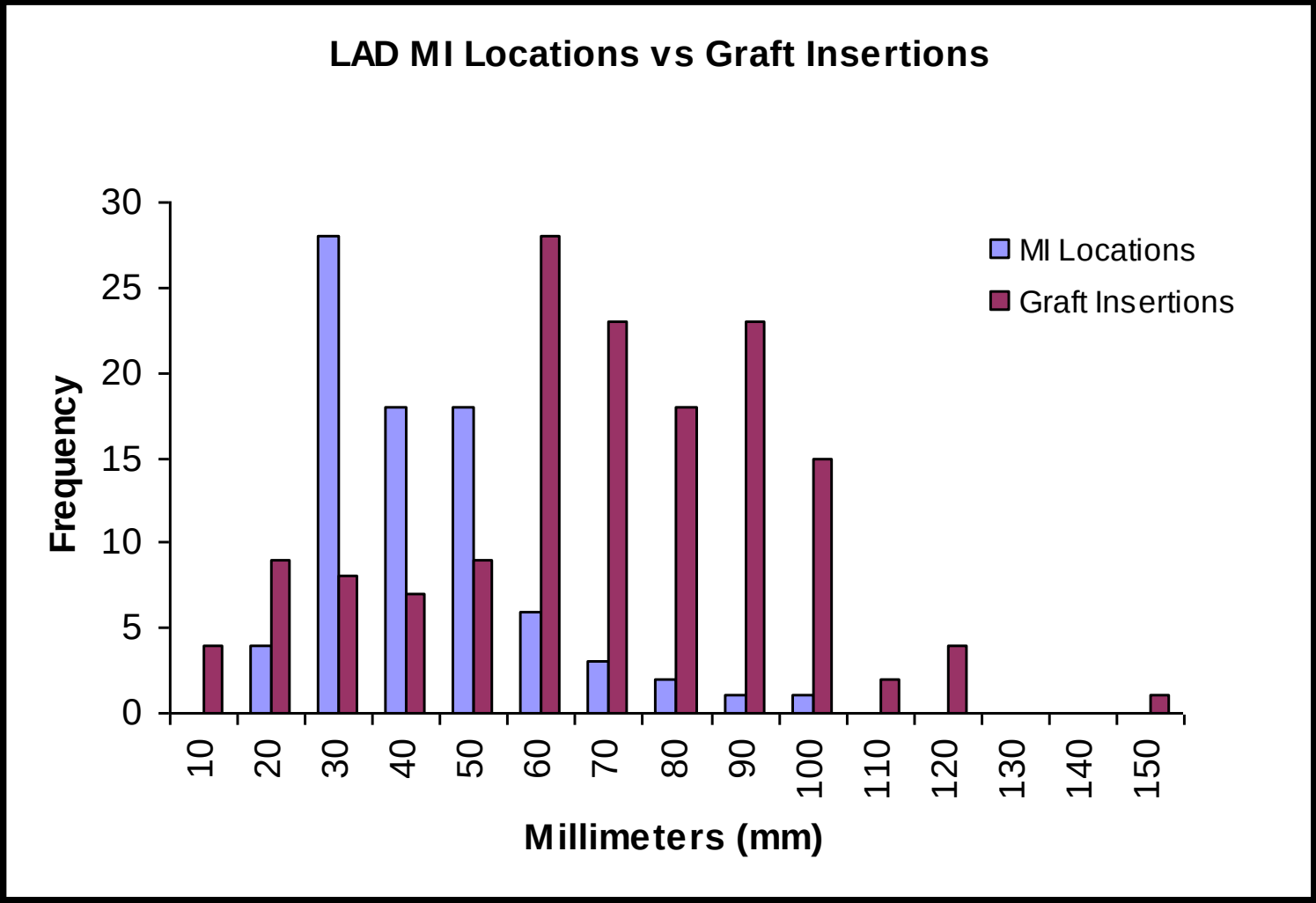






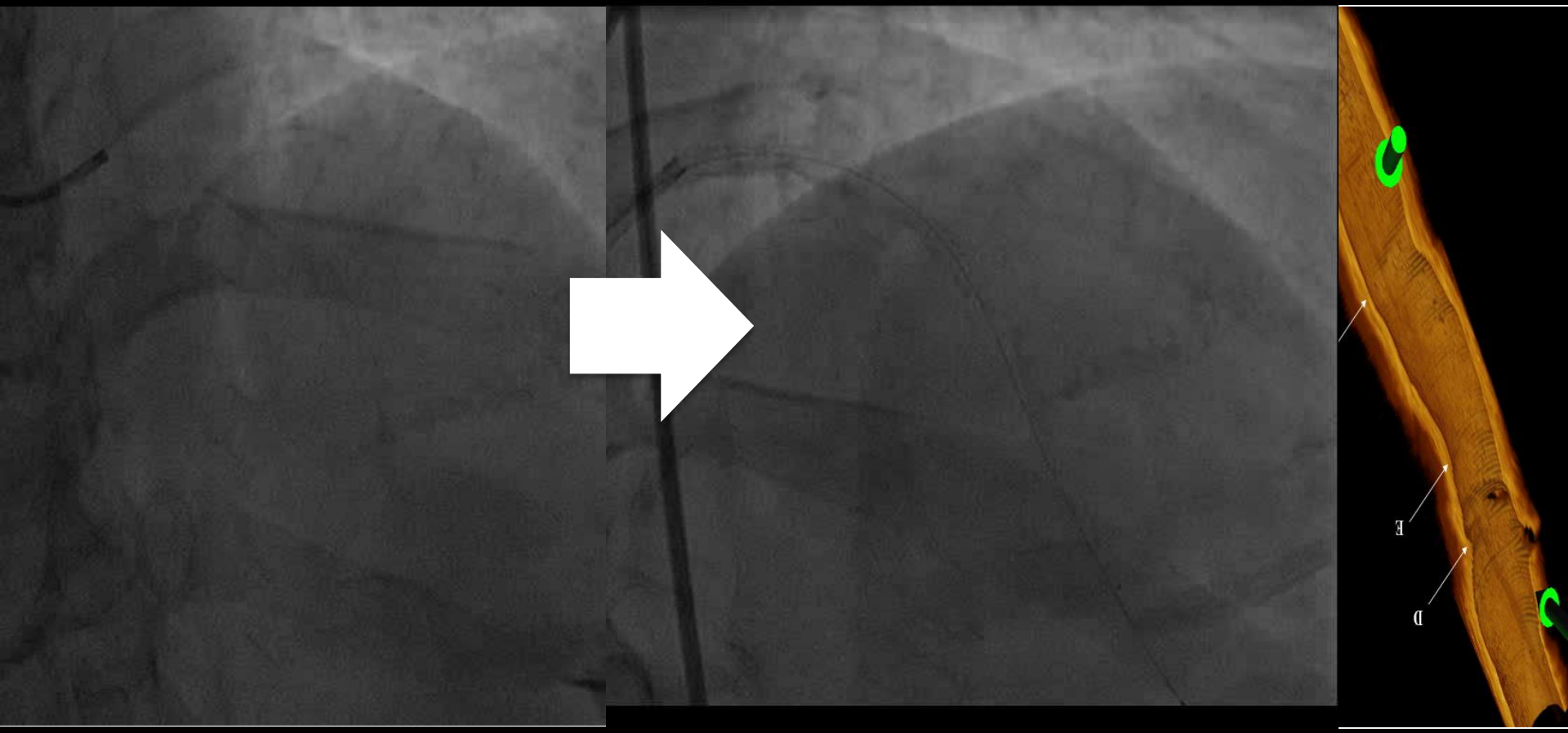
Distribution of Acute Thrombosis Relative to Bypass Graft Anastomoses



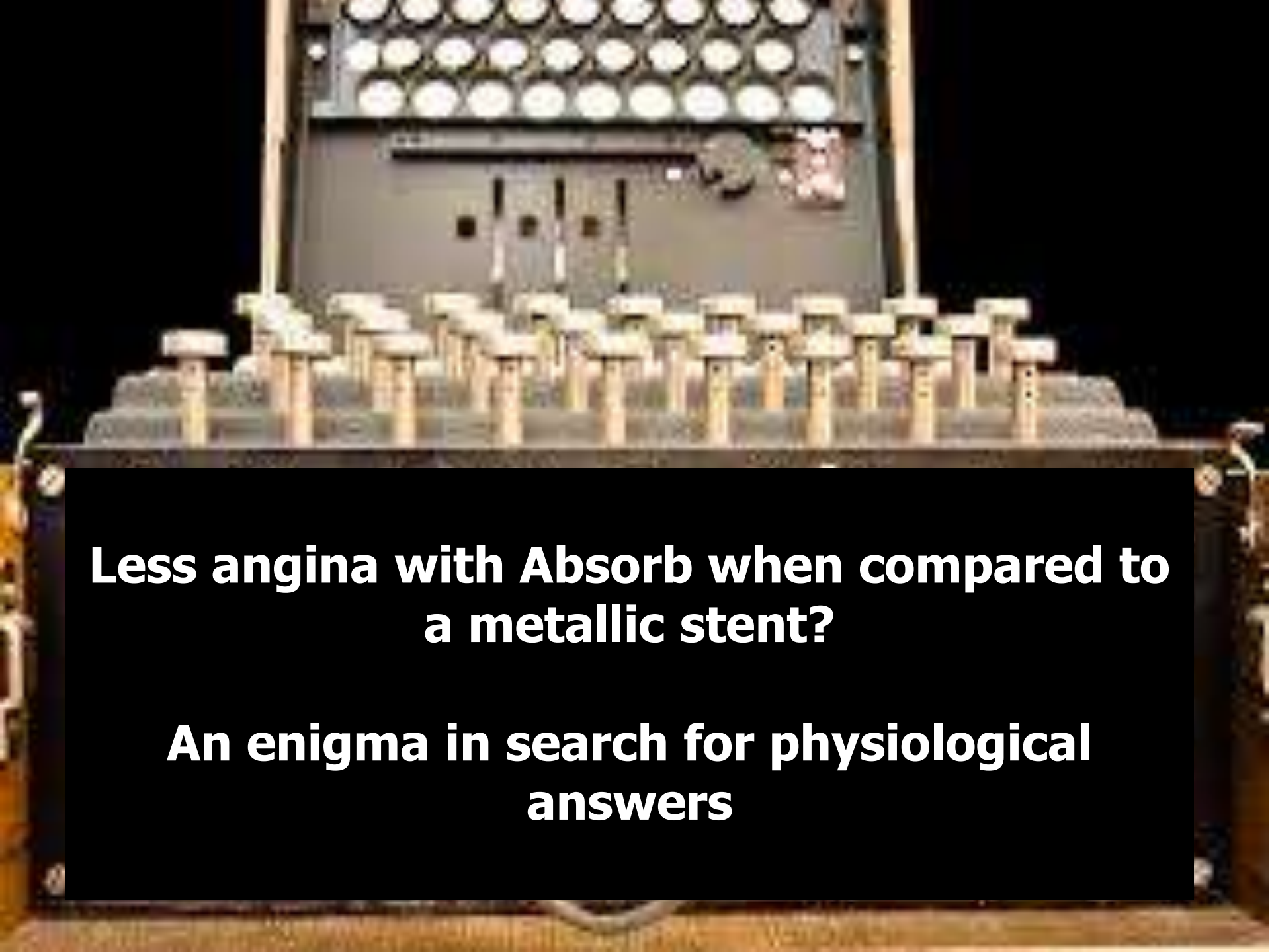
Jeon C, Kuntz RE, Mauri L. 2006.

Endoluminal bypass by the bioresorbable scaffolds

Courtesy of Dr. Colombo

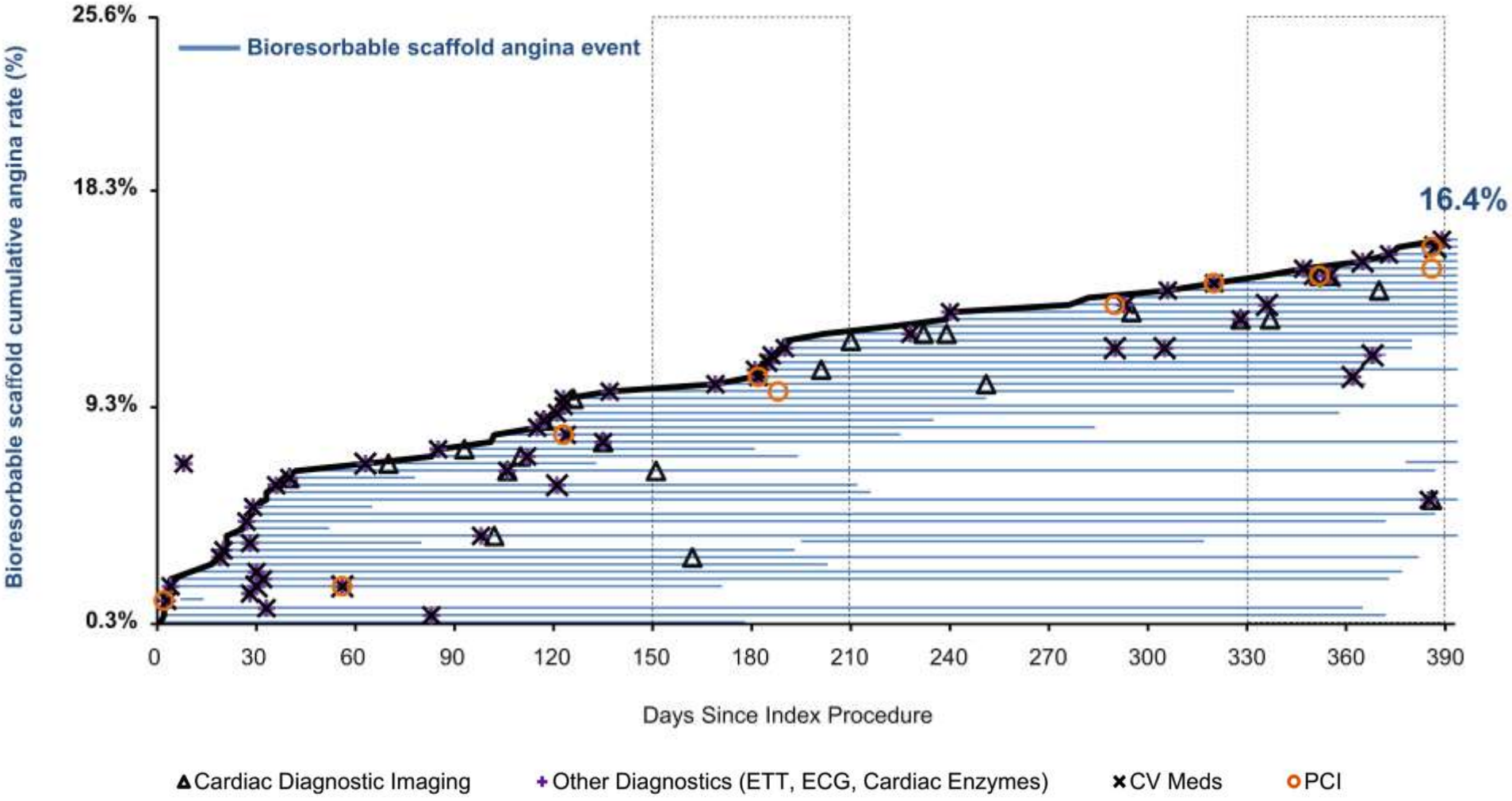


130mm of endoluminal bypass


Less angina with Absorb when compared to a metallic stent?
An enigma in search for physiological answers

Less angina in the Absorb arm than in the Xience arm

A difference in angina rate captured through adverse event form was observed, however, this warrants further physiological and clinical investigations (ABSORB III and IV)



Why is the site-diagnosed angina less in the ABSORB arm than in the Xience arm?

Early

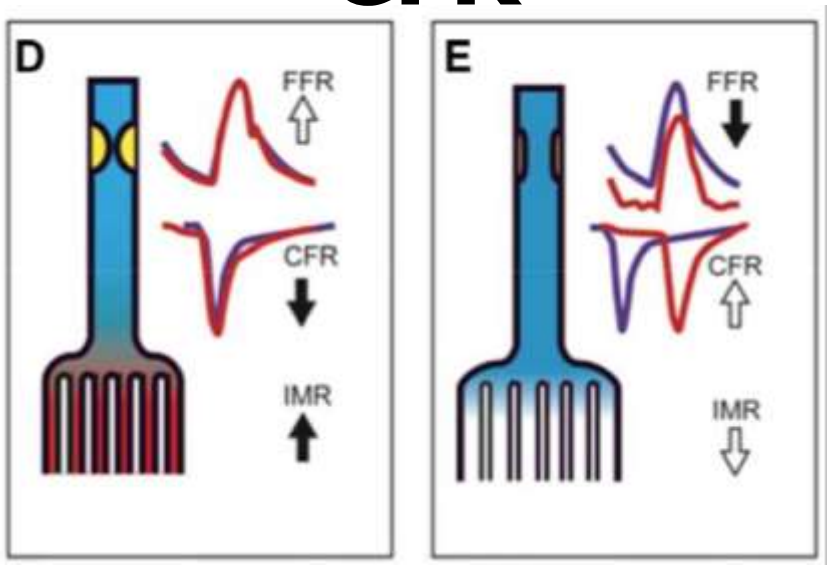
- Placebo effect in absence of blinding
- Better systolic and diastolic conformability of the scaffold to the vessel (angulation change)
- Less aggressive postdilatation – less stretching of adventitia (neurogenic theory)
- Wide scaffold struts with snow-boot effect vs. penetration of thin metallic struts with knife-in-butter effect

Late

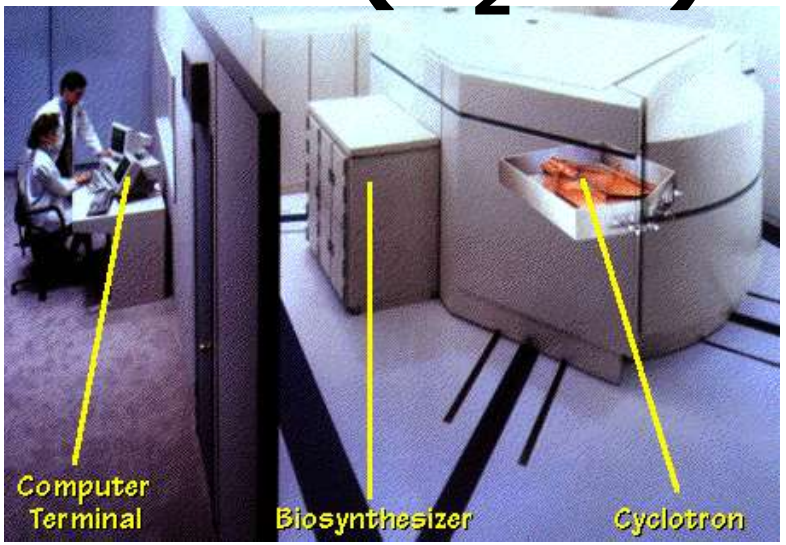
- Vasomotion: better response to nitrate and shear stress
- Normal endothelial cell function in Absorb vs. dysfunctional endothelia in metal
- Cyclic Strain
- Impact of diastolic recoil (Cyclic strain) of scaffolded segment on microcirculation (forward pulse wave) vs. permanently stiff stented segment
- Reduction of microvascular resistance for unknown reason
- Absence of compliance mismatch at the edge of device
- Late lumen enlargement
- Local release of lactic acid molecule and metabolic interference to the vessel wall

Three modes of Research to elucidate the reduction of angina pectoris after ABSORB implantation

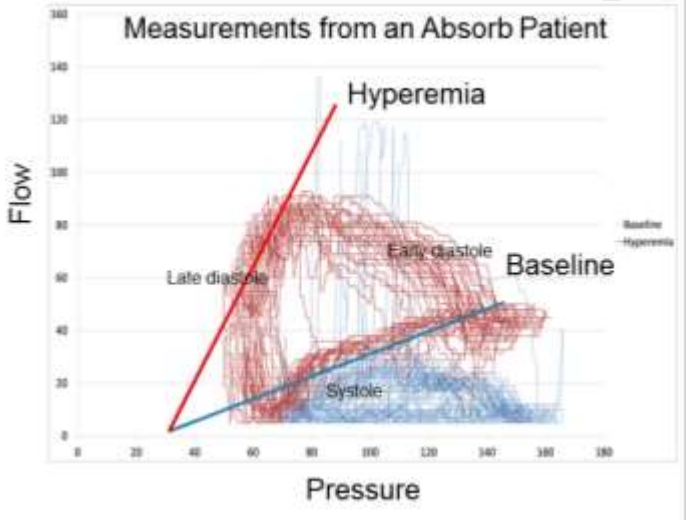
CFR



PET ($H_2{}^{15}O$)



Pressure velocity Loop



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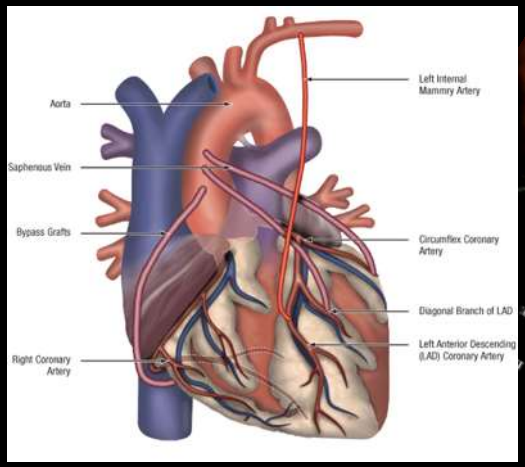
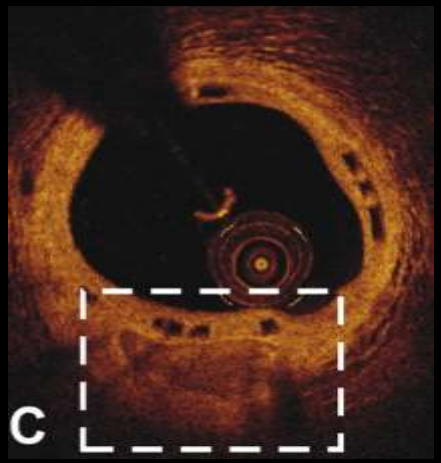


Preventive PCI By sealing plaques



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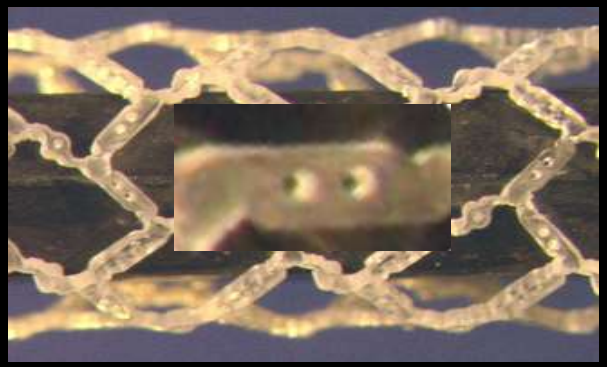


Sealing of plaques as a result of Bioresorbable Scaffold implantation: Can the scaffold cap the plaque?

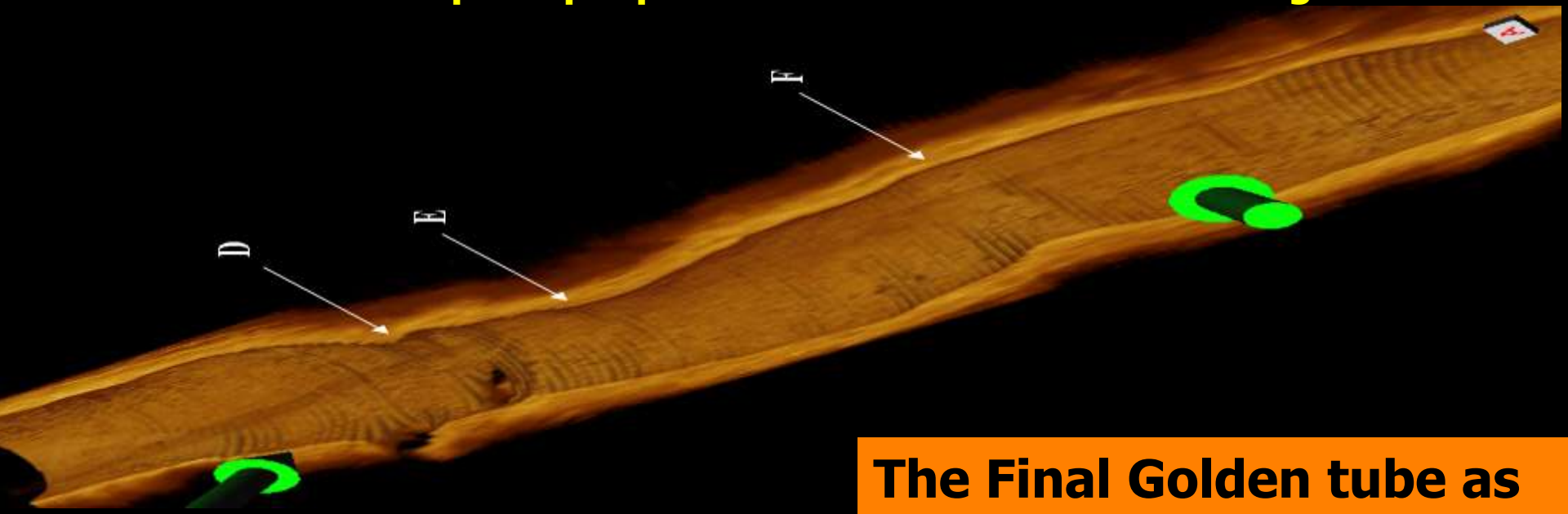
Eurointervention 2014

Bioresorbable vascular scaffold treatment induces the formation of neointimal cap that seals the underlying plaque without compromising the luminal dimensions: a concept based on serial optical coherence tomography data

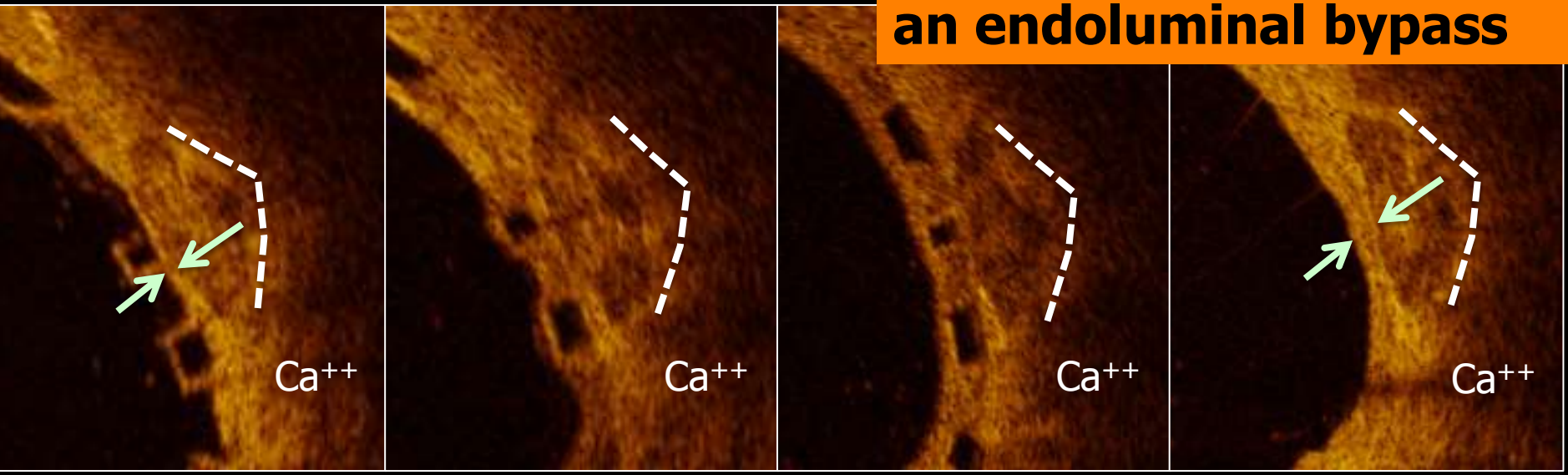
Christos V. Bourantas[1], MD, PhD; Patrick W. Serruys[1]*, MD, PhD; Shimpei Nakatani[1], MD; Yao-Jun Zhang[1], PhD; Vasim Farooq[1], MBChB, MRCP; Roberto Diletti[1], MD; Jurgen Ligthart[1], BSc; Alexander Sheehy[2], MSc; Robert-Jan M. van Geuns[1], MD, PhD; Dougal McClean[3], MD; Bernard Chevalier[4], MD; Stephan Windecker[5], MD; Jacques Koolen[6], MD, PhD; John Ormiston[7], MBChB; Robert Whitbourn[8], MD; Richard Rapoza[2], PhD; Susan Veldhof[9], RN; Yoshinobu Onuma[1], MD; Hector M. Garcia-Garcia[1], MD, PhD

Salvatore Brugaletta, Maria D. Radu, Hector M. Garcia-Garcia, Jung Ho Heo, Vasim Farooq, Chrysafios Girasis[a], Robert-Jan van Geuns[a], Leif Thuesen[d], Dougal McClean[e], Bernard Chevalier[f], Stephan Windecker[g], Jacques Koolen[h], Richard Rapoza[i], Karine Miquel-Hebert[j], John Ormiston[k], Patrick W. Serruys[a,*]

Sealing of plaques as a result of Bioresorbable Scaffold implantation:
Can the scaffold cap the plaque… and create late lumen enlargement !!!



The Final Golden tube as an endoluminal bypass

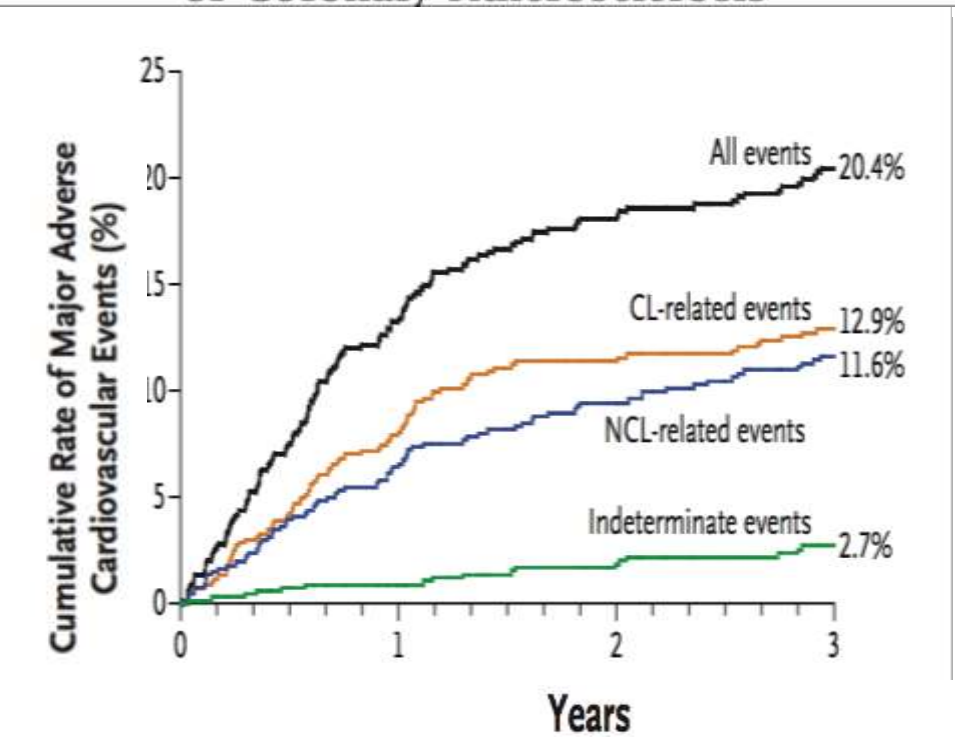


Future of the primary PCI

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

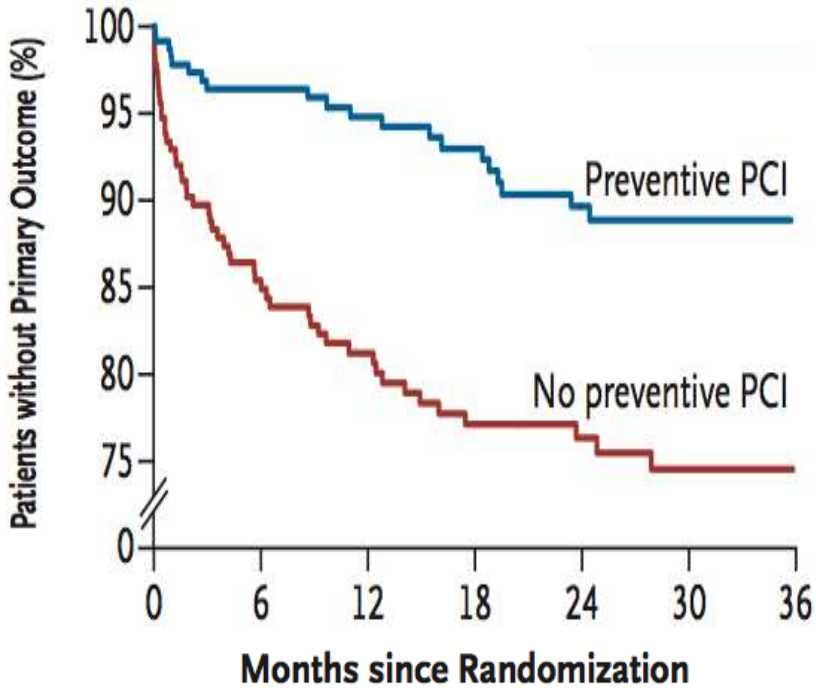
A Prospective Natural-History Study of Coronary Atherosclerosis



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Randomized Trial of Preventive Angioplasty in Myocardial Infarction

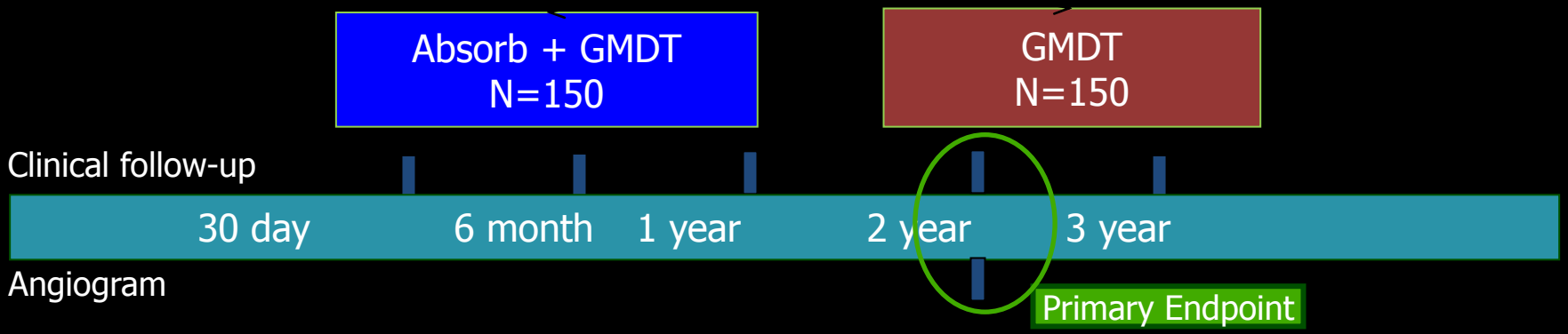


PROSPECT + PRAMI = recipe for prospect II, preventive PCI of non-flow limiting high risk lesions with bioresorbable scaffolds

PROSPECT ABSORB study

PROSPECT ABSORB is an investigator initiated multicenter, randomized trial, which for the first time will evaluate the **ability of a bioresorbable scaffold to safely increase luminal dimensions of vulnerable plaque**

Patients with plaque at high risk of causing future coronary events (plaque burden ≥70%)



Primary Endpoint:	**Minimal Lumen Area (MLA) at 2 years and TLF at 2 years**
Secondary Endpoints:	**MACE up to 2 years, IVUS and Near Infra-Red Spectroscopy parameters**

PROSPECT ABSORB will test the feasibility of an interventional approach in preventing future major adverse events arising from plaques which appear angiographically innocuous but are in fact the source of future acute coronary syndromes

GMDT: Guideline Directed Medical Therapy

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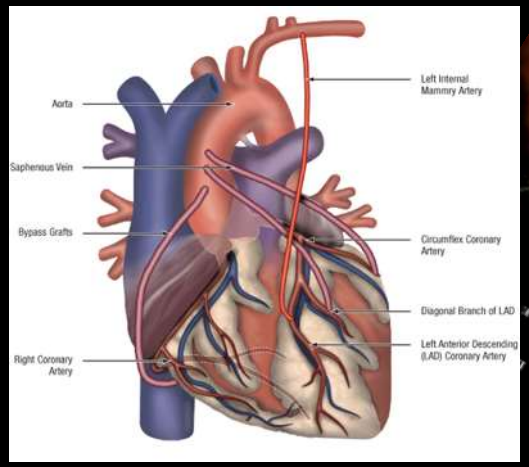

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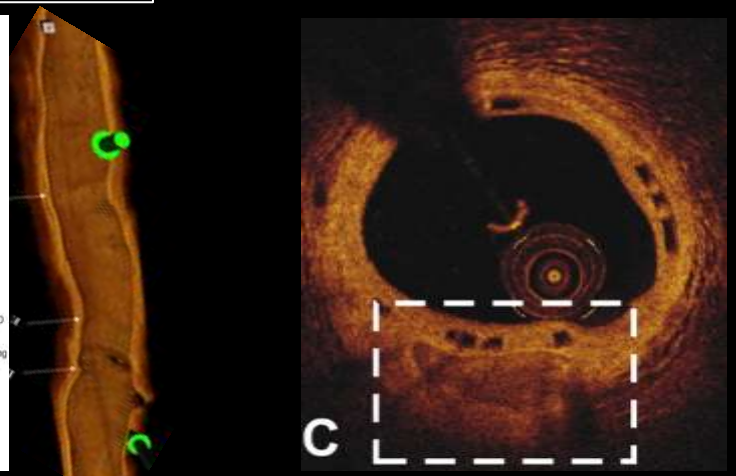

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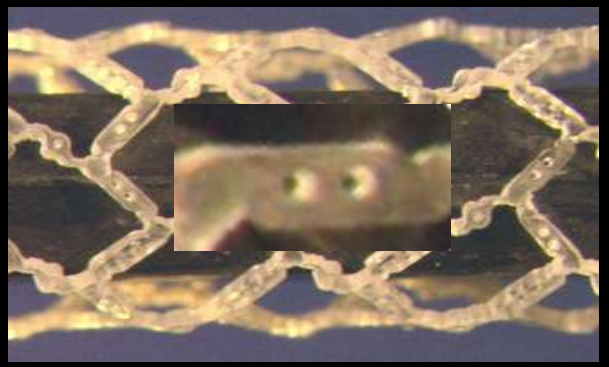
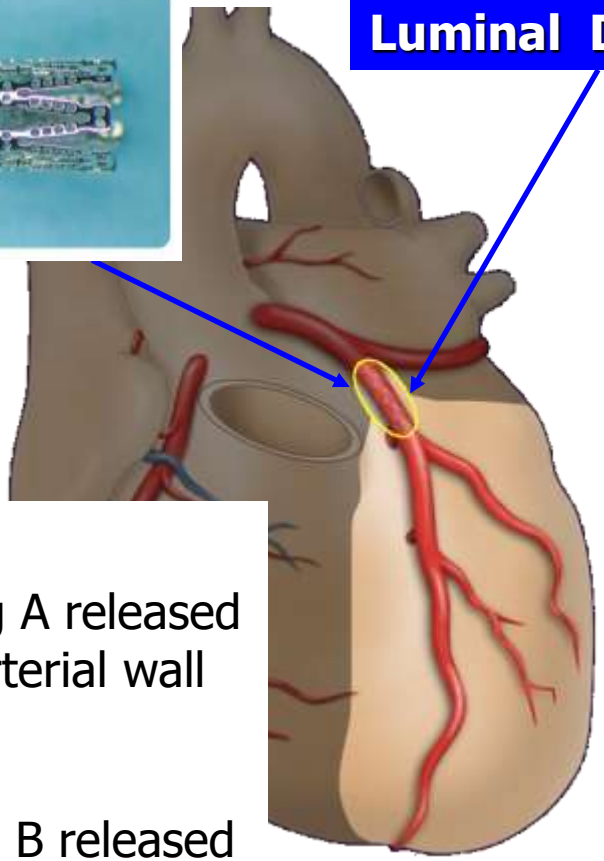


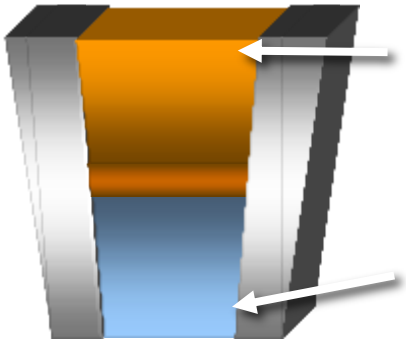
Prophecy on short term

Specific stent device (reservoir with drug) for specific syndrome (e.g. myocardial infarction and diabetes)

Vascular Drug Delivery: Acute MI



Two Drugs, One Well



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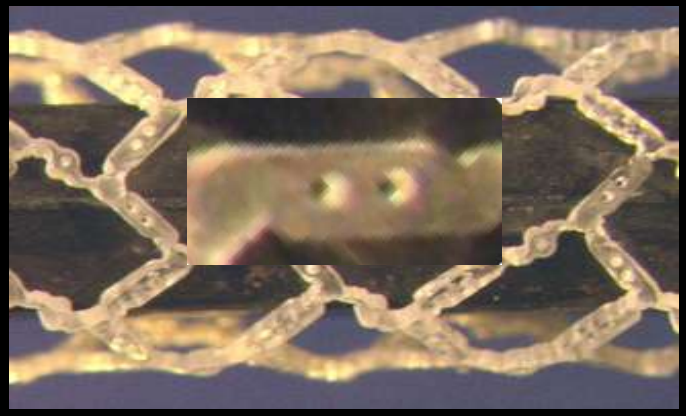

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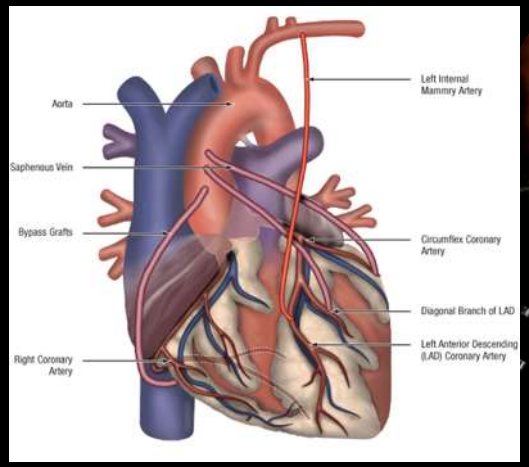

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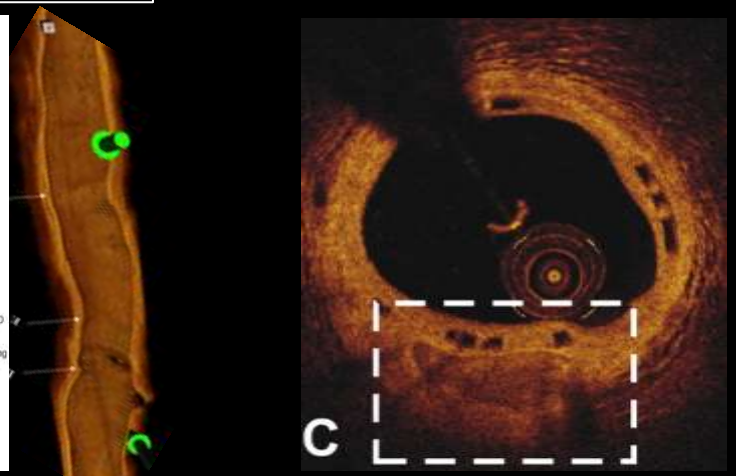

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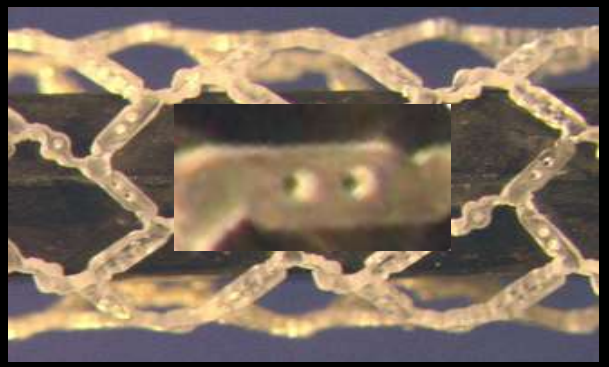

Thank You!


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First-in-man assessment of novel closure device for large puncture accesses
Evaluation of second-generation Absorb BVS: 12-month outcomes of the ABSORB EXTEND study
IVUS vs. angiography guidance for CTOs: two-year results from randomised AIR-CTO study
Improved endothelial function after TAVI
Impact of systemic inflammatory response syndrome in TAVI
Thoracoscopically assisted ventricular reconstruction for ischaemic heart failure with left anteroapical aneurysm
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