

Focal Treatment of Vulnerable Plaque:

PROSPECT ABSORB

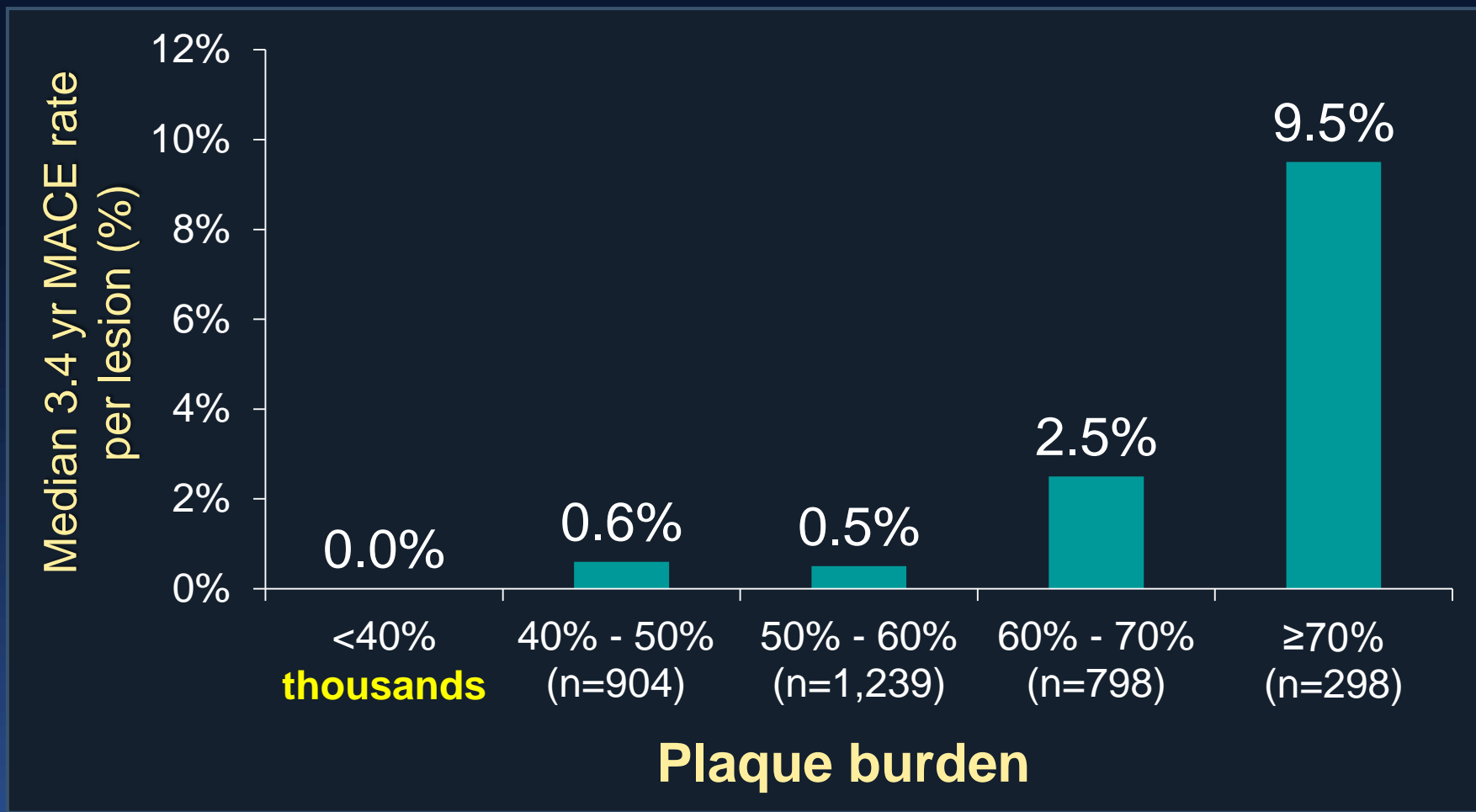
Gregg W. Stone, MD

Columbia University Medical Center
NewYork-Presbyterian Hospital
The Cardiovascular Research Foundation

Disclosures

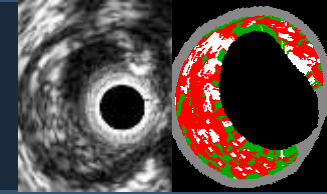
- **Consultant to Reva**

PROSPECT: Correlates of Non-culprit Lesion Related Events: Impact of plaque burden

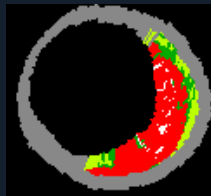


➔ 31.3% of patients had ≥1 lesion with PB ≥70%

PROSPECT: NCL events arising from stenoses with PB ≥70%

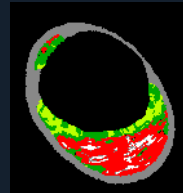


Thin-cap fibroatheroma



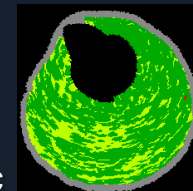
HR (95%CI) =
10.83 (5.55, 21.10)
P<0.0001

Thick-cap fibroatheroma



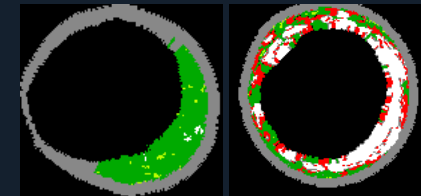
HR (95%CI) =
5.17 (2.59, 10.32)
P<0.0001

Pathologic intimal thickening



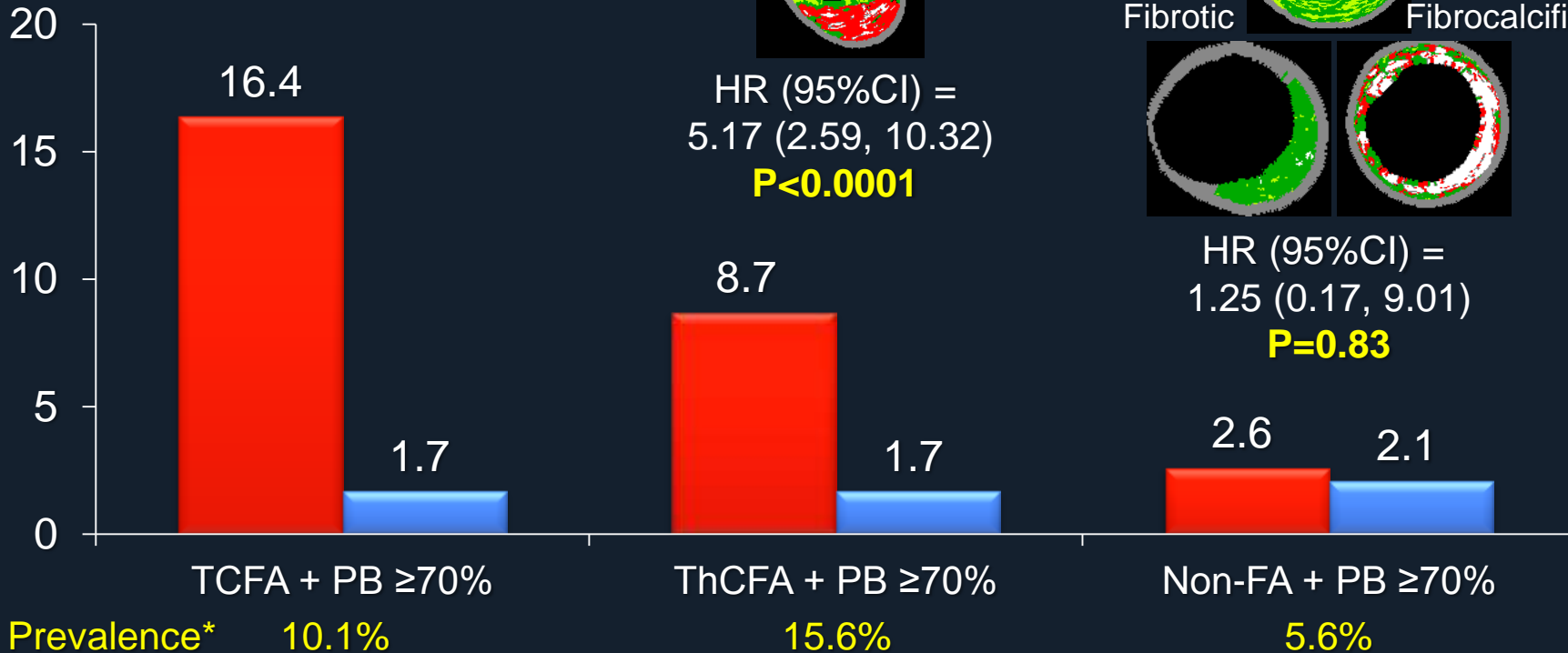
Fibrotic

Fibrocalcific



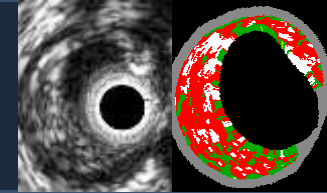
HR (95%CI) =
1.25 (0.17, 9.01)
P=0.83

Median 3 .4 Yr MACE Rate
per Isn (%)



*Likelihood of one or more such lesions being present per patient. PB = plaque burden at the MLA

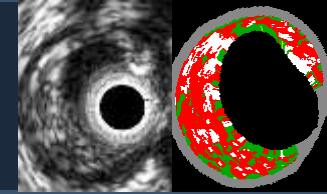
Should VP be Treated?



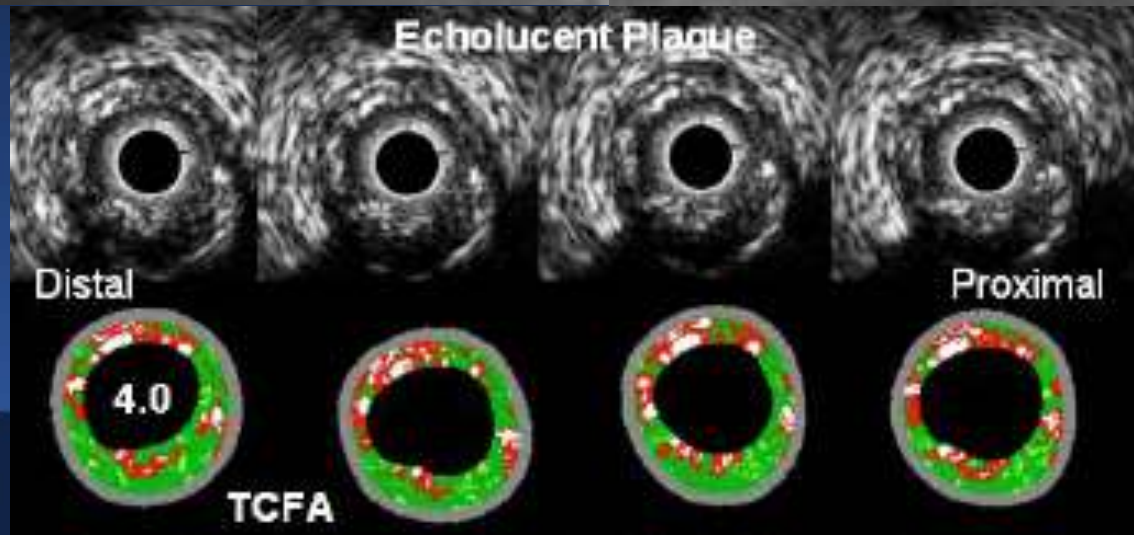
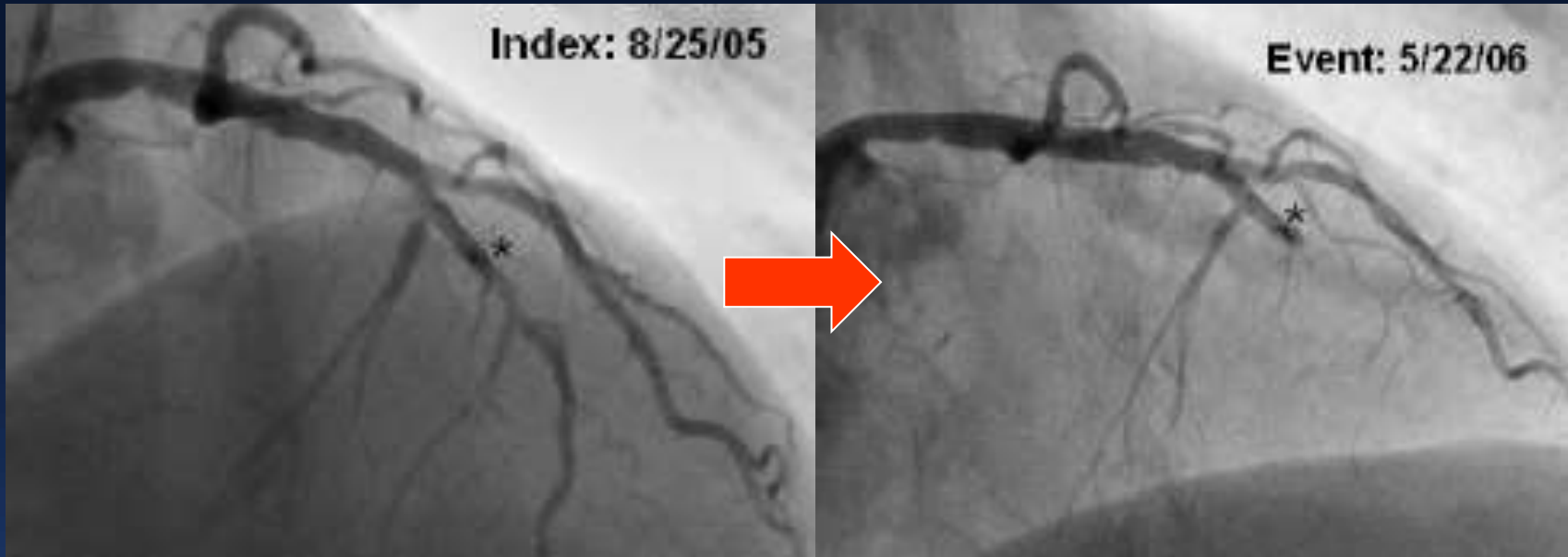
PROSPECT case example



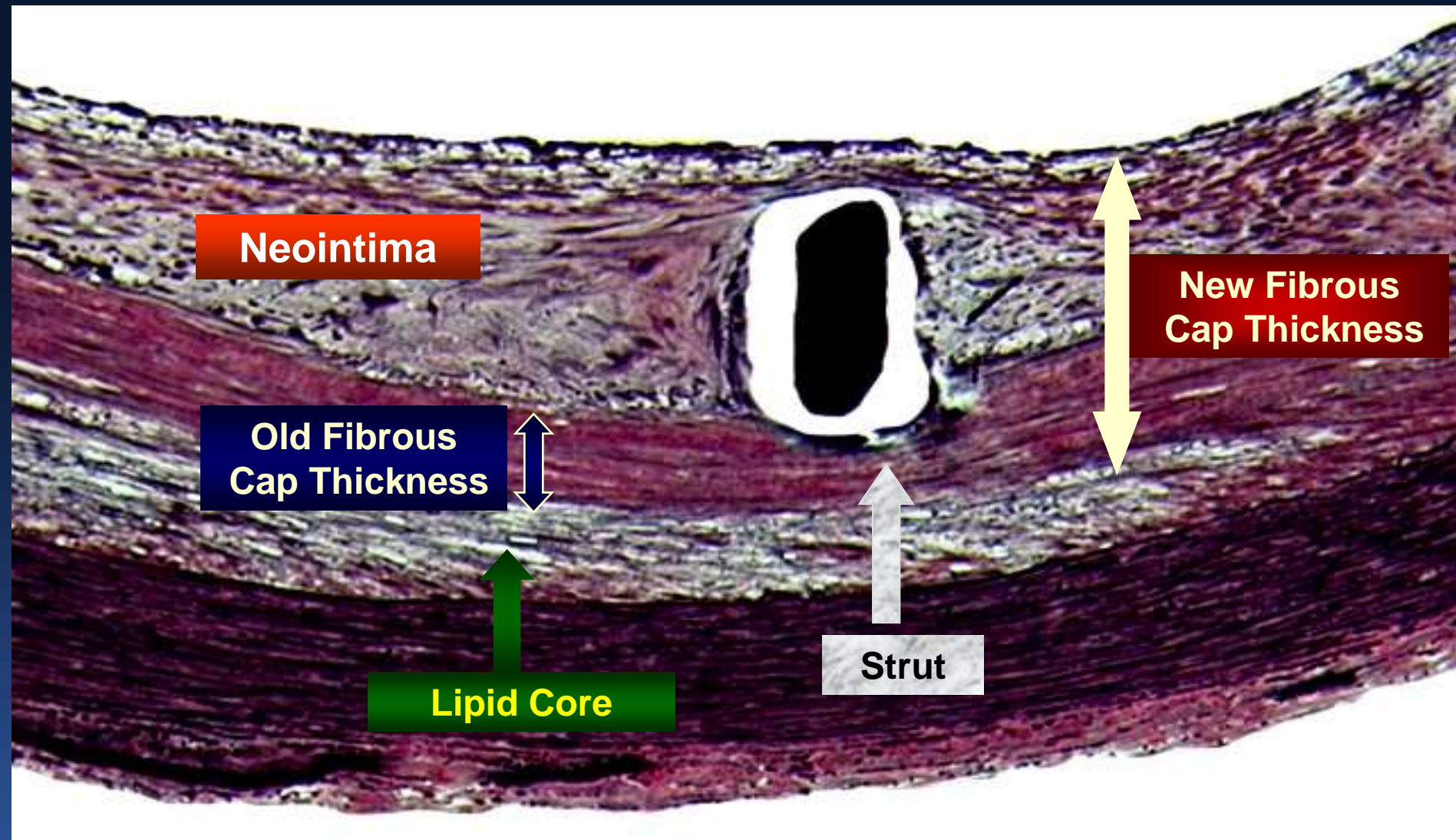
Should VP be Treated?



MLA 4.0 mm²; plaque burden 72%; TCFA

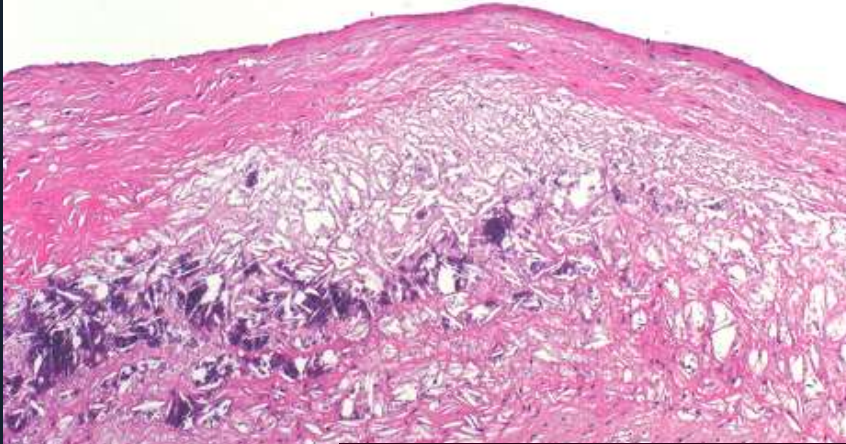


Hypercholesterolemic rabbit aorta TCFAs

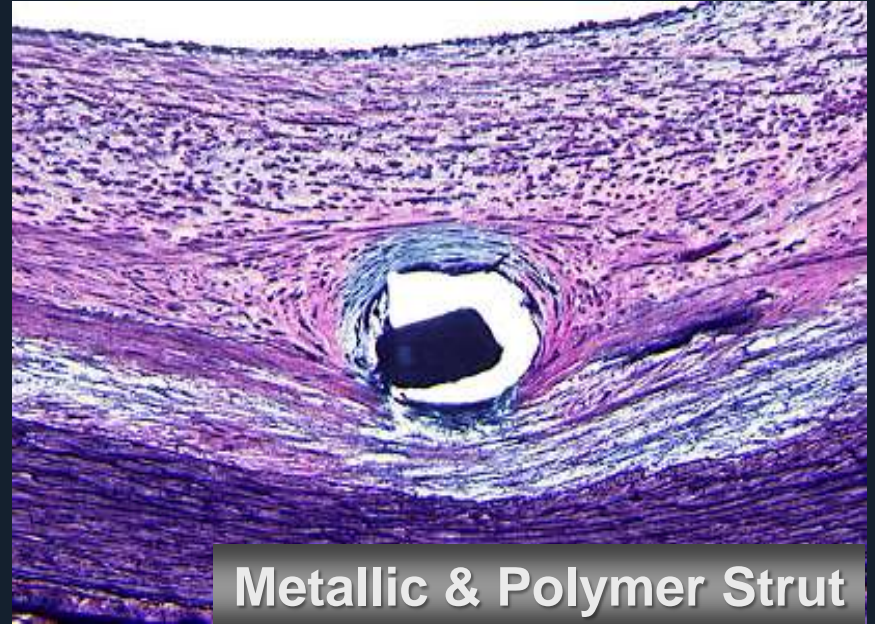


De Novo Lsns and Stents Deployed on TCFAs

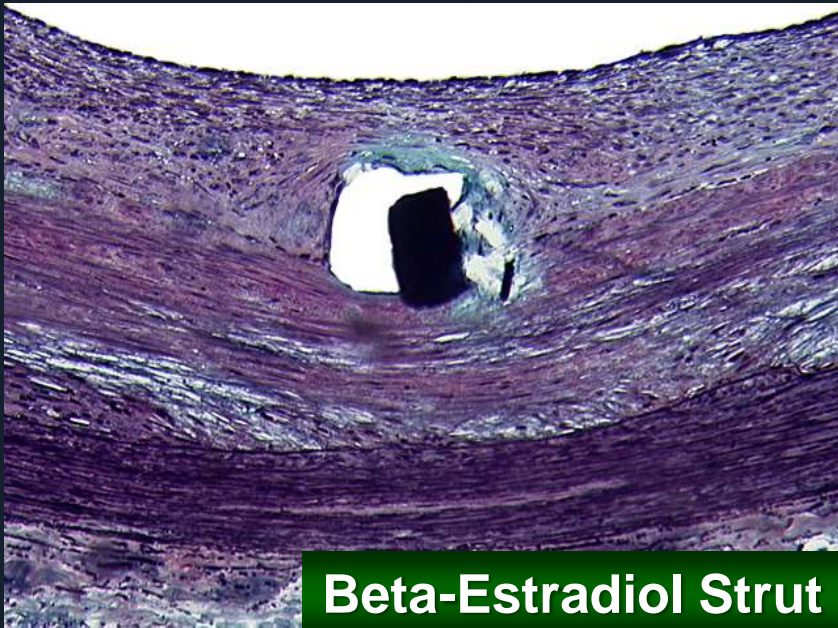
Adapted from Moreno PR.
Cardiol Clin 2010;28:1-30



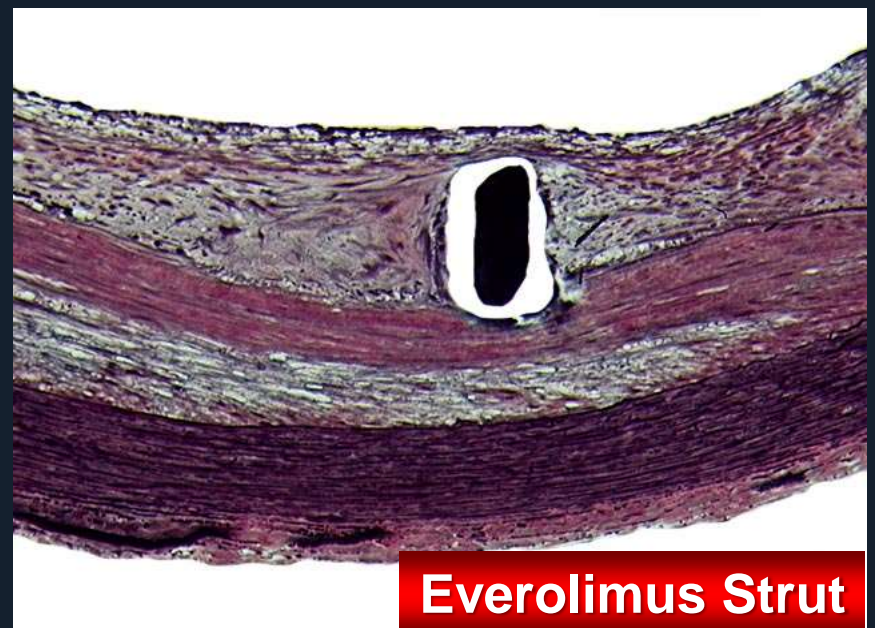
De Novo TCFA



Metallic & Polymer Strut



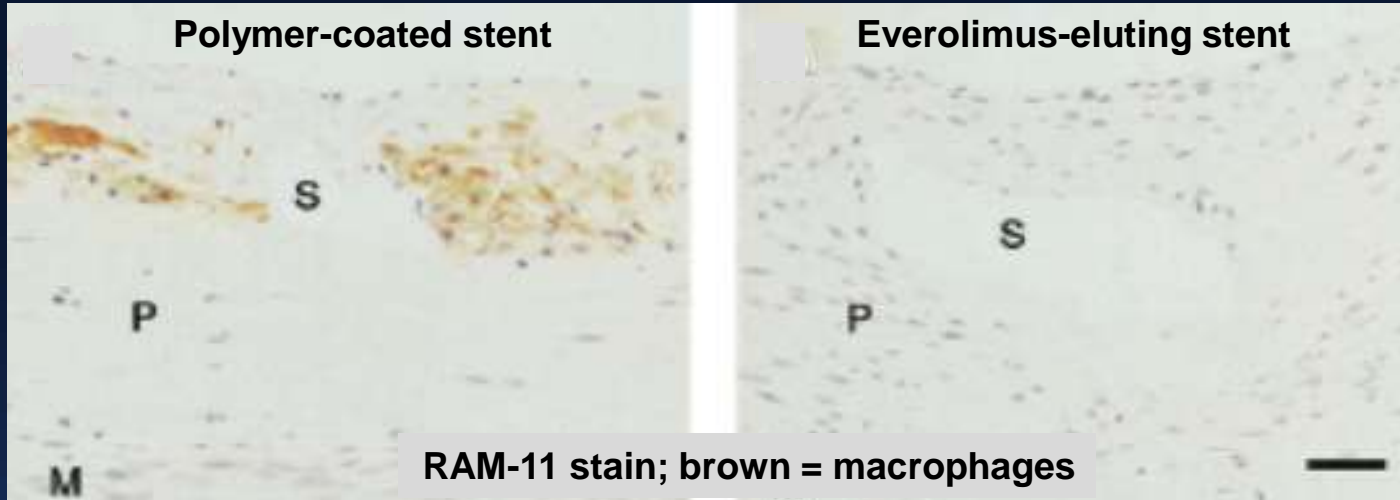
Beta-Estradiol Strut



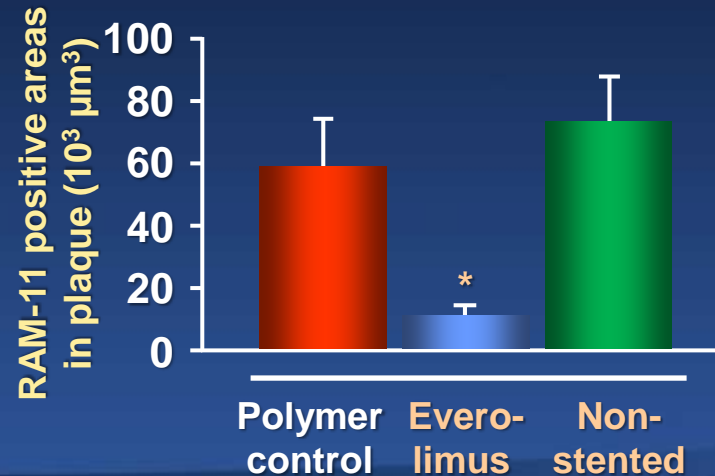
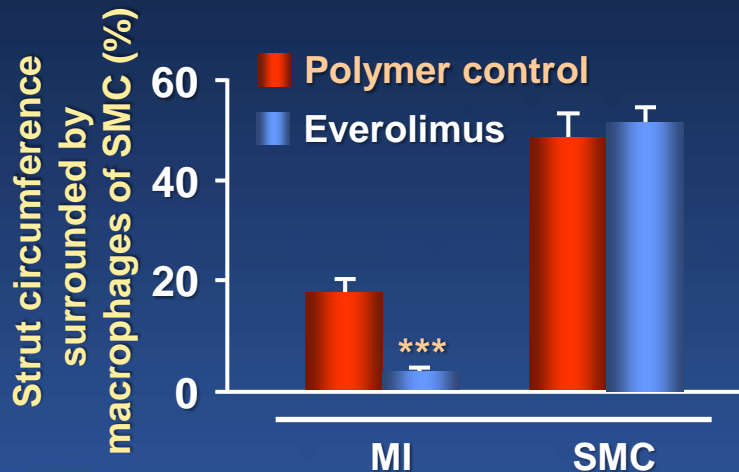
Everolimus Strut

Everolimus Induced Autophagy of Macrophages

EES and polymer only coated metallic stents implanted in atherosclerotic arteries of cholesterol-fed rabbits



EES resulted in marked reduction of macrophage content, with preservation of SMC content



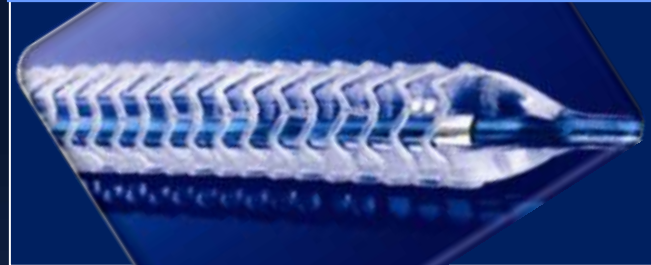
Bioresorbable Vascular Scaffolds (BRS)

Igaki-Tamai



PLLA

Abbott Absorb



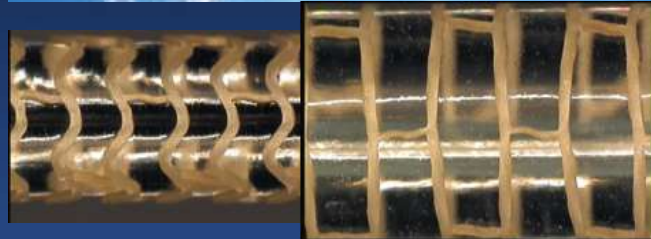
PLLA
(eluting everolimus)

Elixir DESolve



PLLA
(eluting novolimus)

Reva Fantom



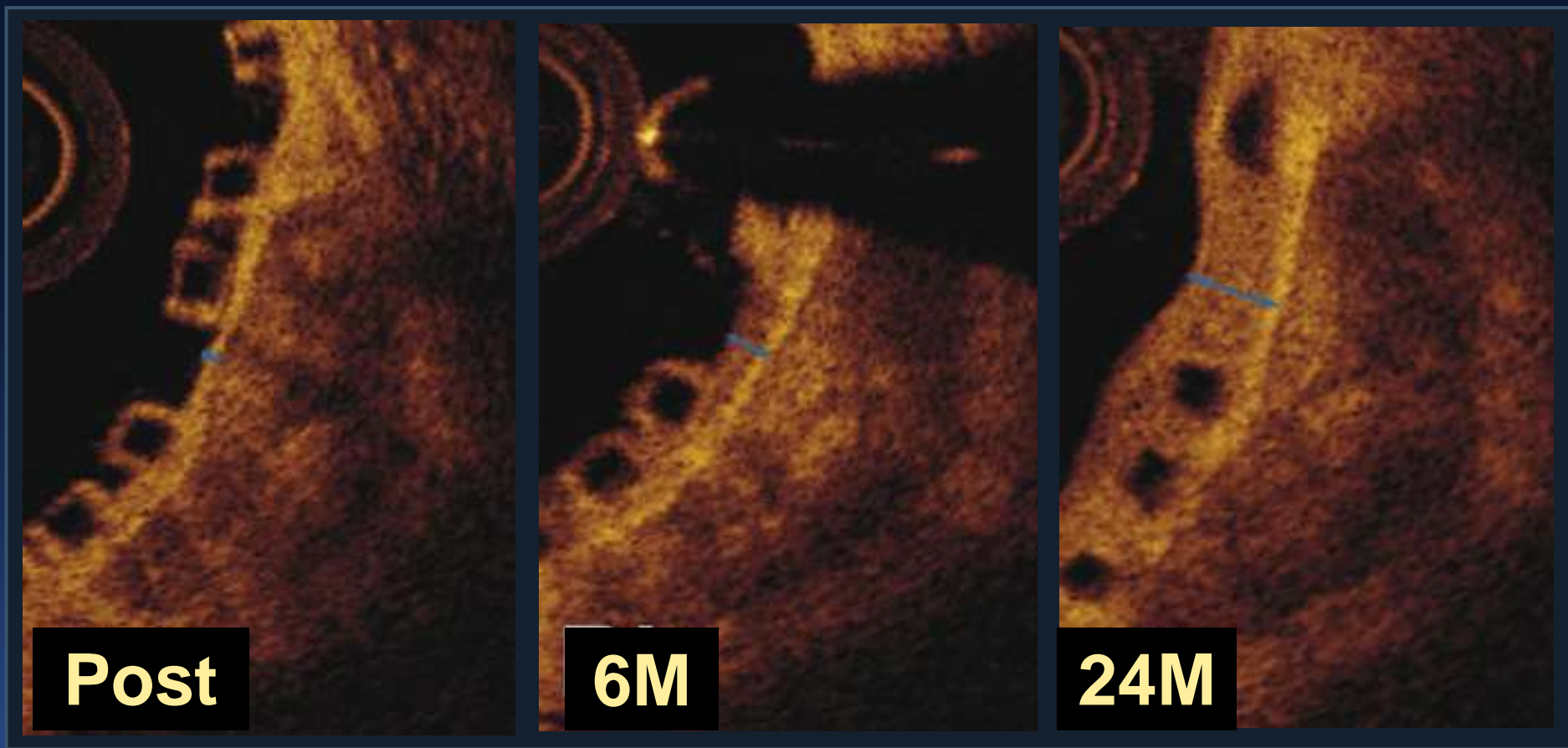
Iodinated tyrosine-
derivative
(eluting sirolimus)

Biotronik Dreams



Magnesium
(eluting sirolimus)

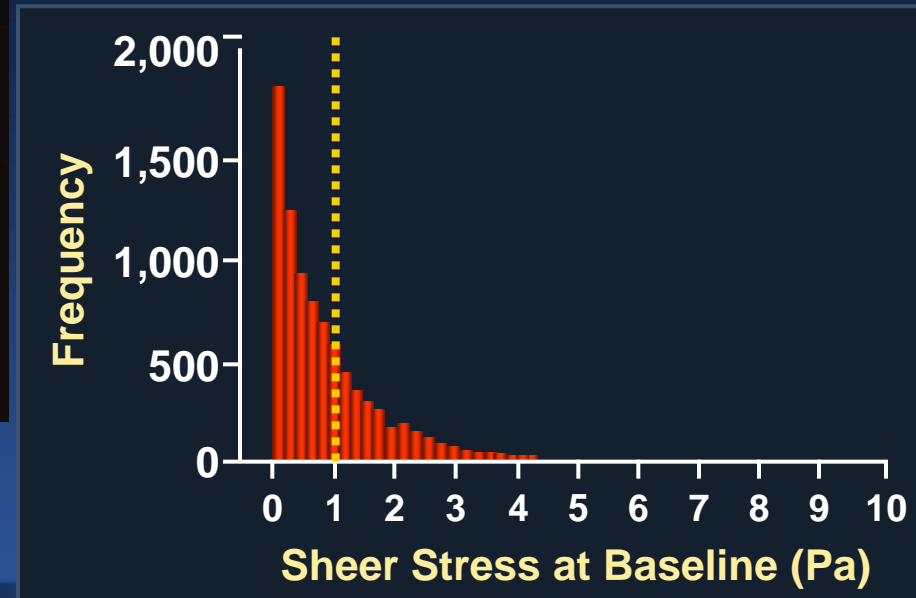
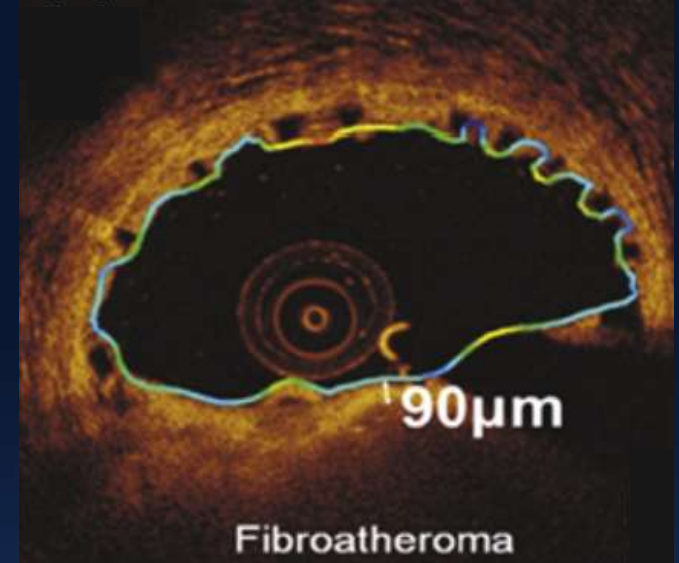
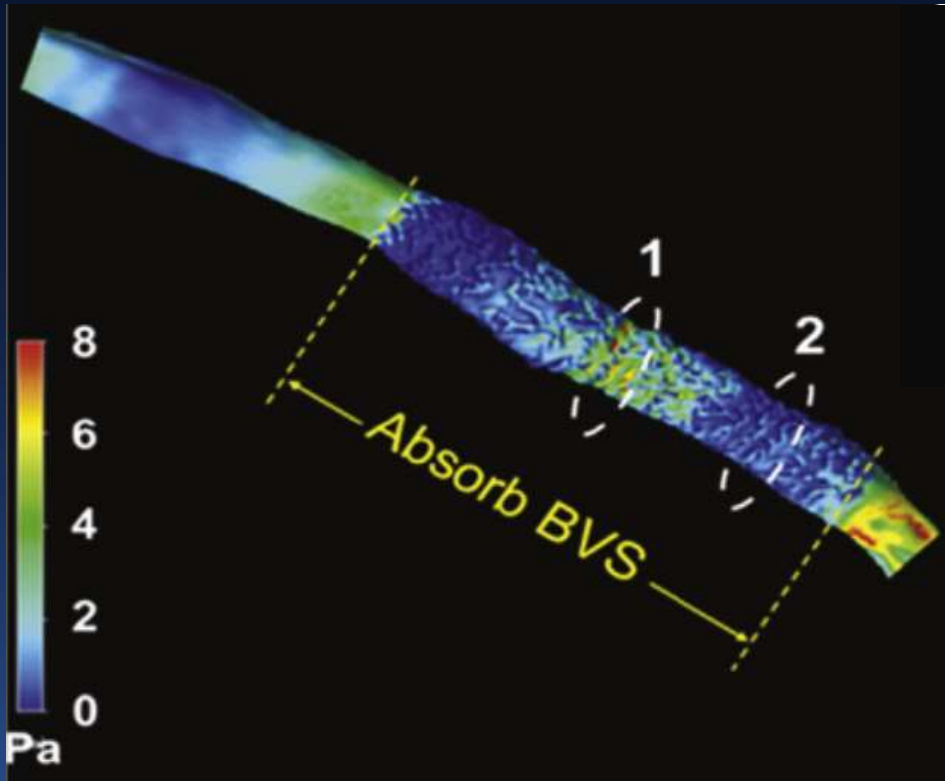
Sealing and Shielding of Plaques After Scaffold Implantation



Example of capping a calcified plaque

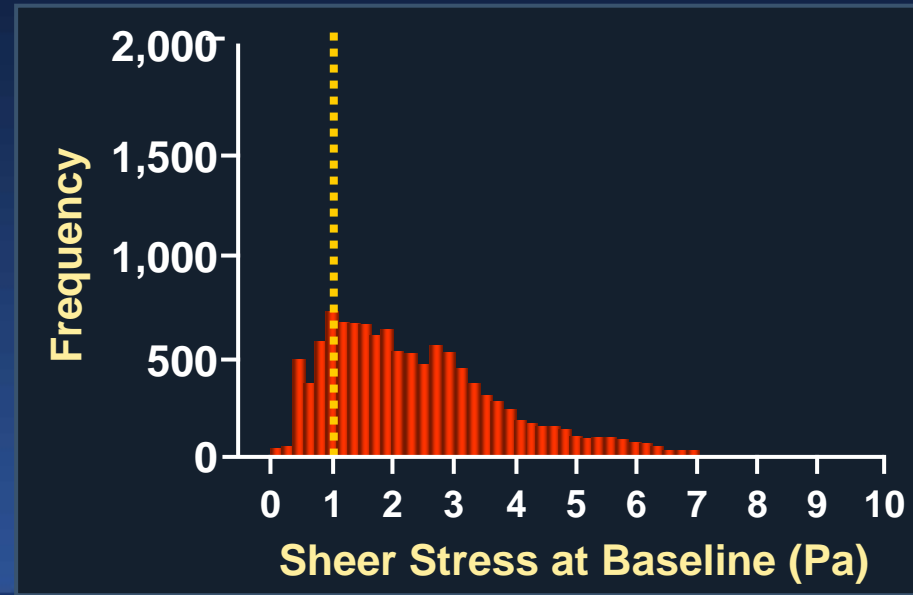
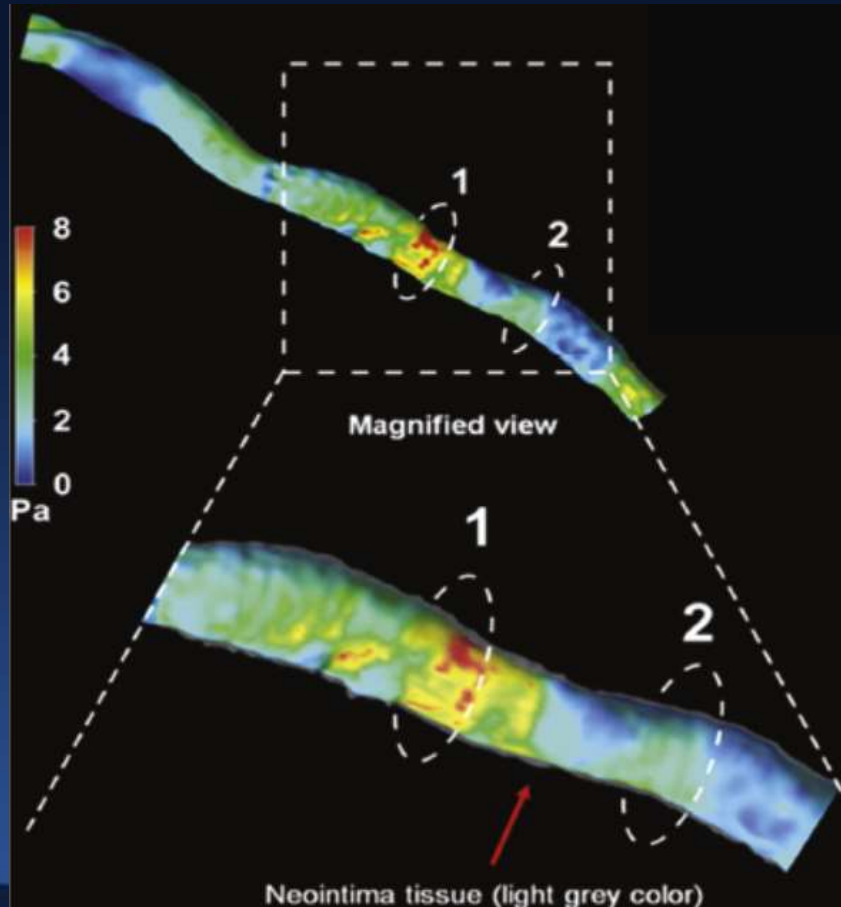
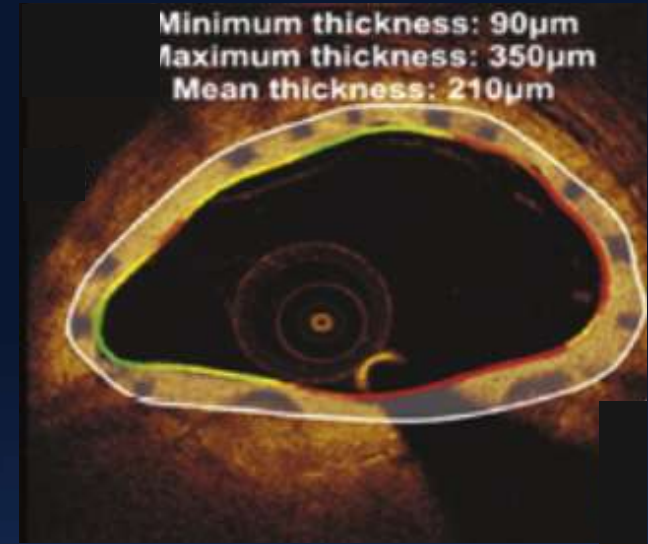
BVS Implantation Over a Fibroatheroma

LAD reconstruction showing low shear stress throughout the BVS



BVS Implantation Over a Fibroatheroma

2 years later: ESS has normalized over the scaffold, and a 210 μm layer of neointima has developed



Transformation of a TCFA to a ThCFA by ABSORB BVS (Cohort B)

OCT measures	Post (n=47)	6-12 mo (n=47)	P ₁ value	2-3 yrs (n=42)	P ₂ value
Lumen area (mm ²)	7.49±1.26	6.14±1.49	<0.001	5.93±1.49	0.57
Scaffold area (mm ²)	7.59±1.12	7.67±1.28	0.71	8.28±1.74	<0.001
TCFA/pt in scaffolded segments	0.26±0.44	0.02±0.15	0.001	0	1.0
TCFA min neointima thickness (um)	-	23±28	-	85±72	0.02
TCFA mean neointima thickness (um)	-	116±64	-	227±140	0.005

Neointimal thickness increases from 6-12 to 2-3 years, but lumen does not decrease because scaffold area increases to accommodate the extra tissue.
TCFA s are all converted to ThCFAs.

Treatment of a TCFA with BVS: Substantial lumen enlargement due to plaque regression with adaptive remodeling (cohort A pt)

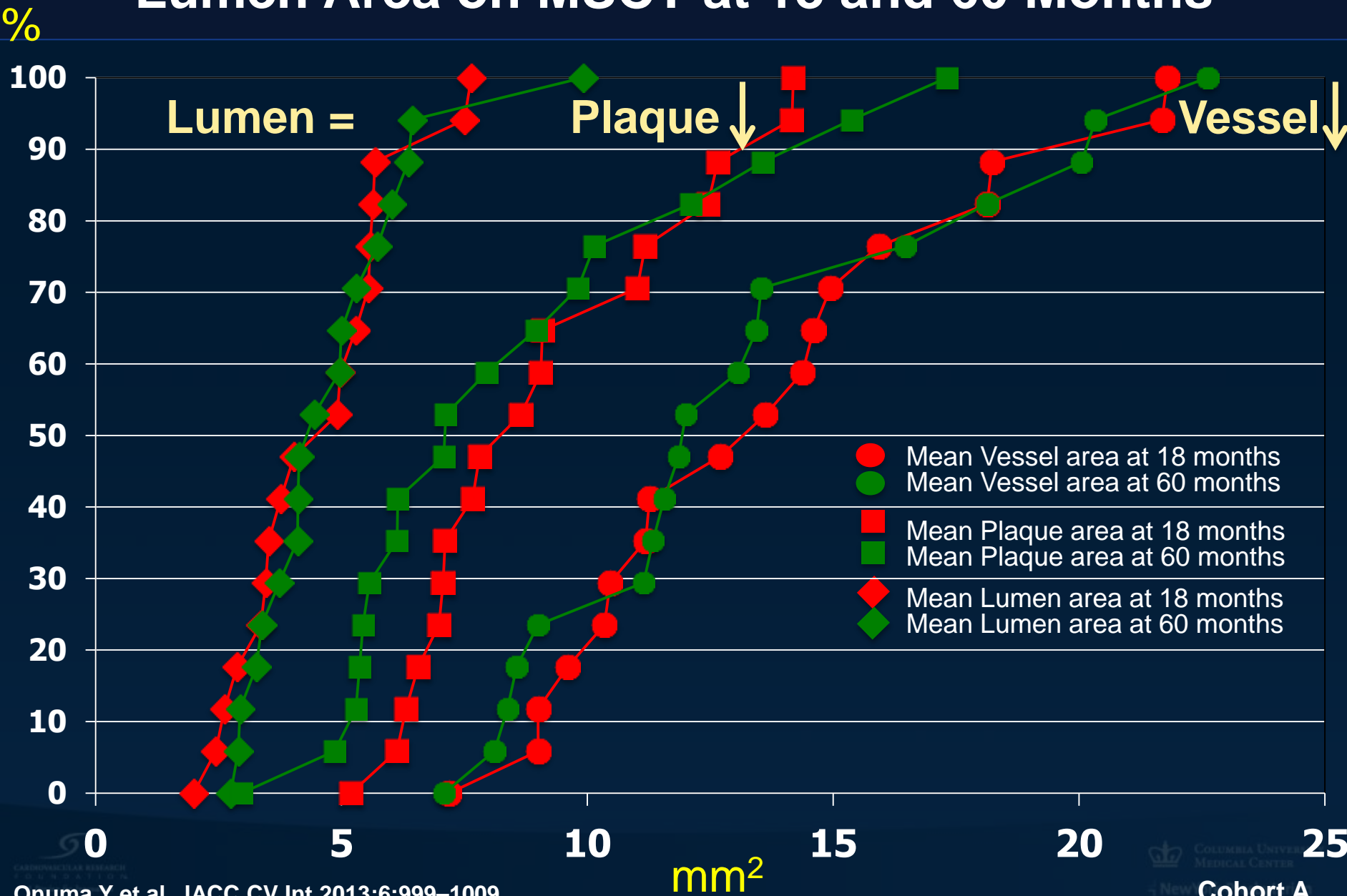
6 months



5 years

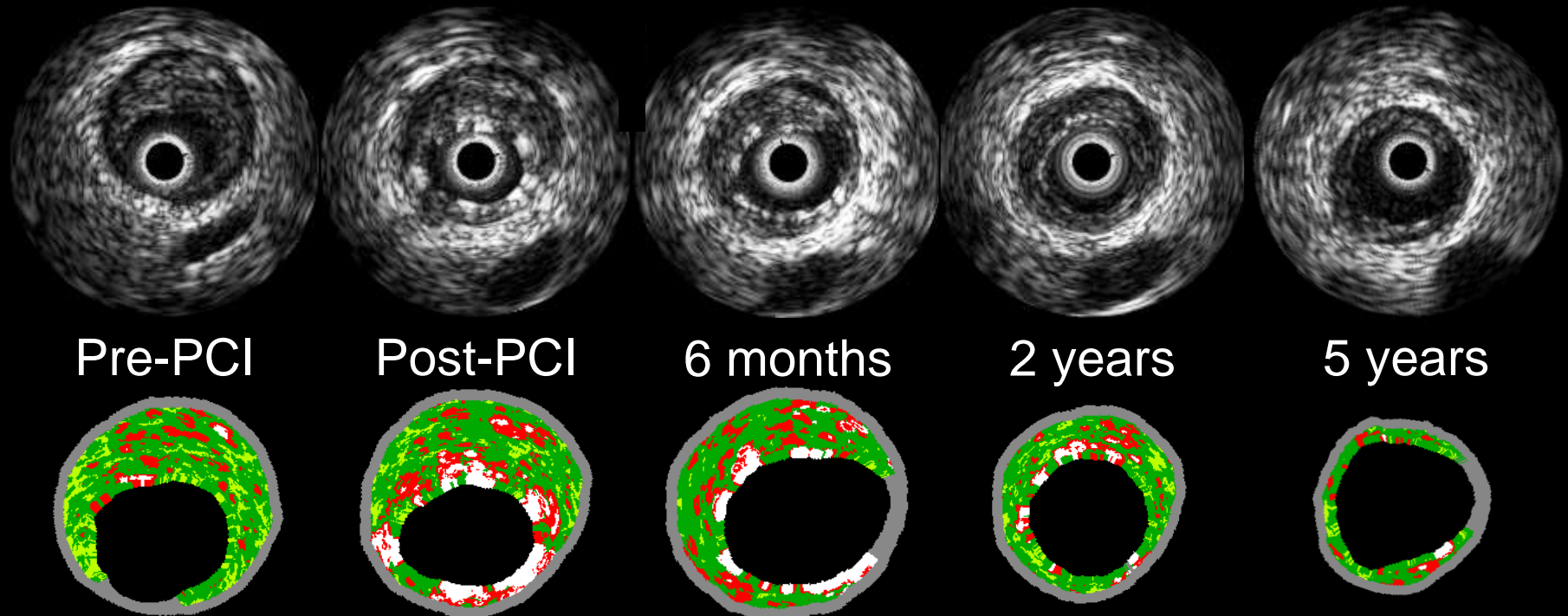


CFD Curves of Vessel Area, Plaque Area and Lumen Area on MSCT at 18 and 60 Months



Interventional Plaque Regression by BVS:

Substantial lumen enlargement due to plaque regression with adaptive remodeling (cohort A pt)



Vessel area (mm ²)	15.72	15.34	14.09	13.76
Mean lumen area (mm ²)	6.95	6.17	6.56	8.09
Plaque area (mm ²)	8.78	9.17	7.54	7.07

PROSPECT II Study

**900 pts with ACS at up to 20 hospitals
in Sweden, Denmark and Norway (SCAAR)**

NSTEMI or STEMI $>12^{\circ}$

IVUS + NIRS (blinded) performed in culprit vessel(s)

Successful PCI of all intended lesions (by angio \pm FFR/iFR)



Formally enrolled



3-vessel imaging post PCI

Culprit artery, followed by non-culprit arteries

Angiography (QCA of entire coronary tree)

IVUS + NIRS (blinded) (prox 6-8 cm of each coronary artery)



PROSPECT II Study PROSPECT ABSORB RCT

900 pts with ACS after successful PCI

3 vessel IVUS + NIRS (blinded)

≥1 IVUS lesion with ≥70% plaque burden present?

Yes

(N=300)

No

(n=600)

R

1:1

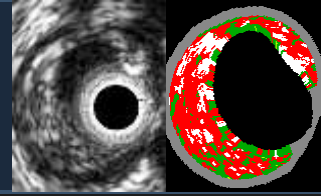
**ABSORB BVS
+ GDMT** (N~150)

GDMT
(N=150)

Routine angio/3V IVUS-NIRS FU at 2 years

Clinical FU for up to 15 years

PROSPECT Case Example



Should you treat this lesion?

Index: 8/25/05

Not today -
Possibly tomorrow!