



SABATO 9 OTTOBRE

LETTURA

QUARANT'ANNI DI ANGIOPLASTICA CORONARICA

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Introduzione di: **Francesco Prati**, *Roma*



No conflicts to disclose

Complex balloon
angioplasty

Primary angioplasty
for acute myocardial
infarction



Geoffrey Hartzler
1946-2012

At that time an unresolved problem was a coronary dissection. The treatment was a prolonged balloon inflation (perfusion balloons) with unpredictable success

OR

Emergency by-pass surgery

Ulrich Sigwart



Gary Roubin

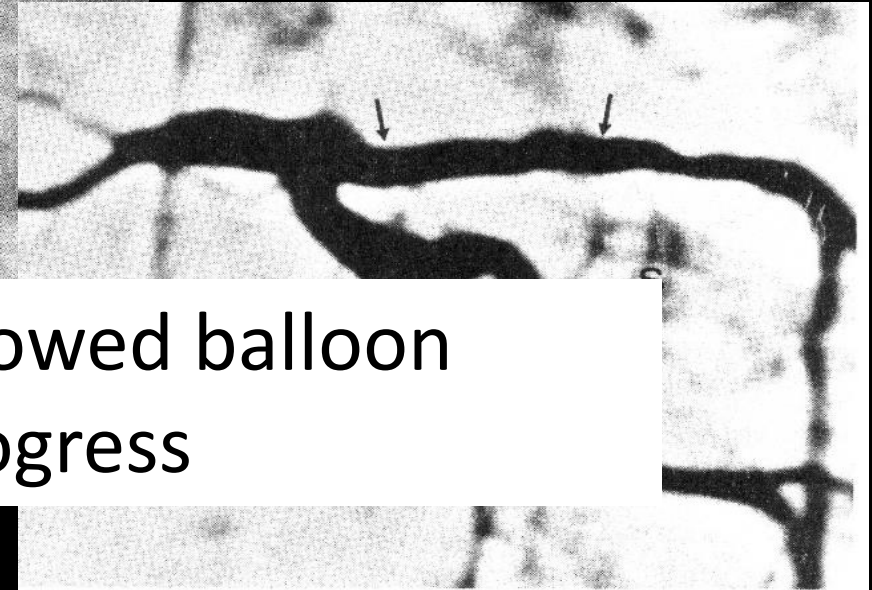


« Proof of Concept » June 1986: stents came about to treat PTCA complications not to prevent restenosis



NEJM 1987

Ulrich Sigwart and Jacques Puel



Stents saved lives and allowed balloon
angioplasty to progress



Virchow Triad

The stool stands only if each leg is solid: one leg with extra strength does not compensate for the broken one

- Lumen Leg: optimal stent cross sectional area
- Run off leg: optimal distal flow
- Blood leg: optimal antiplatelet therapy,

Intracoronary Stenting Without Anticoagulation Accomplished With Intravascular Ultrasound Guidance

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

(Circulation. 1995;91:1676-1688.)

Coumadin/Warfarin was replaced by Ticlopidine and Aspirin

Coronary stenting without anticoagulation

359 patients on Aspirin + Ticlopidine+ IVUS evaluation

- ➡ Aspirin + Ticlopidine in most pts
- ➡ Average balloon pressure 14.9 atm
- ➡ Balloon artery ratio 1.17
- ➡ Thrombosis 0.9%

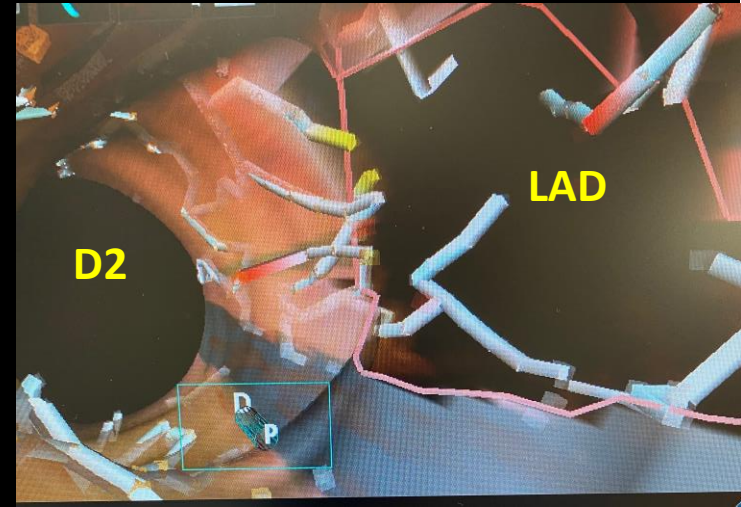
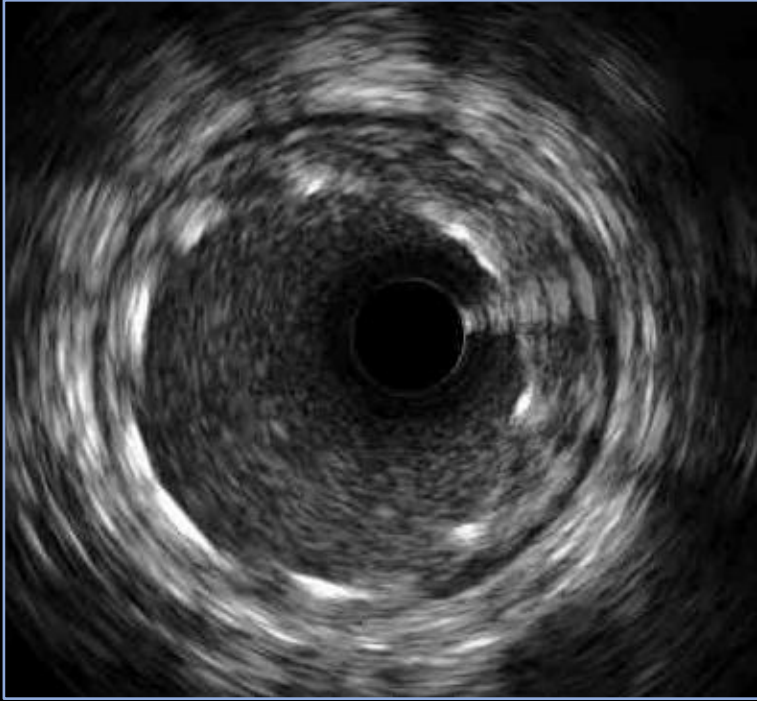
Colombo et al Circulation 1995

Why did I pursue Ticlopidine?

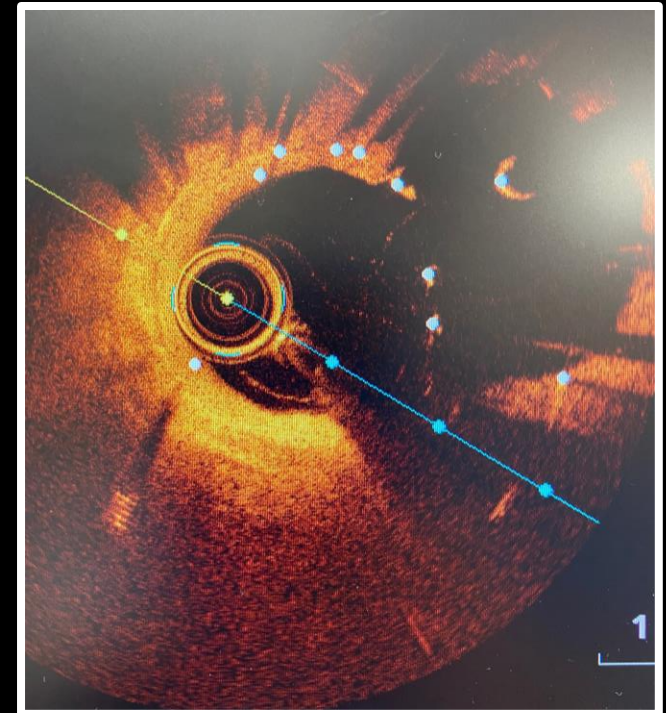
Dr. Paul Barraghan: “ If you start Ticlopidine few days before PTCA and
A cardiac surgeon: “ There is no question that
continue you will have less dissections which will occlude
Ticlopidine causes a malignant bleeding. I will
not operate on any patient who is receiveing
Ticlopidine ”



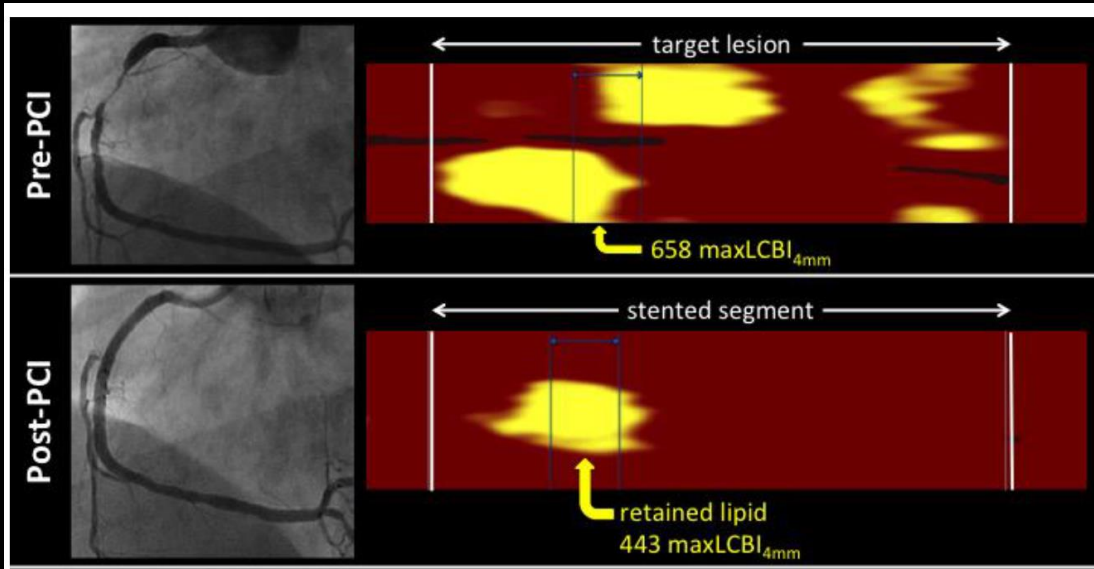
IVUS



OCT



NIRS

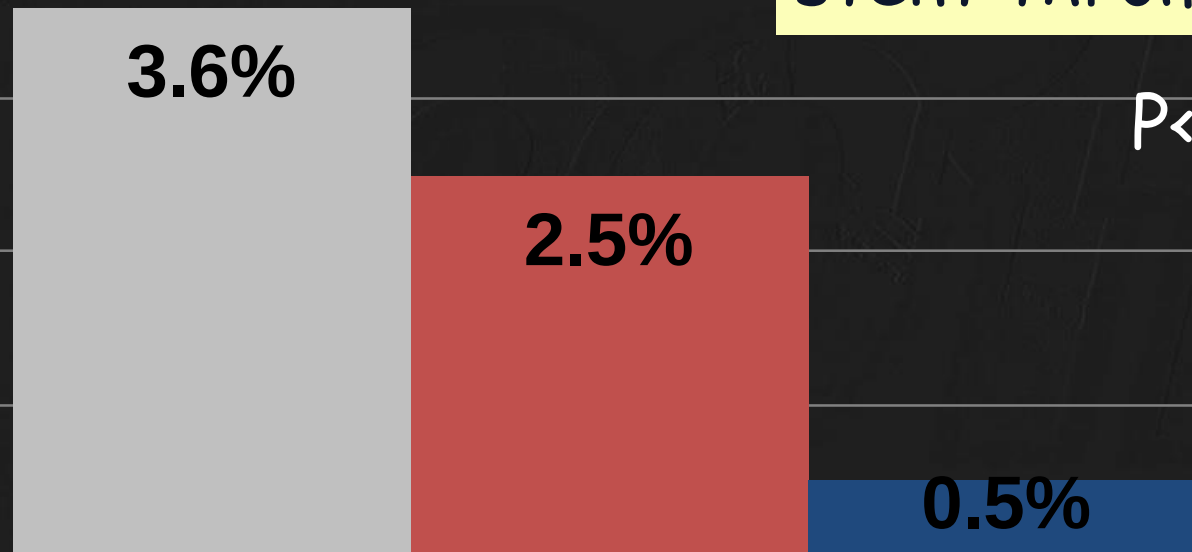


STARS Trial, in 1998

The antithrombotic effect of adding ticlopidine to aspirin

- Aspirin alone (N=557)
- Aspirin+Warfarin (N=550)
- Aspirin+Ticlopidine (N=546)

EVENTS AT 30 DAYS



I am puzzled that 96.4% of patients who took only aspirin did not experience stent thrombosis

$P < 0.001$

*Death, TLR, thrombus, MI

Leon MD et al N Eng J Med 1998; 339: 1665-71

In the meantime Primary PCI came into play

DES replaced bare metal stents and became the way to perform
coronary angioplasty

The Big Trials

SYNTAX Trial (NEJM 2009) : SINTAX score, major impact in Guidelines for PCI

FREEDOM Trial (NEJM 2012): established that CABG should be the first choice for revascularization in most diabetics

In this patient:
the results of the
SYNTAX Trial,
demonstrate that
CABG is superior to PCI
to lower mortality,
myocardial infarction
and need for a second
revascularization
procedure

Image size: 512 x 512
View size: 1230 x 1230
WL: 129 WW: 145

931 (64 y , 64 y)
Cardio ClarityFluoro7.5 -- Coro 15 fpsLow
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Zoom: 240% Angle: 0

Im: 1/71

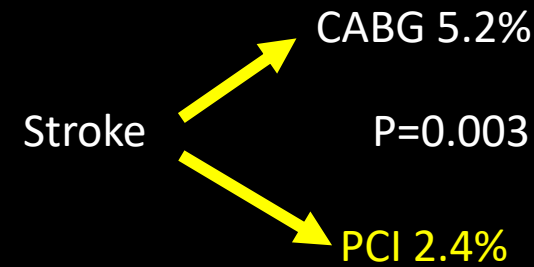
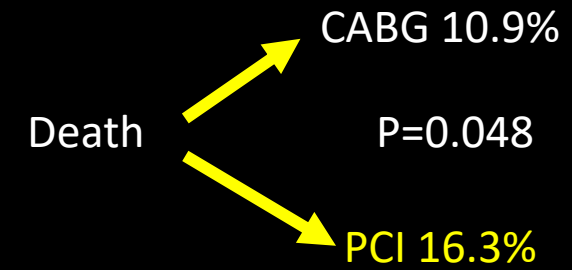
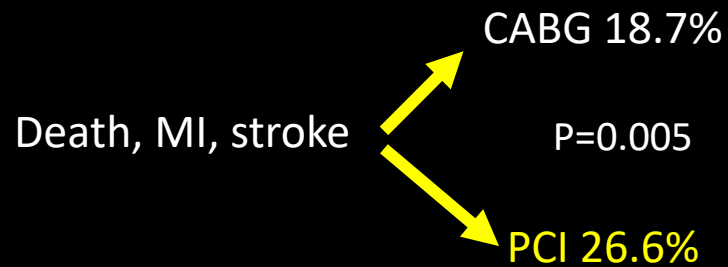
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Made In OsiriX

1900 pts randomized DES vs CABG

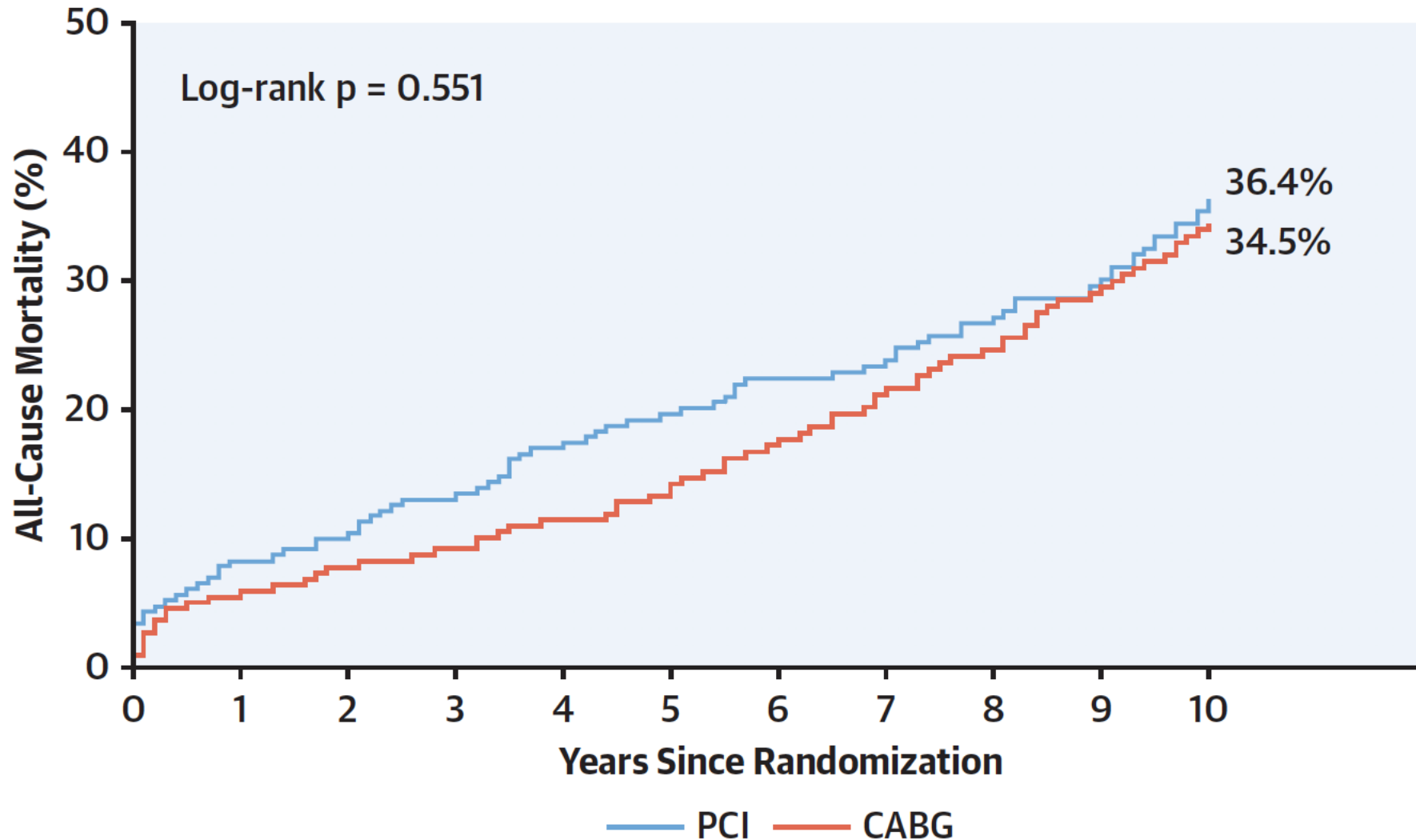
At 5 yrs.



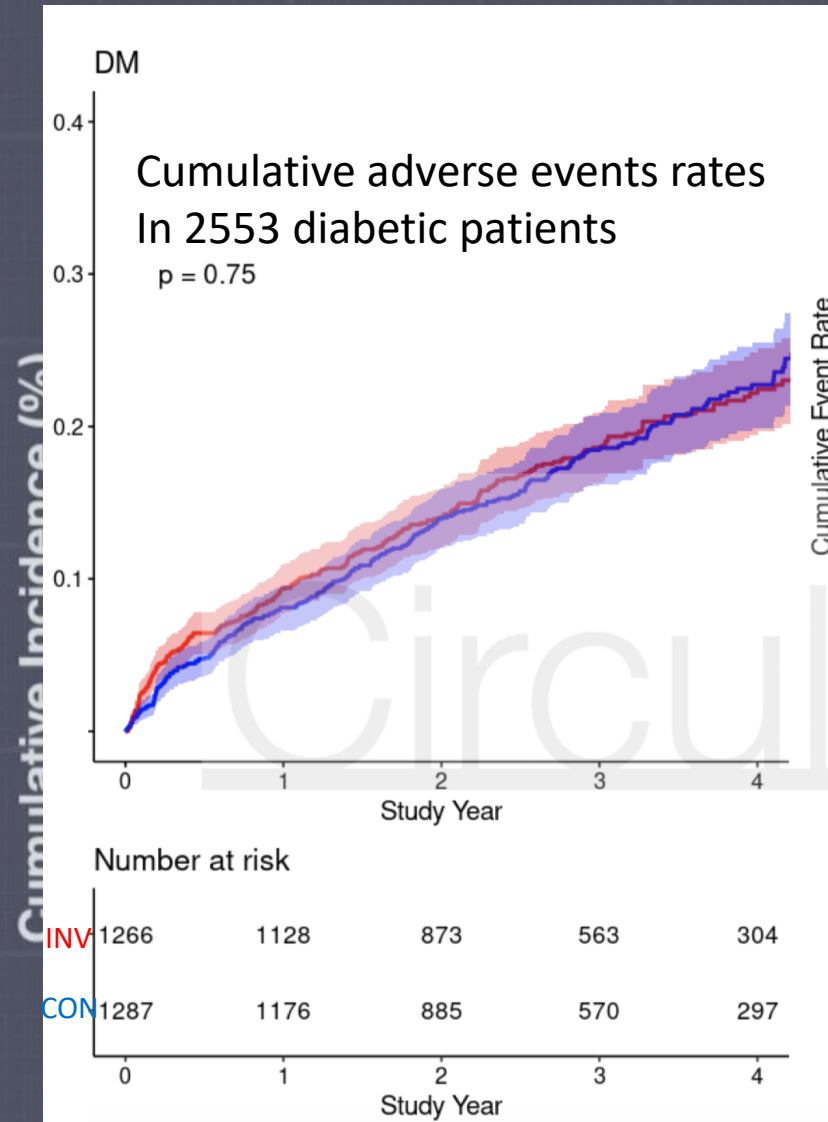
SYNTAX Trial

Lancet 2019

All-Cause Death Up to 10 Years in Diabetes



5179 pts with stable
angina
Randomized to
invasive vs. medical
therapy



stable angina, heart
d cardiac arrest

Conservative strategy
Invasive strategy

(, 0.80 to 1.08)

mization

In the Stable patients ISCHEMIA Trial supported the concept of Reasonable Incomplete Revascularization even NO Revascularization

Sustained evidence that Imaging and Physiology Evaluation make PCI better

Better lesion preparation in particular for calcified lesions. Bioresorbable Scaffolds paved the way to the concept of appropriate lesion preparation and new devices made the success

PCI of complex lesions is now safer thanks to mechanical support (IMPELLA: elective use, high mortality in bailout)

Success and safety for CTO continue to improve

Pharmacology has been simplified, the concept of High Bleeding Risk reduces complications related to Dual Antiplatelet Therapy; for most DES 1 month DAPT and a trend to single agent and no triple therapy

Disease Progression: A weak area

8 mo Follow-Up



15 months Later



11561/03

How I would like to see the future

This is not Contemporary Interventional Cardiology



My considerations

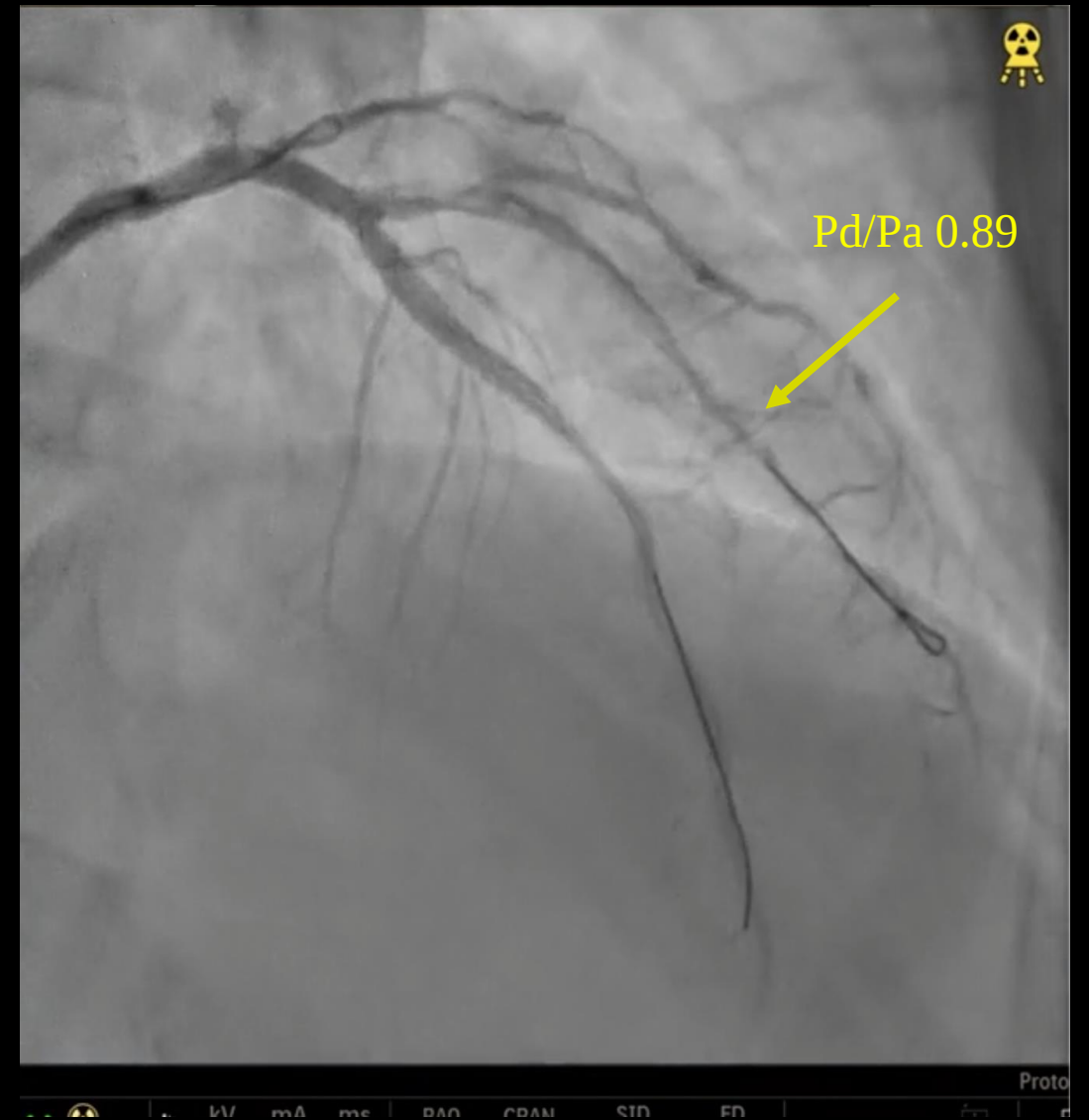
Large vessels (3 mm and over) and short stents (less than 25 mm) with optimal result, evaluated with imaging, could be the default approach.

For these lesions I see the possible come back of bioresorbable scaffolds

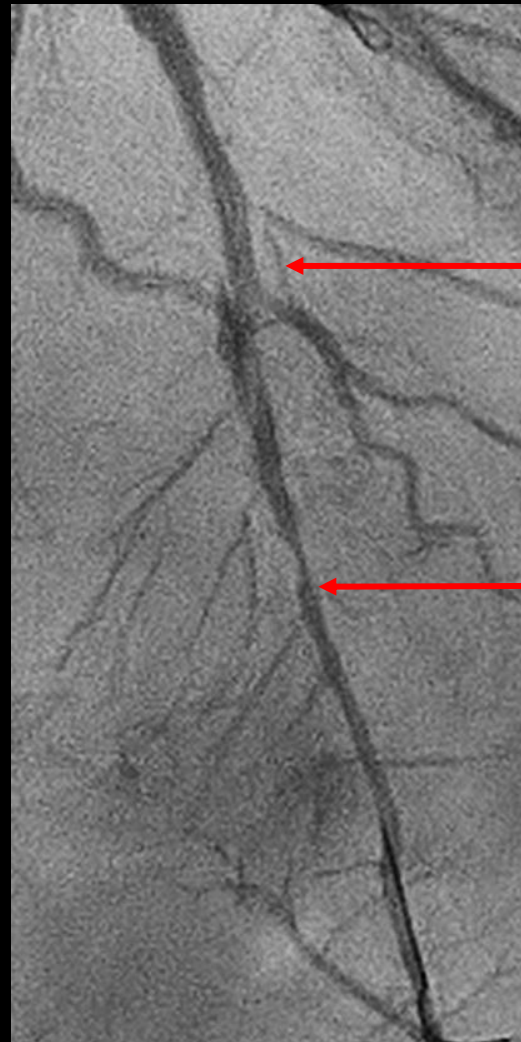
In long lesions with diffuse disease what should we do?

-Use the same approach and implant long stent with imaging optimization?

Optimal lesion preparation, Imaging and Pressure Wire evaluation and, if the result is considered acceptable, treat with Drug Coated Balloons



Repeat physiology assessment after 2.5 mm balloon dilatation of the distal LAD



$Pd/Pa=0.86$

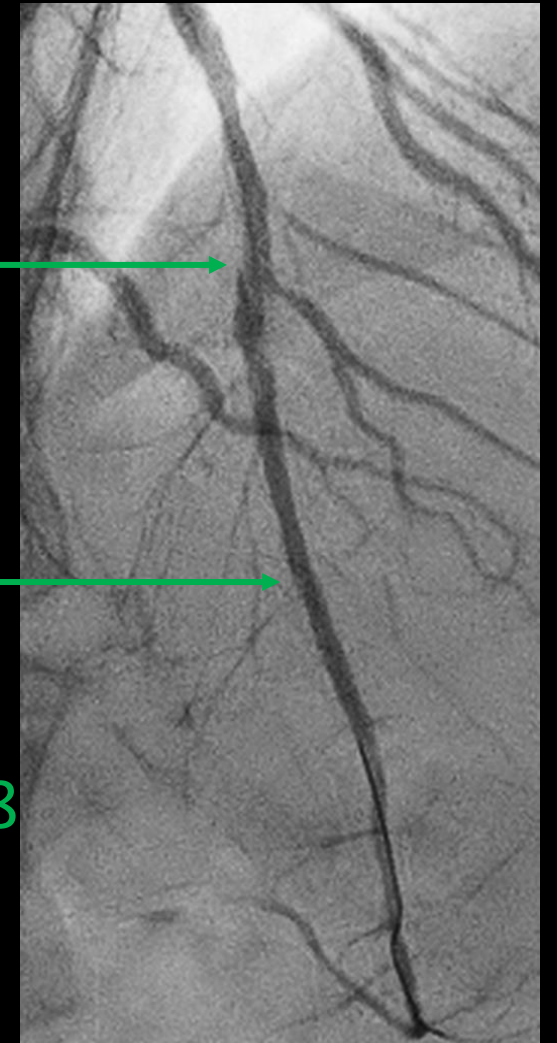
$Pd/Pa=0.84$

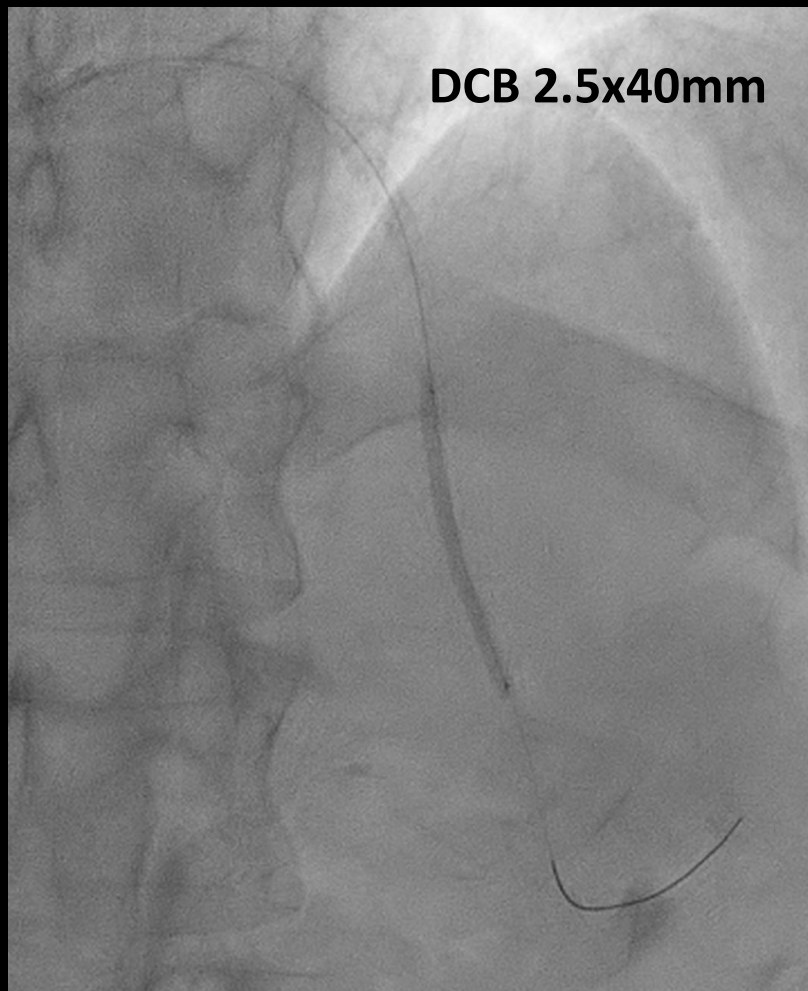
Contrast FFR=0.77

$Pd/Pa=0.94$

$Pd/Pa=0.91$

Contrast FFR=0.88



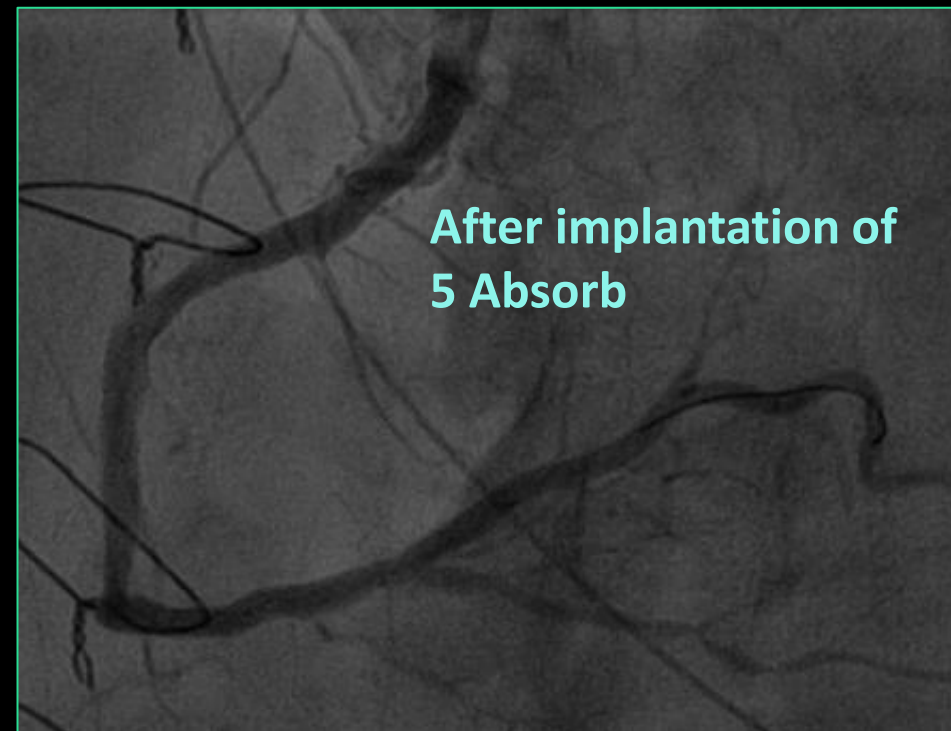


The need for Metal Free PCI

Procedure August 2012

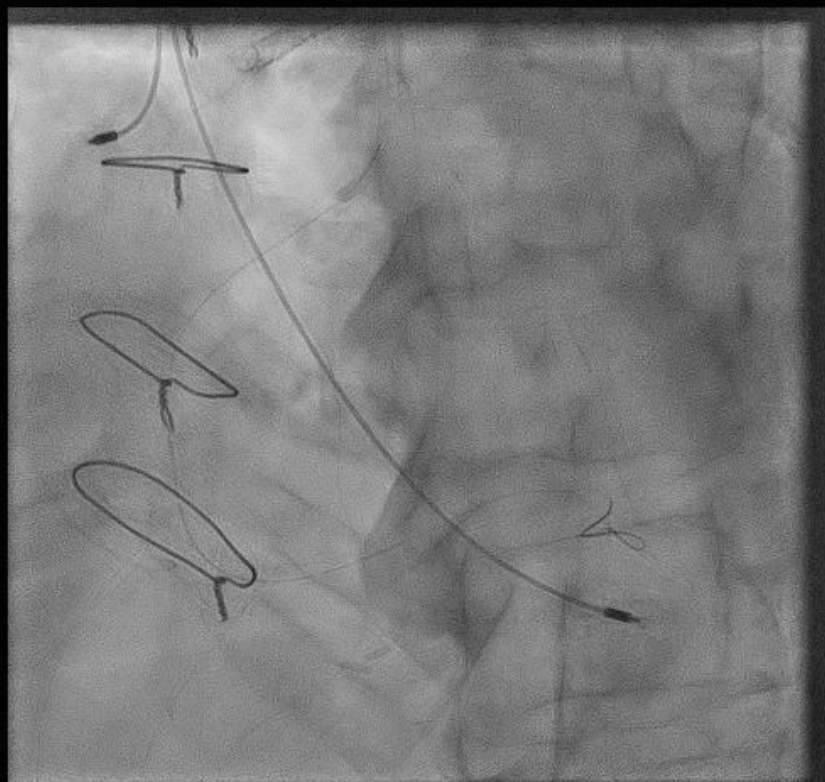


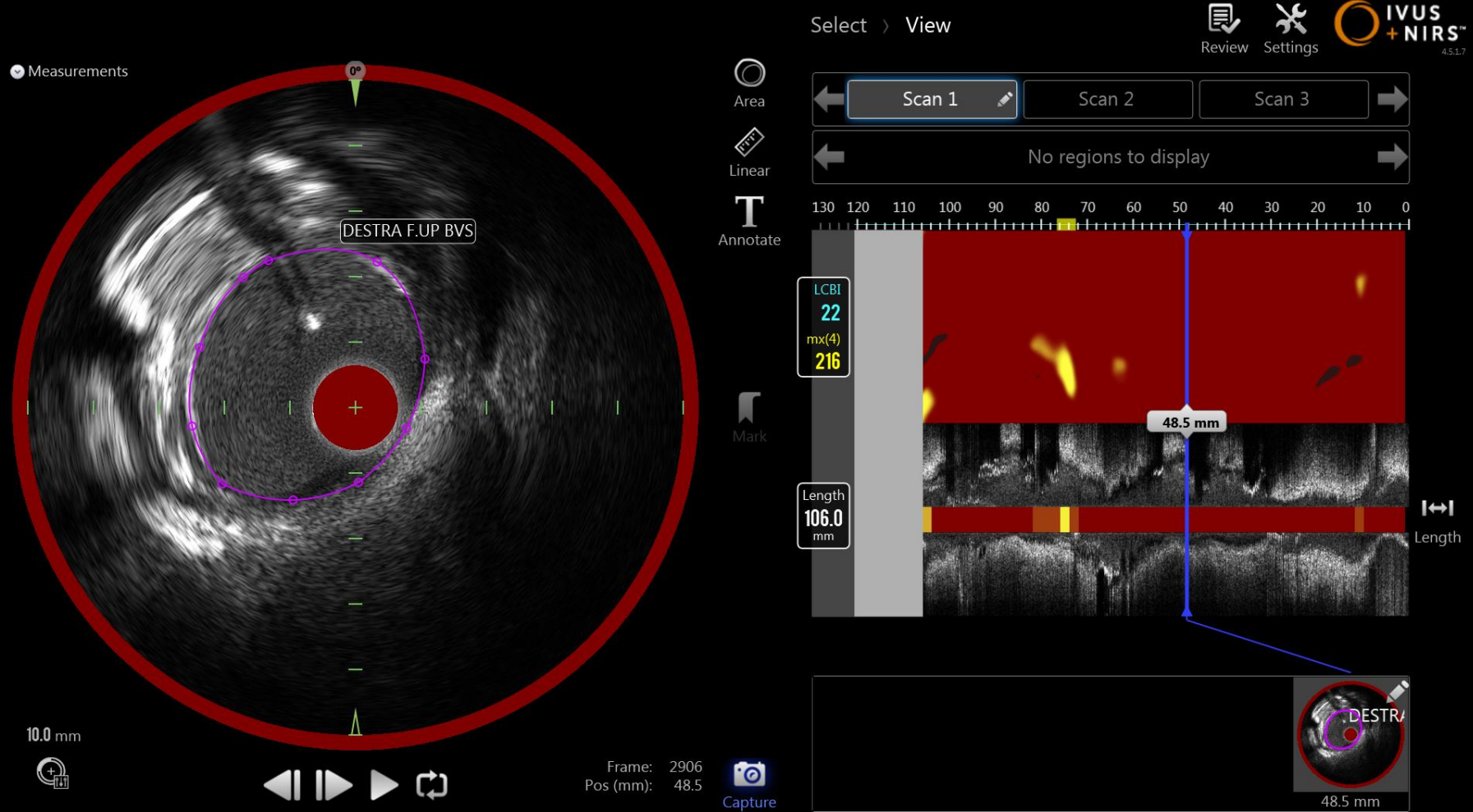
Baseline



Final Result

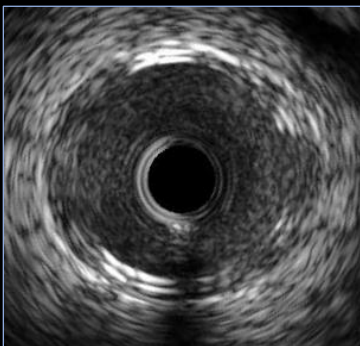
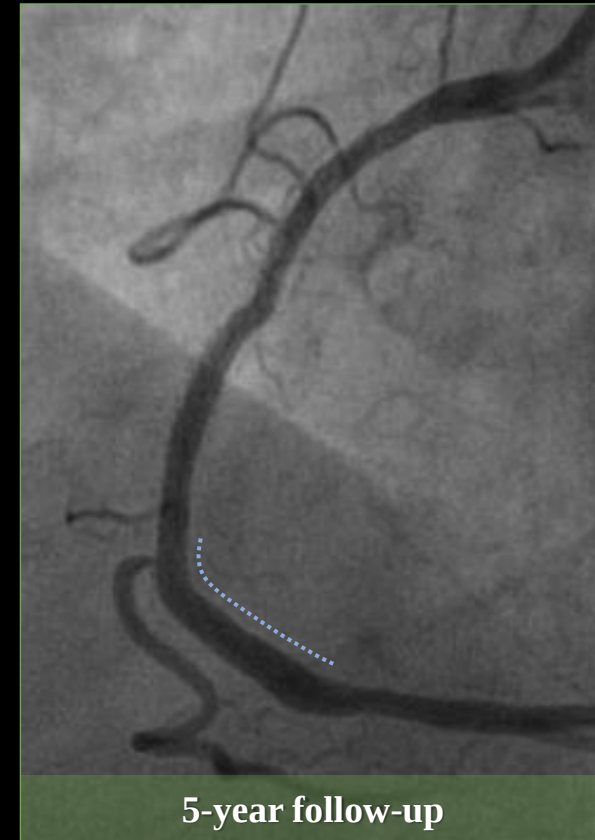
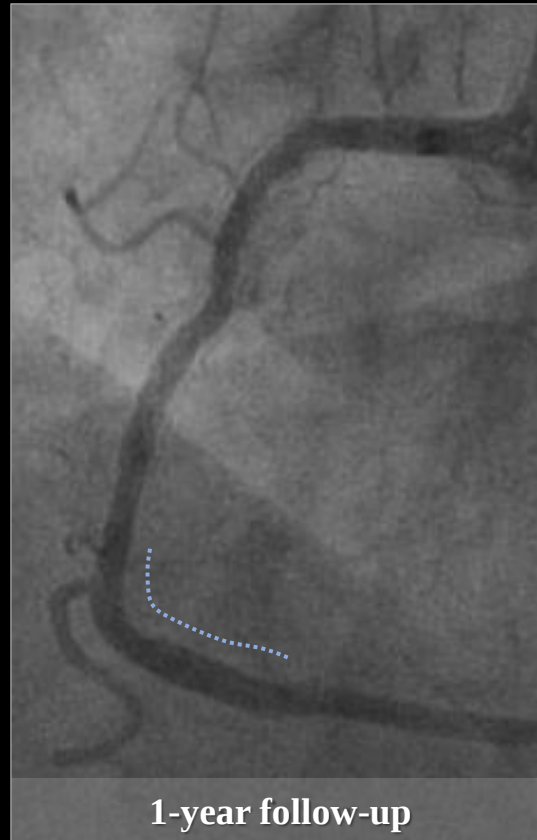
7 yrs. follow-Up



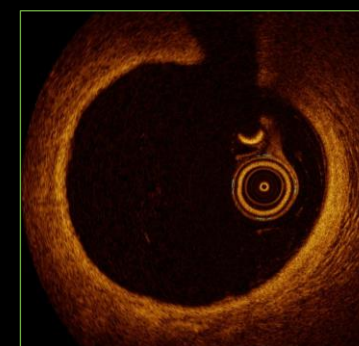


7 yrs. Follow-Up

Positive vessel remodeling after Absorb BRS implantation



Maximal SA:
8.12mm²
(3.08/3.26mm)



Maximal SA:
10.59mm²
(3.65/3.77mm)

Combining bioresorbable scaffolds and drug eluting balloons is the way to make Metal Free PCI

And why not considering left internal mammary to the left anterior descending artery and Metal Free PCI on the other vessels?

PCI needs to evolve

A stent, one type of stent (metal, bioresorbable)
a drug coated balloon, CABG, may not fit for all.

In some situations a combination of them, including CABG,
may be appropriate

A difficult task for Evidence Based Medicine

Treatment of ST Elevation Myocardial Infarction

Braunwald: decrease in oxygen consumption

DeWood et al (NEJM 1980): thrombotic coronary occlusion is the cause of MI

The earlier you open the occluded artery the better

Door To Unload STEMI Trial (Navin K. Kapur, Tuft Univ.)
30 min of LV Unloading with Impella and then Reperfusion

Do not fully dismiss OLD concepts
With time they may become NEW