MIV Drug Delivery Technologies
PTCA Registry India 2008

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Disclosures:

- Consultant MIV Therapeutics
- SAB member MIV Therapeutics

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Improving Life...

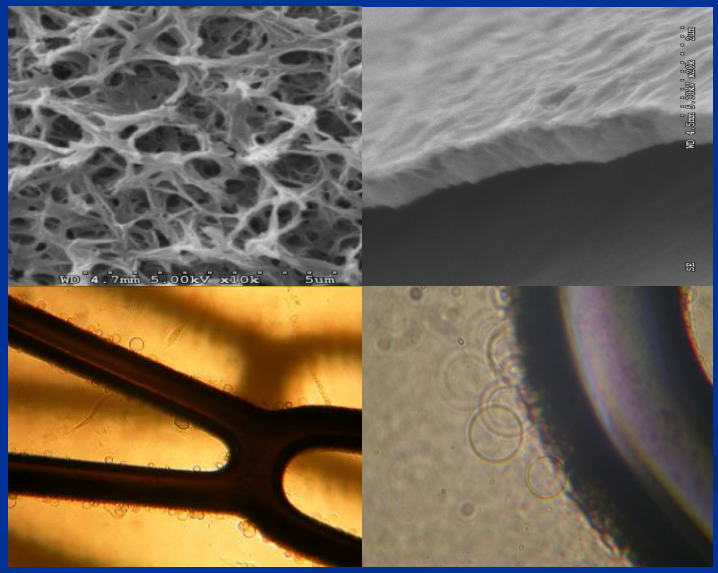
MIV Drug Delivery Technologies

Polymer Free

- Smooth HAP
- MicroPorous HAp
- NanoPorous HAp
- Solid lipids
- Liquid lipids
- Liposomes

Focus Technologies

- NanoPorous HAp
- Lipid formulation

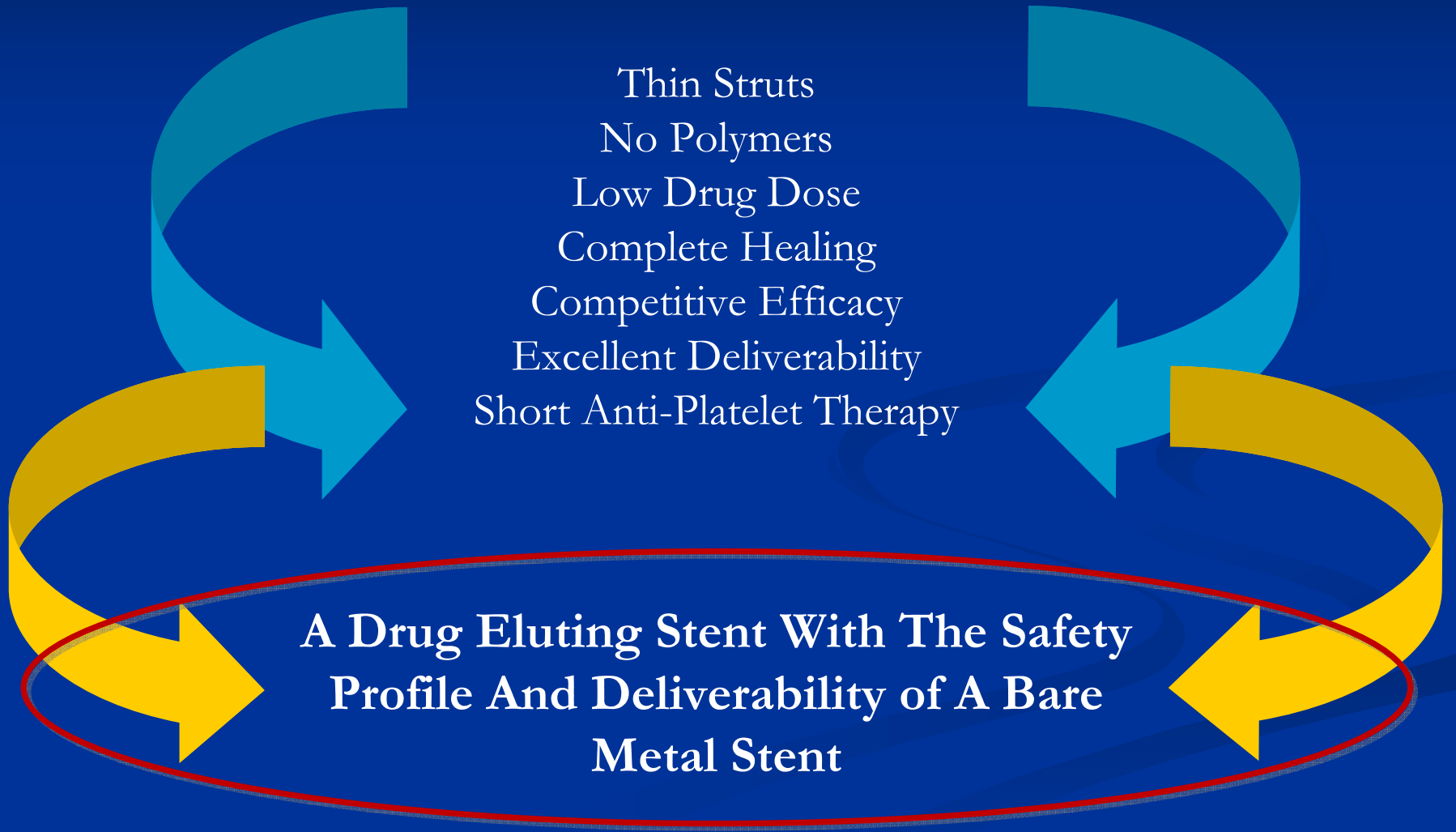


The VESTASYNC™ DES

- Stent platform: Co Cr Thin Strut
- Surface modification: NanoPorous HAp
- Drug: Sirolimus
- Dose: 57 micrograms*
- Formulation: Lipids
- Encapsulation: Yes
- Polymer free: Yes
- Drug elution: > 30 days
- Strut thickness: < 66 microns (including coating)

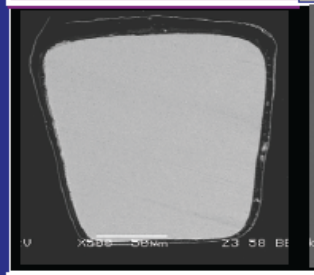
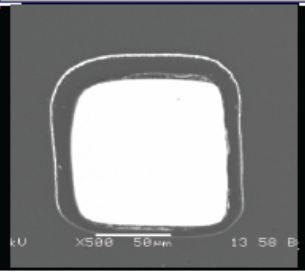
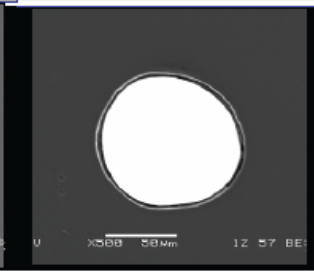
* VESTASYNC: 57ug/19mm stent or 3.0ug/mm Vs. Cypher: 140ug/19mm stent or 7.4 ug/mm

Exploiting A Massive Technology Advantage

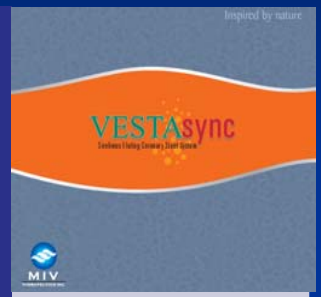


25% Thinner Struts Than Xience

Minimizing Strut and Polymer Thickness to reduce Injury and aid re-endothelialization

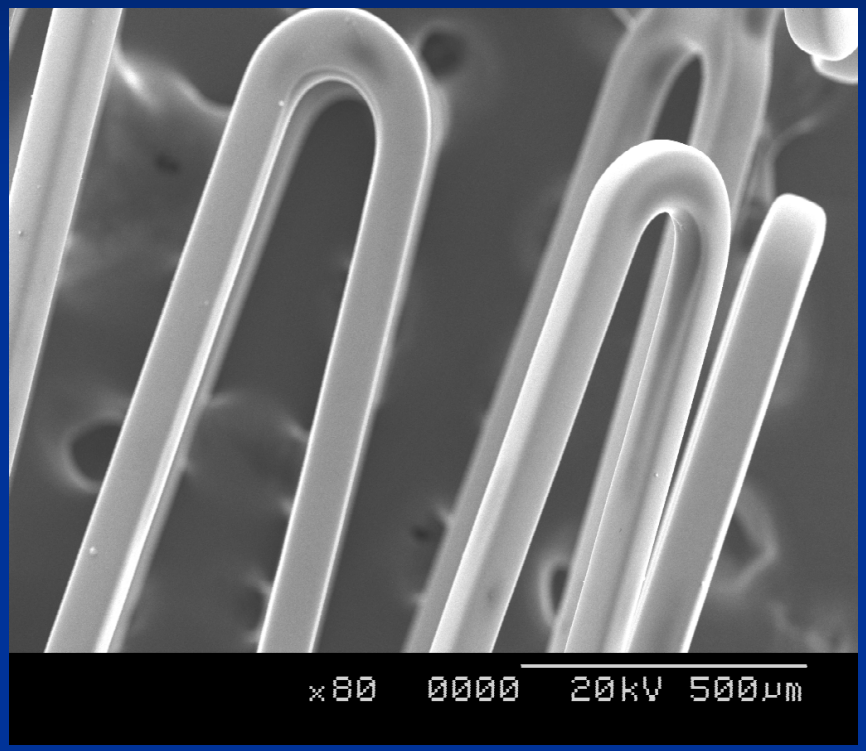
CYPHER®	TAXUS® Liberté	ENDEAVOR™	XIENCE™ V
			
Strut Thickness:	Strut Thickness:	Strut Thickness:	Strut Thickness:
140 um	132 um	91 um	81 um
Polymer Thickness:	Polymer Thickness:	Polymer Thickness:	Polymer Thickness:
13.7 um	16.4 um	4.8 um	7.8 um
PEVA+PBMA	SIBBS:	PC	Fluoropolymer
Sirolimus	Paclitaxol	ABT 578	Everolimus
154 uM	148 uM	96 uM	89 uM

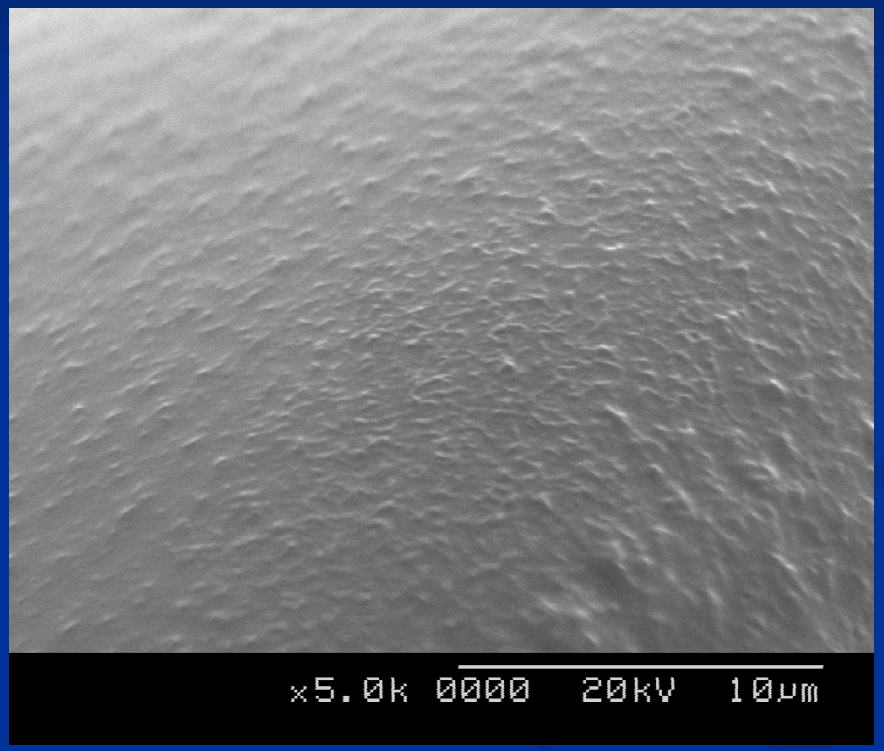
Photos & data on File at Abbott Vascular



BMS Strut Thickness
65 uM
Coating Thickness
0.6 uM
Coating Material
HAp + Lipid
Drug
Sirolimus
DES Strut Thickness
< 66 um
Source
MIV

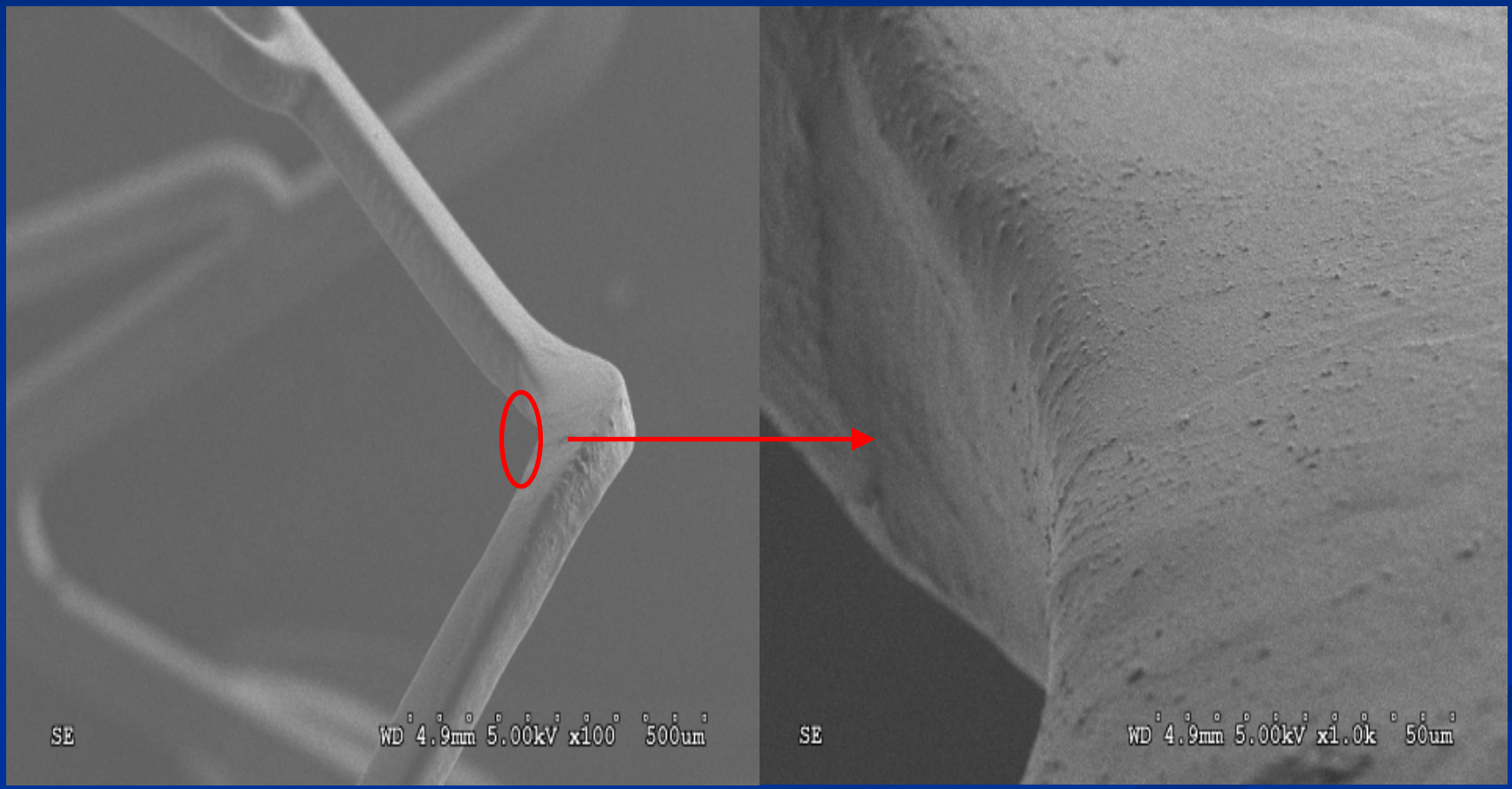
Unmatched Surface Finish, Coating Integrity, Flexibility, and Deliverability





A unique technique was developed to coat the entire HAp depth. This technique produces uniform drug loading with excellent surface morphology and a loading variability under 3%.

Can Other DES Do This?



VESTASYNC™ Comprises Three Core Technologies Protected By Over 50 Patents

- Ultra-thin strut Co Cr stent platform
- NanoPorous HAp surface modification
- Polymer-free lipid-based drug delivery formulation

VESTASYNC™ Compares Favorably With Leading BMS

Brand	VESTASYNC™	Vision	Driver
Company	Biosync	Guidant	Medtronic
Strut Thickness	0.065 mm	0.081 mm	0.091 mm
No of Cells	8	7	10
Crossing profile	0.98 mm	0.99 mm	1.117 mm
Stent Material	Co-Cr	Co-Cr	Co-Ni

MIV HAp Is An Ideal Stent Coating

- A large body of preclinical data supporting the use of MIV HAp as a stent coating
  - Positive 40/100/400 million cycle fatigue life test
  - Excellent toxicology and thrombogenicity studies
  - Multiple animal studies at 1, 3 and 6 (GLP) months confirm safety
- Unlike traditional HAp, MIV HAp does not separate from the underlying substrate and is extremely flexible

Core invention is the ability to load a sufficient quantity of drug into a HAp coating that is within its flexibility band

Excellent HAp Pre-Clinical Results

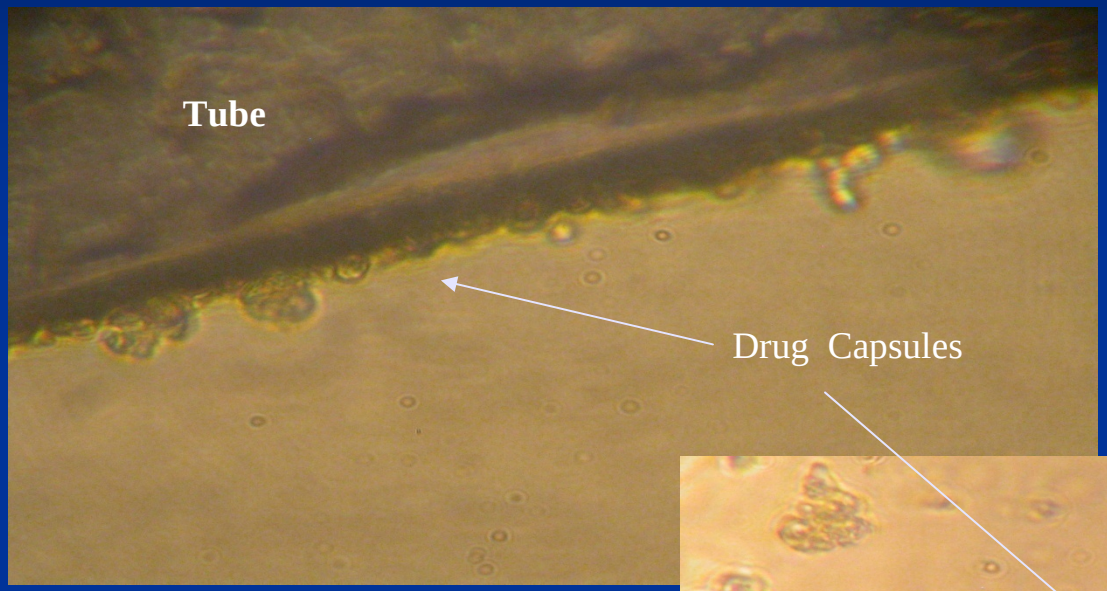
- NanoFilm Preliminary Safety: Rabbit Study
  - Cape Town, South Africa
  - Conclusion: HAp is safe and biocompatible in animals
- NanoFilm Preliminary Safety: Porcine Study
  - The Methodist Hospital and Texas Heart Institute
  - 1 month, 3 month and 6 month porcine studies completed
  - Conclusion: HAp is biocompatible and safe in animals.
- MicroPorous Preliminary Study: Porcine Study
  - Erasmus University, Rotterdam, The Netherlands: 28 day study
  - Conclusion: HAp is biocompatible and safe in animals
- Flow Chamber Thrombogenicity Test
  - The Methodist Hospital and Texas Heart Institute
  - Conclusion: No significant difference between SS, CoCr, MP, NF, SEMP

Encapsulated Drug Delivery

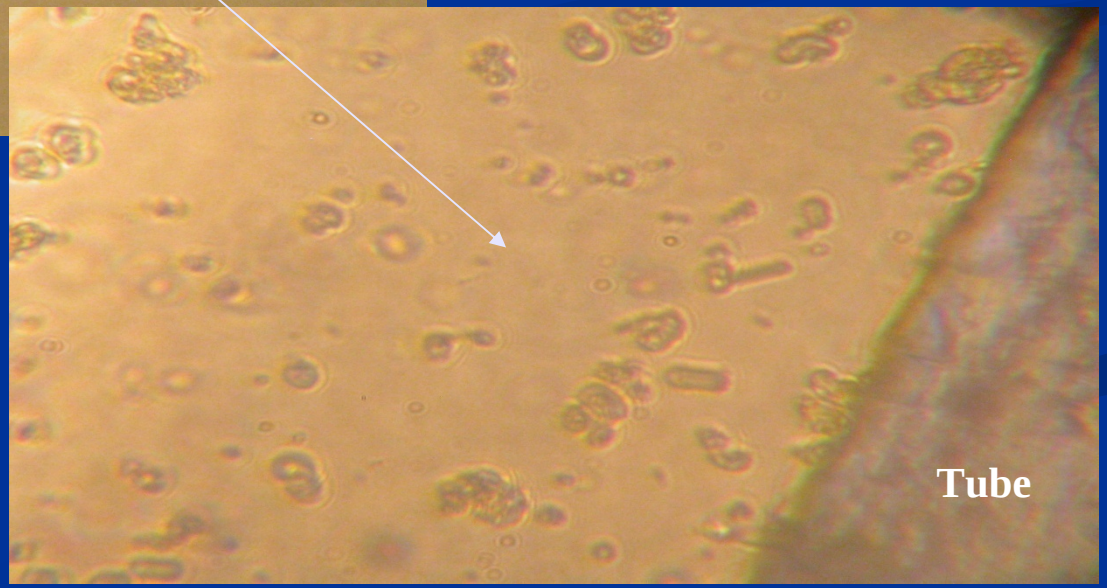
- New concept for delivering drug to coronary arteries
- Achieved by the release of nano, micro, and macro capsules from the stent
- Improves safety and broadens scope of action
  - Improves the uptake drug by local cells
  - Targets the delivery of drug against specific cells
  - Reduces amount of drug required to achieve desired effect
  - Houses drug in a protected capsule protecting surrounding tissue
  - Amplify or suppress the different mechanisms of action of a single drug at different time points in the elution curve
  - Provides a hydrophobic matrix to deliver hydrophilic drugs

In Vitro Capsule Formation

30 minutes post emersion in PBS



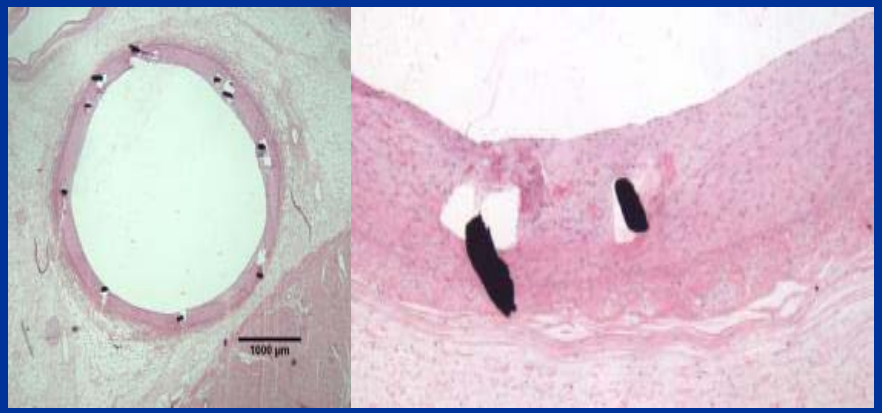
60 minutes post emersion in PBS

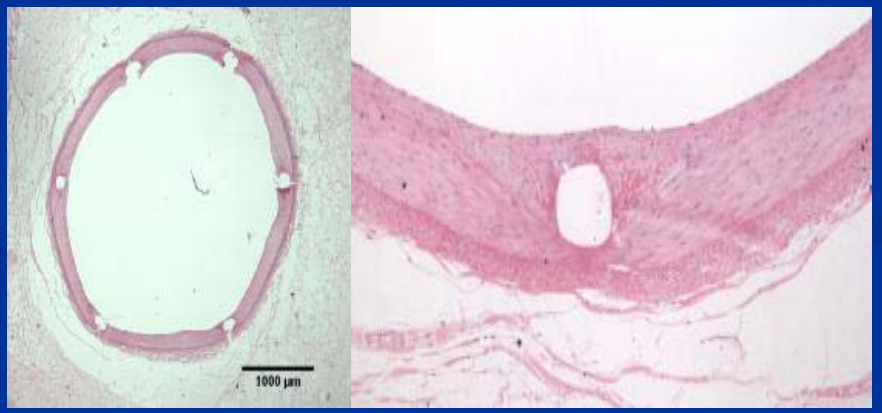


Excellent Morphometric Data

VESTASYNC™		
Injury Score	S/A Ratio	NI Stent (um)
0.3 ± 0.5	1.1 ± 0.1	236 ± 93

Cypher		
Injury Score	S/A Ratio	NI Stent (um)
0.4 ± 0.5	1.1 ± 0.1	282 ± 102

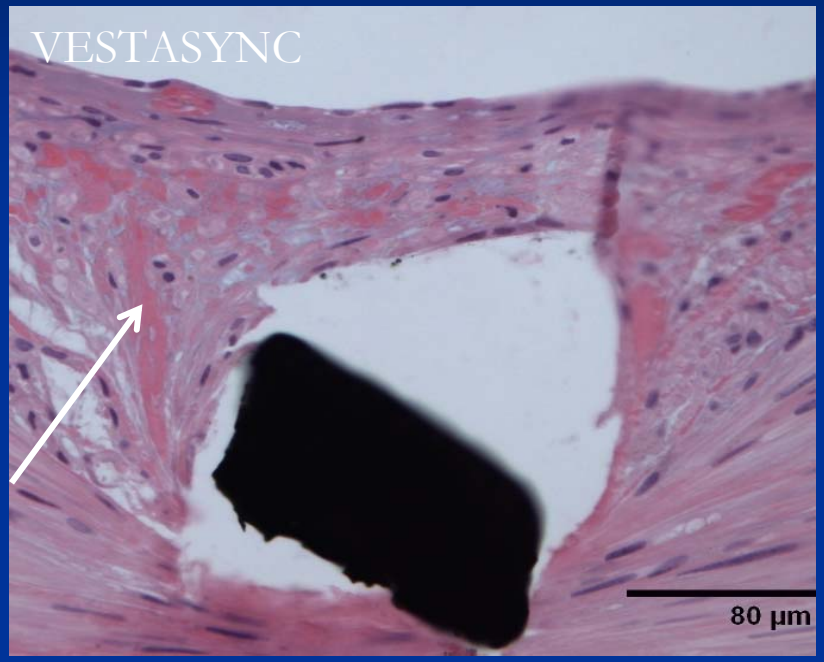




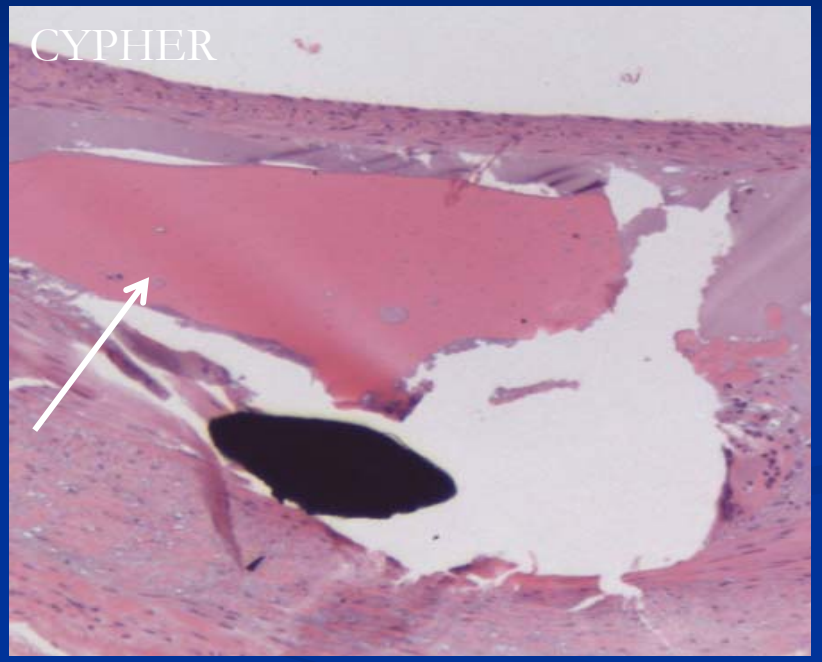
At 28 days the VESTASYNC showed good neointimal healing with complete strut coverage and little inflammation versus incomplete healing with uncovered struts and high levels of inflammation for the Cypher

Source: van der Giessen EUROPCR 2007

75% Less Fibrinoid Material



Minimal Fibrinoid (.03%)



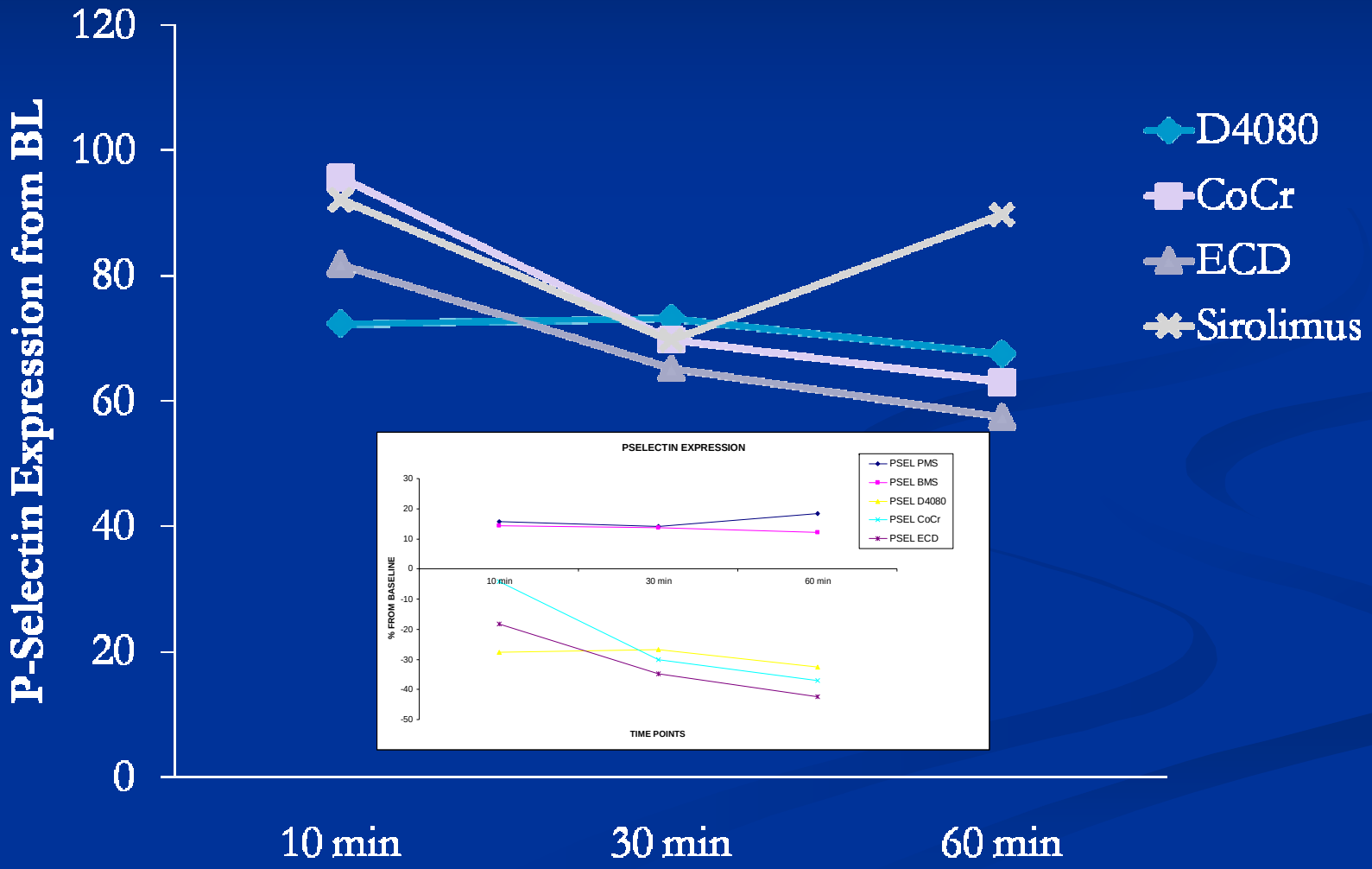
Excessive Fibrinoid (.12%)

At 28 Days the VESTASYNC exhibited a statistically significant (P=0.004) lower amount of fibrinoid material, a marker for delayed healing

Source: van der Giessen EUROPCR 2007

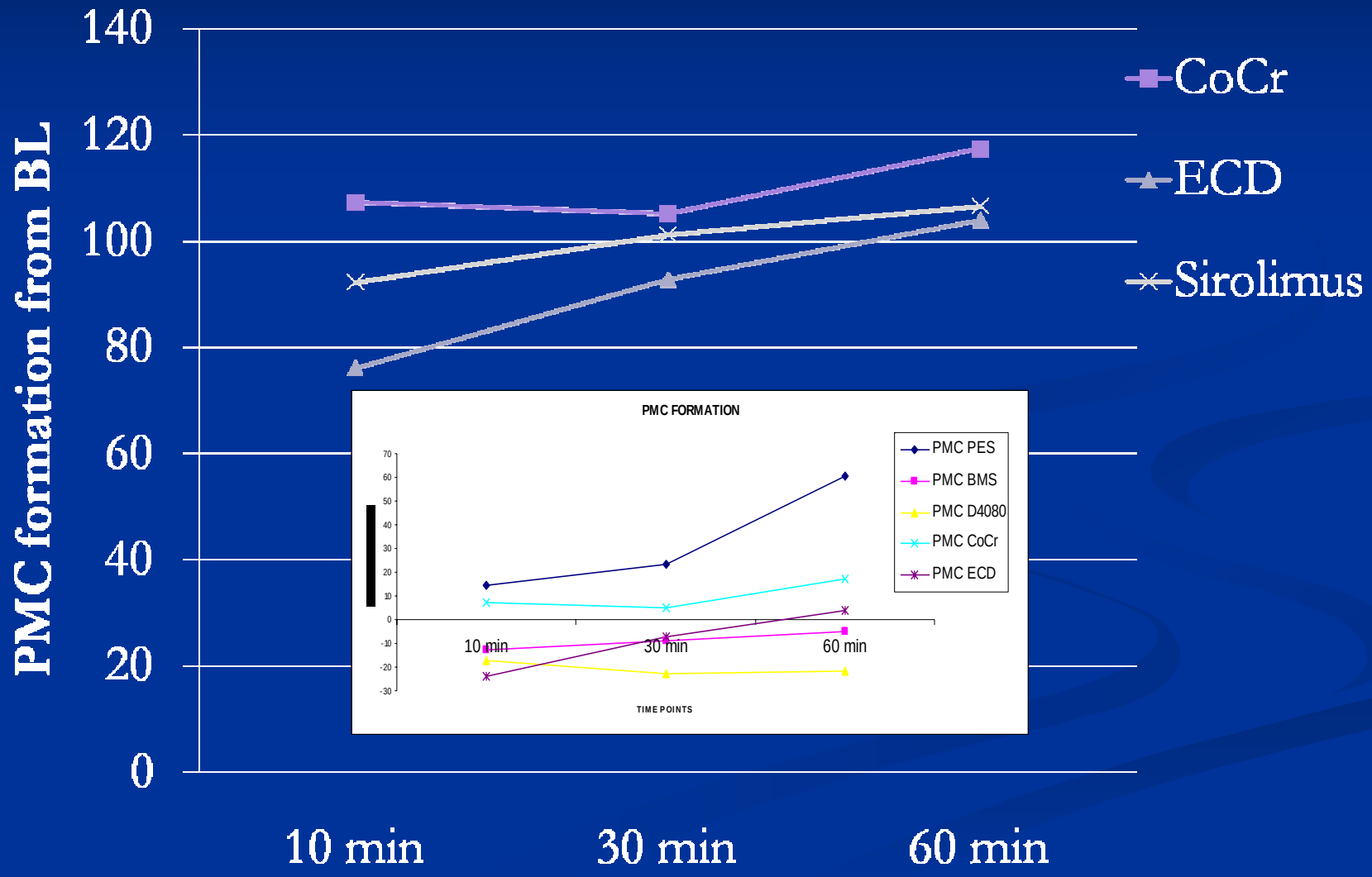
BMS-Like Platelet Activation

Source: Kaluza TCT 2007



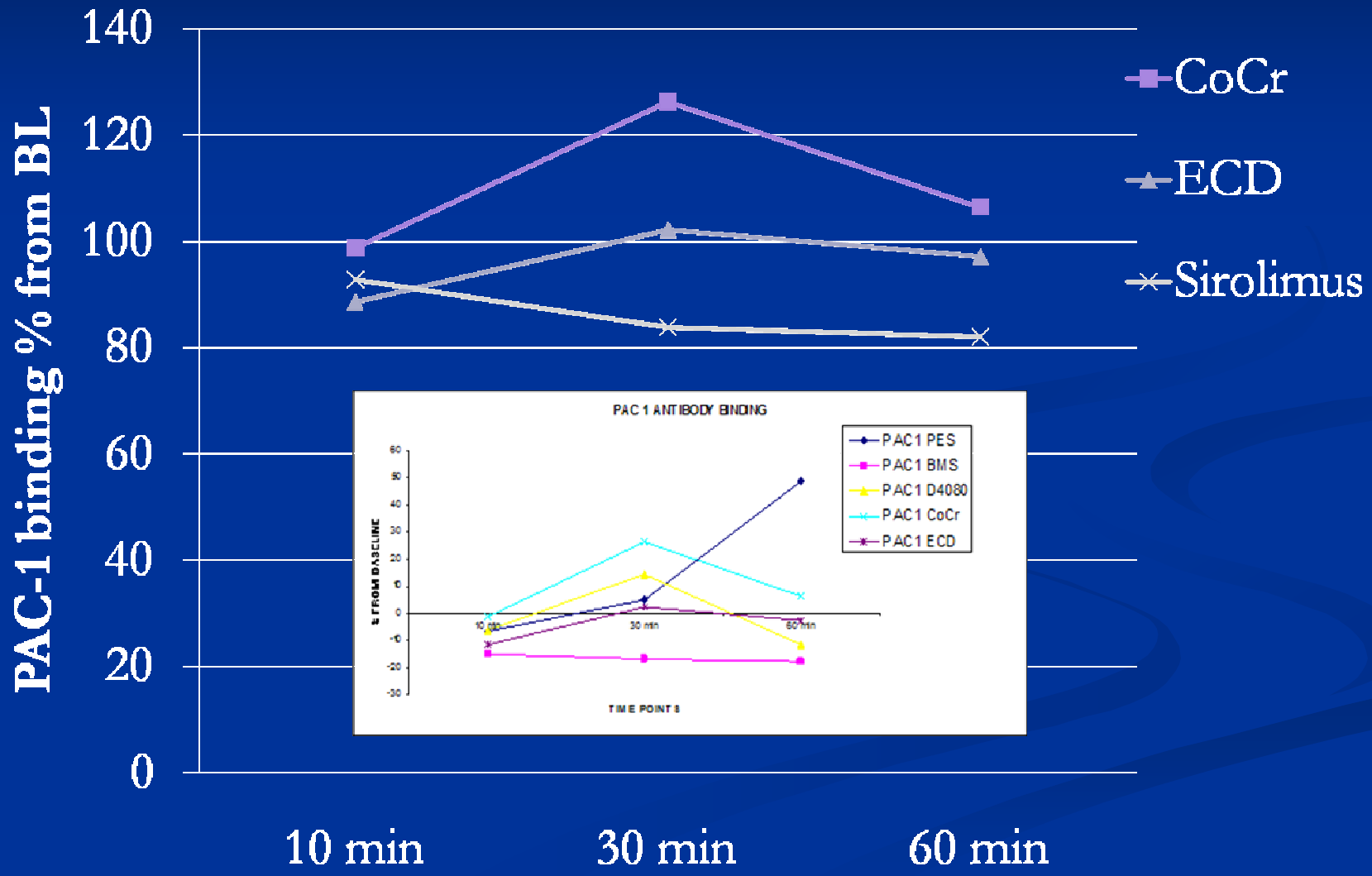
BMS-Like Platelet Activation

Source: Kaluza TCT 2007



BMS-Like Platelet Activation

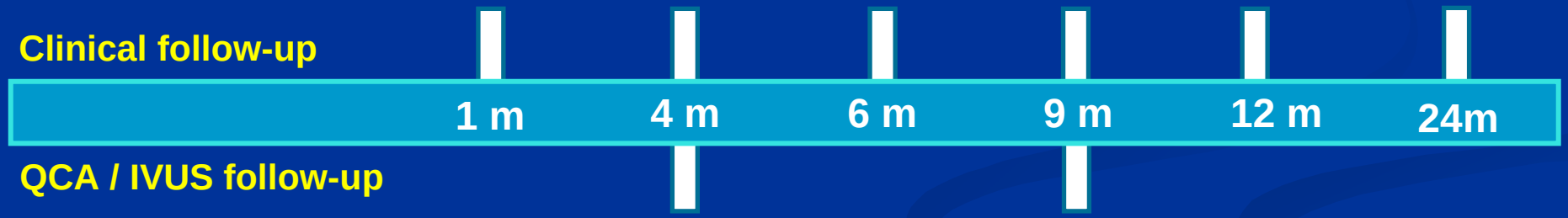
Source: Kaluza TCT 2007



Positive VESTASYNC-I FIM Study

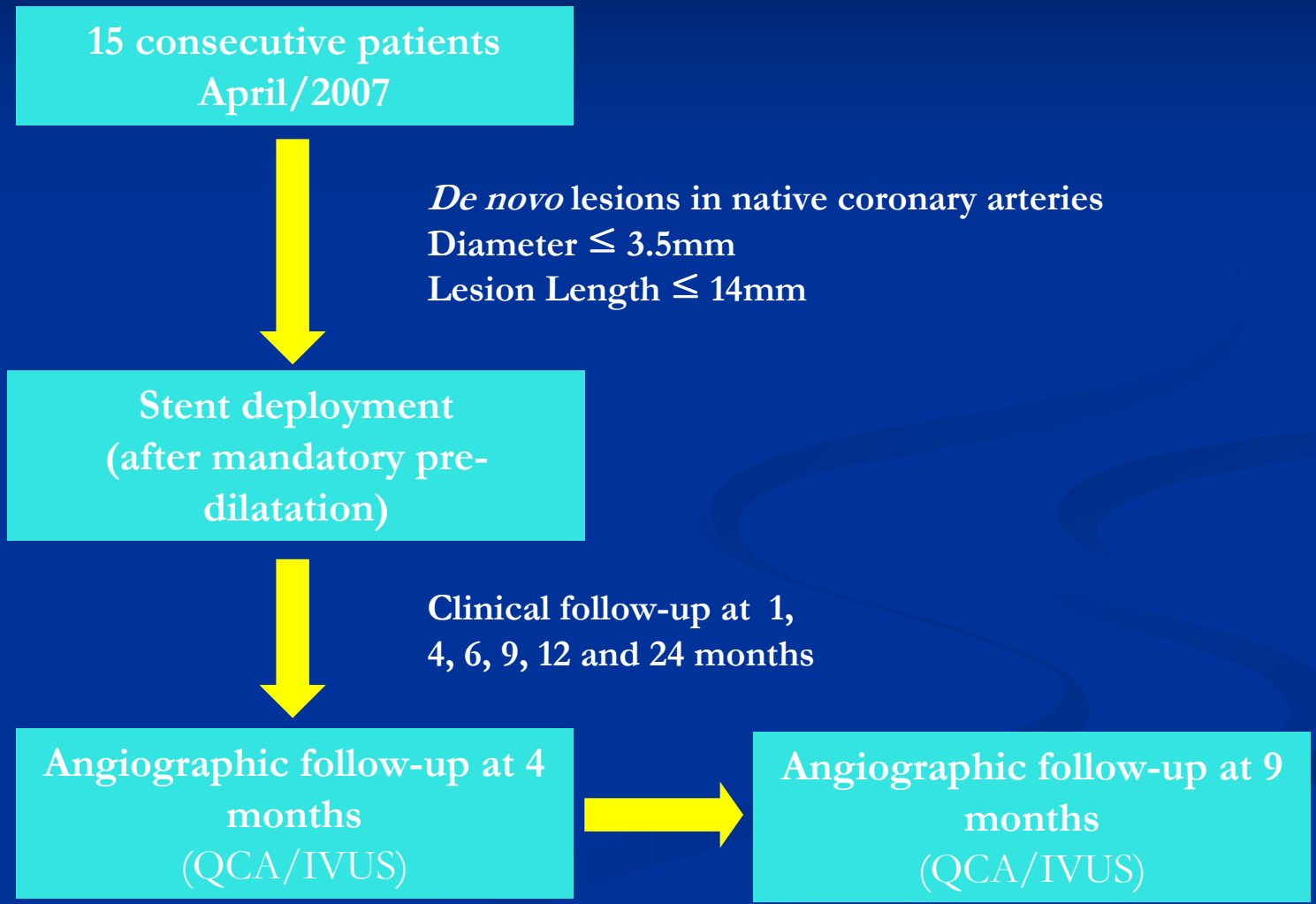
De novo lesions in native coronary arteries
RVD: 3.0 - 3.5 mm
Lesion length: ≤ 14mm
Stent diameters : 3.0 and 3.5mm
Stent length: 19mm
Pre dilatations mandatory

PI: Alexandre Abizaid MD, PhD



Primary Endpoint	In-stent lumen loss at four-month follow-up by QCA
Secondary Endpoints	MACE up to 24 months Acute success TLR and TVR up to 24 months In-stent and in-segment NIH volume at 4 months
Single Center: Brazil (Instituto Dante Pazzanese)	Dual anti-platelet therapy for 5 months

Positive VESTASYNC-I FIM Study

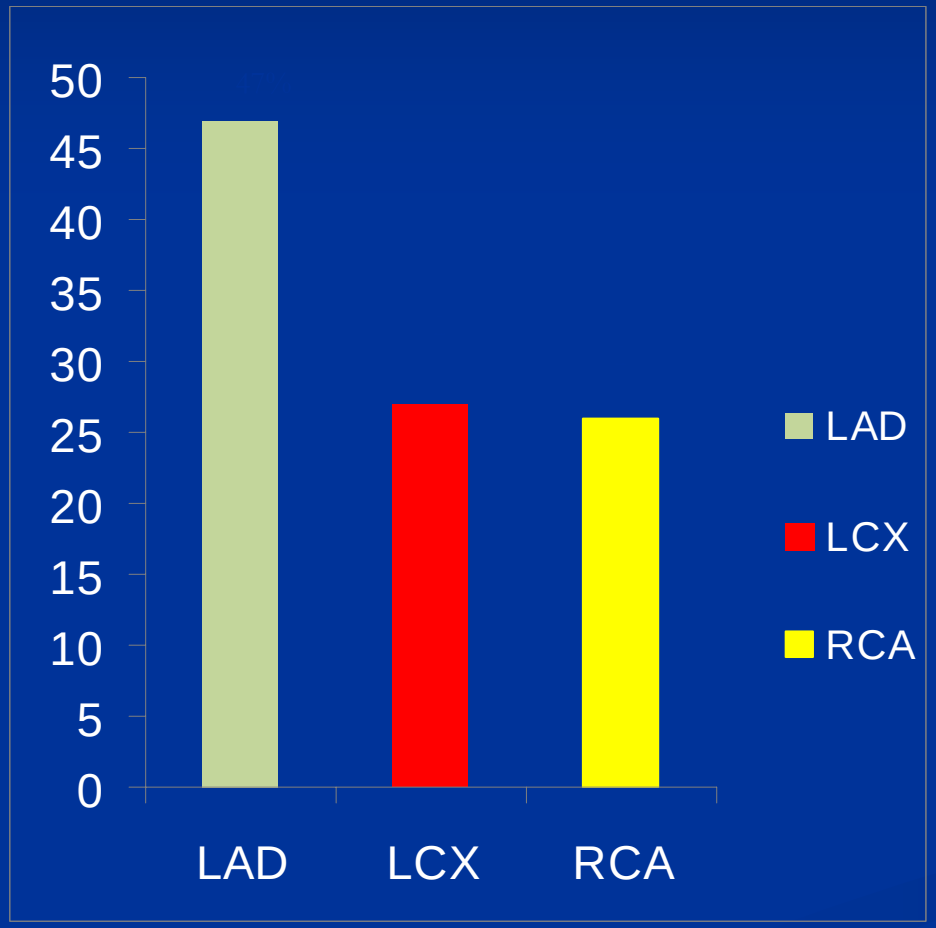


Patient Demographics

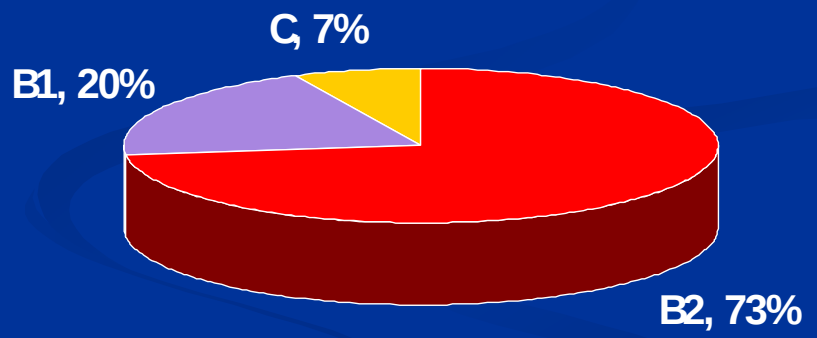
Characteristics	N = 15 Patients
Mean age, years	63,8
Female gender, n(%)	6 (40%)
Hypertension, n(%)	9 (60%)
Dislipidemia, n(%)	7 (47%)
Diabetes, n(%)	5 (33%)
Smoking, n(%)	7 (47%)
Family history of CAD, n(%)	6 (40%)
Previous MI, n(%)	7 (47%)
Previous CABG, n(%)	2 (13%)
Stable angina n(%)	15 (100%)

Lesion Characteristics

Target Vessel



Lesion classification (ACC/AHA)



Pre Intervention QCA Results

Characteristics	N = 15 Patients
Lesion length, mm	9.98 ± 1.98
Reference diameter, mm	2.67 ± 0.32
MLD, mm	0.98 ± 0.29
% Diameter stenosis	63.5 ± 9.90

Values are expressed as mean ± standard deviation. *

Post Procedure QCA Results

Characteristics N = 15 Patients	In Stent	In Segment
MLD, mm	2.64 ± 0.31	2.21 ± 0.36
% Diameter stenosis	8.4 ± 4.3	20.5 ± 9.0
Acute gain, mm	1.66 ± 0.34	1.23 ± 0.40

Values are expressed as mean ± standard deviation. *

Procedure Results

Variable	Lesions (n = 15)
Pre-dilatation, n(%)	15 (100%)
Post-dilatation, n(%)	7 (47%)
Number of stents per lesion	1
Stent mean length, mm	19 mm
Mean final deployment pressure, ATM	12,4 atm
Acute/subacute stent thrombosis, n(%)	0
Angiographic success, n(%)	15 (100%)
Procedure sucess, n(%)	15 (100%)

Excellent 4-Month QCA Data

Variable (n=15)	In-Stent	In-Segment
MLD, mm	2.34 ± 0.36	2.02 ± 0.37
% Diameter stenosis	13.8 ± 7.0	23.6 ± 8.8
Late lumen loss, mm	**0.30 ± 0.25**	**0.16 ± 0.29**
Restenosis*, % (n)	0.0 (0)	0.0 (0)

Values are expressed as mean ± standard deviation. *Defined as diameter stenosis ≥ 50% at angiographic FU.

The VESTASYNC I FIM study met its primary safety and efficacy endpoints

No Degredation At 9-Months

Variable (n=12) 4-Months	In-Stent	In-Segment
Late lumen loss, mm	**0.31 ± 0.26**	**0.17 ± 0.32**
Restenosis*, % (n)	0.0 (0)	0.0 (0)
Variable (n=12) 9-Months	**In-Stent**	**In-Lesion**
MLD, mm	2.27 ± 0.33	2.02 ± 0.29
% Diameter stenosis	15.9 ± 8.2	23.6 ± 9.5
Late lumen loss, mm	**0.37 ± 0.24**	**0.20 ± 0.31**
Restenosis*, % (n)	0.0 (0)	0.0 (0)

*Defined as diameter stenosis ≥ 50% at angiographic FU.

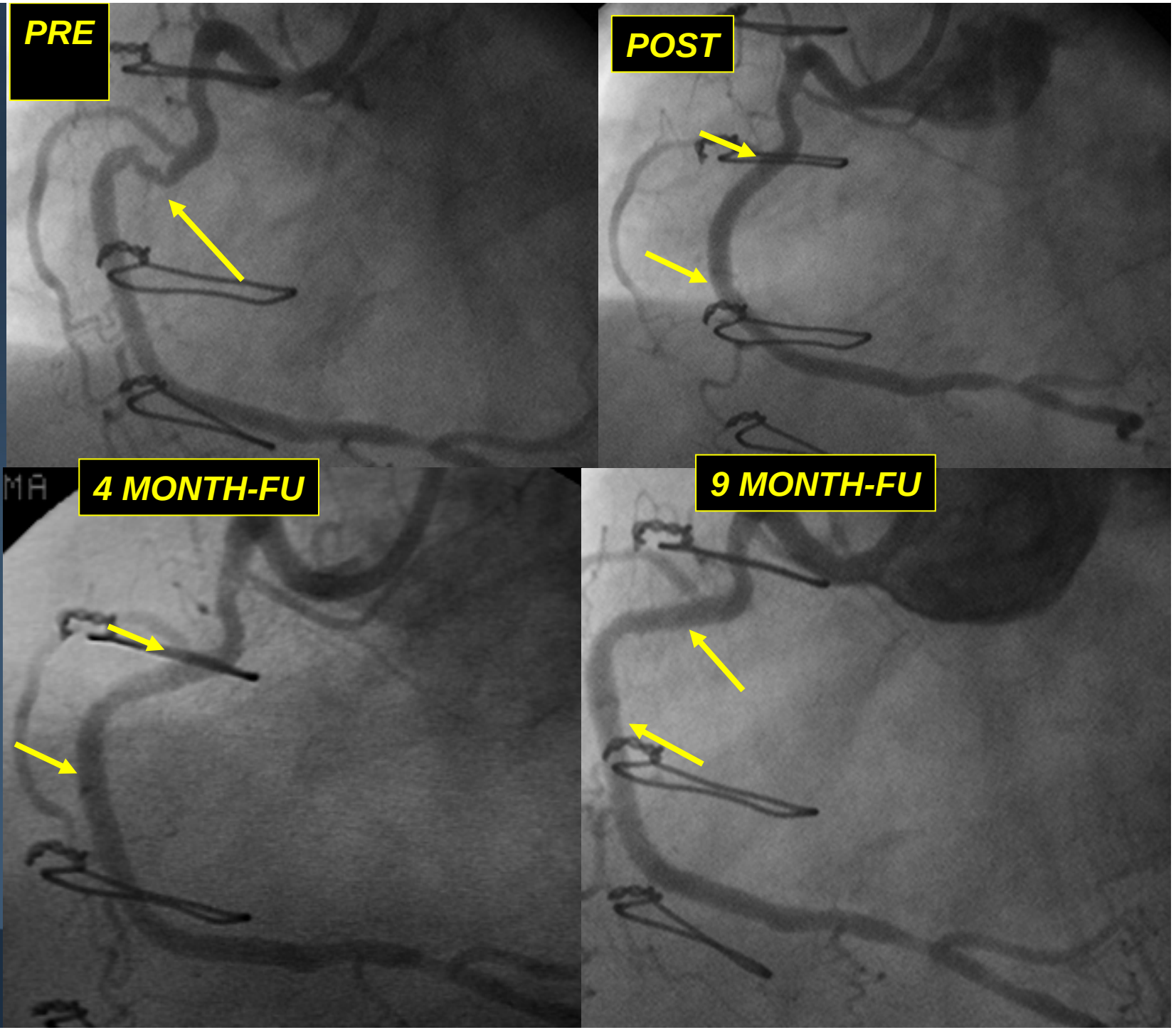
Matched comparison of 12 pts with 4 and 9 month QCA analysis did not show a significant increase in LLL (P=0.9)

Excellent 4-Month IVUS Data

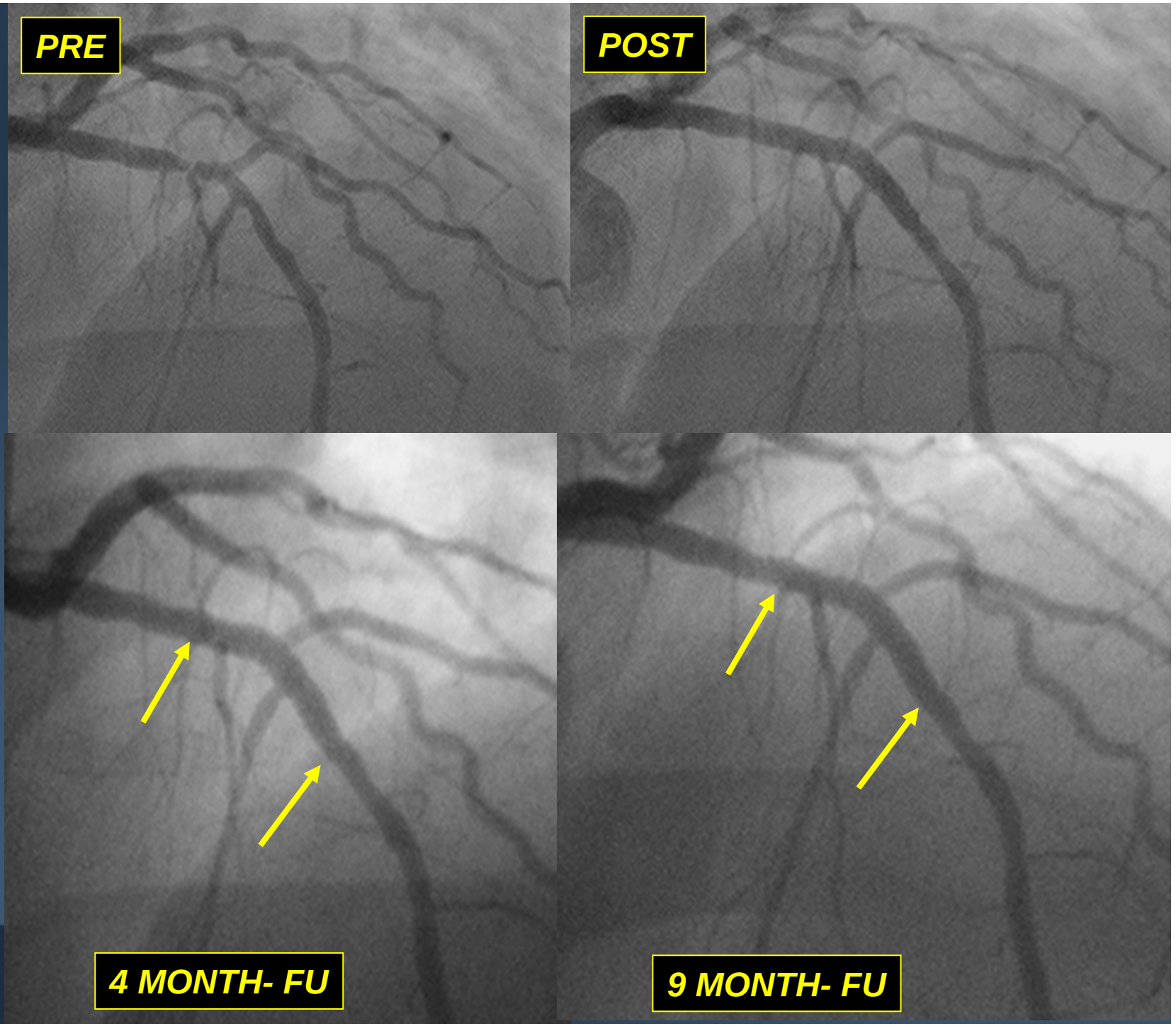
Variable	Baseline n=14*	4-Month FU n=14*
Vessel Volume (mm^3)	276.7 ± 117.1	276.6 ± 84.8
Stent Volume (mm^3)	145.7 ± 14	142 ± 0.5
Lumen Volume (mm^3)	145.8 ± 47.5	138.8 ± 33.5
NIH Volume (mm^3)	N/A	**3.9 ± 3.3**
Mallapposition Volume	0.15 ± 0.5	0.09 ± 0.3
% Stent Obstruction	N/A	**2.6 ± 2.2**

* IVUS consol disk drive malfunction has prevented retrieval of data for patient #14

Higher LLL
(0.80 mm)



Lower LLL
(-0.1 mm)



No Degradation At 9-Months

Variable	4-month N= 11 P*	9-month N= 11 P*
Vessel Volume (mm^3)	286.9 ± 87.4	296.8 ± 85.6
Stent Volume (mm^3)	140.5 ± 36.7	143.1 ± 41.4
Lumen Volume (mm^3)	136.3 ± 34.2	136.8 ± 38.2
NIH Volume (mm^3)**	**4.3 ± 3.5**	**6.1 ± 4.9**
Mallapposition Volume (mm^3)	0.14 ± 0.34	0.13 ± 0.36
% Stent Obstruction**	**2.8 ± 2.2**	**3.8 ± 2.3**

* IVUS consol disk drive malfunction has prevented retrieval of data for patient #14

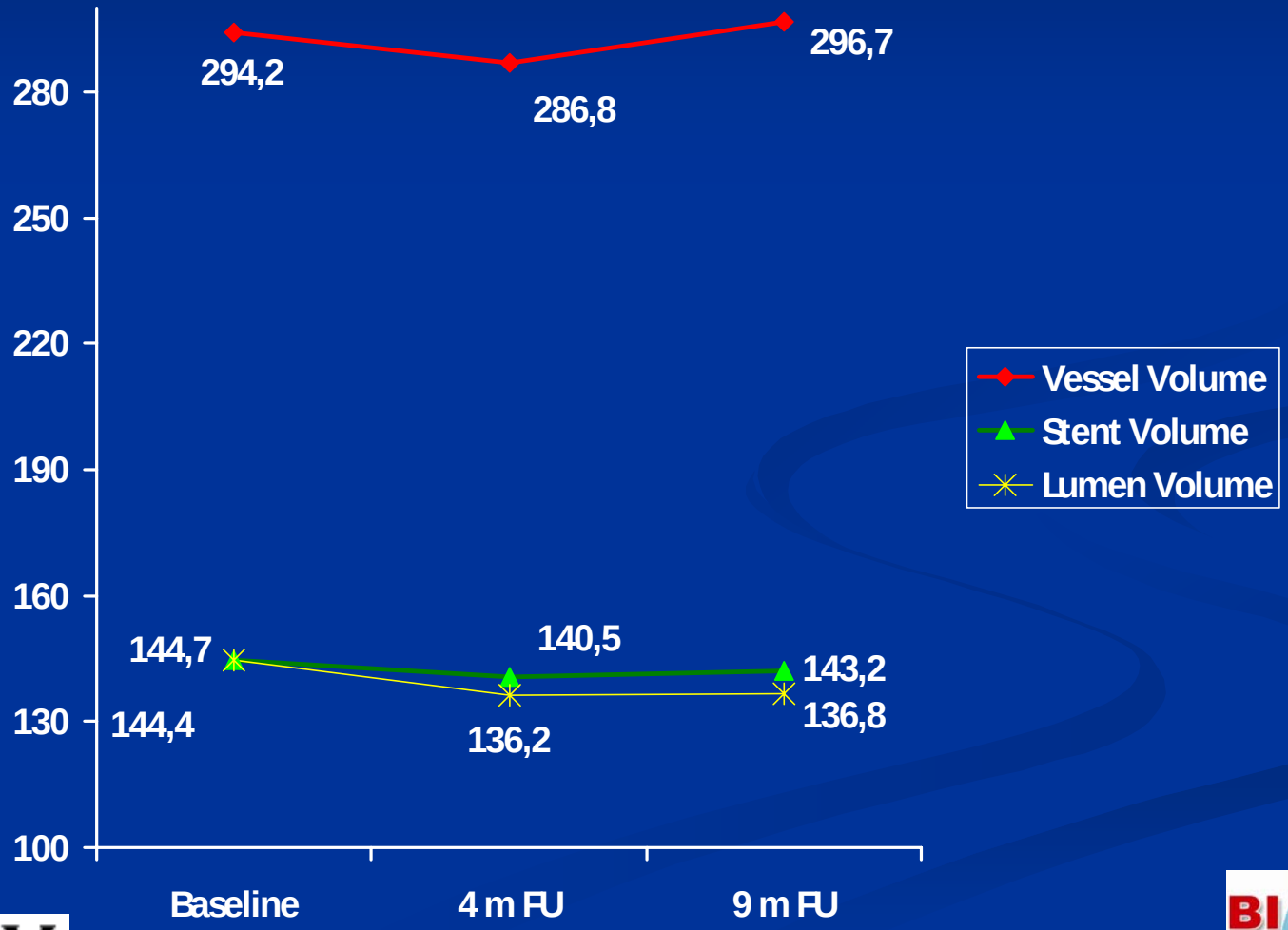
Matched comparison of 11 pts with 4 and 9 month IVUS analysis did not show a significant increase in volume / % obstruction

IVUS Volumetric Analysis

Volume Variation from Baseline to 9-month FU

N=11

* Lumen volume variation between 4 and 9-month FU did not achieve statistical significance (p=0.7)



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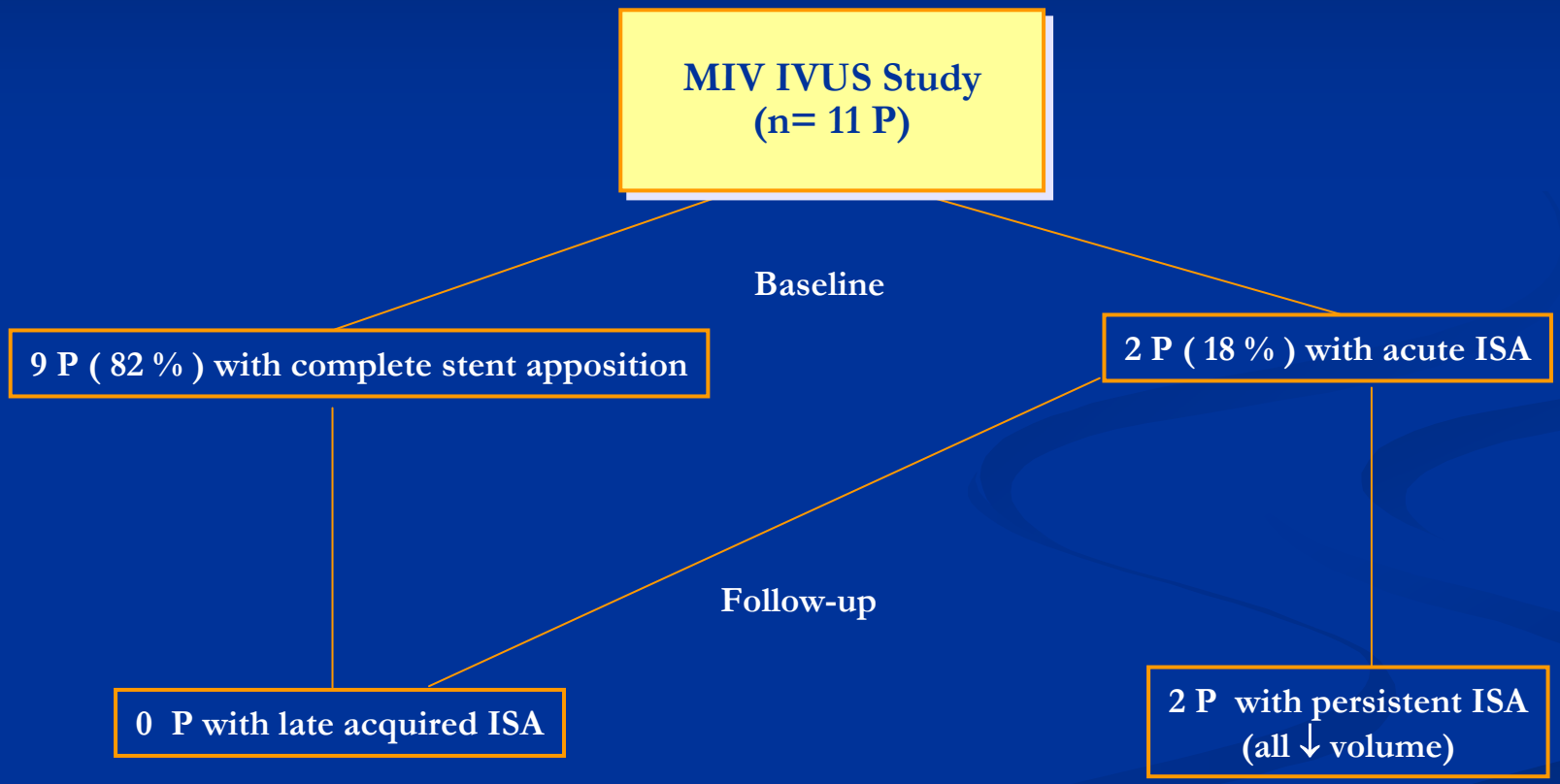
Incomplete Stent Apposition (ISA)



No Major Cardiac Events

Variable	Patients (n=15)
In-hospital	
Death, n(%)	0
MI, n(%)	0
TLR, n(%)	0
Stent thrombosis, n(%)	0
4-month follow-up	
Death, n(%)	0
MI, n(%)	0
TLR, n(%)	0
TVR, n (%)	0
Stent thrombosis, n(%)	0
9-month follow-up	
Death, n(%)	0
MI, n(%)	0
TLR, n(%)	0
TVR, n (%)	0
Stent thrombosis, n(%)	0

VESTASYNC-I Conclusions

- Acute sucess was achieved in all patients with no in-hospital adverse events
- The novel MIV (Sirolimus)-eluting stent was effective in reducing lumen loss (0.30mm) and NIH formation (2.8%) at four-month angiographic follow-up
- These enthusiastic initial results were sustained at nine-month follow-up with no evidence of late “catch up” by QCA and IVUS evaluation.
- Long-term data in more complex groups of patients is necessary to confirm its safety profile