Monday, 31st October 2016, 12:21 - 12:29 pm, Main Arena II

MeRes-1

Six-Month Clinical, Angiographic, IVUS and OCT Results with a ***Thin-Strut PLLA Based Sirolimus Eluting Bioresorbable Vascular Scaffold*** in Patients with Coronary Artery Disease

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For the **MeRes-1 Investigators**

Disclosure Statement of Financial Interest

Within the past 12 months, I, Dr Ashok Seth, have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Consulting Fees/Honoraria	• Meril Life Sciences
• Consulting Fees/Honoraria	• Abbott Vascular

Background

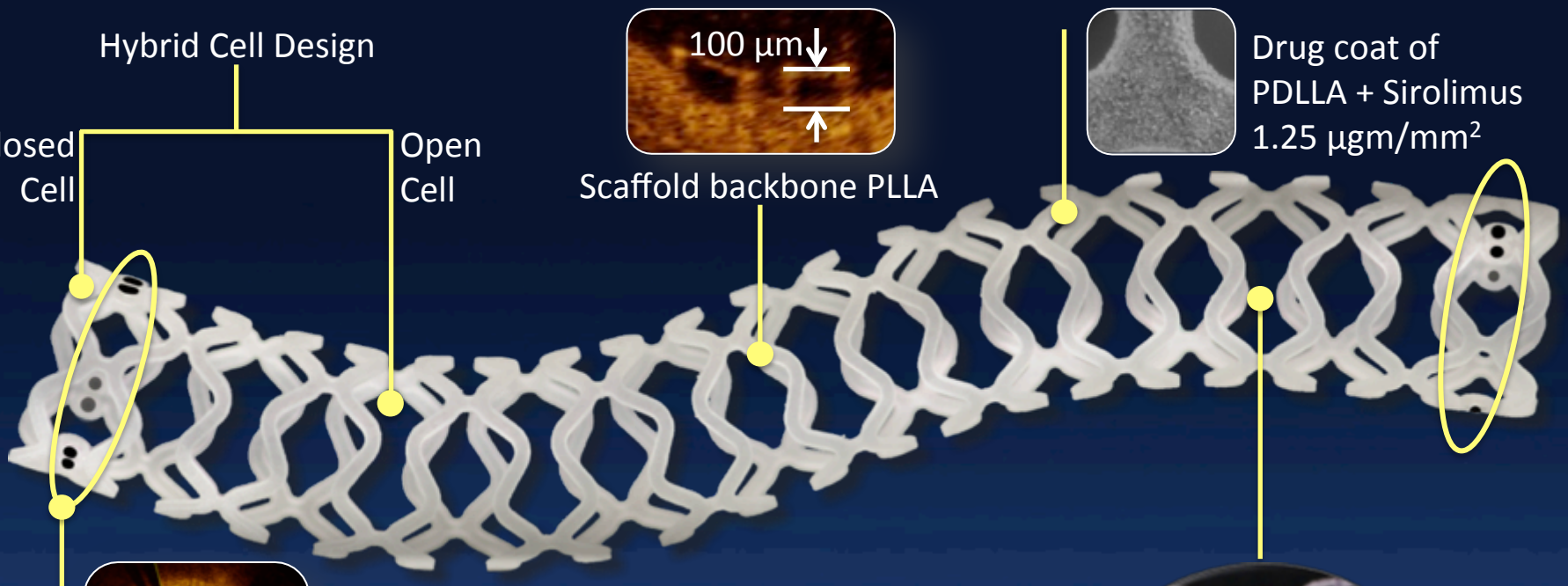
BRS are now a reality in the treatment of coronary artery disease.
Current gen BRS is not a ‘ user friendly device ‘ and hence difficult to apply to the real world patient population

- Thick struts, high profile
- Special tips and tricks of implantation
- Limited expansion characteristics
- Limited accessibility to side branches
- Low radiopacity
- Uncertain radial strength
- Concerns regarding scaffold thrombosis
- Limited sizes of lengths and diameters

NEXT GENERATION Devices Are Needed!

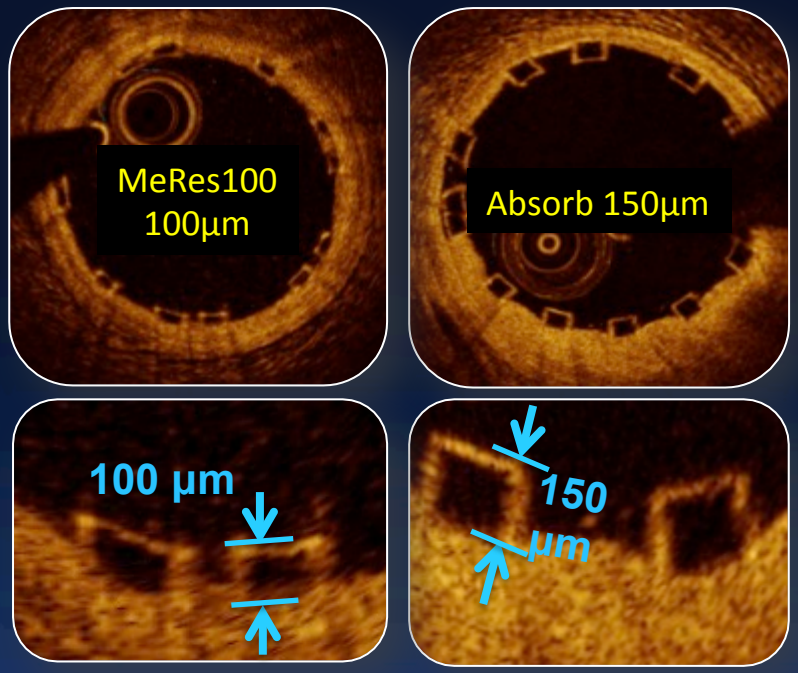
MeRes100 (developed in INDIA)

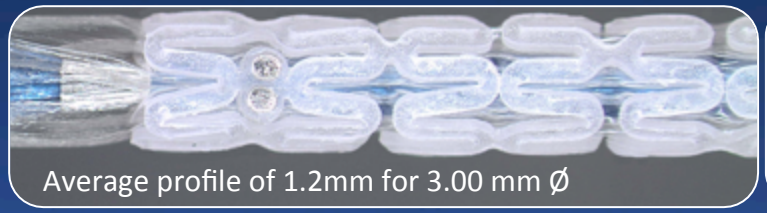
Sirolimus Eluting Bioresorbable Vascular Scaffold

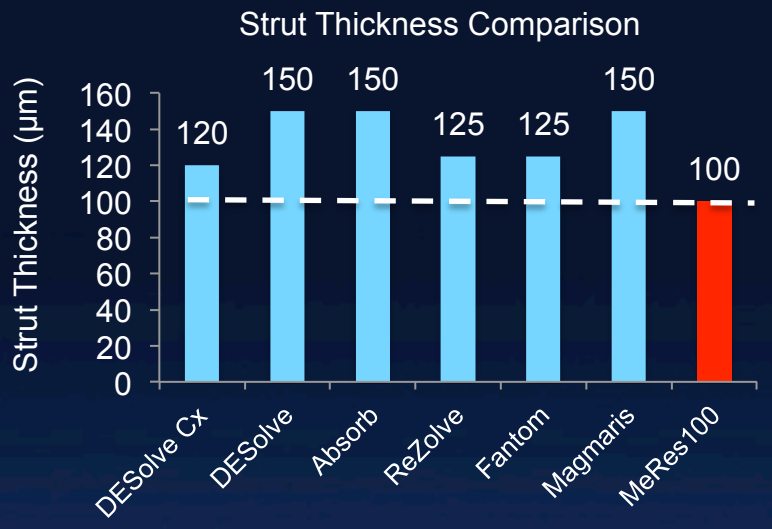


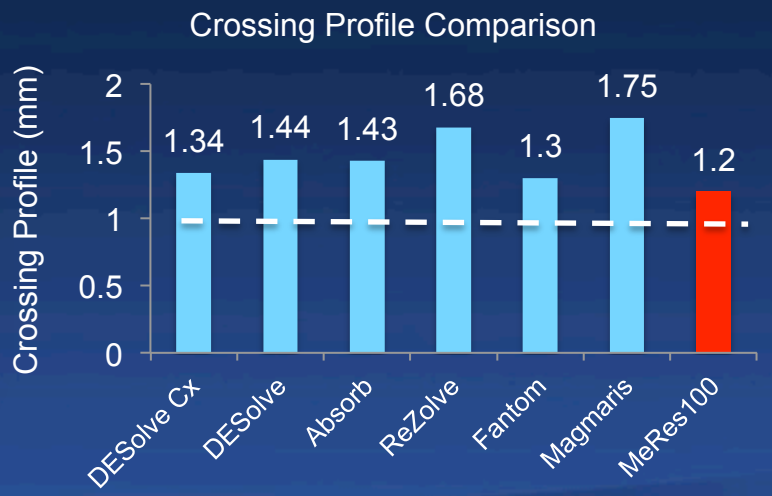
Size Matrix – 63 SKUs
Diameters – 2.50, 2.75, 3.00, 3.25, 3.50, 4.00, 4.50 mm
Lengths – 8, 13, 16, 19, 24, 29, 32, 37, 40 mm

MeRes100 – BRS
Strut Thickness, Profile









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OCT images courtesy of Dr. Daniel Chamié, Dante Pazzanese Institute of Cardiology, Sao Paulo, Brazil. Data on file with Meril Life Sciences Pvt. Ltd.

Cardiovascular Research Foundation

MeRes-1 Study Design

First-in-man Safety and Efficacy **in Patients with Single, *De-novo* Coronary Lesion (in up to 2 vessels) treated by a Single MeRes100 Scaffold up to 24mm length in 108 pts**

Clinical follow-up

N = 108 → 30-days → 6-month → 1-year → 2-years → 3-years

***QCA, IVUS, OCT & MSCT follow-up**

CLINICAL FOLLOW-UP	108	**108**	108	108	108
ANGIOGRAPHIC FOLLOW-UP	-	**36**	-	36	-
OCT FOLLOW-UP	-	**13**	-	13	-
IVUS FOLLOW-UP	-	**12**	-	12	-
MSCT FOLLOW-UP	-	**-**	12	-	-

Diameters – 2.75, 3.00, and 3.50 mm
Length – 19 and 24 mm

DAPT Rx 1 year

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* Pre-designated sites & patients consent. Regulatory approval study in India.

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Key Eligibility Criteria

MeRes-1

Key Inclusion Criteria

- Age 18-65 years
- Up to 2 lesions in native arteries
- 1 lesion per target vessel allowed
- RVD 2.75-3.50 mm
- Lesion length ≤ 20 mm
- Stenosis ≥ 50% & < 100%
- TIMI ≥ 1

Key Exclusion Criteria

- Acute MI <7 days
- Creatinine ≥1.3 mg/dL
- Prior revascularization
- LVEF ≤ 30%
- LM and/or ostial location
- Significant calcification
- Bifurcation lesion (SB >2 mm)
- Severe tortuosity/angulation

Major Clinical Endpoints

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- **Safety**
  - **Primary Endpoint:**
    - **MACE** at 6-months (Cardiac death, MI, ID-TLR, ID-TVR)
  - **Secondary Endpoints:**
    - **Device & procedure success**
    - **Scaffold thrombosis (ARC defined)**

- **Efficacy**
  - **QCA: Late lumen loss (in-scaffold / in-segment)**
  - **OCT: minimum lumen area (flow area), NIH area**
  - **IVUS: Scaffold & lumen area, %VO**

Study Leadership

- **PI** – **Dr. Ashok Seth, Fortis Escorts, New Delhi**
- Co-PI – Dr. Praveen Chandra, Medicity, New Delhi
- Co-PI – Dr. Vinay K. Bahl, AIIMS, New Delhi

- **Core Labs**
  - **Angiographic** – **Cardiovascular Research Center, Sao Paulo**
  - **IVUS / OCT /MSCT** – **Cardialysis, Rotterdam**

- **Data Management**
  - **CRO** – **JSS, New Delhi, India**

Investigating Sites

108 Subjects, 16 Investigating Sites

Investigating Site	City	Investigator	# Enrolled
Jayadeva	Bangalore	Dr. C. N. Manjunath	23
LTMG	Mumbai	Dr. Ajay Mahajan	20
Max	New Delhi	Dr. Viveka Kumar	13
SGPGI	Lucknow	Dr. P. K. Goel	11
Medicity	Gurugram	Dr. Praveen Chandra	10
AIIMS	New Delhi	Dr. Vinay K. Bahl Dr. Sundeep Mishra	07
Hero DMC	Ludhiana	Dr. G. S. Wander	07
Fortis Escorts	New Delhi	Dr. Ashok Seth	06
Apollo	Chennai	Dr. Samuel Mathew Dr. G. Sengottuvelu	04
Sree Chitra	Trivandrum	Dr. Ajit Kumar V. K.	03
Fortis Vasant Kunj	New Delhi	Dr. Upendra Kaul	02
GB Pant	New Delhi	Dr. Vijay Trehan	01
Apollo Jubilee Hills	Hyderabad	Dr. P. C. Rath	01

Baseline Demographics

MeRes-1

Variable	N = 108
Age, years (mean ± SD)	50.7 ± 9.3
Male	71%
Smoker	32%
Diabetes mellitus	28%
Dyslipidemia	13%
Hypertension	42%
Myocardial Infarction (> 7days)	34%
Clinical presentation	
- Stable Angina	52%
- Unstable Angina	34%
- Silent Ischemia	14%
LVEF, % (mean ± SD)	50.6 ± 10.0

Lesion Characteristics & Procedure

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Variable	108 pts | 116 lesions
LAD | LCx | RCA	60% | 11% | 29%
Calcium: mild | moderate | severe	8% | 2% | 4%
Tortuosity: moderate | severe	9% | 2%
SB ≥ 2 mm (visual estimation)	29%
Lesion class: A | B1 | B2 | C	7% | 32% | 56% | 5%
Baseline TIMI 3 flow	97%
Lesions per patient	1.07 ± 0.35
Nominal scaffold diameter: 2.75 | 3.0 | 3.5 mm	11% | 51% | 38%
Nominal scaffold length: 19 | 24 mm	65% | 35%
Balloon postdilatation	100%
Device | Procedure success	100% | 99%*

*One patient received a metal DES to cover a proximal dissection during post dilatation.

Primary Clinical endpoint at 6 Months

MeRes-1

100% monitored / CEC adjudicated

Primary Endpoint MACE, n (%)	In-Hospital N = 108 (100%)	1-month N = 108 (100%)	6-months N = 108 (100%)
MACE	0 (0%)	0 (0%)	0 (0%)
Cardiac Death	0 (0%)	0 (0%)	0 (0%)
Myocardial Infarction@	0 (0%)	0 (0%)	0 (0%)
Ischemia-driven TLR	0 (0%)	0 (0%)	0 (0%)
Ischemia-driven TVR	0 (0%)	0 (0%)	0 (0%)
Scaffold Thrombosis$	**0 (0%)**	**0 (0%)**	**0 (0%)**
Non-cardiac deth	0 (0%)	0 (0%)	1# (0.9%)

Death due to aminophylline induced anaphylactic shock.

$ ARC defined criteria

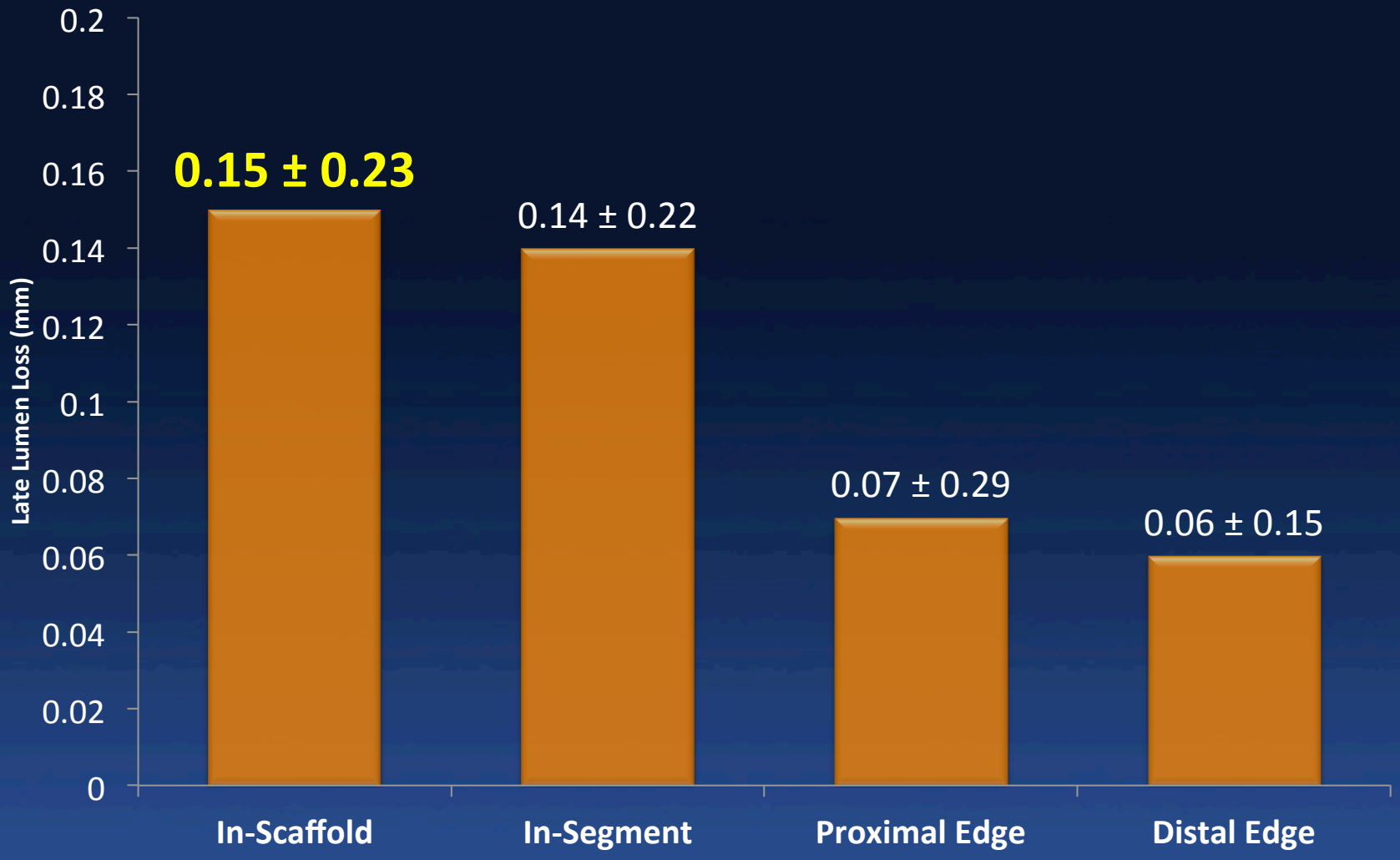
QCA Analysis – All Patients

Angiographic Analysis (QCA)	Baseline N = 116	Post-procedure N = 116
Lesion length (mm)	12.81 ± 6.26	-
In-segment RVD (mm)	3.02 ± 0.41	2.97 ± 0.43
In-scaffold RVD (mm)	-	3.09 ± 0.41
In-segment MLD (mm)	0.92 ± 0.38	2.61 ± 0.35
In-scaffold MLD (mm)	-	2.73 ± 0.32
In-segment acute gain (mm)	-	1.68 ± 0.44
In-scaffold acute gain (mm)	-	1.81 ± 0.40
In-segment DS (%)	69.4 ± 11.7	11.8 ± 8.2
In-scaffold DS (%)	-	10.9 ± 7.8

QCA Analysis – Angio Subset

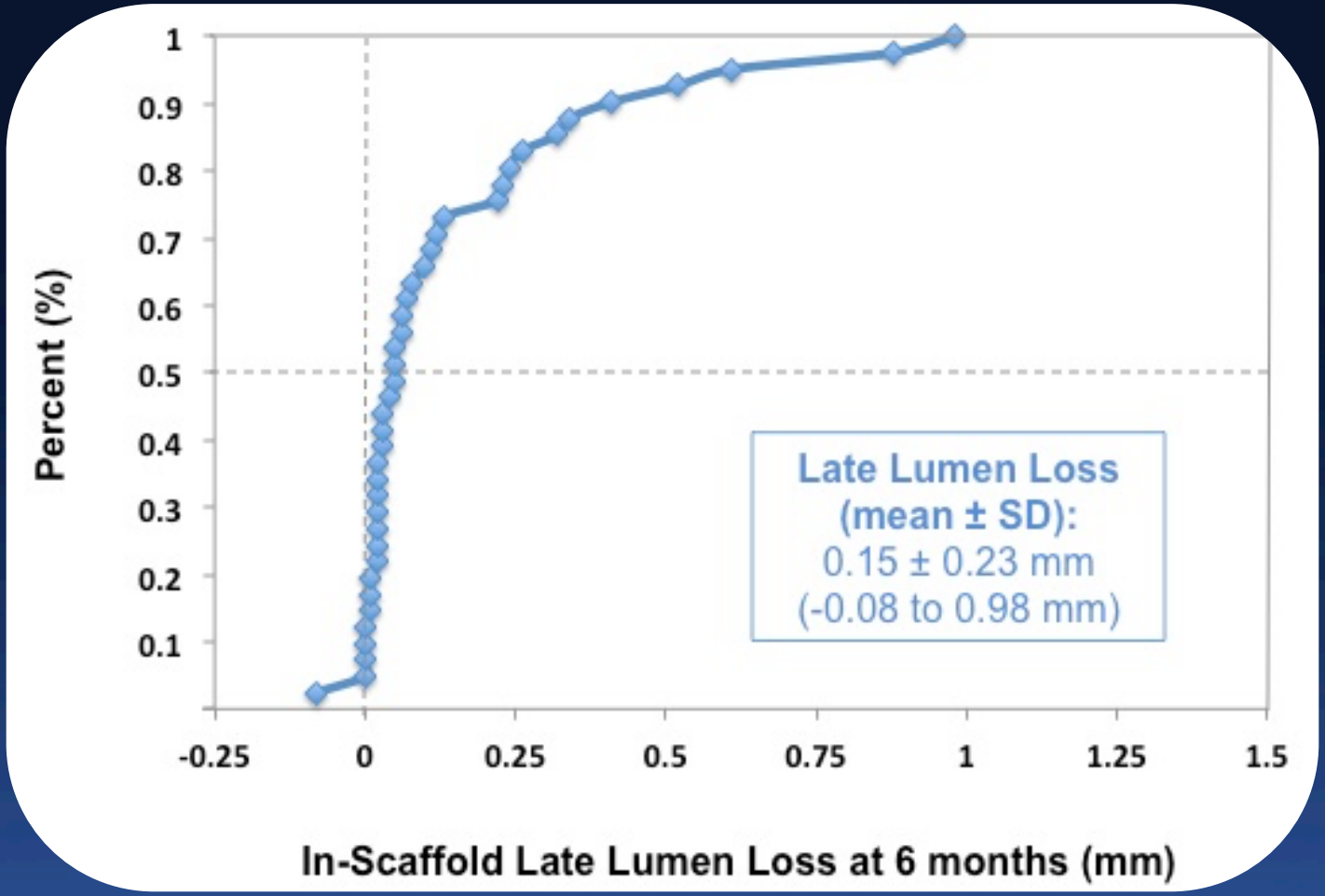
Angiographic Analysis (QCA)	Baseline N = 41	Post-procedure N = 41	6-months N = 41
Lesion length (mm)	12.13 ± 3.77	-	-
In-segment RVD (mm)	3.07 ± 0.39	3.03 ± 0.41	2.94 ± 0.38
In-scaffold RVD (mm)	-	3.14 ± 0.38	3.06 ± 0.39
In-segment MLD (mm)	0.95 ± 0.38	2.67 ± 0.38	2.53 ± 0.40
In-scaffold MLD (mm)	-	2.82 ± 0.32	2.67 ± 0.40
In-segment acute gain (mm)	-	1.71 ± 0.50	-
In-scaffold acute gain (mm)	-	1.86 ± 0.42	-
In-segment DS (%)	68.75 ± 11.9	11.66 ± 8.1	13.87 ± 9.6
In-scaffold DS (%)	-	10.02 ± 6.5	12.68 ± 8.5

Late Lumen Loss at 6-Month FU

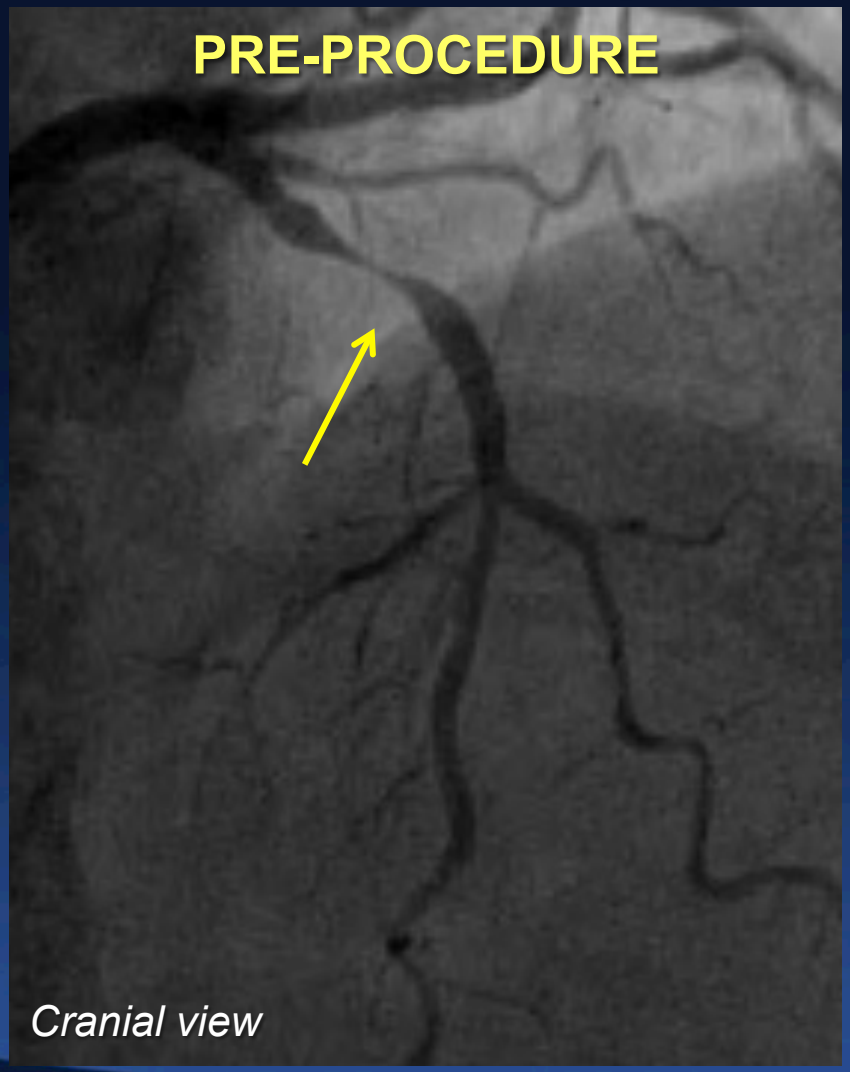


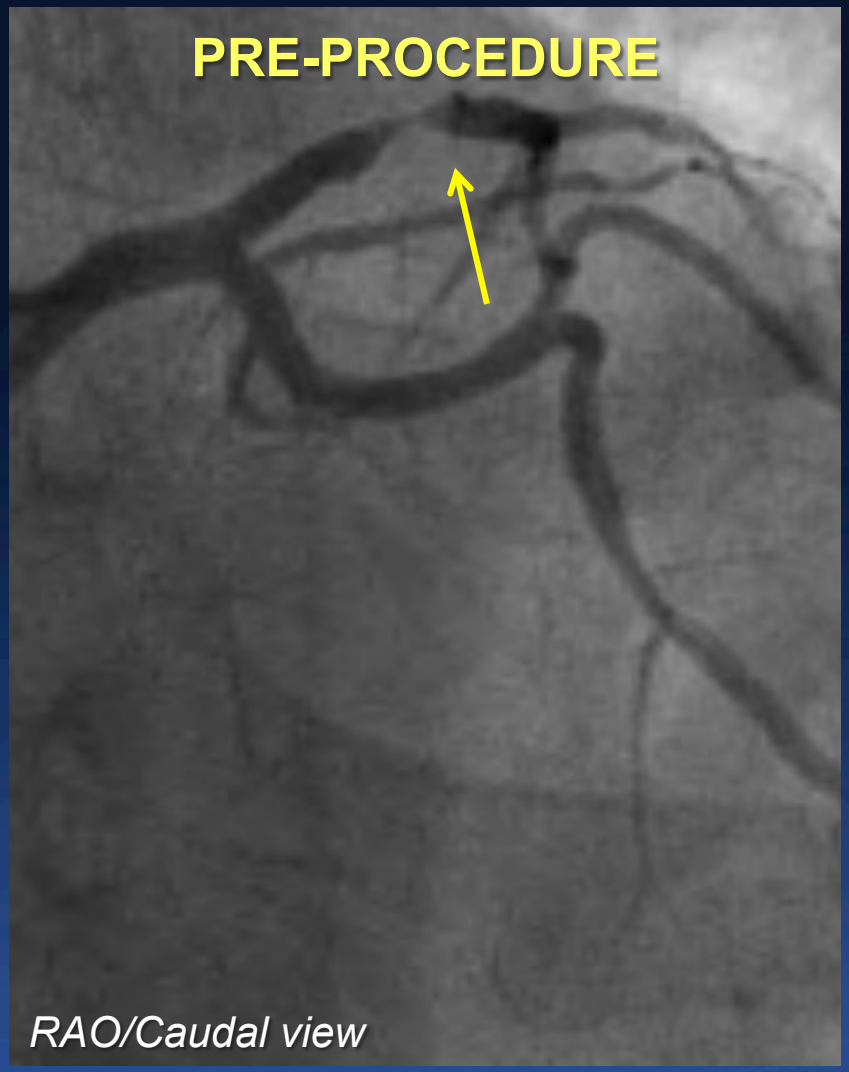
Angiographic Core Lab – CRC, Sao Paulo, Brazil. Dr. Ricardo Costa & Dr. Alexandre Abizaid

CFD Curve for Late Lumen Loss at 6-Months FU

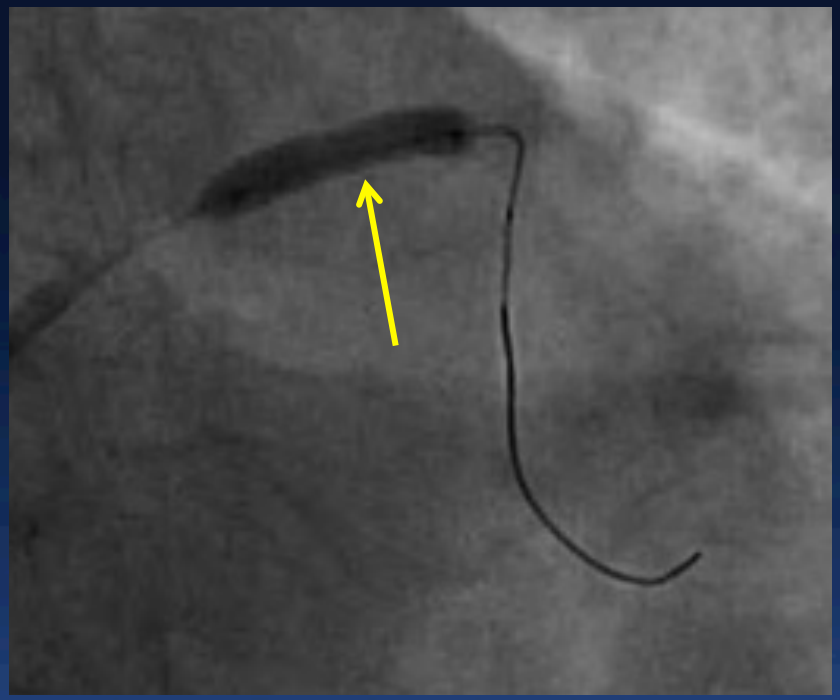


Proximal LAD Sub-Occlusive Stenosis

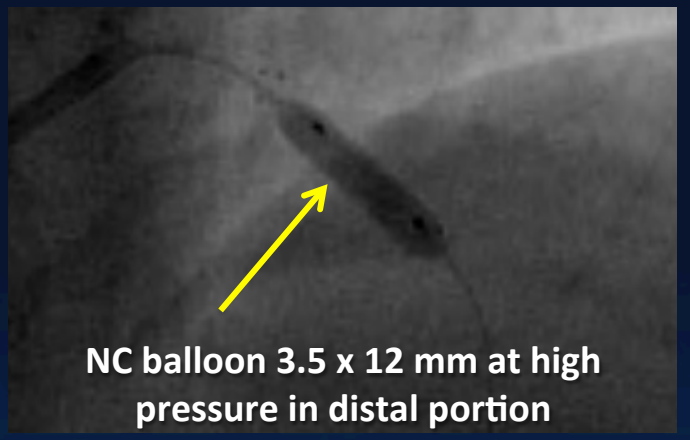




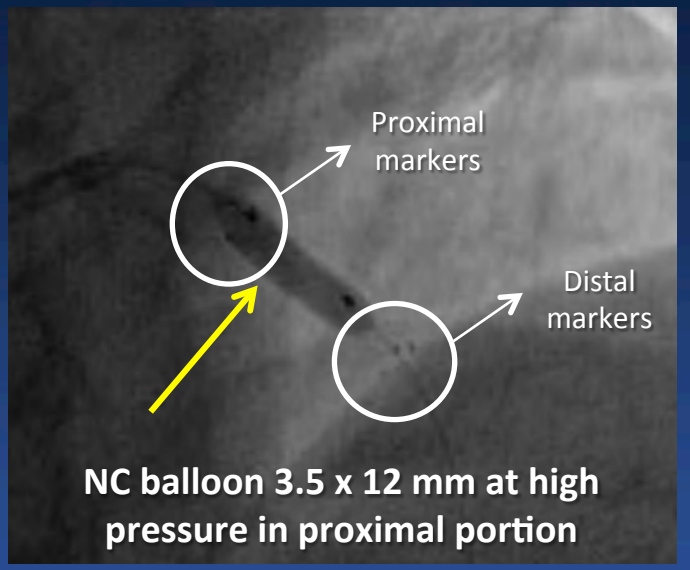
Scaffold Implant and Post-Dilatation



MeRes100 3.5 x 19 mm

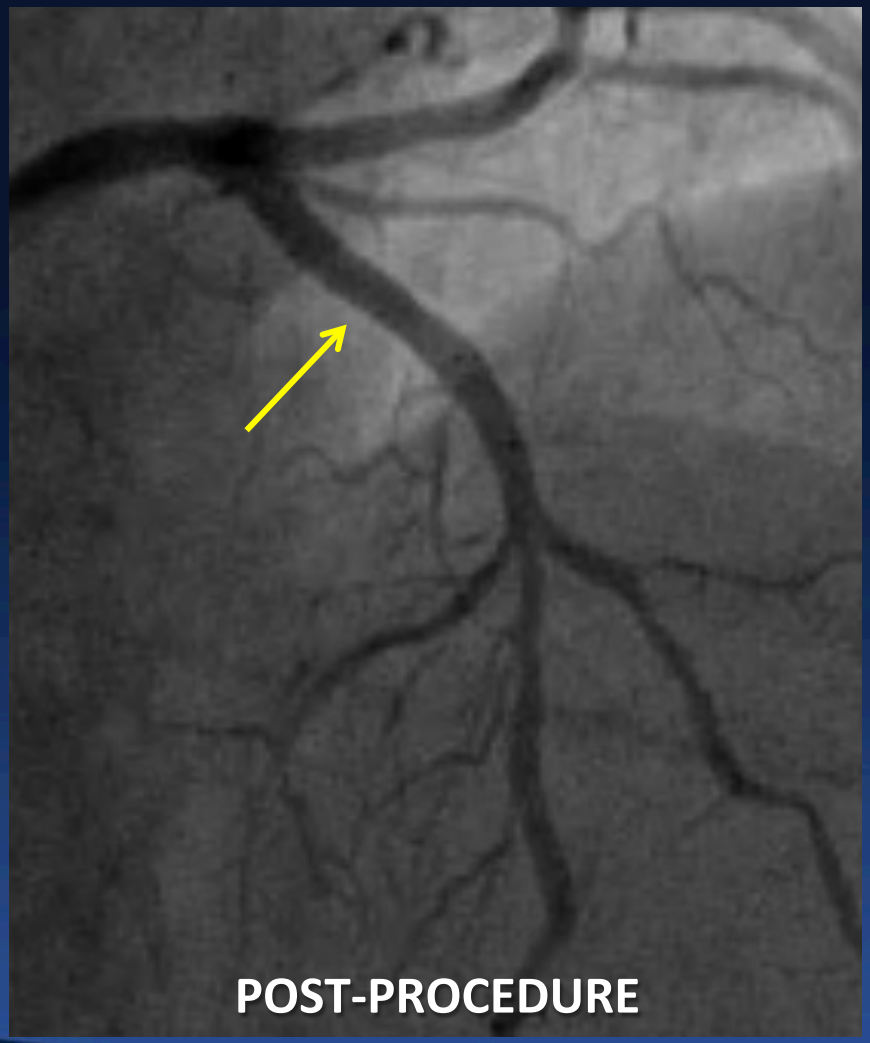


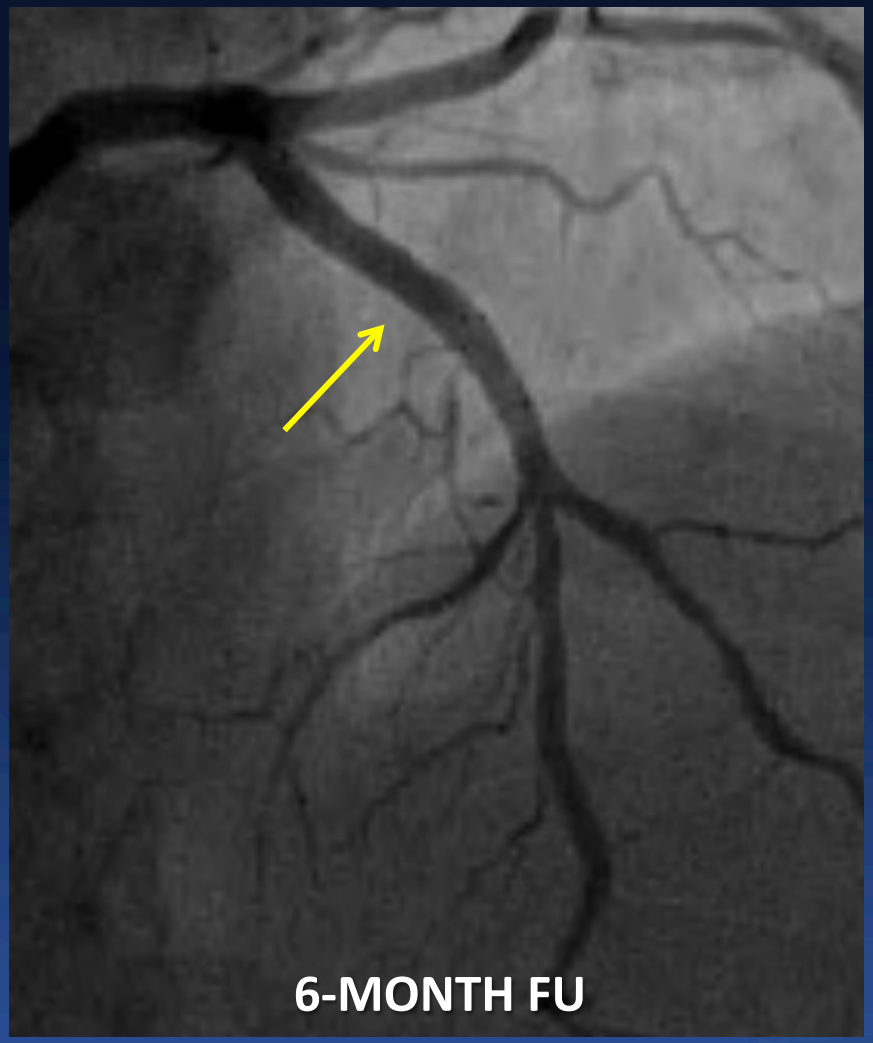
NC balloon 3.5 x 12 mm at high pressure in distal portion



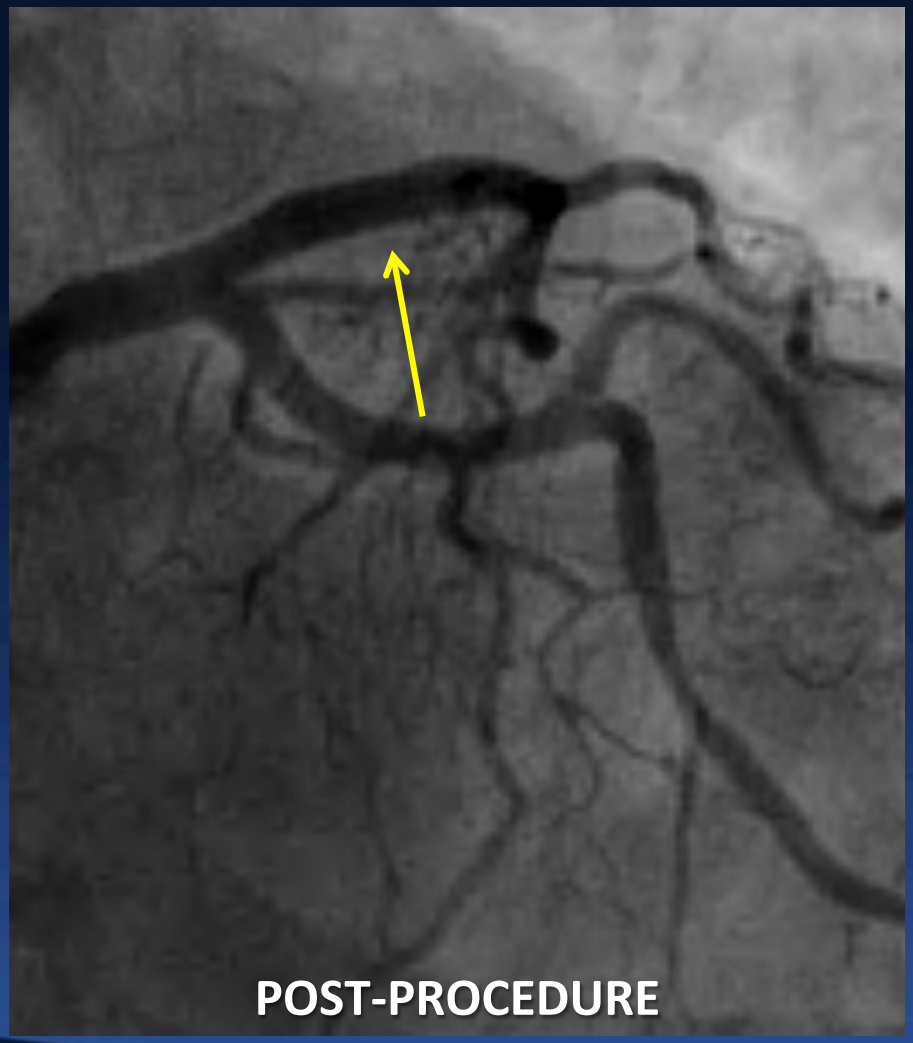
NC balloon 3.5 x 12 mm at high pressure in proximal portion

Final Results and Late Follow-up

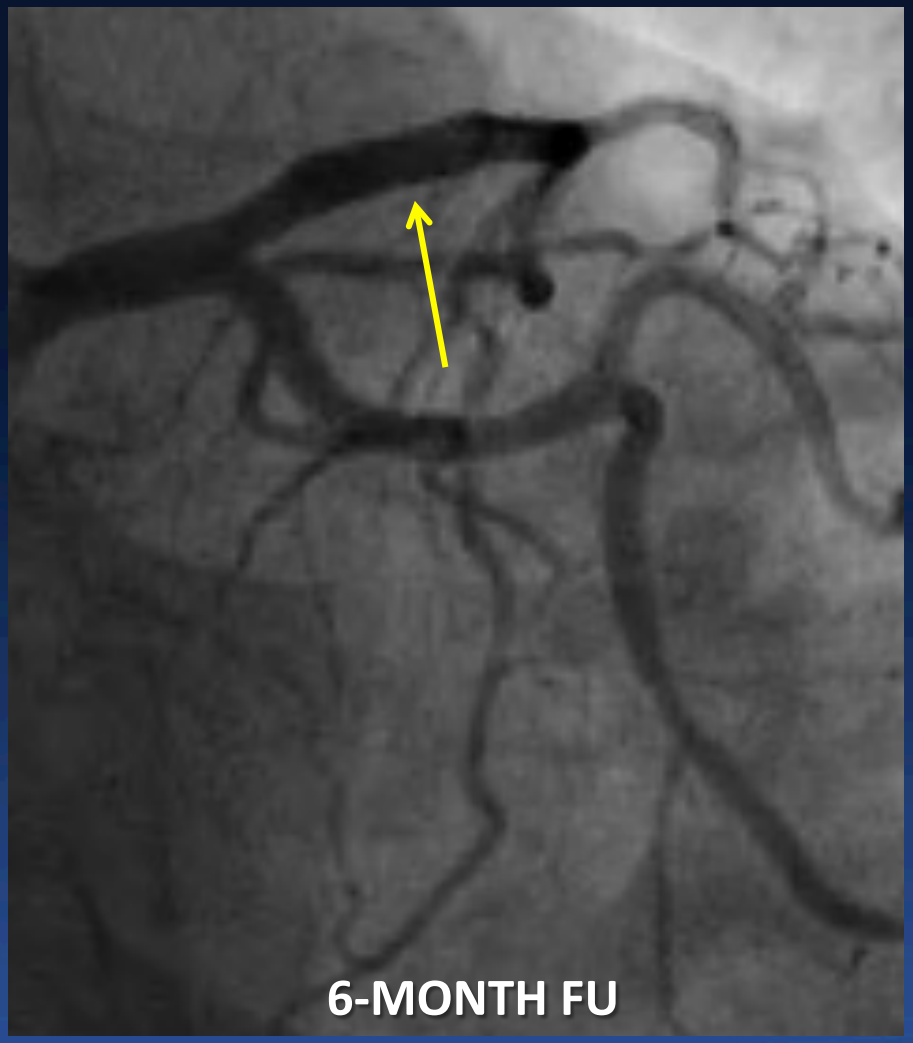




Final Result and Late Follow-up



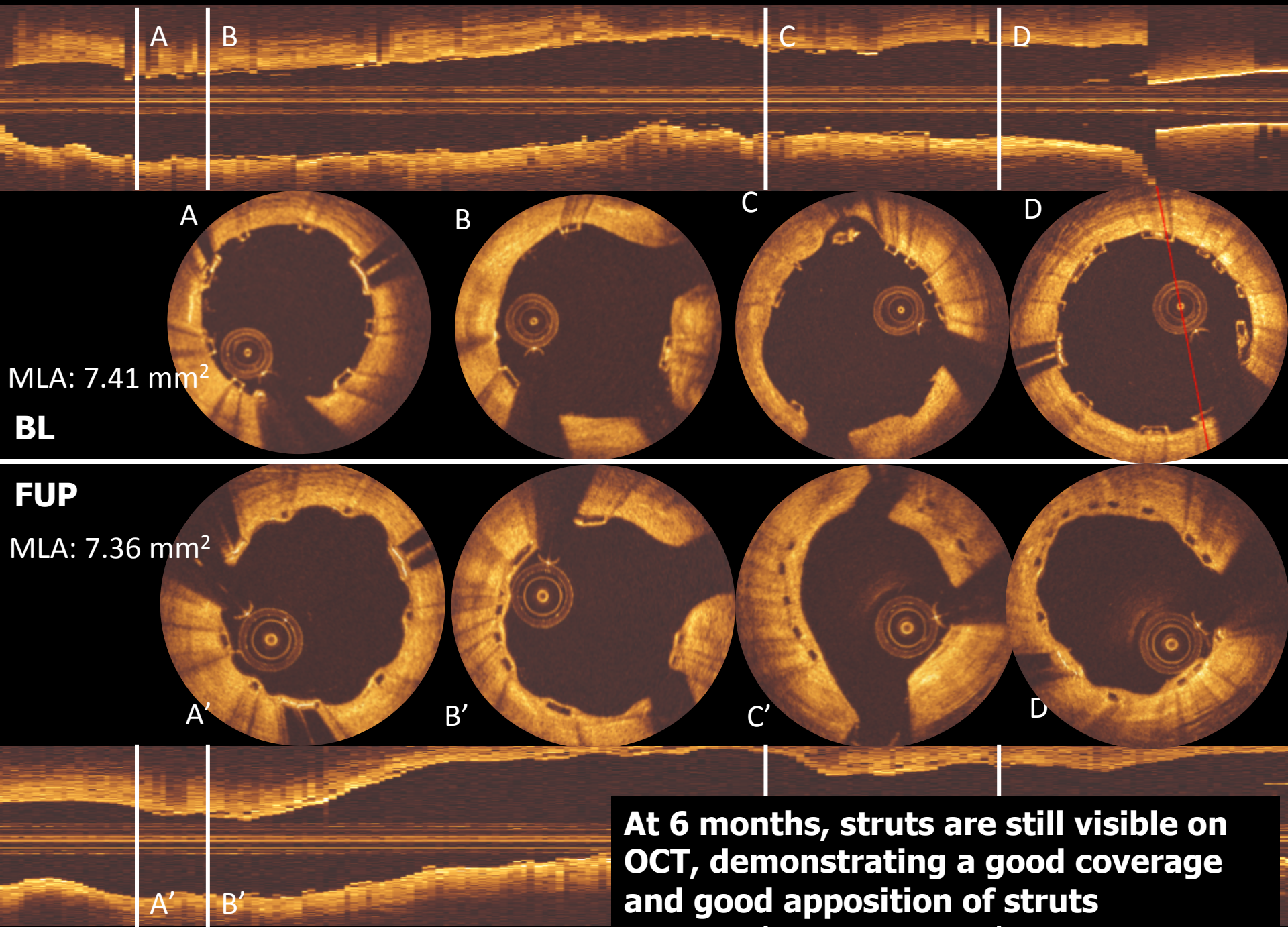
POST-PROCEDURE



6-MONTH FU

Core Lab Quantitative Assessment of OCT

N = 13	Post-procedure	6 months	Delta	p value
Mean Flow area (mm^2)	7.20	6.87	-0.33	0.283
Minimum Flow area (mm^2)	6.13	5.06	-1.07	0.001
Mean Abluminal Scaffold area (mm^2)	8.04	8.47	+0.43	0.241
Minimum Abluminal Scaffold area (mm^2)	7.00	6.83	-0.13	0.458
Mean strut core area (mm^2)	0.14	0.11	0.03	0.003
Mean neointimal area (on top & in-between struts) (mm^2)	-	1.53	-	-
% Covered struts	**-**	**99.3%**		


A
B
C
D
A
B
C
D
MLA: 7.41 mm²
BL
FUP
MLA: 7.36 mm²
A’
B’
C’
D
A’
B’
At 6 months, struts are still visible on OCT, demonstrating a good coverage and good apposition of struts

Core Lab Serial Quantitative IVUS Analysis (12 pairs)

N = 12	Post-procedure	6 months	Delta	p value (BL-6M)
Mean Lumen area (mm^2)	6.14	6.25	+0.10	0.64
Mean Scaffold area (mm^2)	6.17	6.47	+0.30	0.122
Mean Vessel area (mm^2)	13.4	13.4	+0.07	0.915
NIH area (mm^2)		0.14		
% Volume obstruction	-	2.53%	-	
Minimum lumen area (mm^2)	5.08	4.81	-0.28	0.332
Minimum scaffold area (mm^2)	5.10	5.25	+0.14	0.478

CONCLUSIONS

- MeRes-I trial for the first human evaluation of a 2nd generation MeRes100 bioresorbable scaffold with 100 micron struts demonstrated high acute success and no major adverse clinical events or scaffold thrombosis up to 6-months.
- Serial QCA analysis demonstrated relatively low late lumen loss (0.15±0.24 mm), suggesting high efficacy on inhibiting NIH at late follow-up
- OCT and IVUS subset analyses demonstrated sustained mean flow area and virtually complete strut coverage (99.3%)

FUTURE DIRECTIONS

- These encouraging results provide the basis for further studies, using a wider range of lengths and sizes in more complex and larger patient population
- MeRes-I Extend (n=64) clinical trial currently recruiting in multiple sites in Europe, Asia, South Africa and South America
- Randomized pivotal trial against 2nd generation metallic DES (EES) planned for Q2 2017