# *Two-year Follow Up of a First-in-Man Registry with a Bioabsorbable Polymer Based Sirolimus-Eluting Stent (Medistra Excel Drug-elutIng STent TRiAl (MEDISTRA)*

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# *Background*

- One major issue of the wide application drug-eluting stents is "COST"
- Furthermore, permanent polymer may carry the potential for increased inflammatory & thrombogenic responses life threatening consequences.
- *"MEDISTRA"* is a single center, open label, "first-in-man" (FIM) study of *"EXCEL",* a "less costly" bioabsorbable polymer based* sirolimus-eluting stent in real world cases

* Biodegradable poly-lactic acid polymer

# **M***edistra* **E***xcel* **D***rug-Elut***I***ng* **S***tent* **TR***i***A***l*

- Single center, prospective, observational study
  (Medistra Hospital) (January 30, 2004 – August 28, 2006)

- Study ***NOT*** sponsored by the company

- ***Inclusions:***
  - All comers who are candidates for PCI
    ("real world cases")

- ***Exclusions:***
  - Contraindications to anti-platelets
  - Patients with short life expectancy &
    serious concomitant disease (advanced cancer, etc)
  - Lack of patient's consent

- ***QCA analysis*** is done by an independent core laboratory
  (National Heart Centre – Singapore) (Dr. A. Wong, A/Prof. T.H. Koh)

# Medistra Excel Drug-ElutIng Stent TRiAl

***Primary End-Point:***

TLR at 6 and 12 months

***Secondary End-Point:***

6-month in-segment restenosis rate

In-segment late loss

Major Adverse Cardiac Events (MACE):

→ Death, QMI, NQMI, & / or TLR

- **Predilatation** is encouraged, even though direct stenting is allowed in simple lesion
- **Stent selection:**
  - Try to always use *EXCEL*
  - If appropriate size / length not available, use other DES (Cypher or Taxus)
  - If other DES is not available (logistic problem), use BMS
- **Antiplatelet regimen:**
  - ASA 160 mg indefinitely (unless contraindicated)
  - Clopidogrel 300 mg (loading), then 75 mg for **6 months**

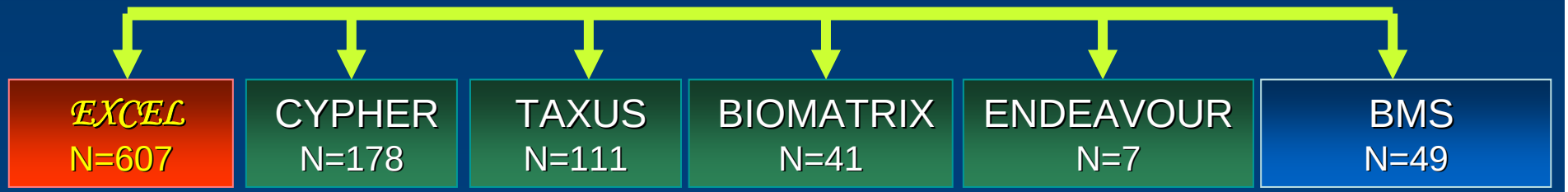
# *Methods*

All comers,
N = 359

2 stent dislodgement* ("prototype stent")

357 eligible pts

DES-stenting as default strategy (N=993 stents),
except if there is logistic problem (BMS will be used)




* 1 case when negotiating mildly stenotic, acutely angulated LCX to fix mid-LCX stenosis
1 case with diffuse, calcified mid-RCA stenosis, during attempted direct stenting

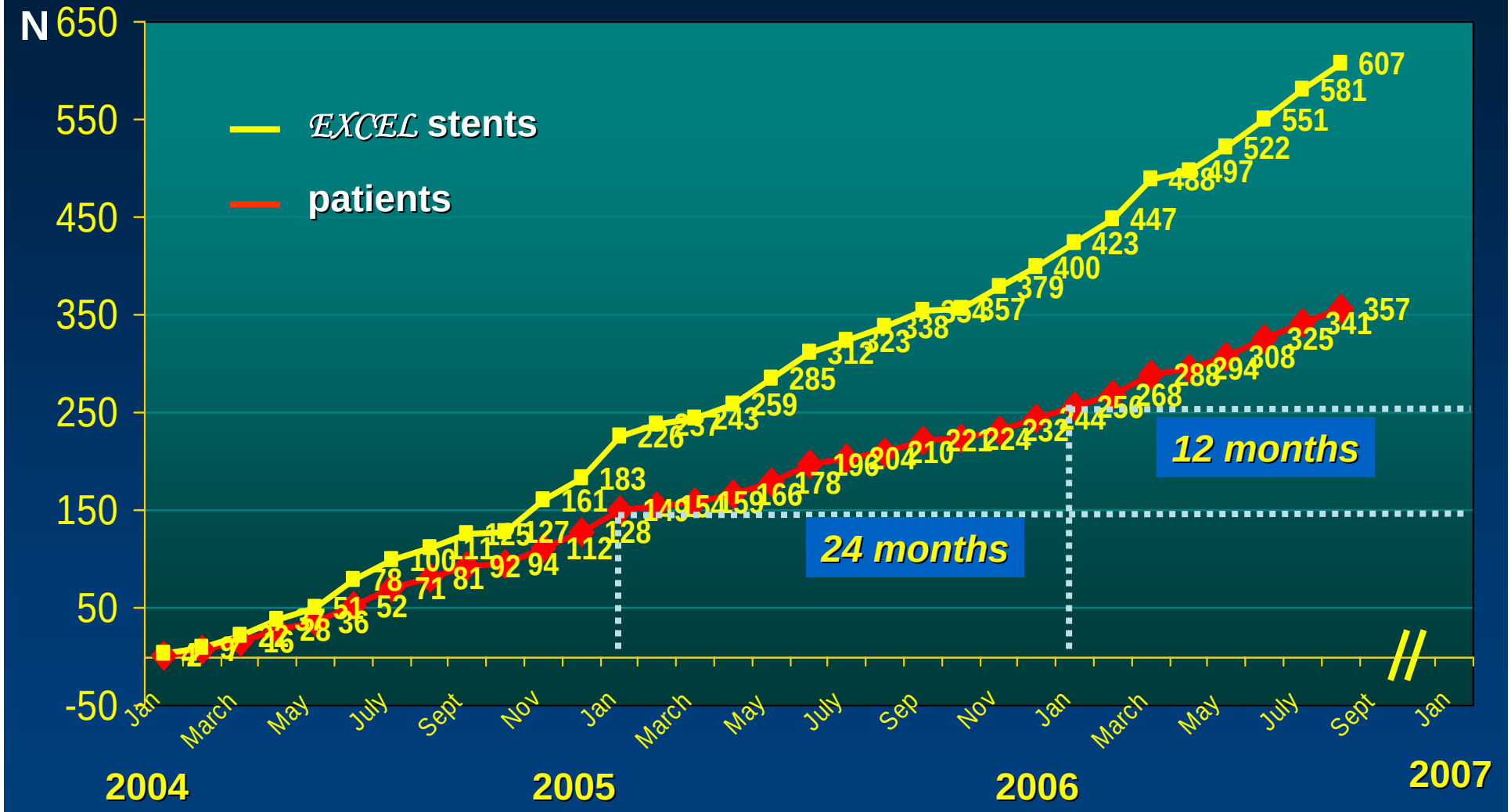
## *Demographics & CV Risk Factors*

| | |
|---|---|
| N patients | 357 |
| No lesions | 812 |
| No stents | 993 |
| Age (yrs) | 58.8 ± 9.7 |
| Male / female | 297/60 |
| Family history | 108 (30.2%) |
| Hypertension | 192 (53.8%) |
| Dyslipidemia | 212 (59.4%) |
| Diabetes mellitus | 126 (35.3%) |
| Smoking | 162 (45.4%) |
| Prior MI | 163 (45.7%) |
| Prior CABG | 19 (5.3%) |
| Prior PCI | 101 (28.3%) |

## *Clinical Presentation*

| | |
|---|---|
| **Clinical presentation** | |
| Stable angina | 153 (42.8%) |
| Unstable angina / ACS | 42 (11.8%) |
| Acute MI | 17(4.8%) |
| Recent MI ( < 30 days) | 20 (5.6%) |
| Silent ischemia | 125 (35.0%) |
| **Disease extent:** | |
| Single vessel disease | 137 (38.4%) |
| Double vessel disease | 128 (35.8%) |
| Triple vessel disease | 77 (21.6%) |
| LM + SVD | 10 (2.8%) |
| LM + DVD | 3 (0.8%) |
| LM + TVD | 1 (0.3%) |
| LM only | 1 (0.3%) |
| LVEF (%, mean ± SD) | 58 ± 11% |

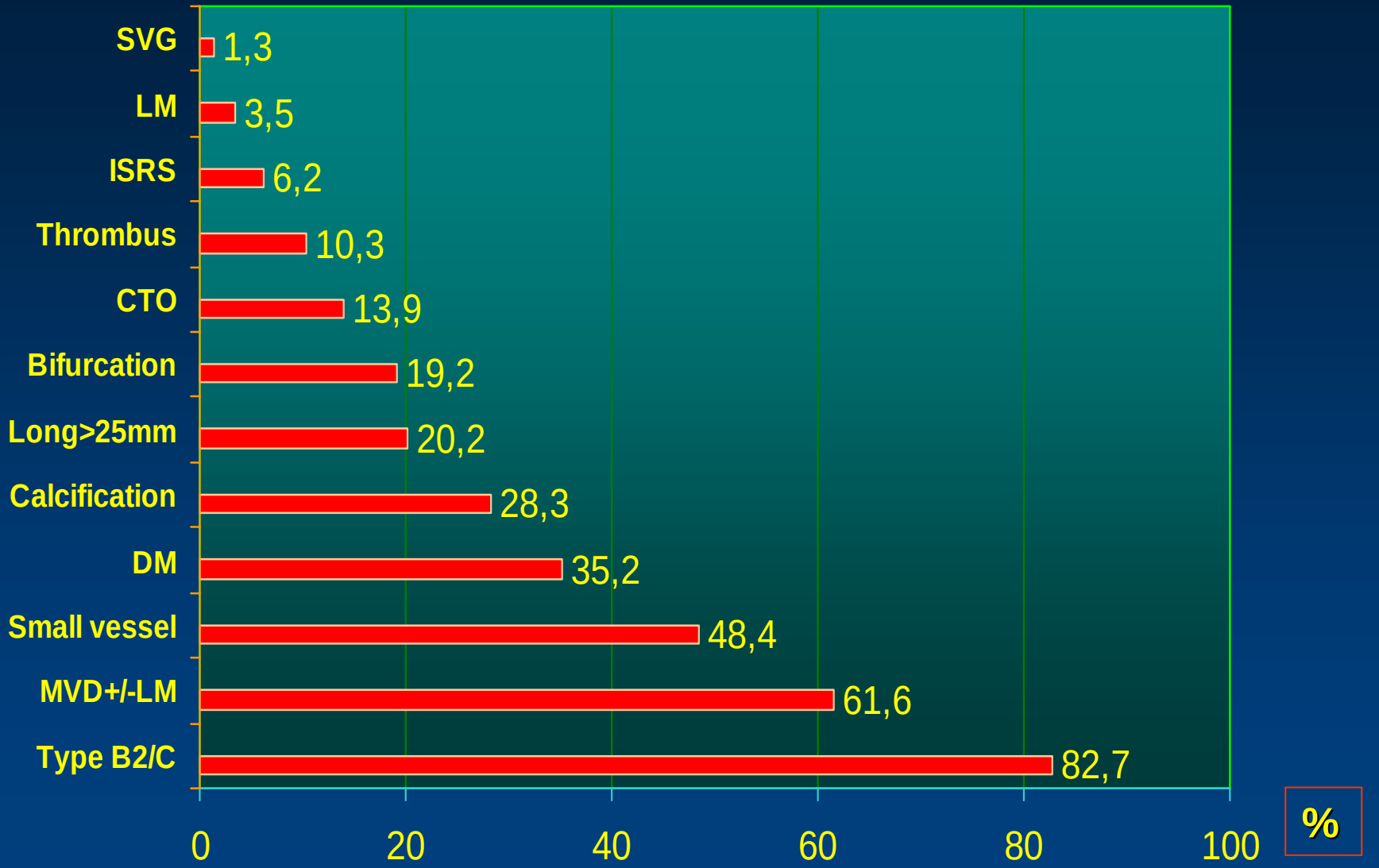
# *Cumulative Patient Recruitment & EXCEL Stent Utilization*



| | Excel (N=607) | Taxus (N=111) | Cypher (N=178) | Biomatrix (N=41) | Endeavour (N=7) | BMS (N=49) |
|---|---|---|---|---|---|---|
| ***Vessel location (n, %)*** | | | | | | |
| LM | 21 (3.5) | 4 (3.6) | 2 (1.1) | 0 | 0 | 0 |
| **LAD** | **276 (45.5)** | 58 (52.3) | 82 (46.1) | 17 (41.5) | 0 | 27 (55.1) |
| LCX | 145 (23.9) | 25 (22.5) | 45 (25.3) | 6 (14.6) | 3 (42.9) | 9 (18.4) |
| RCA | 157 (25.9) | 24 (21.6) | 47 (26.4) | 18 (43.9) | 4 (57.1) | 13 (26.5) |
| SVG | 8 (13.2) | 0 | 2 (1.1) | 0 | 0 | 0 |
| ***Indication for stenting (n, %)*** | | | | | | |
| **De-novo** | **591 (97.4)** | 111 (100) | 170 (95.5) | 36 (87.8) | 7 (100) | 45 (91.8) |
| Suboptimal | 11 (1.8) | 0 | 5 (2.8) | 3 (7.3) | 0 | 0 |
| Bail out | 5 (0.8) | 0 | 3 (1.7) | 2 (4.9) | 0 | 4 (8.2) |
| ***Types of lesions (n, %)*** | | | | | | |
| A | 10 (1.6) | 7 (6.3) | 6 (3.4) | 0 | 0 | 2 (4.1) |
| B1 | 95 (15.7) | 17 (15.3) | 17 (9.6) | 9 (21.9) | 0 | 7 (14.3) |
| **B2** | **292 (48.1)** | 59 (53.2) | 100 (56.1) | 20 (48.8) | 4 (57.1) | 27 (55.1) |
| **C** | **210 (34.6)** | 28 (25.2) | 55 (30.9) | 12 (29.3) | 3 (42.9) | 13 (26.5) |

| | Excel (N=607) | Taxus (N=111) | Cypher (N=178) | Biomatrix (N=41) | Endeavour (N=7) | BMS (N=49) |
|---|---|---|---|---|---|---|
| ***Stent length, mm (n, %)*** | | | | | | |
| < 15 | 171 (28.2) | 9 (8.2) | 53 (29.8) | 17 (41.5) | 1 (14.4) | 15 (30.6) |
| 15-19 | 178 (29.3) | 23 (20.7) | 48 (27.0) | 13 (31.7) | 3 (42.8) | 10 (20.4) |
| 20-24 | 145 (23.9) | 45 (40.5) | 39 (21.9) | 6 (14.6) | 3 (42.8) | 16 (32.7) |
| ≥ 25 | 113 (18.6) | 34 (30.6) | 38 (21.3) | 5 (12.2) | 0 | 8 (16.3) |
| ***Stent diameter, mm (n, %)*** | | | | | | |
| 2.25 | -- | 12 (10.8) | -- | -- | -- | -- |
| 2.5 | 297 (48.9) | 26 (23.4) | 55 (30.9) | 19 (46.3) | 3 (42.8) | -- |
| 2.75 | -- | 33 (29.7) | 55 (30.9) | -- | -- | 12 (24.5) |
| 3.0 | 200 (32.9) | 20 (18.0) | 54 (30.3) | 9 (22.0) | 2 (28.6) | 7 (14.3) |
| 3.5 | 110 (18.2) | 20 (18.0) | 14 (7.9) | 10 (24.4) | 2 (28.6) | 9 (18.4) |
| 4.0 | -- | -- | -- | 3 (7.3) | -- | 21 (42.8) |

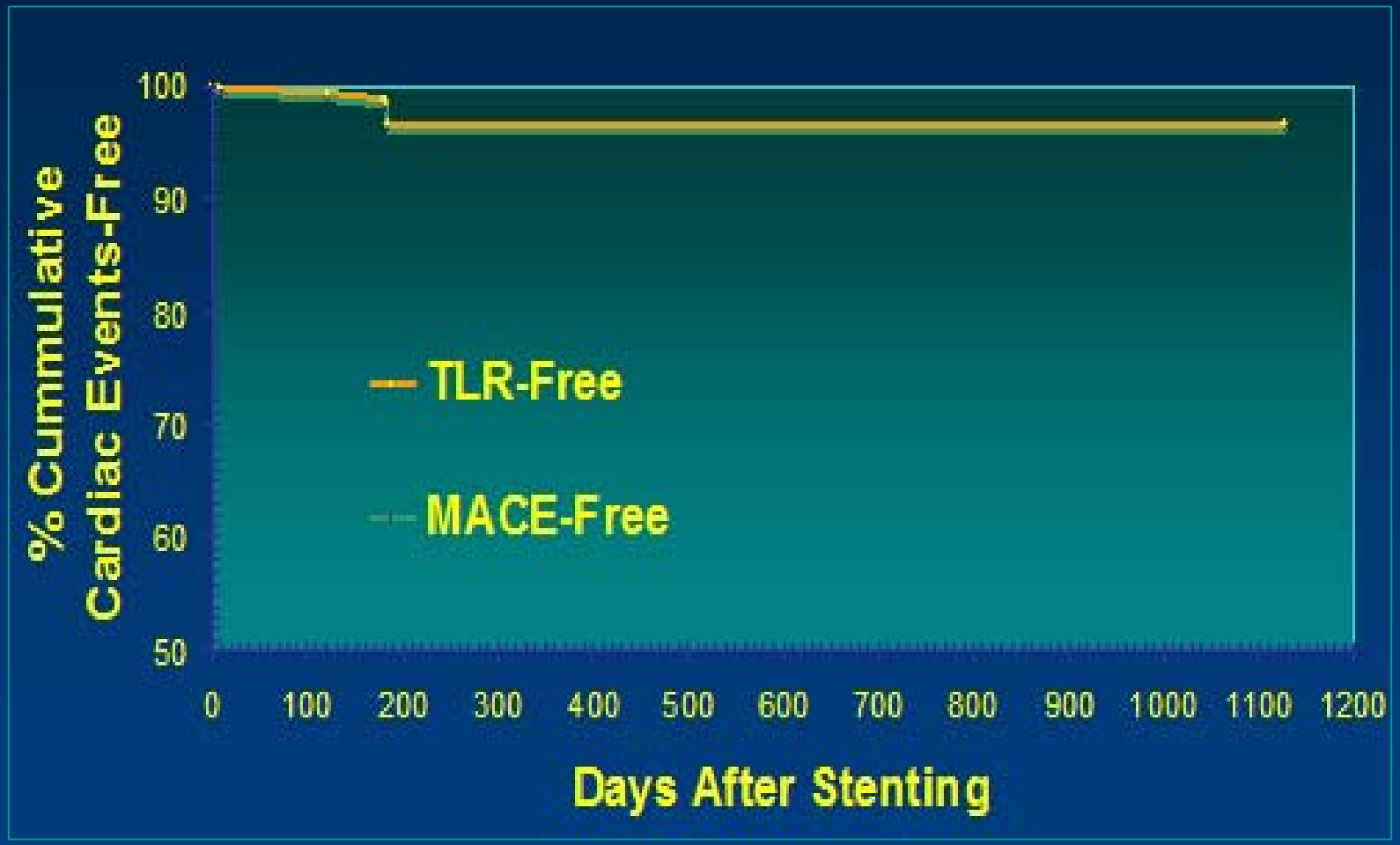
# EXCEL in Real World Cases



| | In-hospital | 30-day clinical outcome | 60-day clinical outcome | 12 month clinical outcome | 24 month clinical outcome |
|---|---|---|---|---|---|
| N (%) | 357 (100) | 357 (100) | 268 (100) | 210 (100) | 78 (96.2) |
| Cardiac death (n,%) | 0 (0) | 3 (0.8) | 3 (1.1) | 3 (1.4) | 3 (3.8) |
| Non-cardiac death (n,%) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Non-fatal QMI (n,%) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Nonfatal NQMI (n,%) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Any nonfatal MI (n,%) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| TLR (n,%) | 0 (0) | 1 (0.3) | 7 (2.6) | 7 (3.3) | 7 (9.0) |
| Stent thrombosis (n,%) | 0 (0) (acute) | 3 (0.8) (subacute) | 0 (0) (late) | 0 (0) (late) | 0 (0) (very late) |
| MACE (n,%) | 0 (0) | 3 (0.8) | 7 (2.6) | 7 (3.3) | 7 (9.0) |

# *Kaplan Meier Curve:*

## *Cumulative TLR and MACE Event – Free Survival*



# *QCA analysis at 6 months*

*(independent QCA lab – NHC, Singapore)*

QCA analysis: 109 pts with 255 lesions.

Vessels & number of lesions treated:

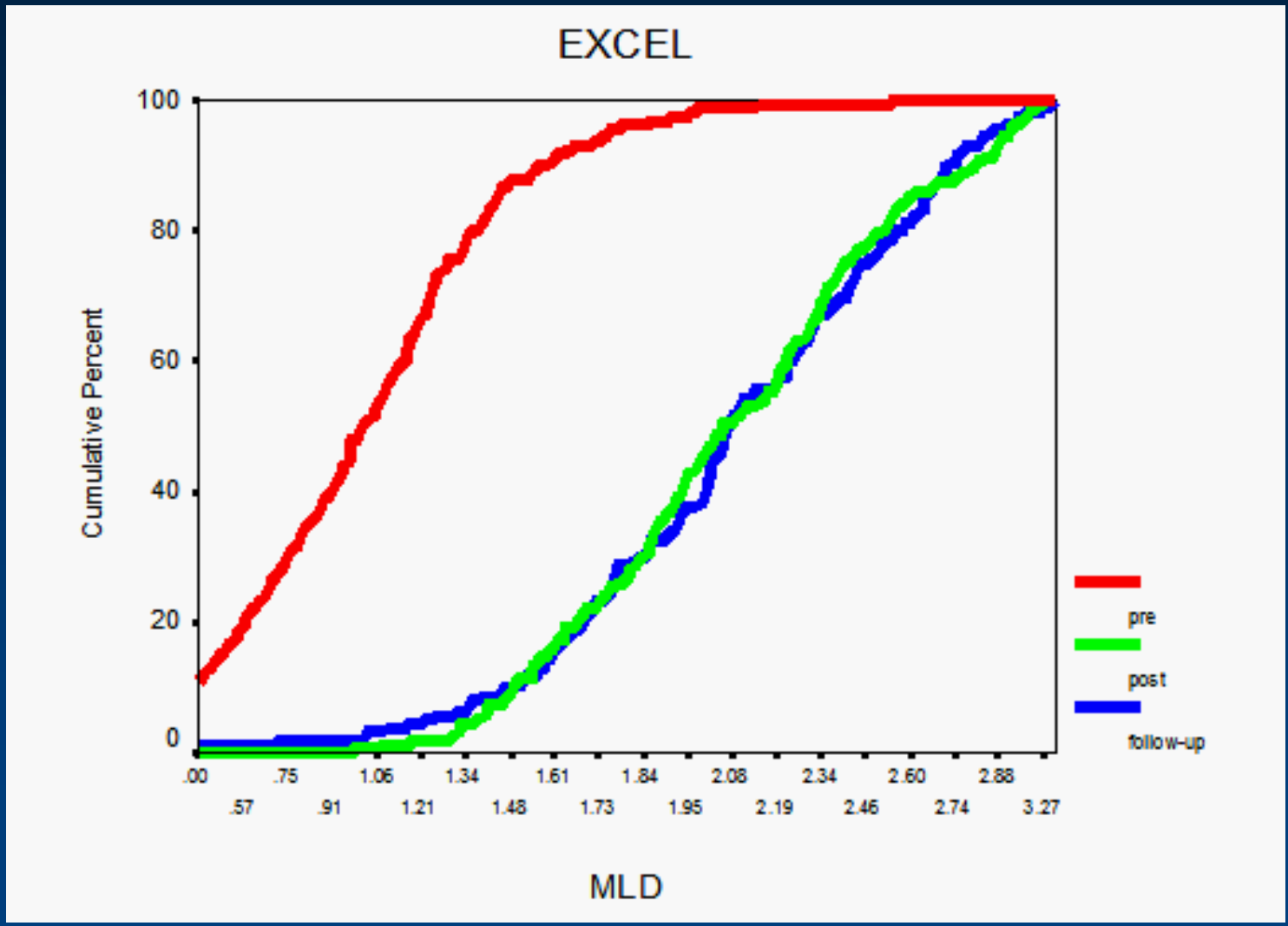
- LAD/D = 111, LCX/OM = 76, RCA = 60; LM = 8

## Types of Stents used (per lesion)

| | **Cypher** | **Taxus** | *EXCEL* | **BMS** |
|---|---|---|---|---|
| | **(n=43)** | **(n=36)** | **(n=155)** | **(n=16)** |
| Lesion length(mm) | 16.5 | 17.4 | 15.5 | 12.8 |
| Stent size (mm) | 2.84 | 2.82 | 2.87 | 3.53 |
| Stent length (mm) | 23.8 | 25.3 | 21.4 | 17.0 |

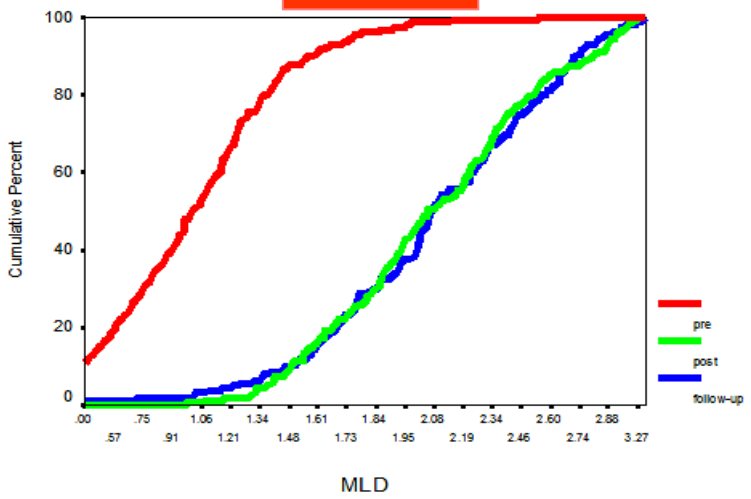
| QCA (6 mo) | CYPHER | TAXUS | EXCEL | BMS |
|---|---|---|---|---|
| ***Pre procedural*** | | | | |
| RVD, mm | 2.63 | 2.53 | 2.55 | 3.27 |
| MLD, mm | 0.95 | 0.91 | 0.98 | 1.11 |
| DS, % | 64.5 | 64.4 | 61.9 | 64.8 |
| ***Post procedural*** | | | | |
| RVD, mm | 2.60 | 2.55 | 2.56 | 3.21 |
| MLD, mm | 2.12 | 2.07 | 2.11 | 2.76 |
| DS, % | 18.1 | 18.8 | 17.8 | 13.0 |
| Stent MLD, mm | 2.26 | 2.25 | 2.34 | 2.79 |
| In-stent DS, % | 12.6 | 11.4 | 8.0 | 12.5 |
| ***Follow-up (6 months)*** | | | | |
| RVD, mm | 2.72 | 2.59 | 2.67 | 3.24 |
| MLD, mm | 1.93 | 1.80 | 2.10 | 2.05 |
| DS, % | 29.1 | 30.1 | 21.3 | 36.7 |
| Stent MLD, mm | 2.08 | 1.93 | 2.28 | 2.05 |
| In-stent DS, % | 23.3 | 25.0 | 14.3 | 36.7 |
| ***Late loss, mm*** | | | | |
| In-segment | 0.19 | 0.25 | 0.00 | 0.61 |
| In-stent | 0.25 | 0.35 | 0.07 | 0.59 |
| ***Restenosis (>50%)*** | | | | |
| In-segment | 6/42 (14.3%) | 3/36 (8.3%) | 7/155 (5.2%) | 2/13 (15.4%) |
| In-stent | 5/42 (11.9%) | 2/36 (5.6%) | 5/155 (3.2%) | 2/13 (15.4%) |

# *Cumulative Distribution Curves for EXCEL Stent*

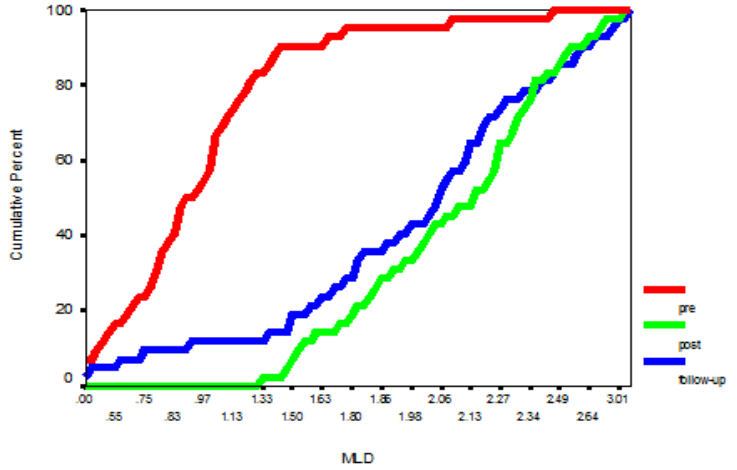


# Cumulative Distribution Curves for All Stents

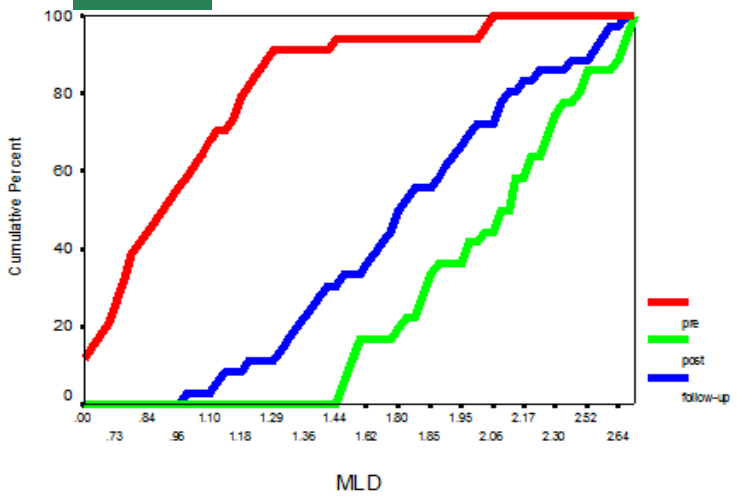
EXCEL



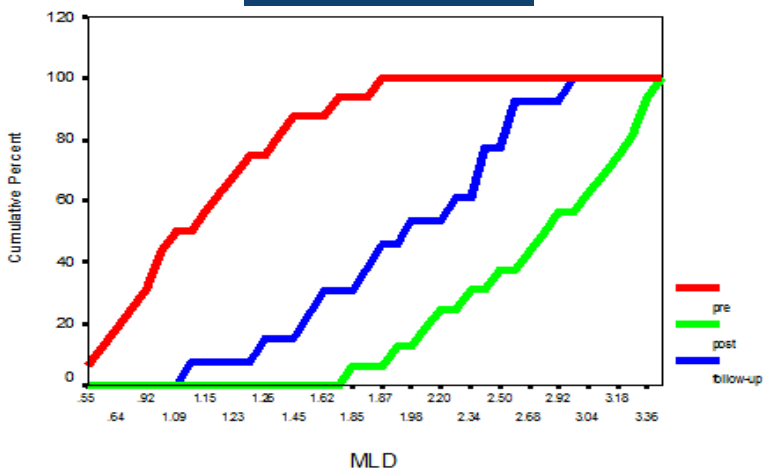

CYPHER




TAXUS



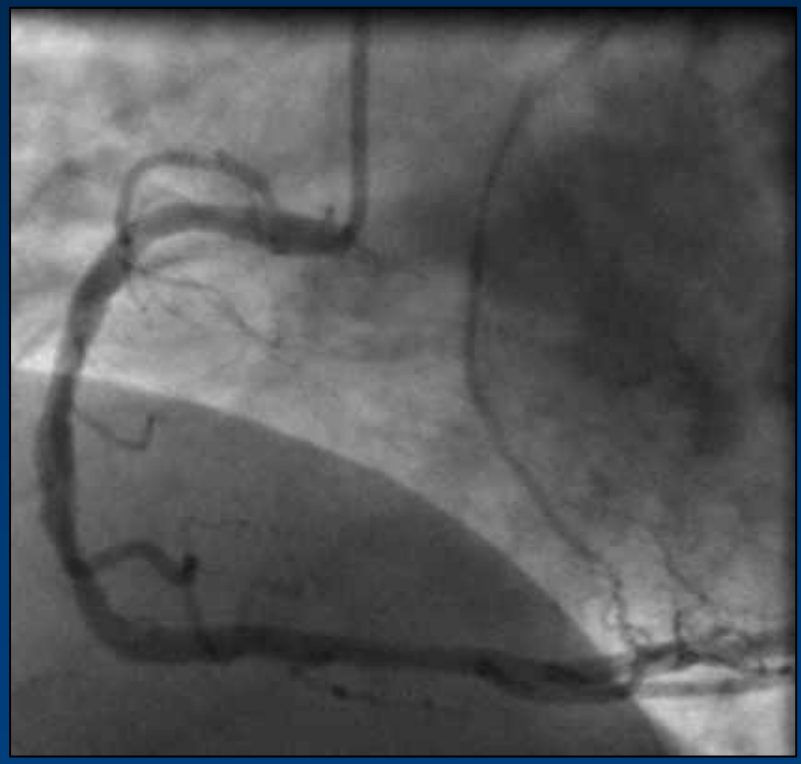

Bare Metal Stent



# *Total occlusion of LM bifurcation in a patient with NSTEMI*

TSS, 63, M, 1 hr chest pain,
BP 85/60, widespead ST depressions in anterior leads, elevated enzymes

Occluded LM bifurcation



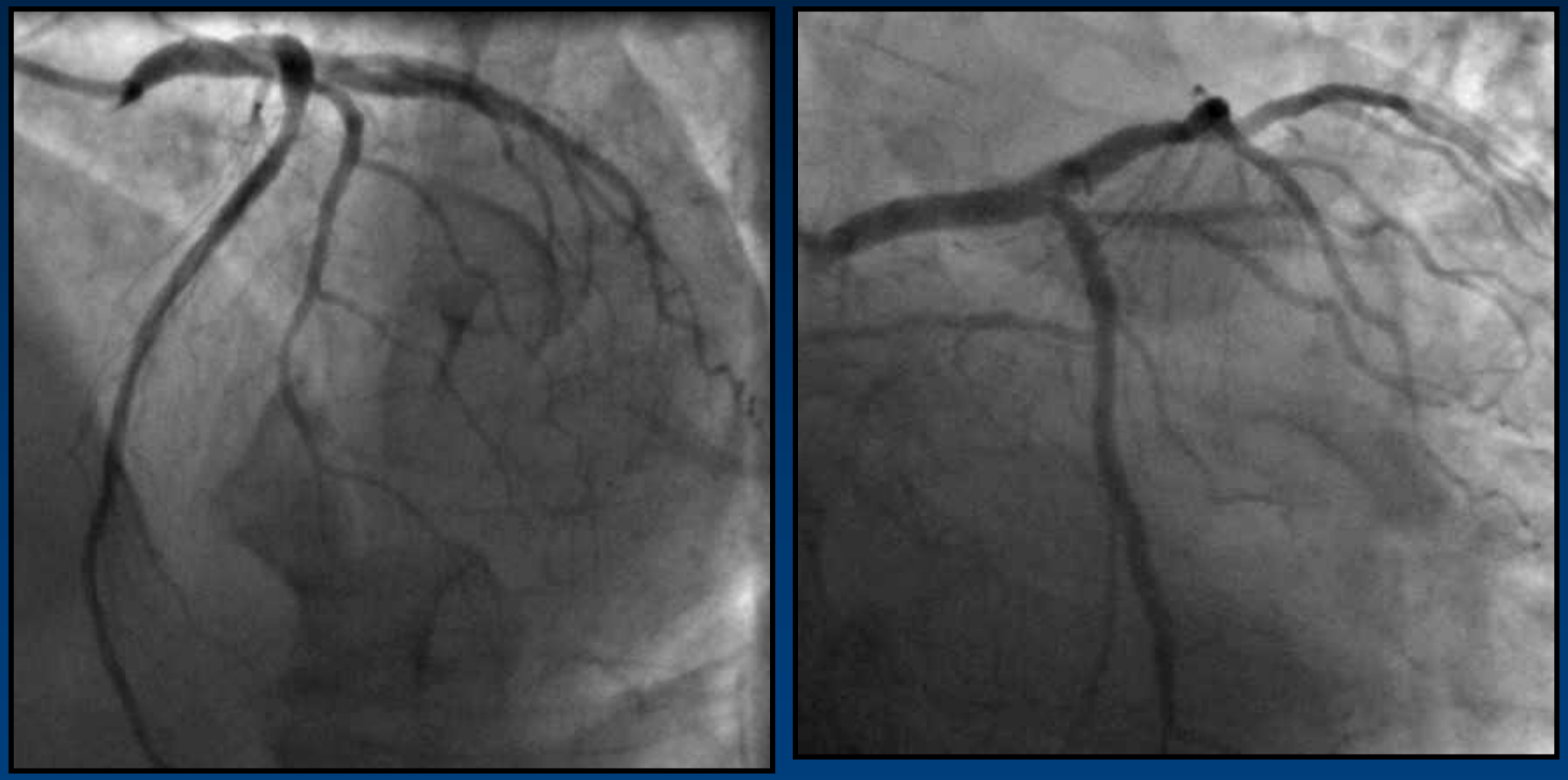
Rich collaterals from RCA

# *Total occlusion of LM bifurcation in a patient with NSTEMI*

Final result:
after thrombus aspiration and
implantation of 2 DES
(Excel 3.5/14 & 3.5/18 mm)
with crushing technique;
followed by
kissing balloon dilatation*

**** LM bifurcation stenting** in a **thrombus laden** artery is associated with a higher rate of stent thrombosis*

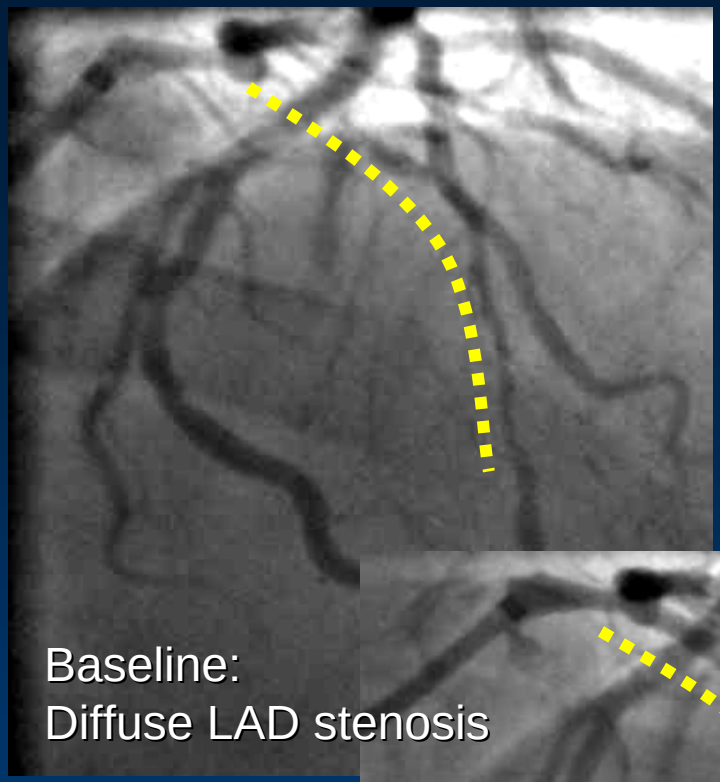
# *Total occlusion of LM bifurcation in a patient with NSTEMI*



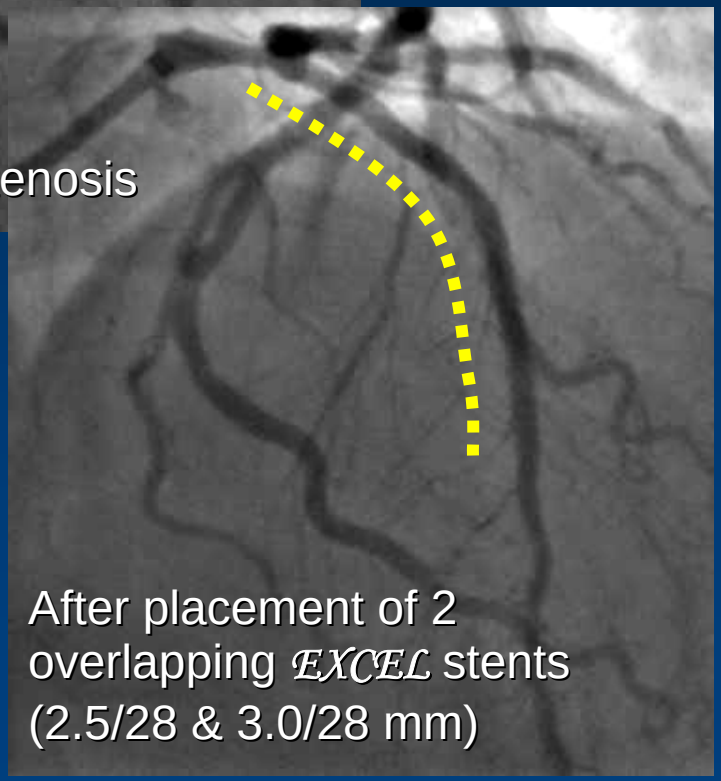
6 month angio

# *Very long / diffuse LAD stenosis*

GeGnwn, M, 62, silent ischemia



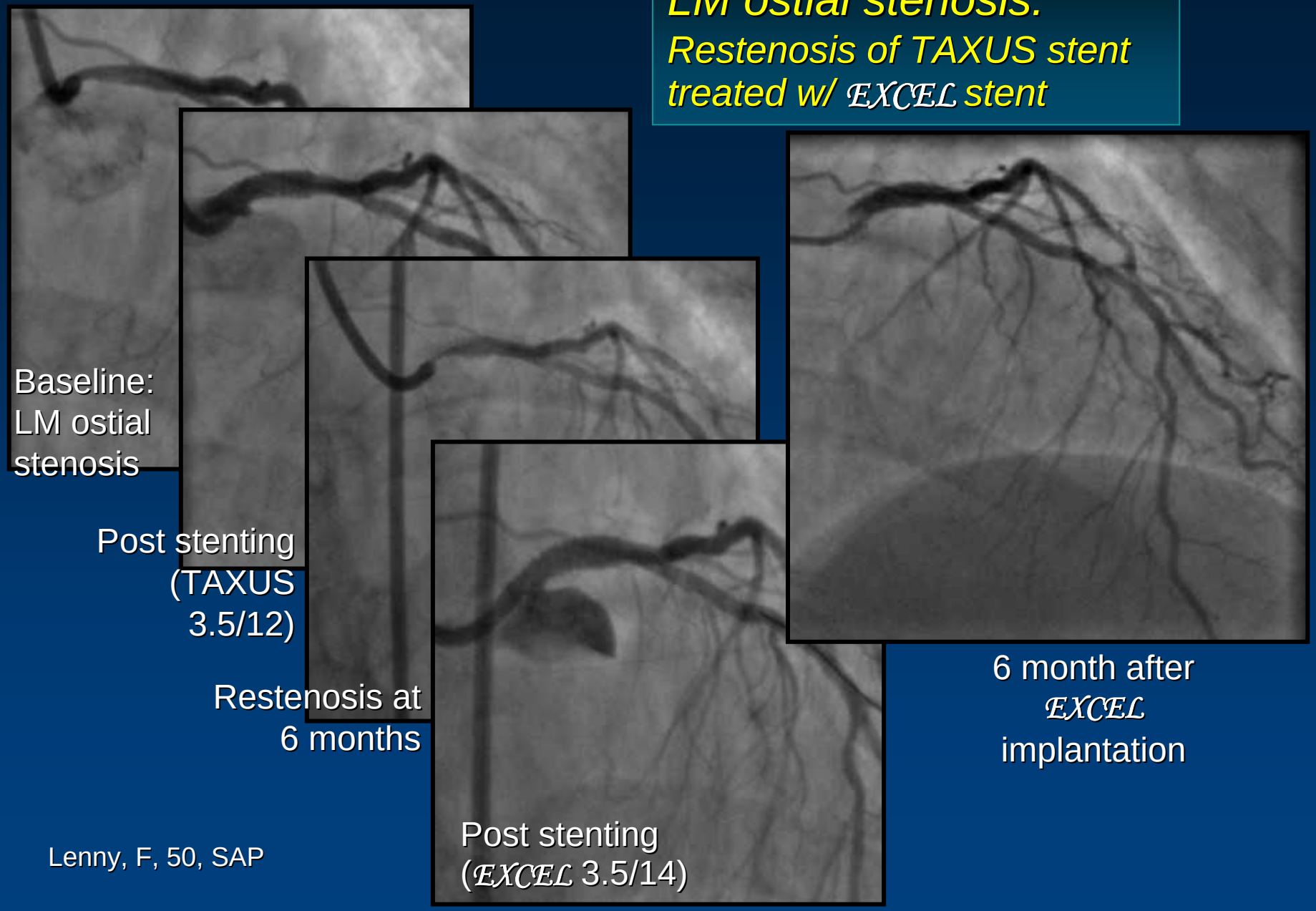
Baseline:
Diffuse LAD stenosis



After placement of 2 overlapping *EXCEL* stents (2.5/28 & 3.0/28 mm)

No restenosis at 6 months angiogram. f/up

## *LM ostial stenosis:*
### *Restenosis of TAXUS stent treated w/ EXCEL stent*



Baseline: LM ostial stenosis

Post stenting (TAXUS 3.5/12)

Restenosis at 6 months

Post stenting (*EXCEL* 3.5/14)

6 month after *EXCEL* implantation

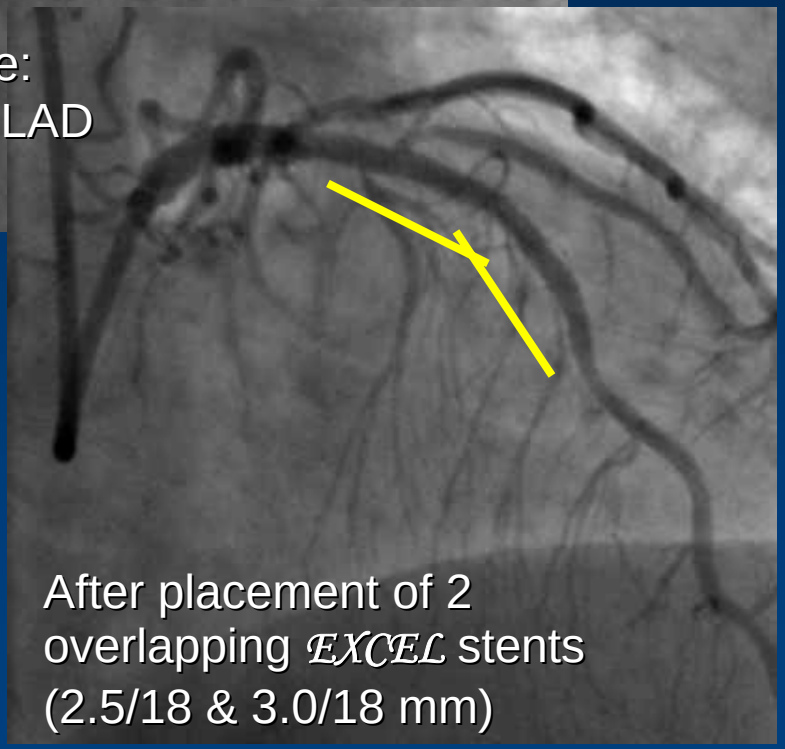
Lenny, F, 50, SAP

# *Triple CTO (LAD/LCX/RCA)*

IskS, M, 63, Stable angina

LAD

Baseline:
CTO in LAD



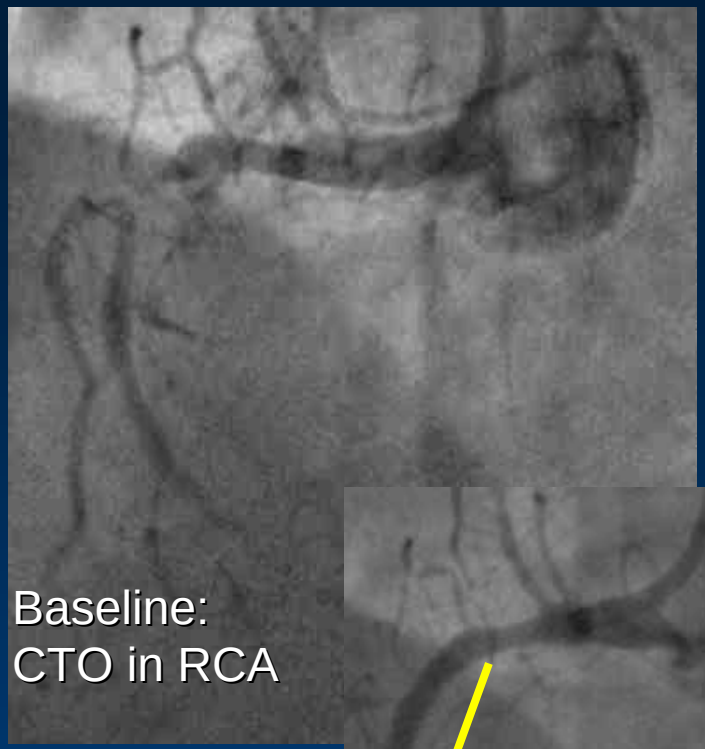
After placement of 2 overlapping *EXCEL* stents (2.5/18 & 3.0/18 mm)

No restenosis at 6 months angiogram. f/up

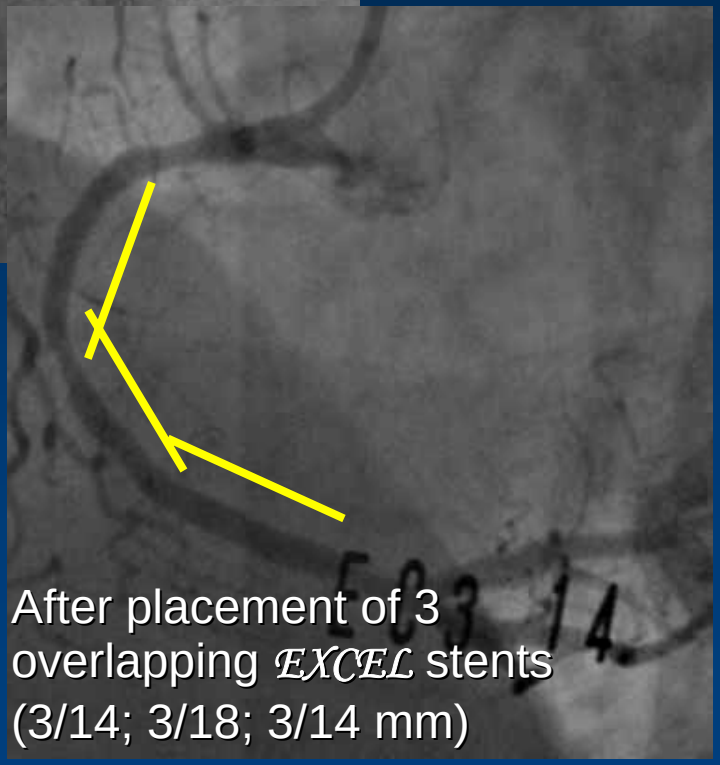
# *Triple CTO (LAD/LCX/RCA)*

IskS, M, 63, Stable angina

## RCA



Baseline:
CTO in RCA



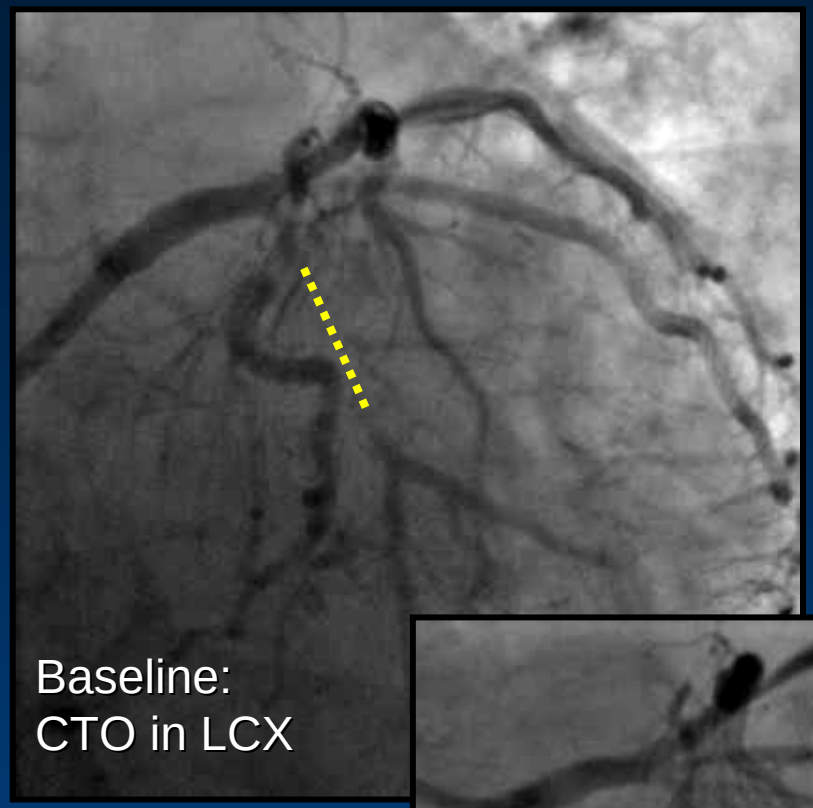
After placement of 3 overlapping *EXCEL* stents (3/14; 3/18; 3/14 mm)

No restenosis at 6 months angiogram. f/up

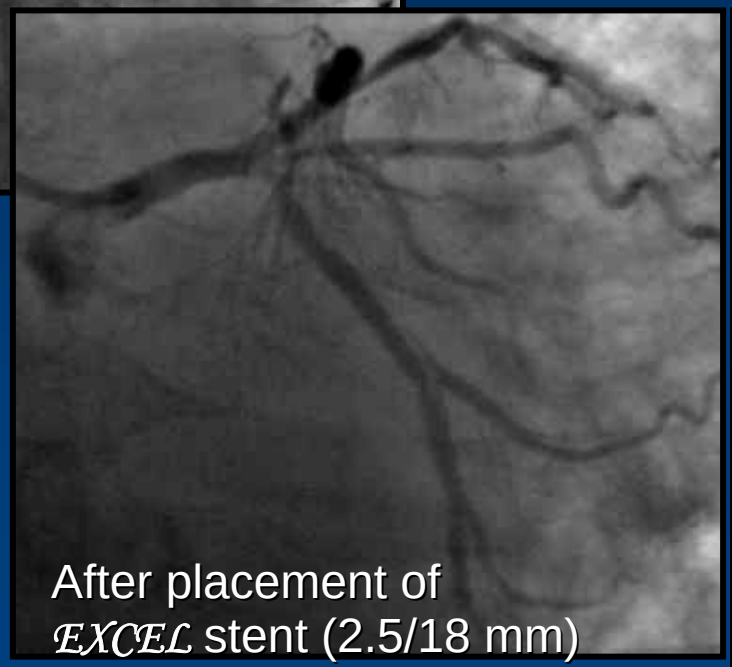
# *Triple CTO (LAD/LCX/RCA)*

IskS, M, 63, Stable angina

LCX



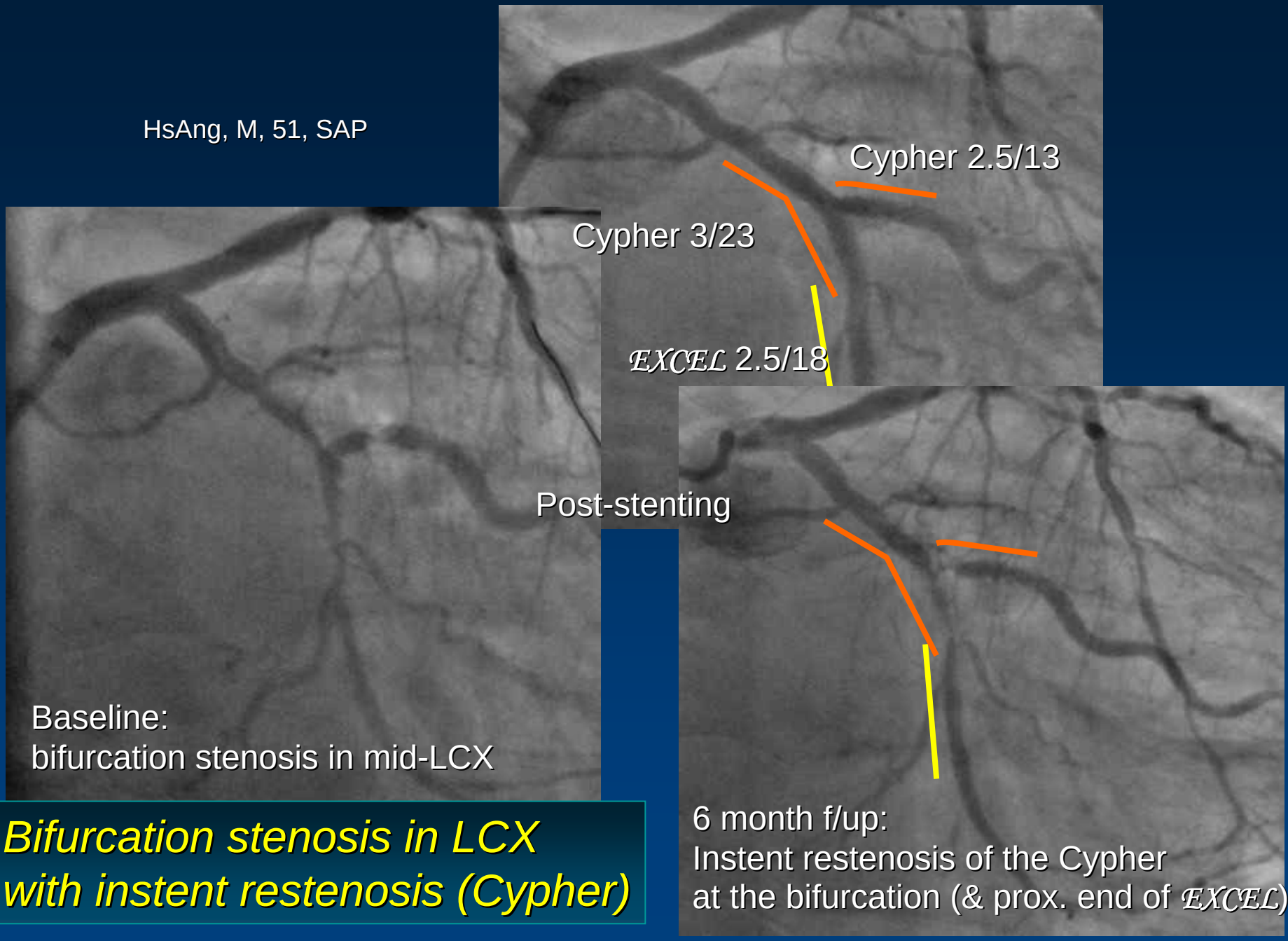
Baseline:
CTO in LCX



After placement of
*EXCEL* stent (2.5/18 mm)

No restenosis at 6 months
angiogram. f/up

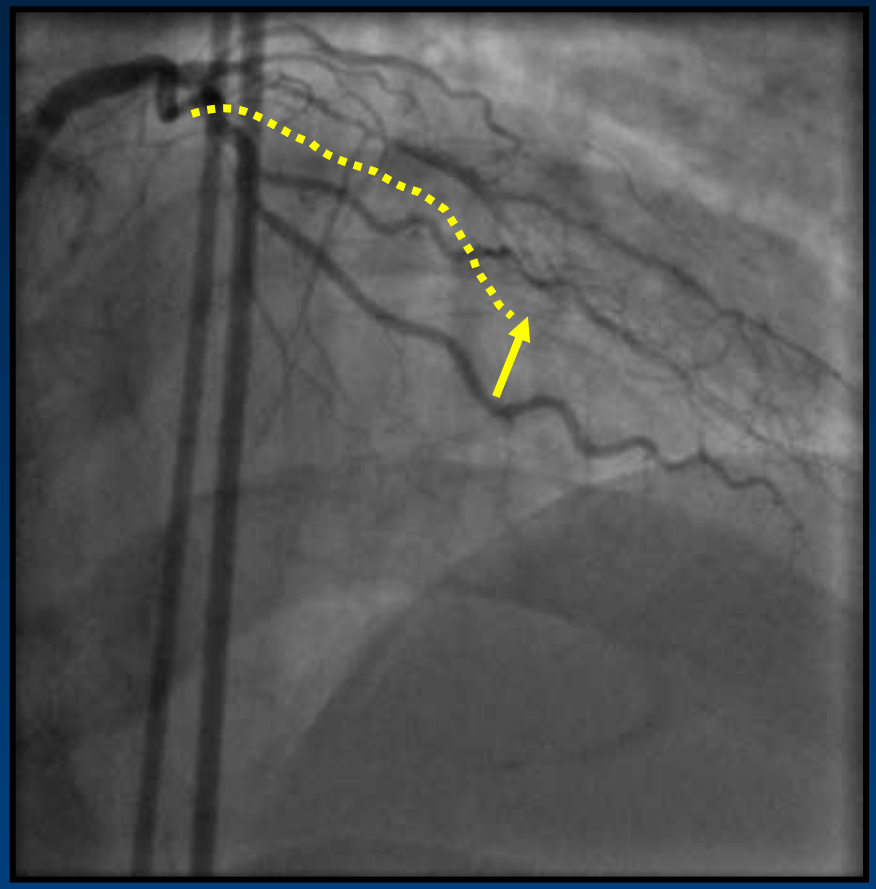
HsAng, M, 51, SAP




*Bifurcation stenosis in LCX with instent restenosis (Cypher)*

# *Diffuse, small vessel disease with CTO in LAD (1)*

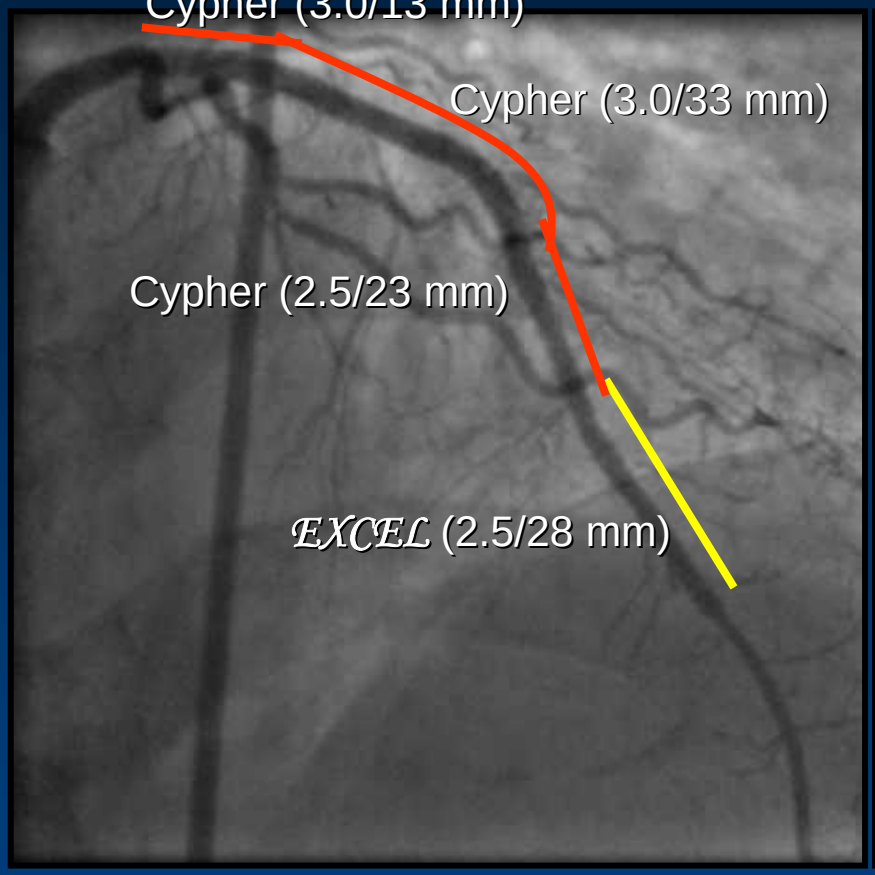
HW, M, 45, OMI



Baseline:Diffuse, small vessel disease (dotted line) with CTO (arrow).

After placement of very long overlapping *EXCEL* (2.5/28 mm) & Cypher (2.5/23; 3/33; 3/13 mm) stents

# *Diffuse, small vessel disease with CTO in LAD (2)*




After placement of very long overlapping EXCEL (2.5/28 mm) & Cypher (2.5/23; 3/33; 3/13 mm) stents

HW, M, 45, OMI

Occlusion of Cypher (& EXCEL) stent. TLR not performed as distal LAD was filled by collaterals from RCA

# *Conclusion*

- *Despite the inclusion of challenging "real world cases" (DM, MVD, small vessel, complex lesions, long – diffuse disease, calcified stenosis, ostial stenosis, LM, AMI, CTO, instent restenosis, etc) the preliminary **EXCEL** results are encouraging, with very low MACE rate & "clean" angiographic appearance of the stent.*

- *Despite the use of double antiplatelet medications for only 6 months, at a follow-up period of up to two years there is no late or very late stent thrombosis*