Integrated Use of FFR and IVUS:

Case Based Learning

Left Main disease

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Disclosure Statement of Financial Interest

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

Affiliation/Financial Relationship

- Grant/Research Support
- Consulting Fees/Honoraria
- Major Stock Shareholder/Equity
- Royalty Income
- Ownership/Founder
- Intellectual Property Rights
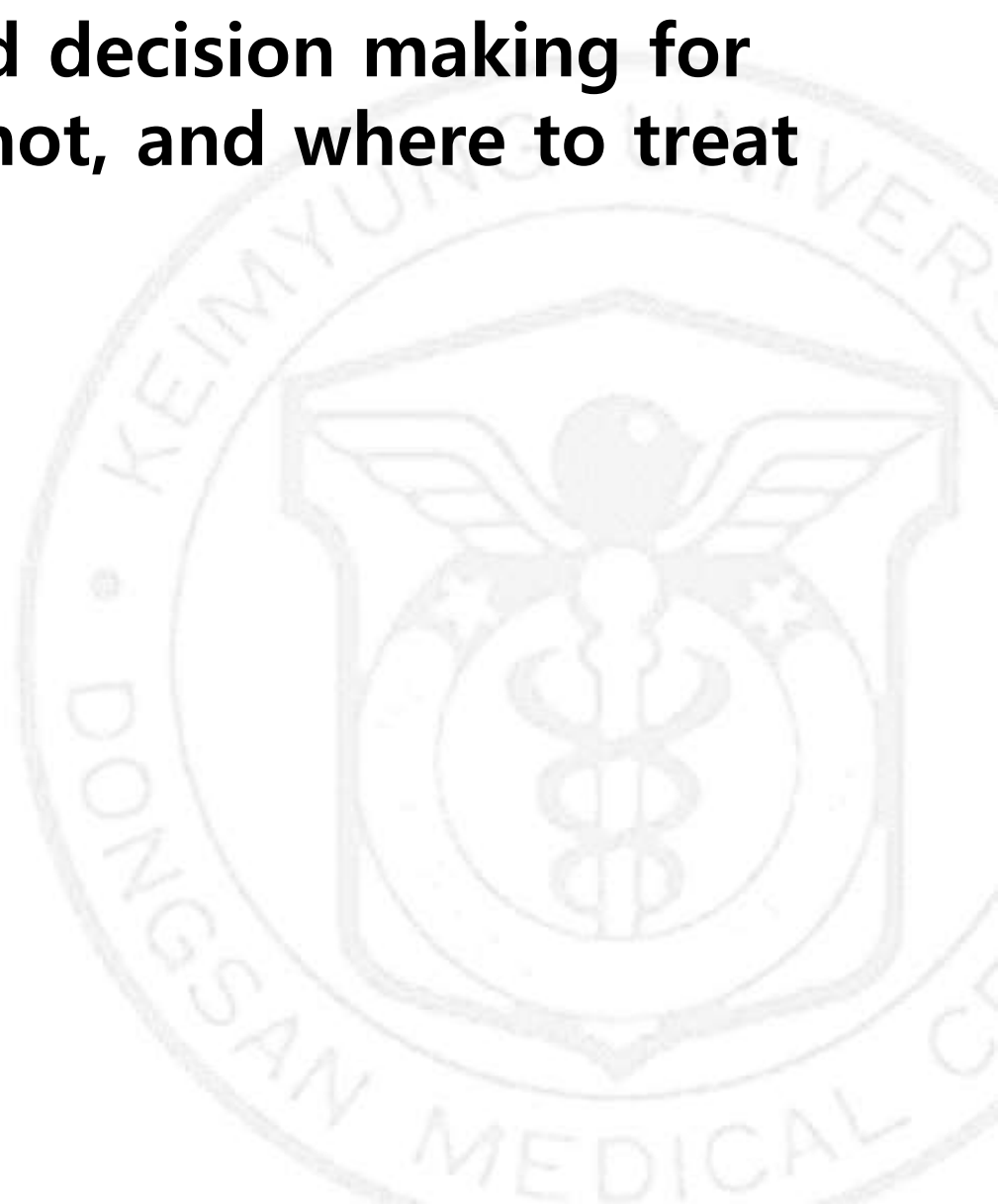- Other Financial Benefit

Company

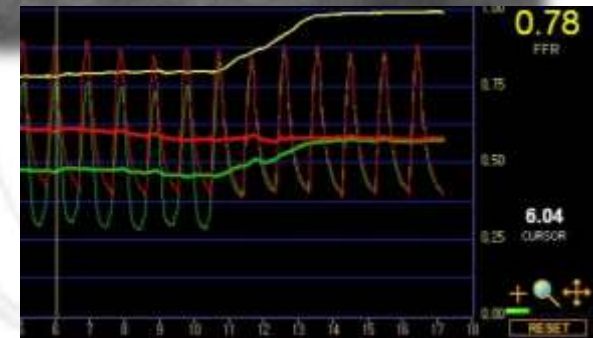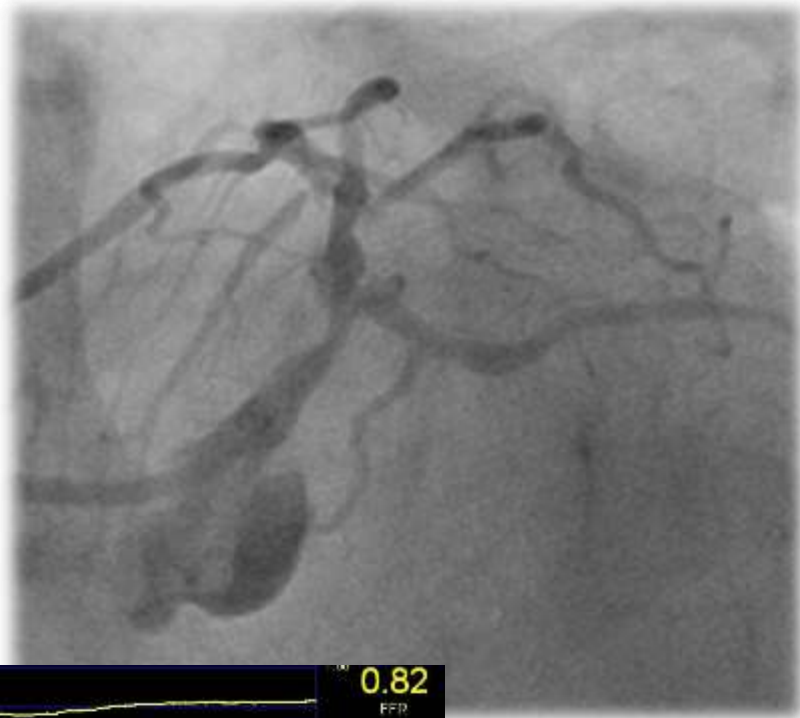- Medtronic, Biosensors, Pfizer
- SJM, AstraZeneca

How to integrate Physiology and Imaging in LM

01 **Physiology-guided decision making for whether treat or not, and where to treat**
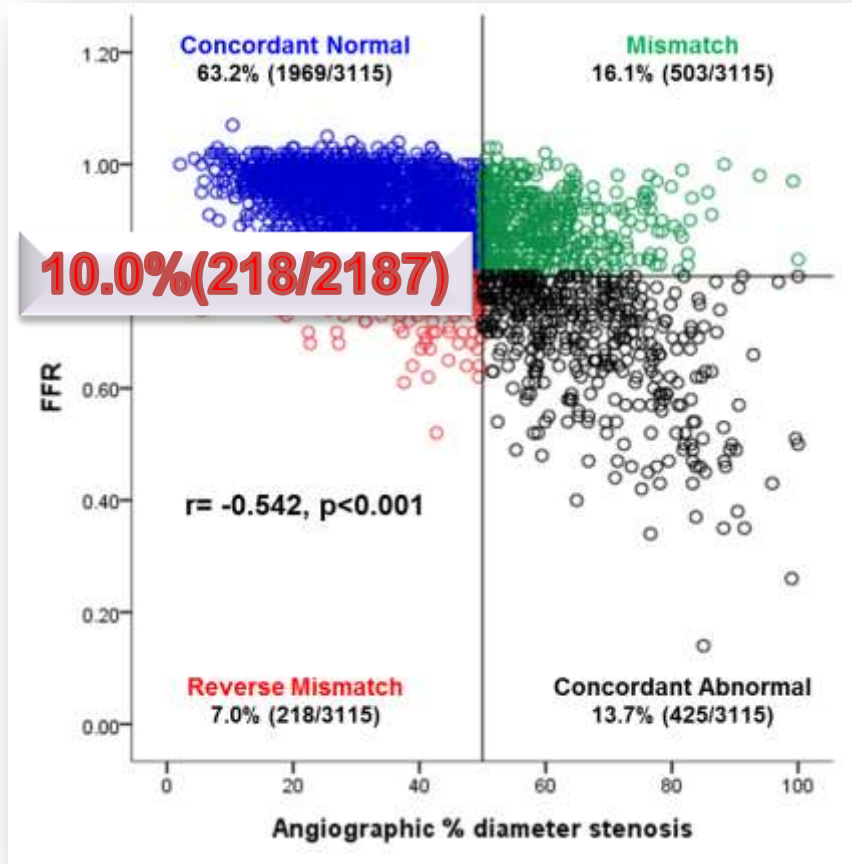
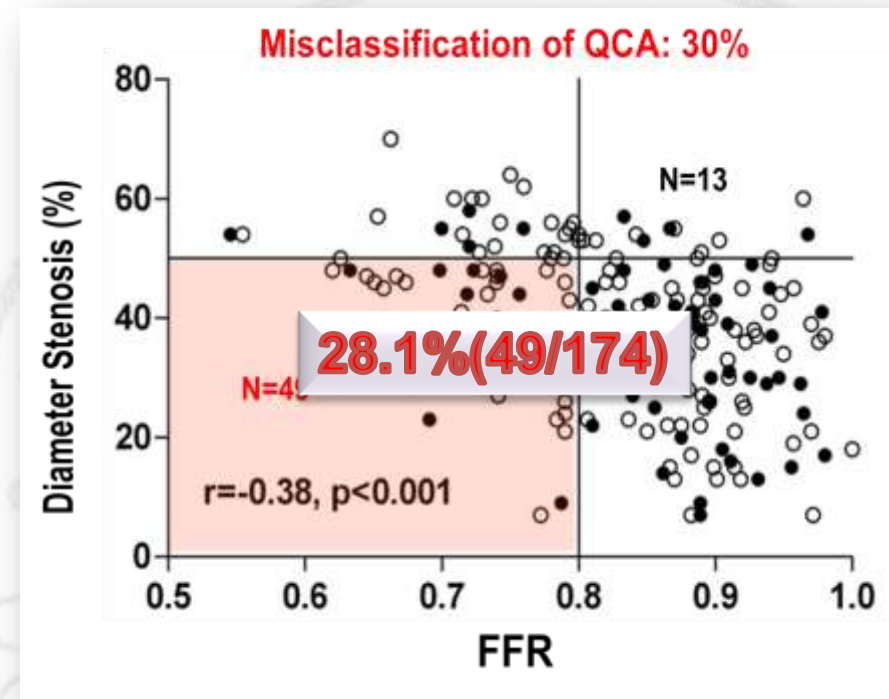# Physiology-guided decision making in LM: Same or Different

Which lesion is significant?

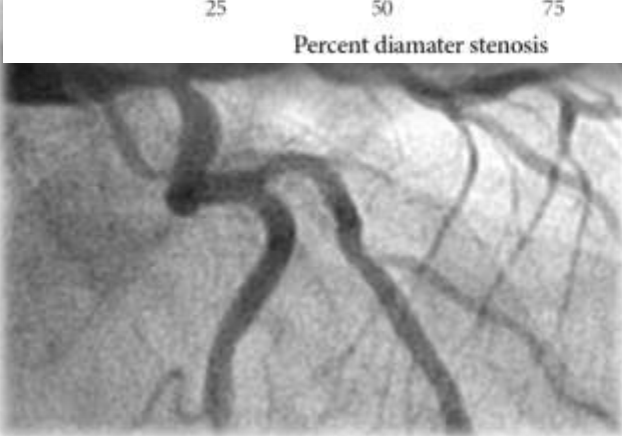# Physiology-guided decision making in LM: Same or Different

Non LM disease

Concordant Normal 63.2% (1969/3115)
Mismatch 16.1% (503/3115)

10.0%(218/2187)

r= -0.542, p<0.001

FFR

Reverse Mismatch 7.0% (218/3115)
Concordant Abnormal 13.7% (425/3115)

Angiographic % diameter stenosis

LM disease

Misclassification of QCA: 30%

N=13

28.1%(49/174)

N=4⬤

r=-0.38, p<0.001

Diameter Stenosis (%)

FFR

Incidence of Reverse mismatch is higher in LM disease.

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Physiology-guided decision making in LM:
Same or Different

Jailed LCX

Keimyung University, Korea

Nam CW, et al. Korean Circ J 2011;41:304
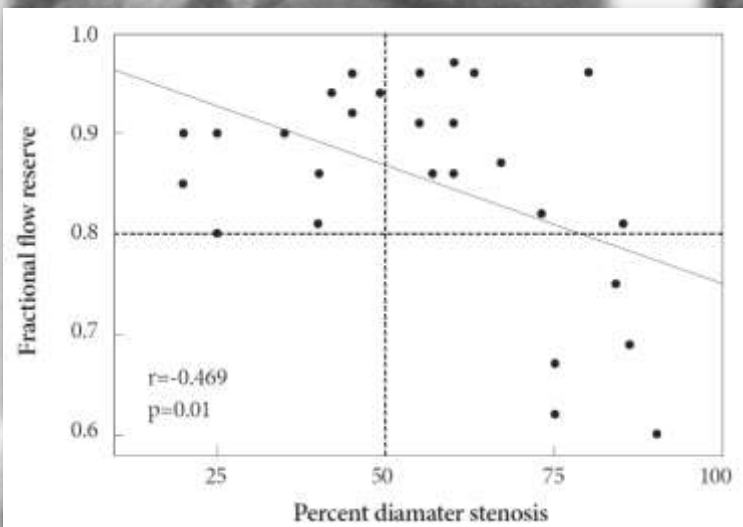
Physiology-guided decision making in LM: Same or Different

Safety of FFR-guided defer in Left Main Stenosis

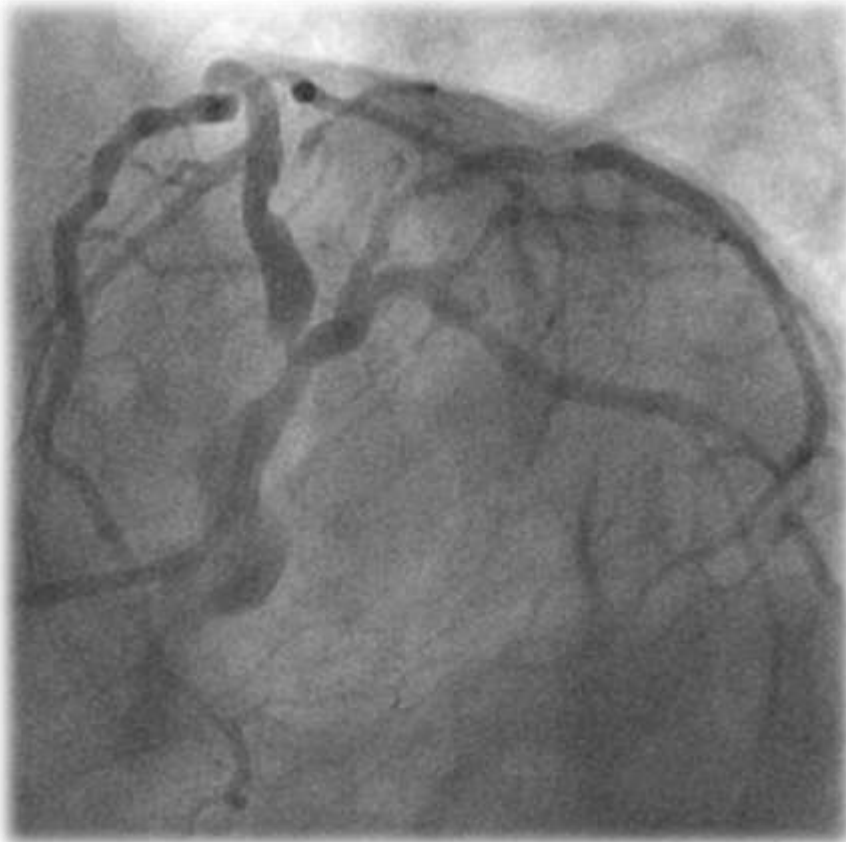FFR ≥ 0.75 or 0.8 → Medical treatment **vs**. FFR < 0.75 or 0.8 → Revascularization

| First Author (Ref. #) | N | | | FU (Months) Mean Duration | Overall Survival | |
	Total	Defer Group	Surgical Group		Defer Group (%)	Surgical Group (%)
Bech et al. (23)	54	24	30	29 ± 15	100	97
Jasti et al. (24)	51	37	14	25 ± 11	100	100
Jiménez-Navarro et al. (25)	27	20	7	26 ± 12	100	86
Legutko et al. (26)	38	20	18	24 ± 12	100	89
Suemaru et al. (27)	15	8	7	33 ± 10	100	100
Lindstaedt et al. (28)	51	24	27	29 ± 16	100	81
Hamilos et al. (20)	213	138	75	35 ± 12	90	85
Total or (mean)	449	271	178	(28 ± 13)	(95)*	(89)

LM bifurcation PCI with FFR & IVUS

Case

62/Male, Angina for 1 month
CVRF: HTN, Dyslipidemia, Smoking
TMT: ST depression in multi-leads
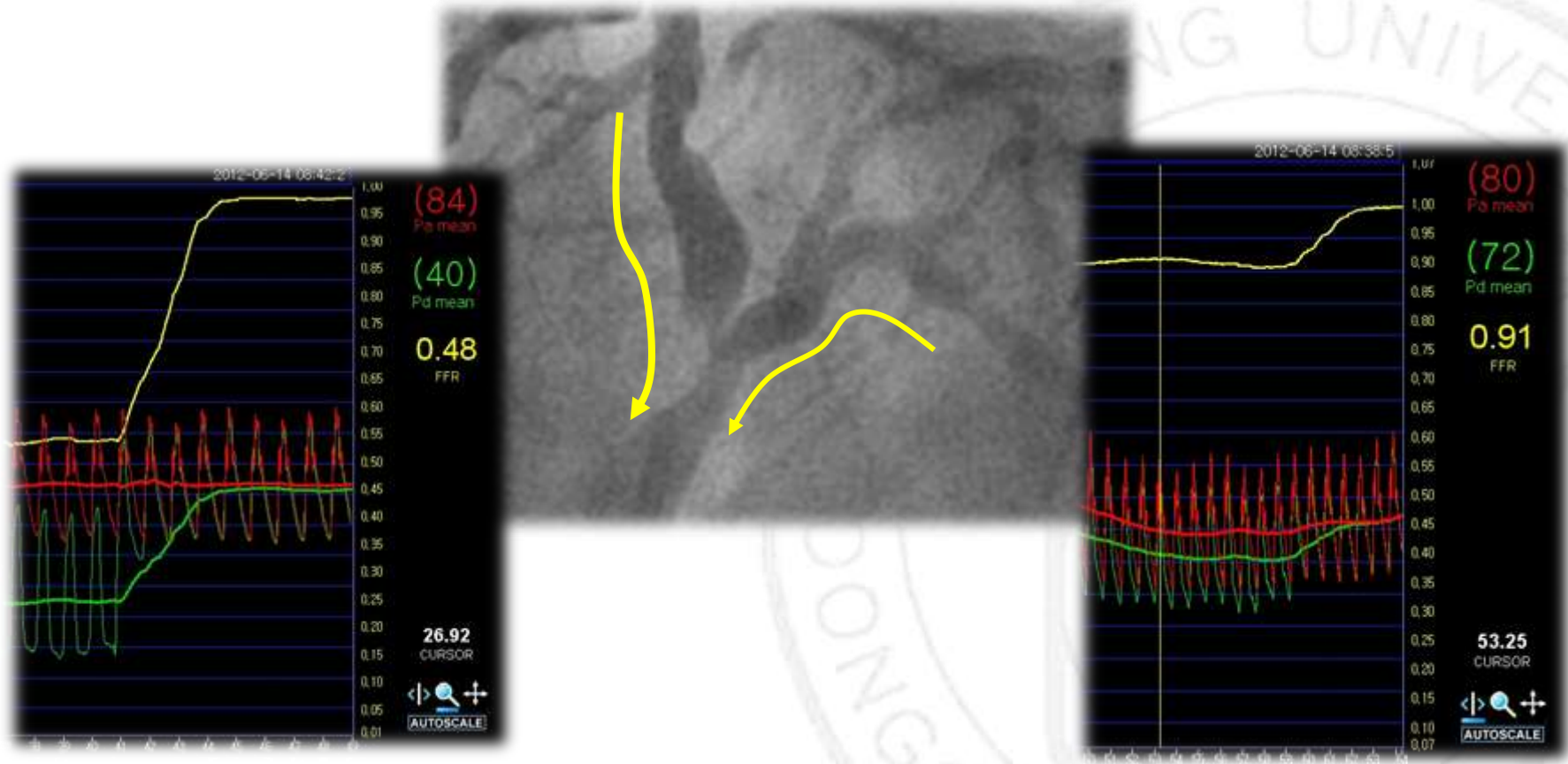
Keimyung University, Korea

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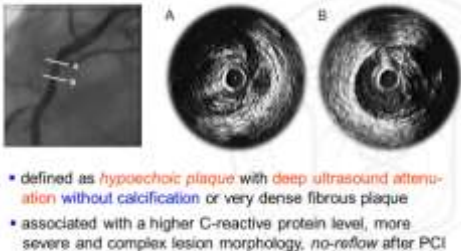
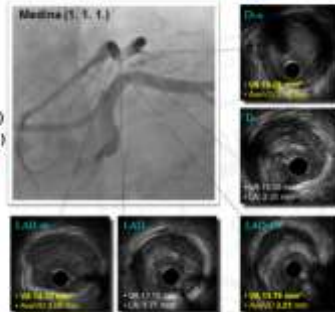**02** Imaging-guided decision making for how to treat

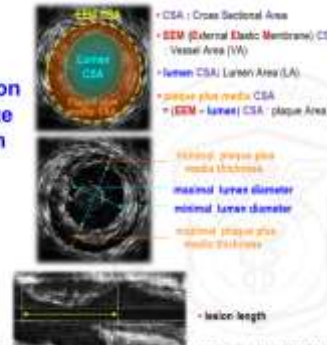➡ **Target lesion selection, Device selection, Stent selection, Procedure selection, etc**

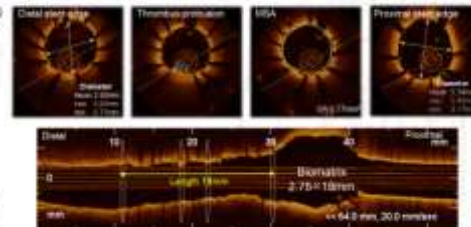**Evaluation of Plaque Composition 'Attenuated Plaque'**

- defined as *hypoechoic plaque* with *deep ultrasound attenuation* without calcification or very dense fibrous plaque
- associated with a higher C-reactive protein level, more severe and complex lesion morphology, no-reflow after PCI

Decision of Optimal Strategy

- 68Y.O. / Female
- Hypertension (4Y)
- Obesity (BMI 25.1)
- Unstable Angina

Determination of Stent Size and Length

Post-PCI Quantitative Measurement

63YO/M, NSTEMI

Keimyung University, Korea

How to Evaluate LM bifurcation: Anatomic

What is your Decision?

0.48

0.91

Simple Crossover Stenting

DES 4.0*15mm
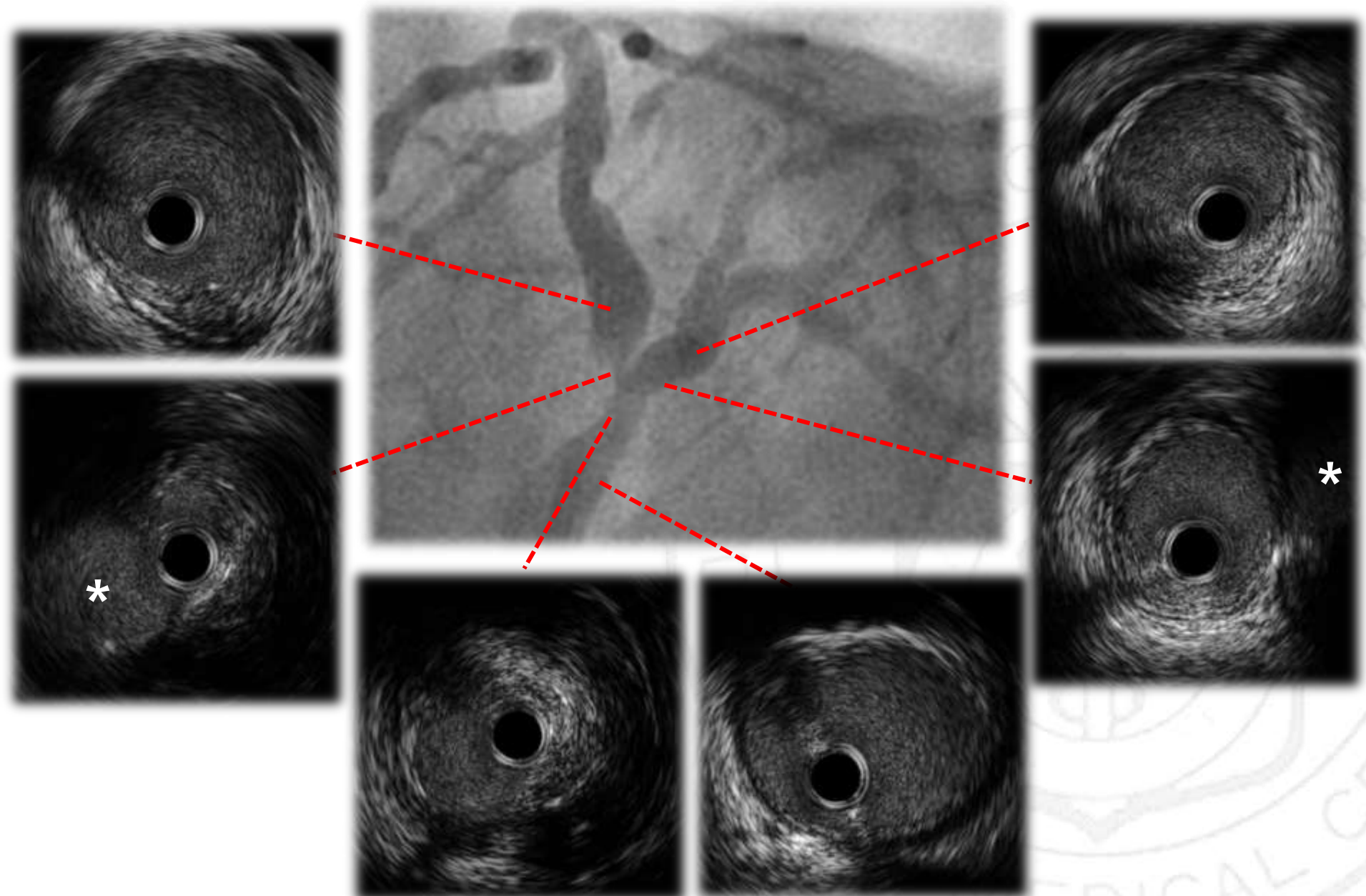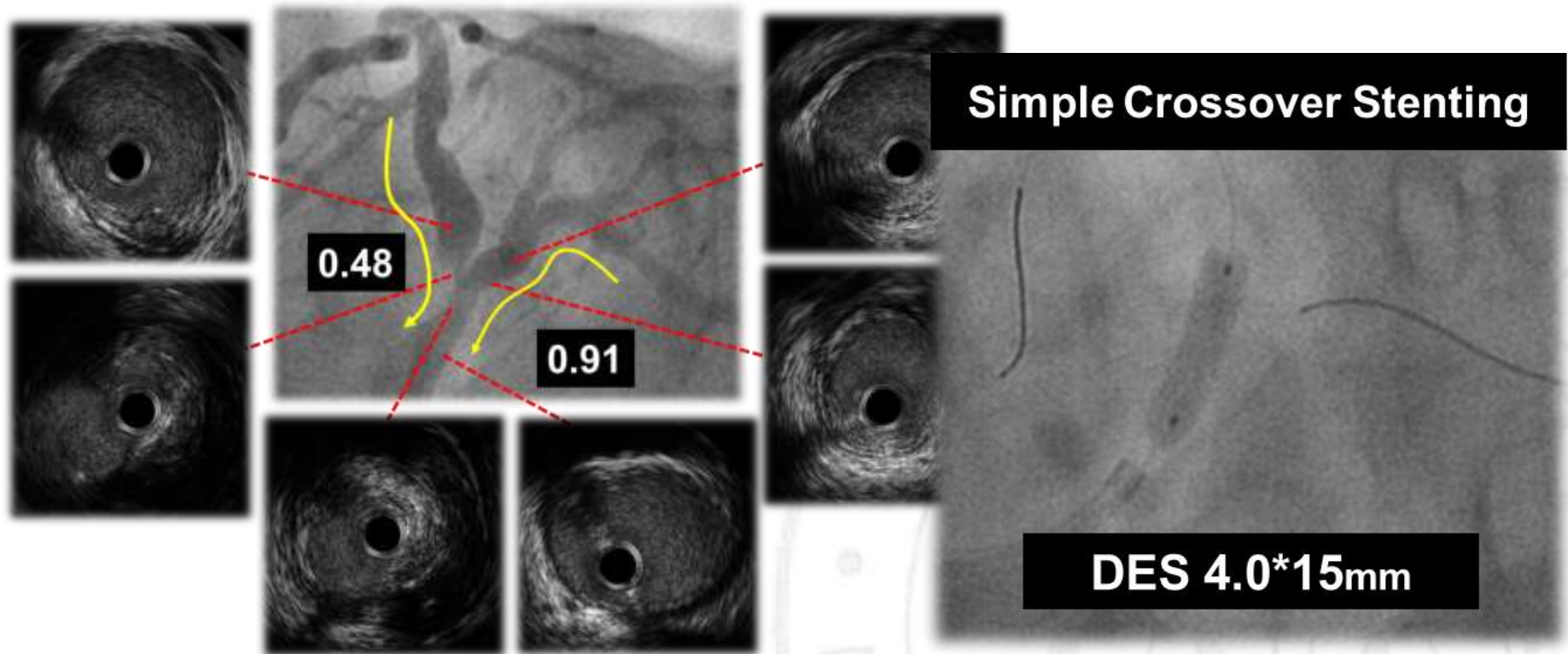
- **Functional significance of LAD & LCX**
- **Location of plaque, from distal LM to proximal LAD**
- **Plaque free in ostial LCX**
- **Large stent due to large reference vessel diameter**
- **Acute angle between LAD and LCX**
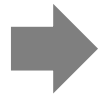
Keimyung University, Korea

Case

How to integrate Physiology and Imaging in LM

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02 Imaging-guided decision making for how to treat

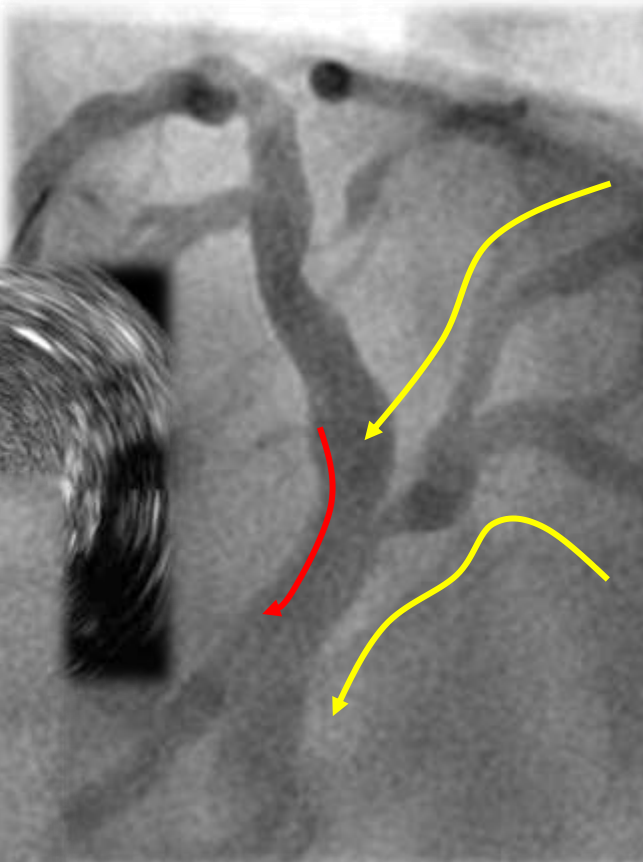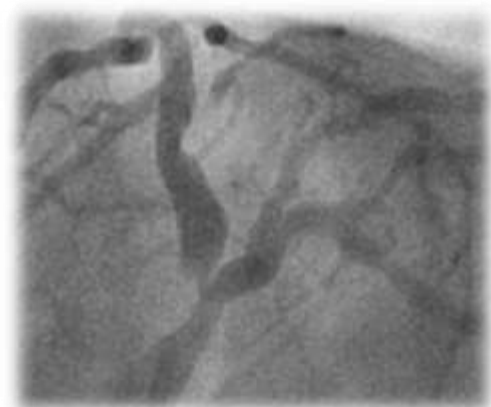➡ Target lesion selection, Device selection, Stent selection, Procedure selection, etc

03 **Imaging (and/or Physiology)-guided post procedural evaluation**

➡ Result assessment, Additional procedure decision, Prognosis expectation, etc

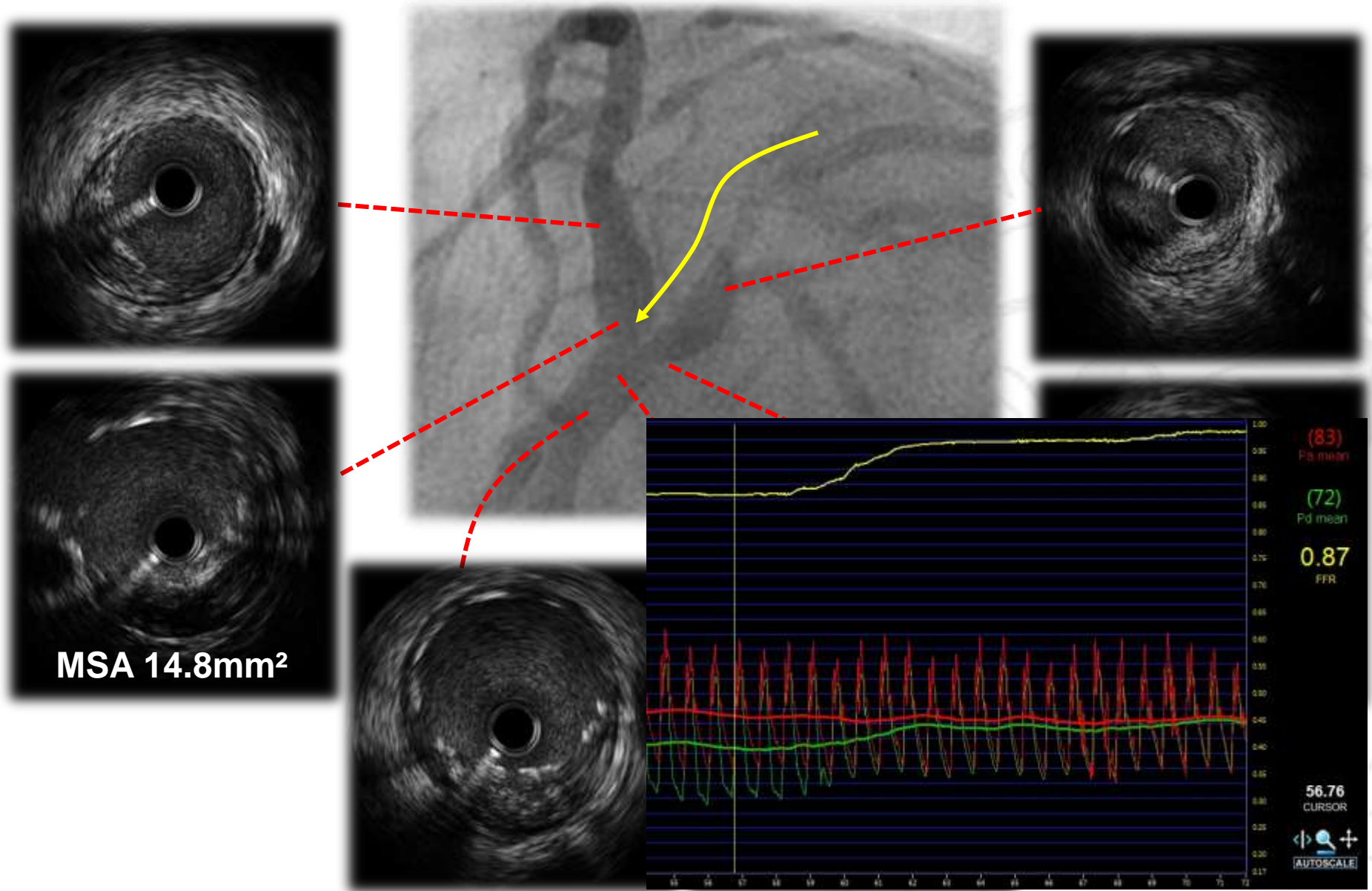*Keimyung University, Korea*

How to Assess Jailed osLCX

4.0x15mm &
2.5x20mm

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Post PCI Evaluation by IVUS & FFR

MSA 14.8mm²

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LM bifurcation PCI with IVUS & FFR

Case

Before, During, After
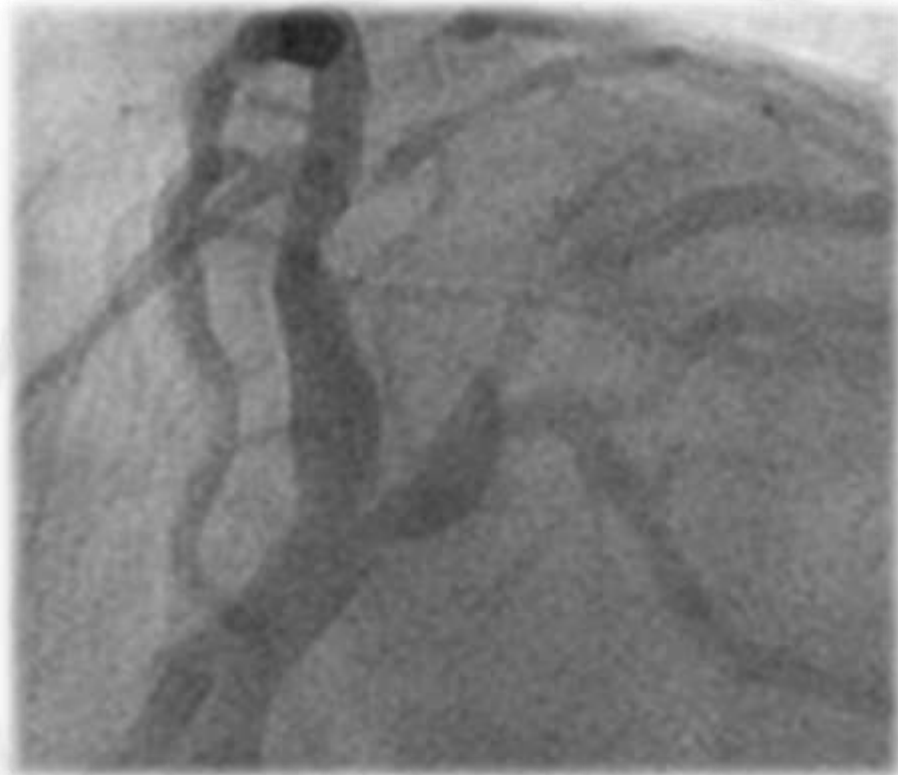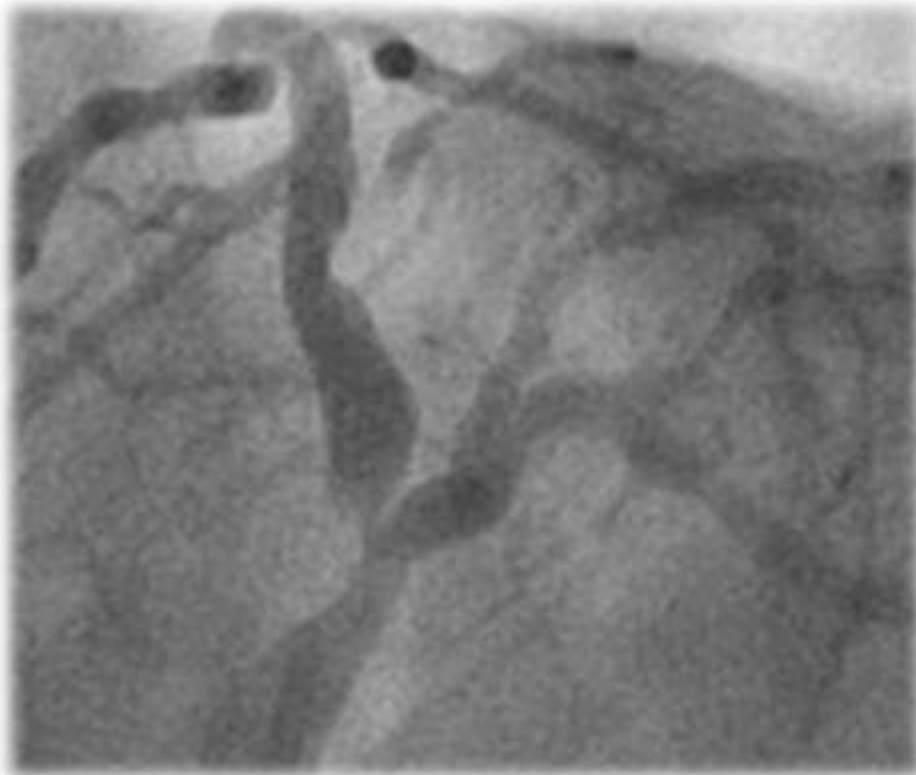
Follow-up TMT: (-), 12.1 METs

Take Home Message

How to Evaluate LM bifurcation: Functional
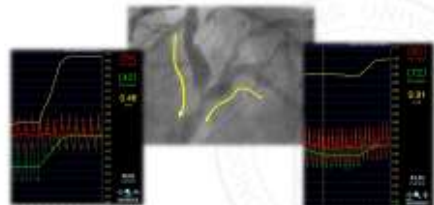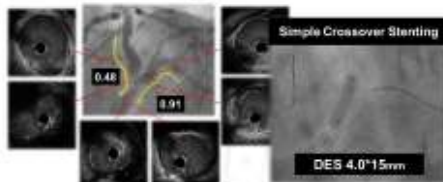
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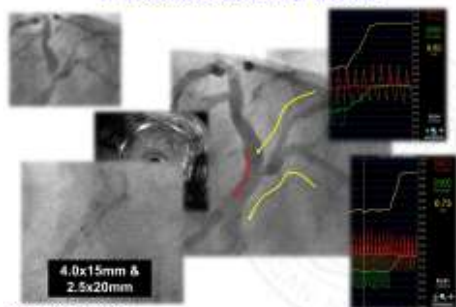
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- Plaque free in ostial LCX
- Large stent due to large reference vessel diameter
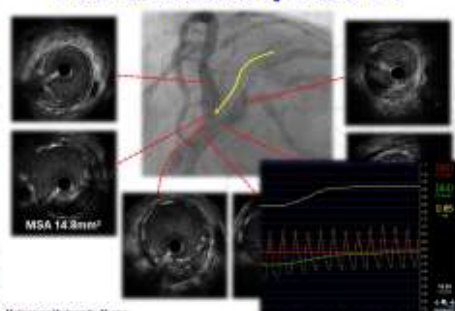- Large plaque in distal LM
- Acute angle between LAD and LCX

How to Assess Jailed osLCX

4.0x15mm &
2.5x20mm

Post PCI Evaluation by IVUS & FFR

MSA 14.3mm²

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Integration of Physiology & Imaging-guided decision making can help to find the best option before, during, and after LM PCI.

Keimyung University, Korea