

An architectural rendering of the Keimyung University Dongsan Medical Center. The image shows a large, modern medical complex with several multi-story buildings. A prominent feature is a tall, slender tower with a glass facade and a curved top. The buildings are surrounded by landscaped grounds with trees and walkways. The sky is overcast.

Session: OCT and FFR-guided PCI

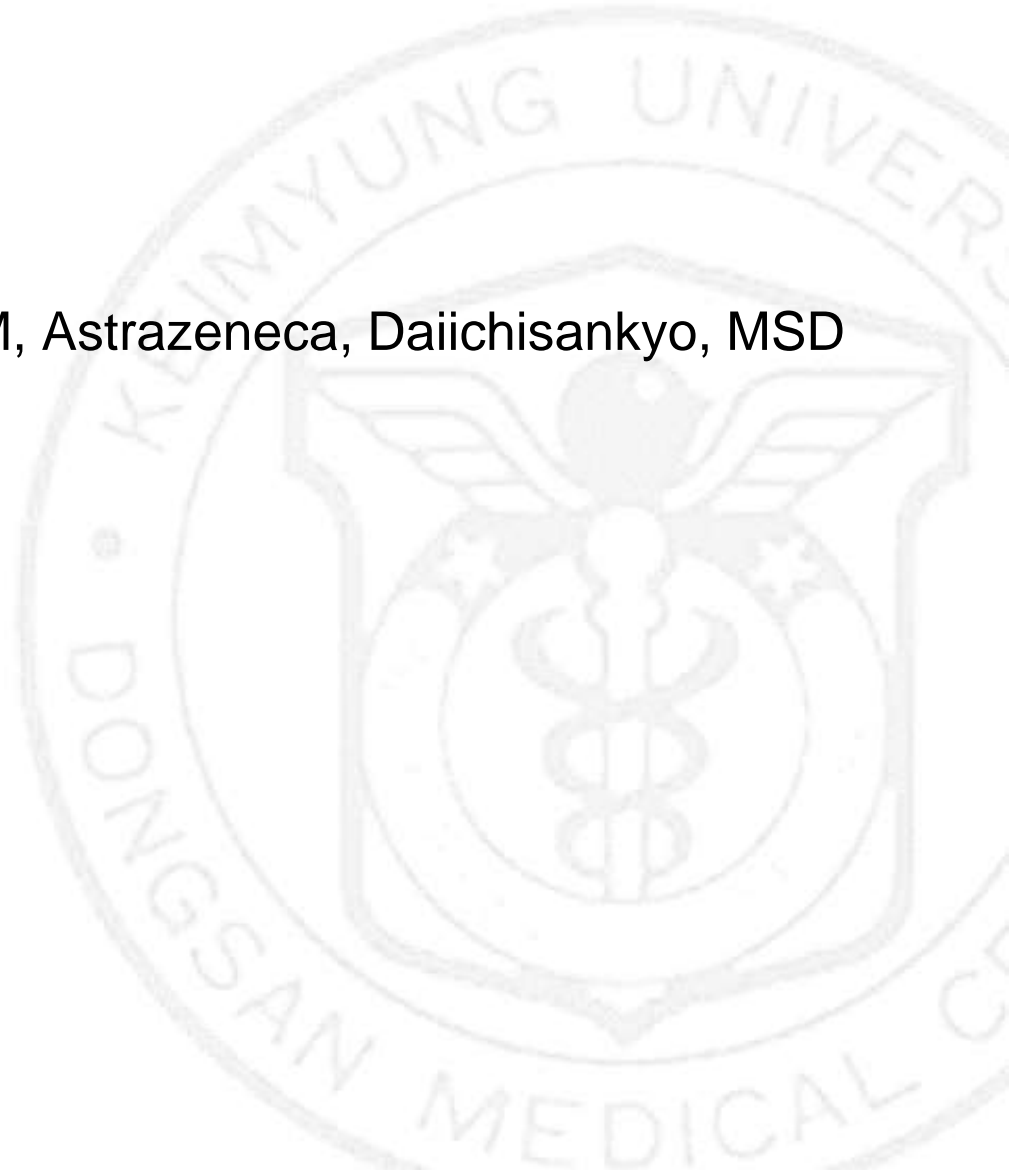
How to Practically Use FFR for Coronary Intervention?

Keimyung University Dongsan Medical Center

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DISCLOSURE

- **Research grant:** Pfizer
Medtronic
Biosensors
- **Consultant:** Pfizer, SJM, Astrazeneca, Daiichisankyo, MSD



Practical usage of FFR: Guidelines...

Recommendations	Class ^a	Level ^b
FFR is recommended to identify hemodynamically relevant coronary lesion(s) when evidence of ischaemia is not available.	I	A
Revascularization of stenoses with FFR <0.80 is recommended in patients with angina symptoms or a positive stress test.	I	B
IVUS or OCT may be considered to characterize lesions.	IIb	B
IVUS or OCT may be considered to improve stent deployment.	IIb	B
Revascularization of an angiographically intermediate stenosis without related ischaemia or without FFR <0.80 is not recommended.	III	B

5.4.1. FFR: Recommendation

Class IIa

1. FFR is reasonable to assess angiographic intermediate coronary lesions (50% to 70% diameter stenosis) and can be useful for guiding revascularization decisions in patients with SIHD.^{12,97,484–486} (Level of Evidence: A)

5.4.2. IVUS: Recommendations

Class IIa

1. IVUS is reasonable for the assessment of angiographically indeterminate left main CAD.^{489–491} (Level of Evidence: B)
2. IVUS and coronary angiography are reasonable 4 to 6 weeks and 1 year after cardiac transplantation to exclude donor CAD, detect rapidly progressive cardiac allograft vasculopathy, and provide prognostic information.^{492–494} (Level of Evidence: B)
3. IVUS is reasonable to determine the mechanism of stent restenosis.⁴⁹⁵ (Level of Evidence: C)

Class IIb

1. IVUS may be reasonable for the assessment of non-left main coronary arteries with angiographically intermediate coronary stenoses (50% to 70% diameter stenosis).^{489,496,497} (Level of Evidence: B)
2. IVUS may be considered for guidance of coronary stent implantation, particularly in cases of left main coronary artery stenting.^{490,495,498} (Level of Evidence: B)
3. IVUS may be reasonable to determine the mechanism of stent thrombosis.⁴⁹⁵ (Level of Evidence: C)

Class III: NO BENEFIT

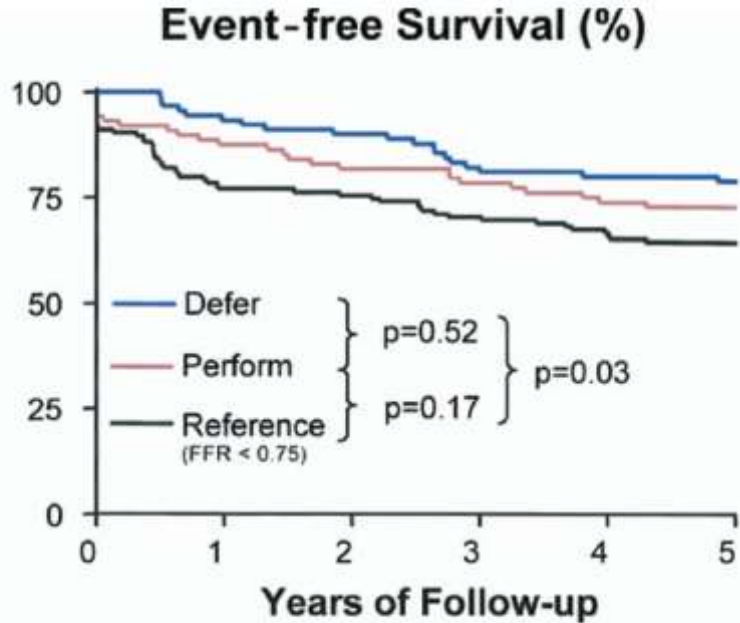
1. IVUS for routine lesion assessment is not recommended when revascularization with PCI or CABG is not being contemplated. (Level of Evidence: C)

Evidences for ACC/AHA/SCAI Guideline

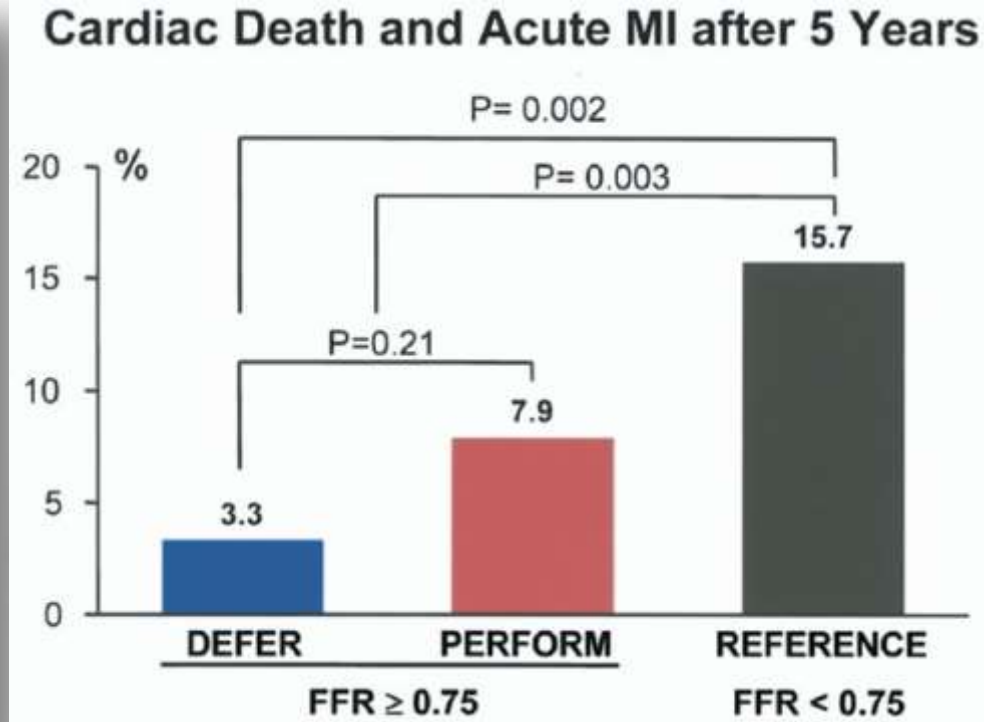
5-year outcomes for patients with medical therapy based on an FFR >0.75 were superior compared with PCI in the DEFER (Deferral Versus Performance of Balloon Angioplasty in Patients Without Documented Ischemia) study.⁴⁸⁵ The FAME (Fractional Flow Reserve Versus Angiography for Multivessel Evaluation) study identified the benefit for deferring PCI in patients with multivessel disease and lesion FFR >0.80 , with reduced rates of cardiac events at both 1 and 2 years.^{97,486} Whereas both FFR and IVUS have been used for assessment of intermediate angiographic stenosis with favorable outcomes, FFR may reduce the need for revascularization when compared with IVUS.⁴⁸⁸ Although IVUS is often considered in the assessment of equivocal left main stenosis, FFR may be similarly effective.⁴⁸⁴

DEFER

In 325 patients scheduled for PCI of an intermediate stenosis, if FFR was ≥ 0.75 , patients were randomized to deferral (Defer; n=91) or performance (Perform; n=90) of PCI. If < 0.75 , PCI was performed (Reference; n=144).

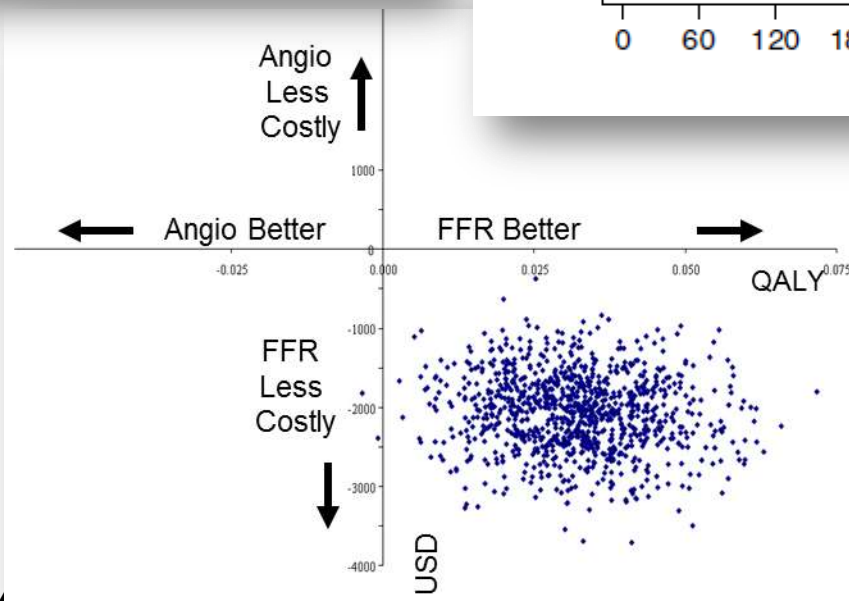
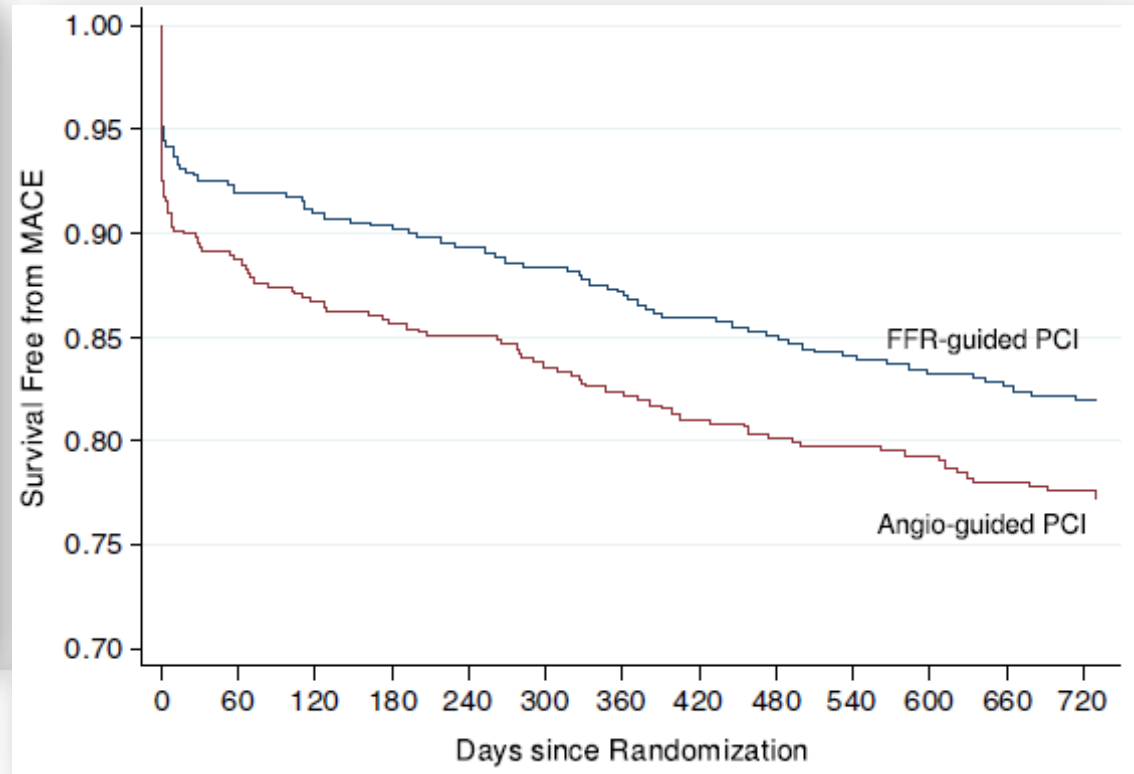
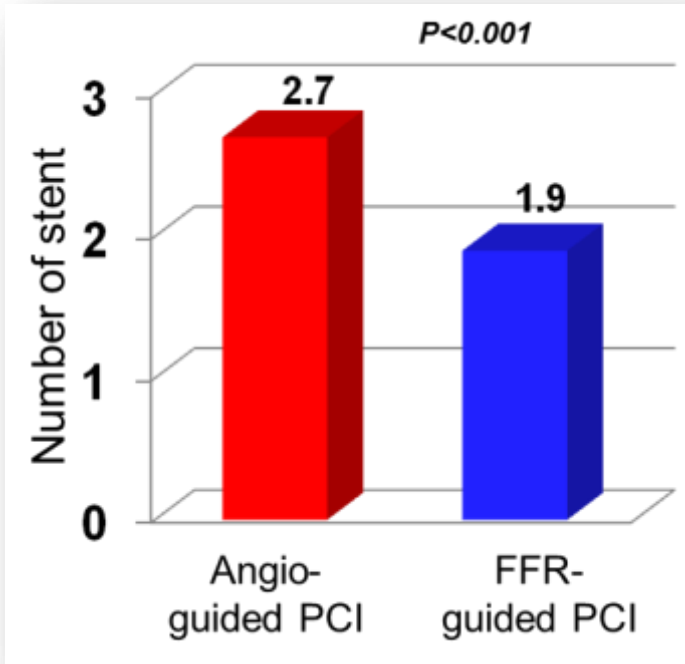


No. at risk	0	1	2	3	4	5
Defer group	91	85	80	74	73	72
Perform group	90	80	75	70	67	64
Reference group	144	116	106	96	90	88



5-year outcomes for patients with medical therapy based on an FFR >0.75 were superior compared with PCI.

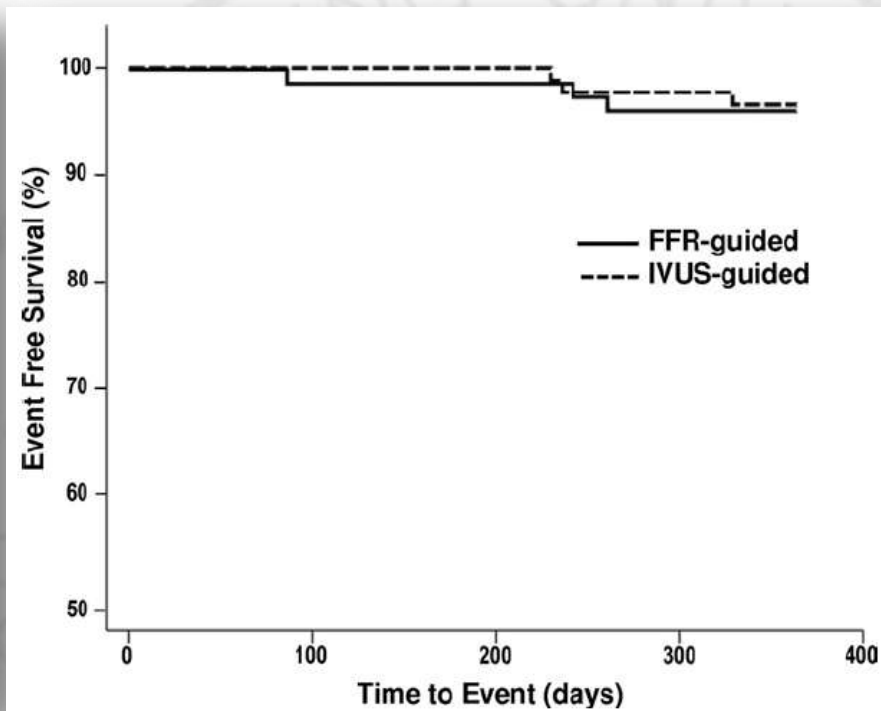
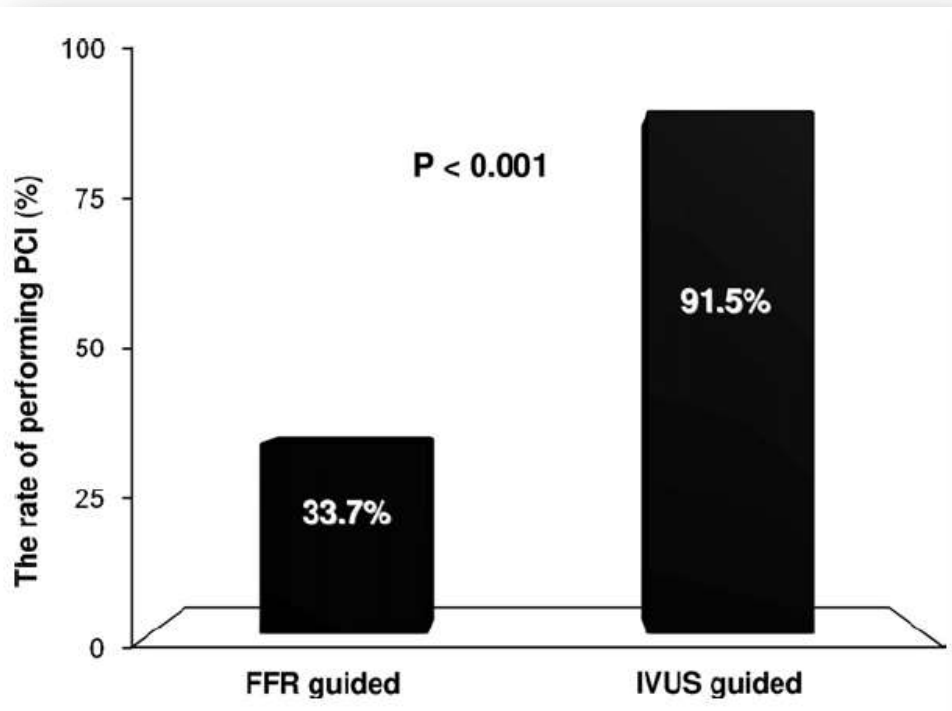
MVD in FAME



Tonino PA, NEJM 2009;360:213-24
Fearon WF, Circ 2010;29
Pijls NH, JACC 2010;56:177

Outcomes of PCI in Intermediate CAD: FFR-guided vs. IVUS-guided

167 consecutive patients, with intermediate coronary lesions evaluated by FFR or IVUS (FFR-guided, 83 lesions vs. IVUS-guided, 94 lesions)



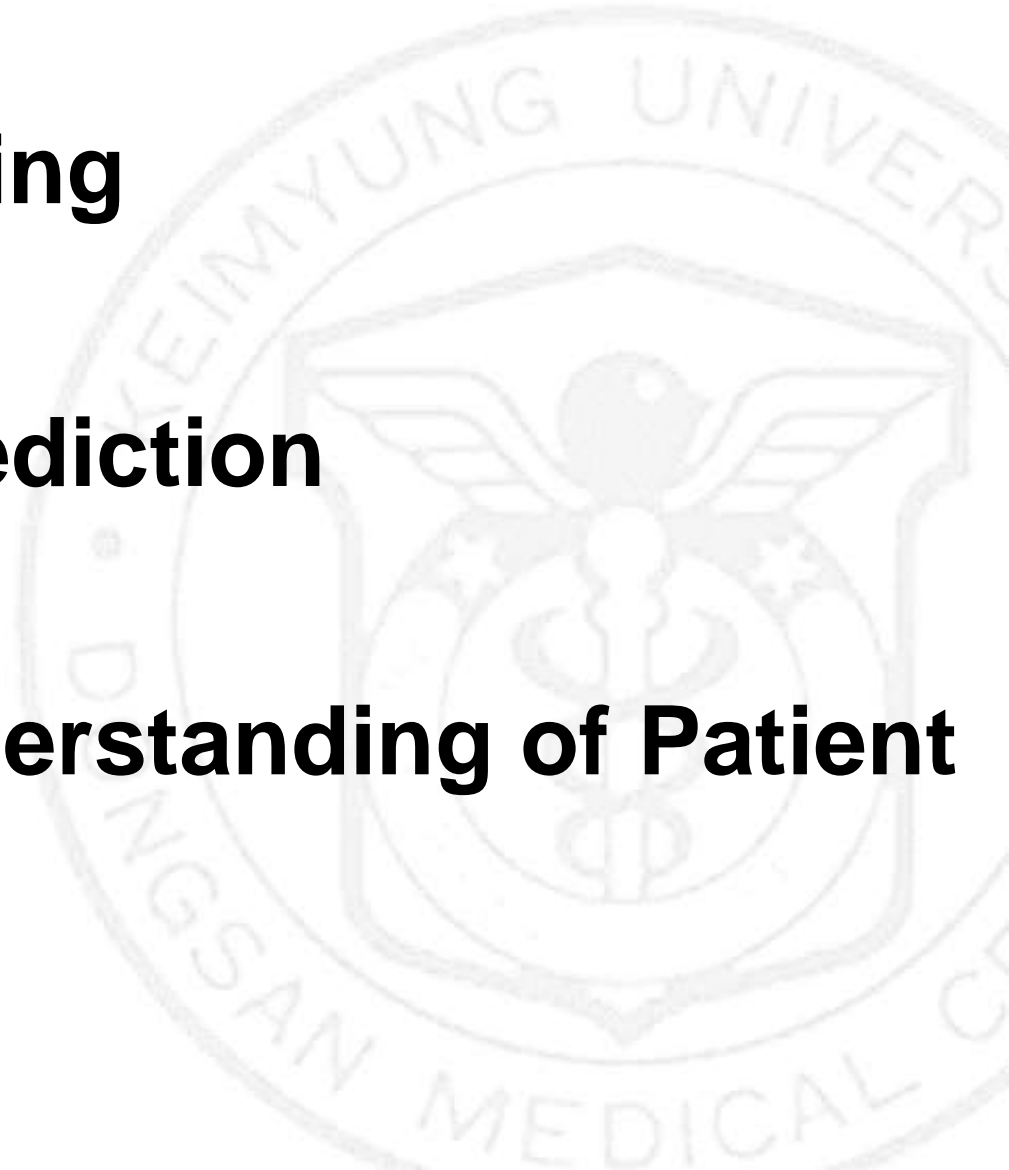
Whereas both FFR and IVUS have been used for assessment of intermediate angiographic stenosis with favorable outcomes, FFR may reduce the need for revascularization when compared with IVUS

Practical Usage of FFR

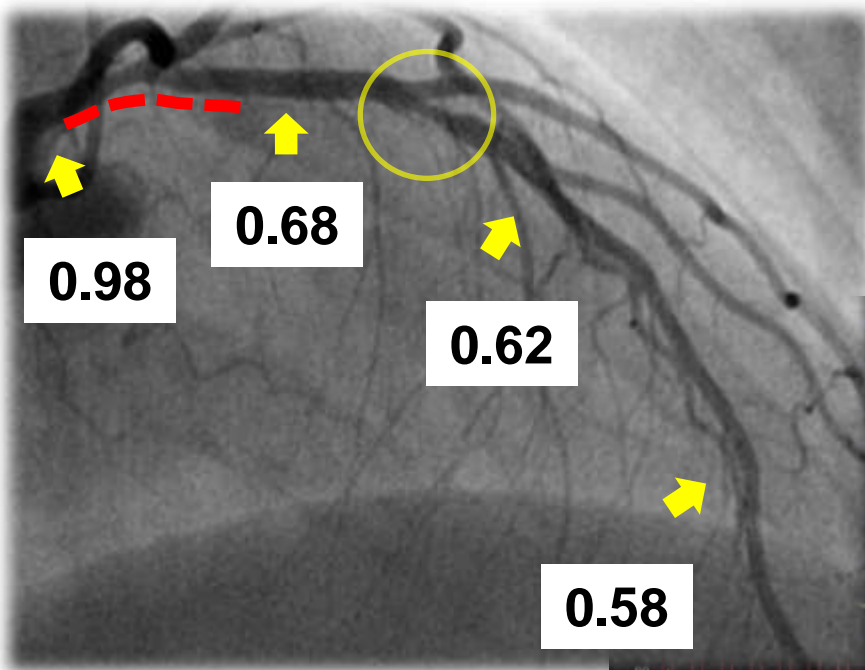
1 Decision Making

2 Prognosis Prediction

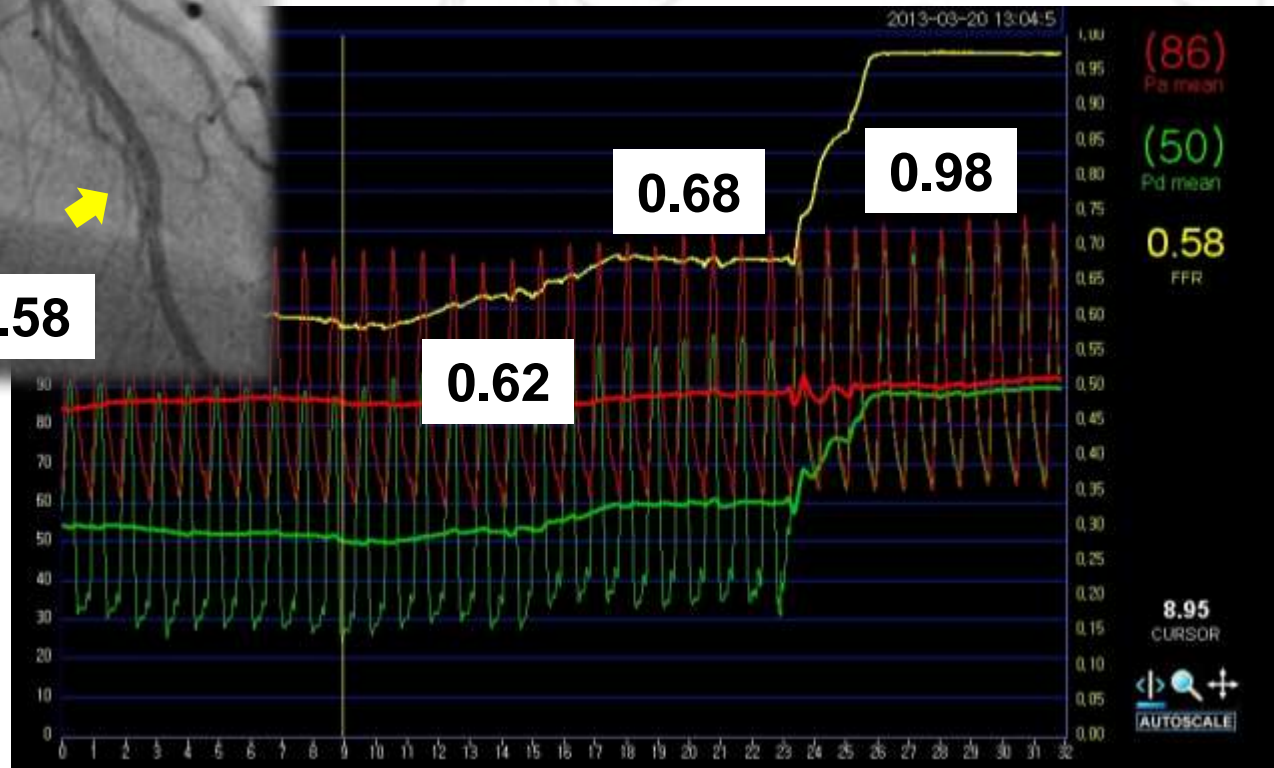
3 Extended Understanding of Patient



Decision Making



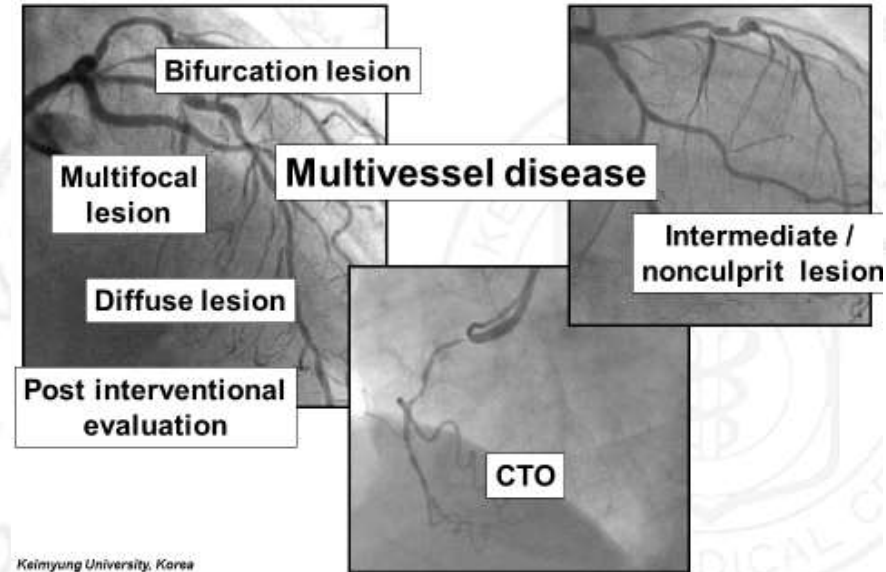
Mid LAD
intermediate lesion



Tandem lesion
with LM disease

Decision Making by FFR

- Intermediate or ambiguous lesion
- Multi-vessel CAD
- Multi-focal (Tandem) lesion
- Diffuse long lesion
- Left main coronary lesion
- Bifurcation lesion
- Instant restenosis lesion
- Post-interventional evaluation
- Acute coronary syndrome
- ...

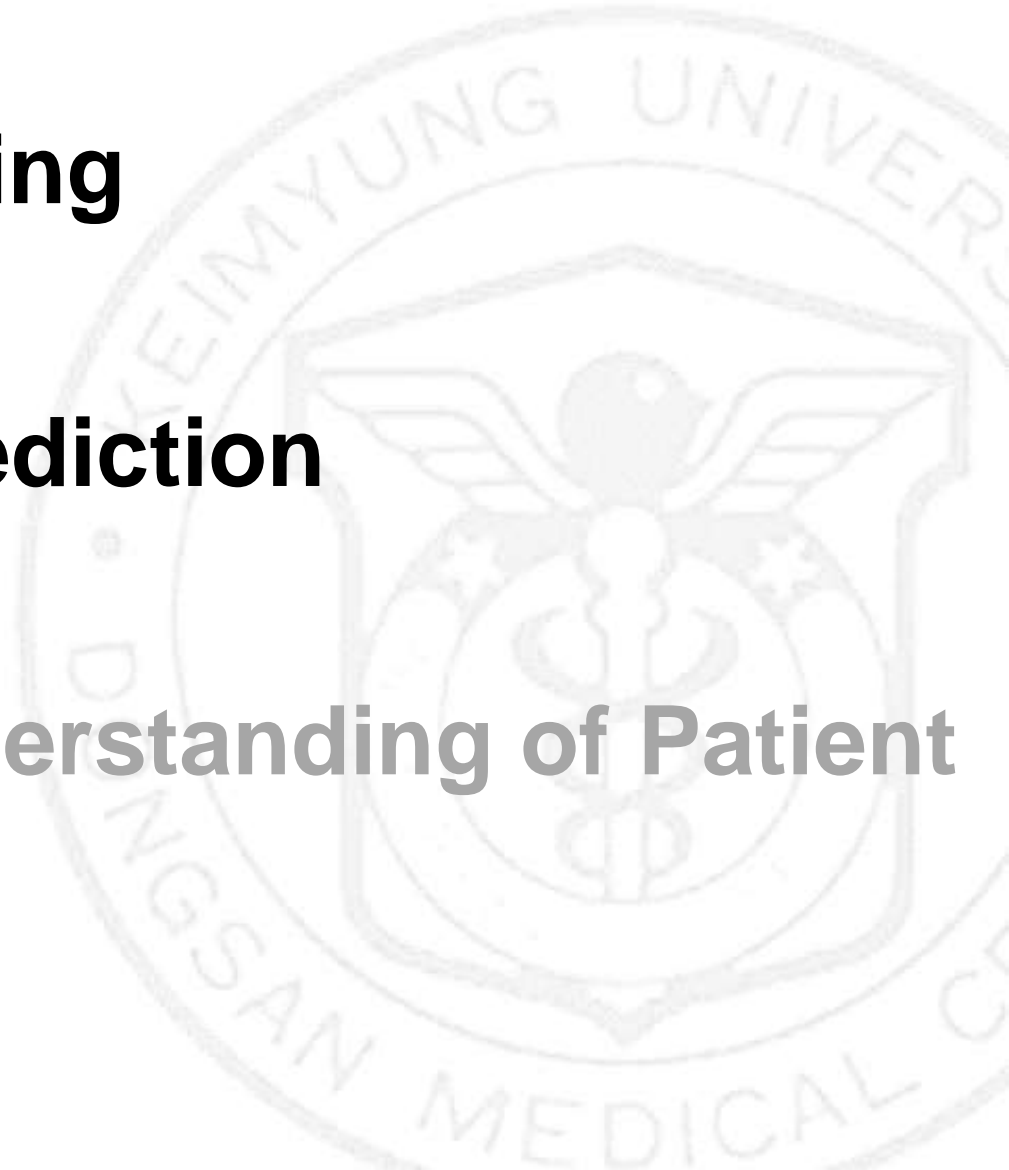


Practical Usage of FFR

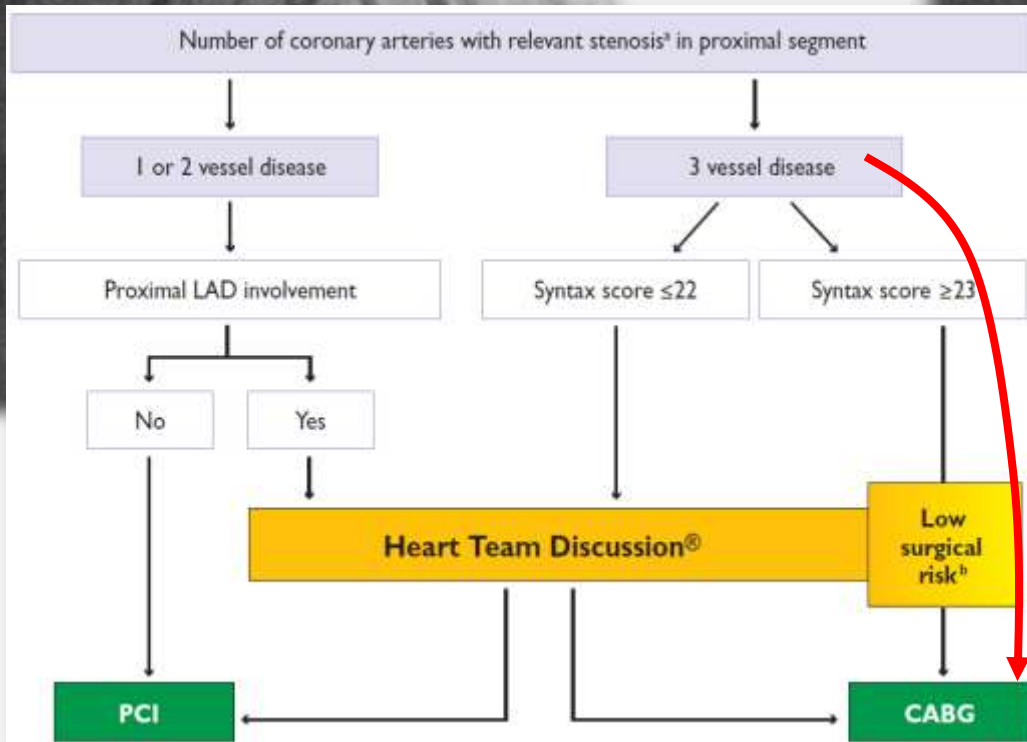
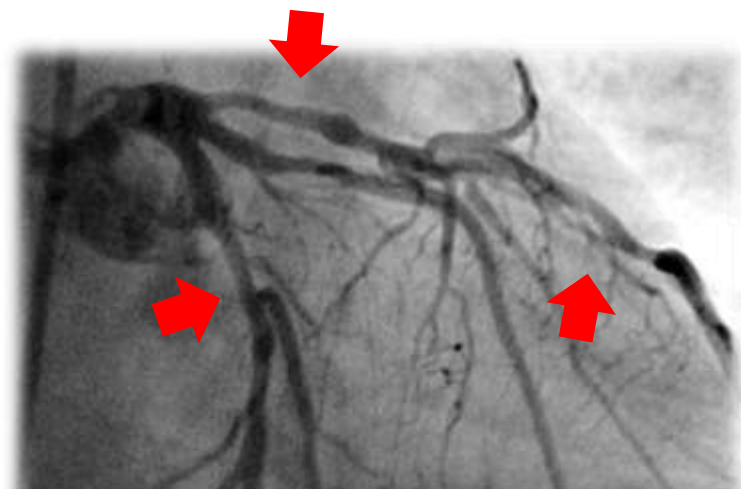
1 Decision Making

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3 Extended Understanding of Patient



52YO/♂ Atypical angina, CCT(+)



SYNTAX score

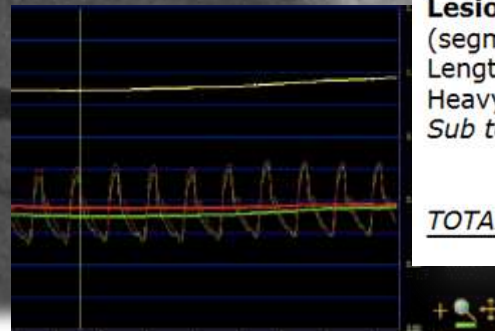
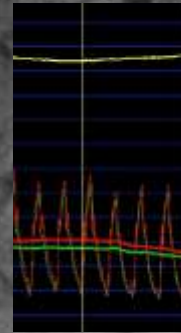
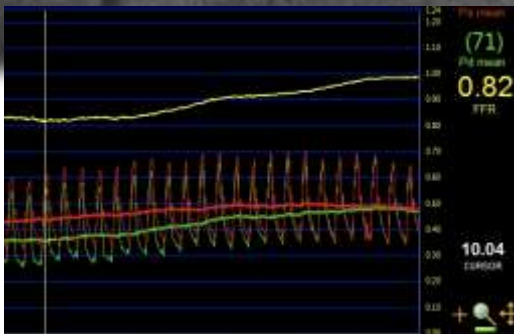
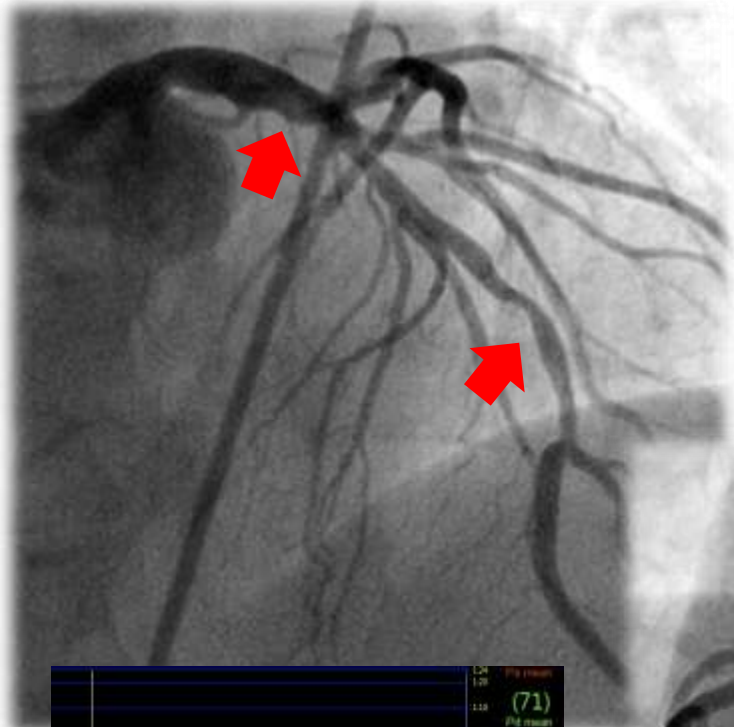
Lesion 1
 (segment 6): $3.5 \times 2 = 7$
 Bifurcation Type: Medina 0,1,0: 1
 Length >20 mm: 1
 Sub total lesion 1: 9

Lesion 2
 (segment 7): $2.5 \times 2 = 5$
 Bifurcation Type: Medina 1,0,0: 1
 Heavy calcification: 2
 Sub total lesion 2: 8

Lesion 3
 (segment 1): $1 \times 2 = 2$
 Length >20 mm: 1
 Heavy calcification: 2
 Sub total lesion 3: 5

TOTAL: 29

Functional SYNTAX score



Functional SYNTAX score

0

Lesion 1

(segment 6): 3.5x2= 7
 Bifurcation Type: Medina 0,1,0: 1
 Length >20 mm: 1
 Sub total lesion 1: 9

Lesion 2

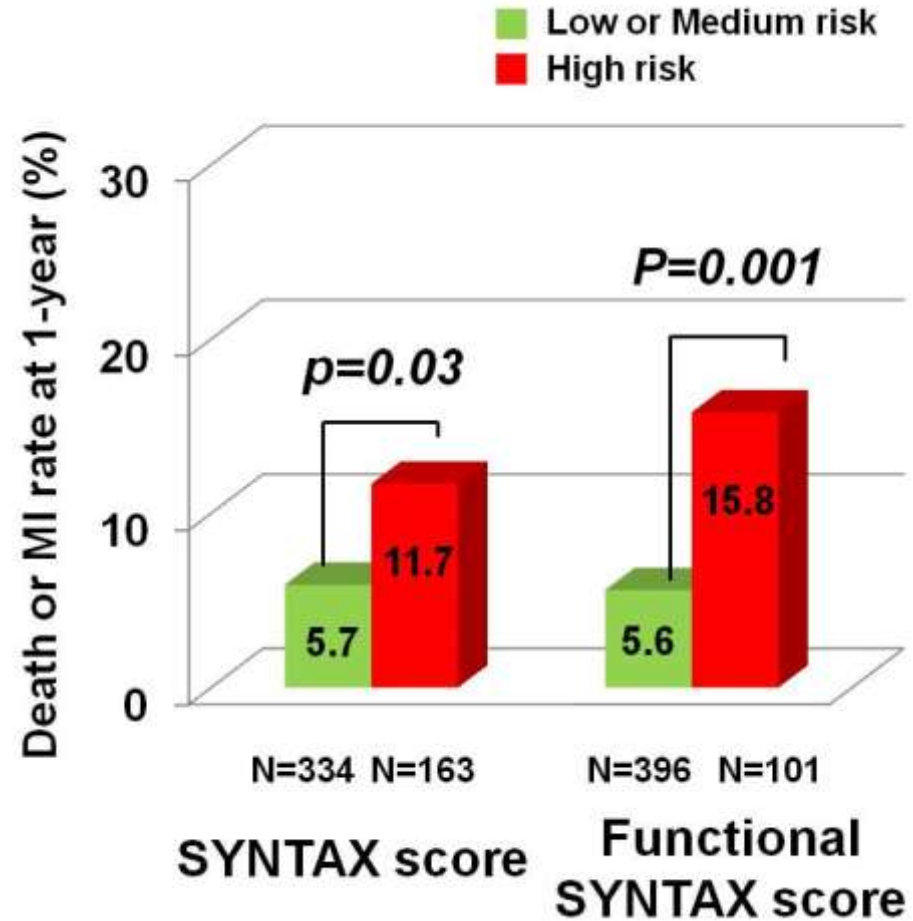
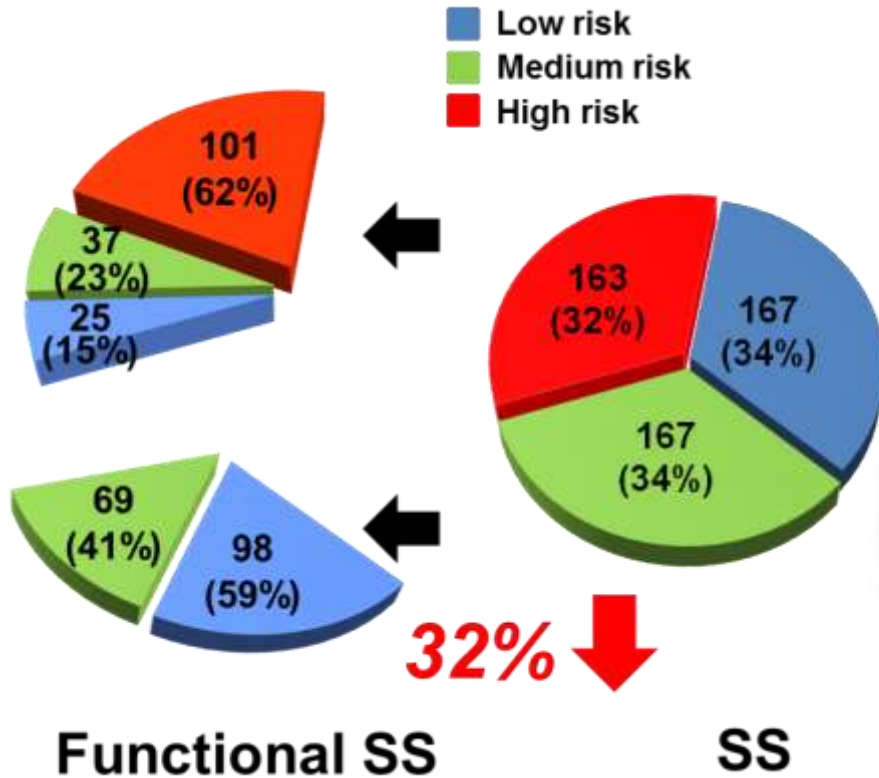
(segment 7): 2.5x2= 5
 Bifurcation Type: Medina 1,0,0: 1
 Heavy calcification: 2
 Sub total lesion 2: 8

Lesion 3

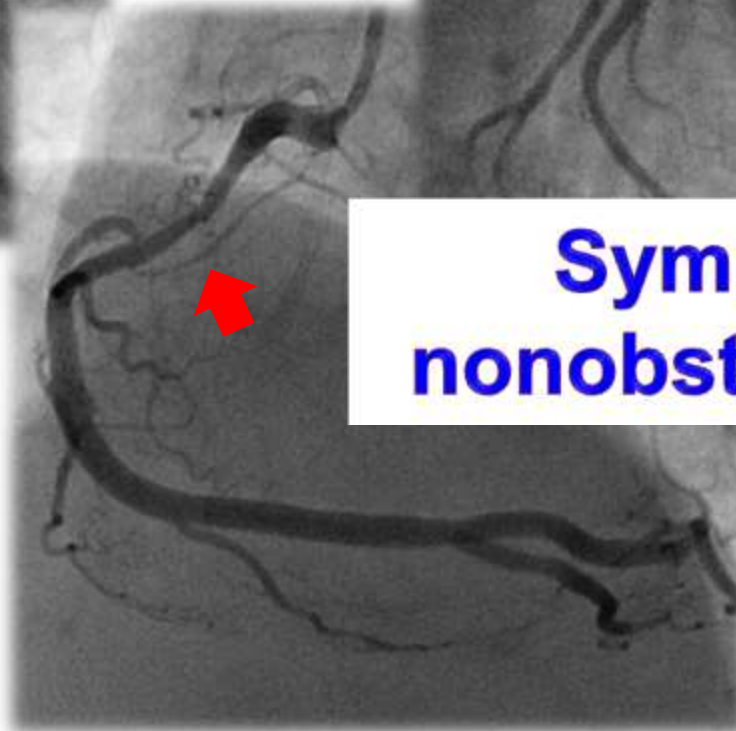
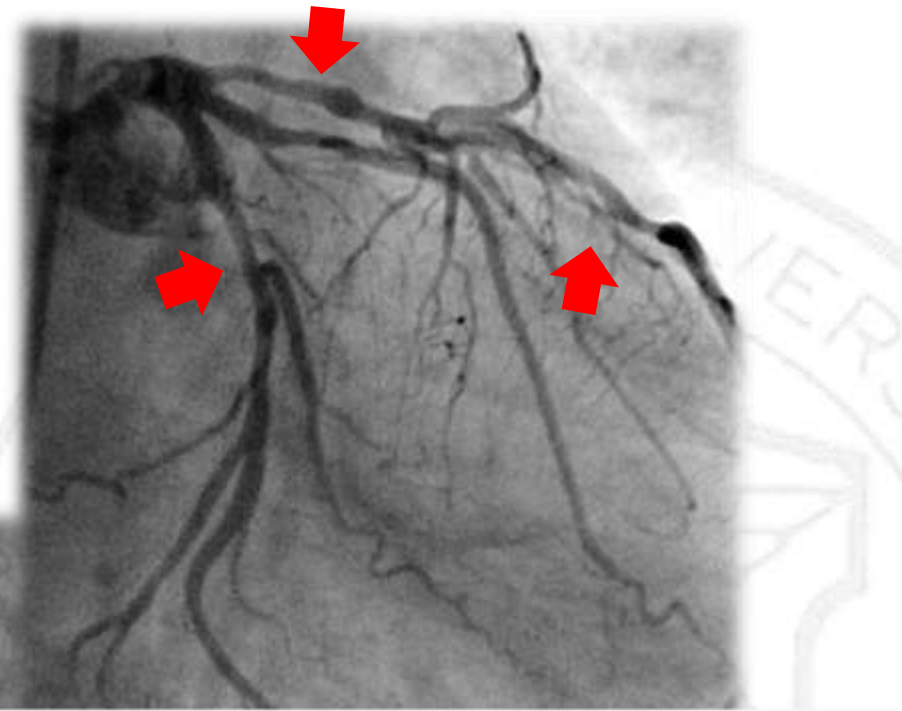
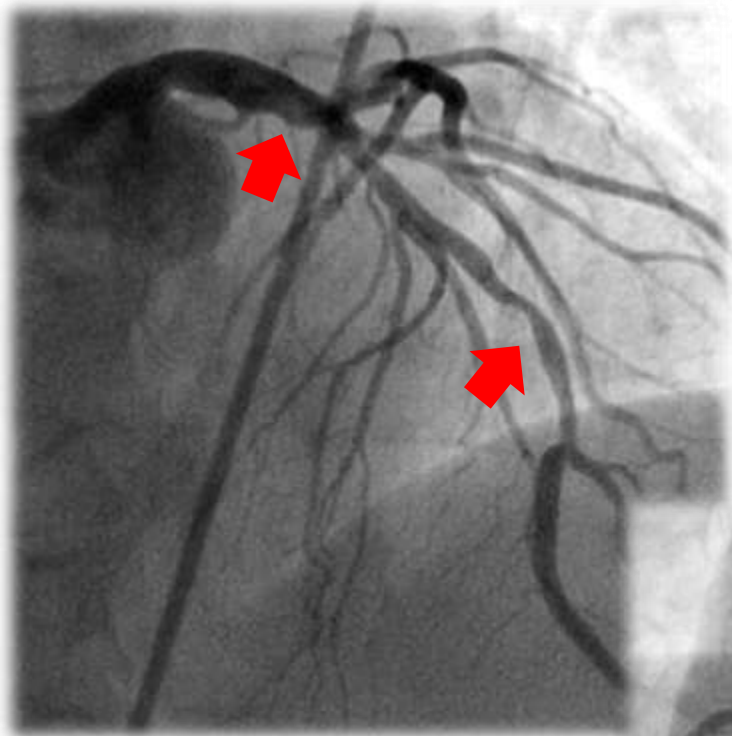
(segment 1): 1x2= 2
 Length >20 mm: 1
 Heavy calcification: 2
 Sub total lesion 3: 5

TOTAL: 29

Functional SYNTAX score in FAME



Angiographic 3 vessel disease



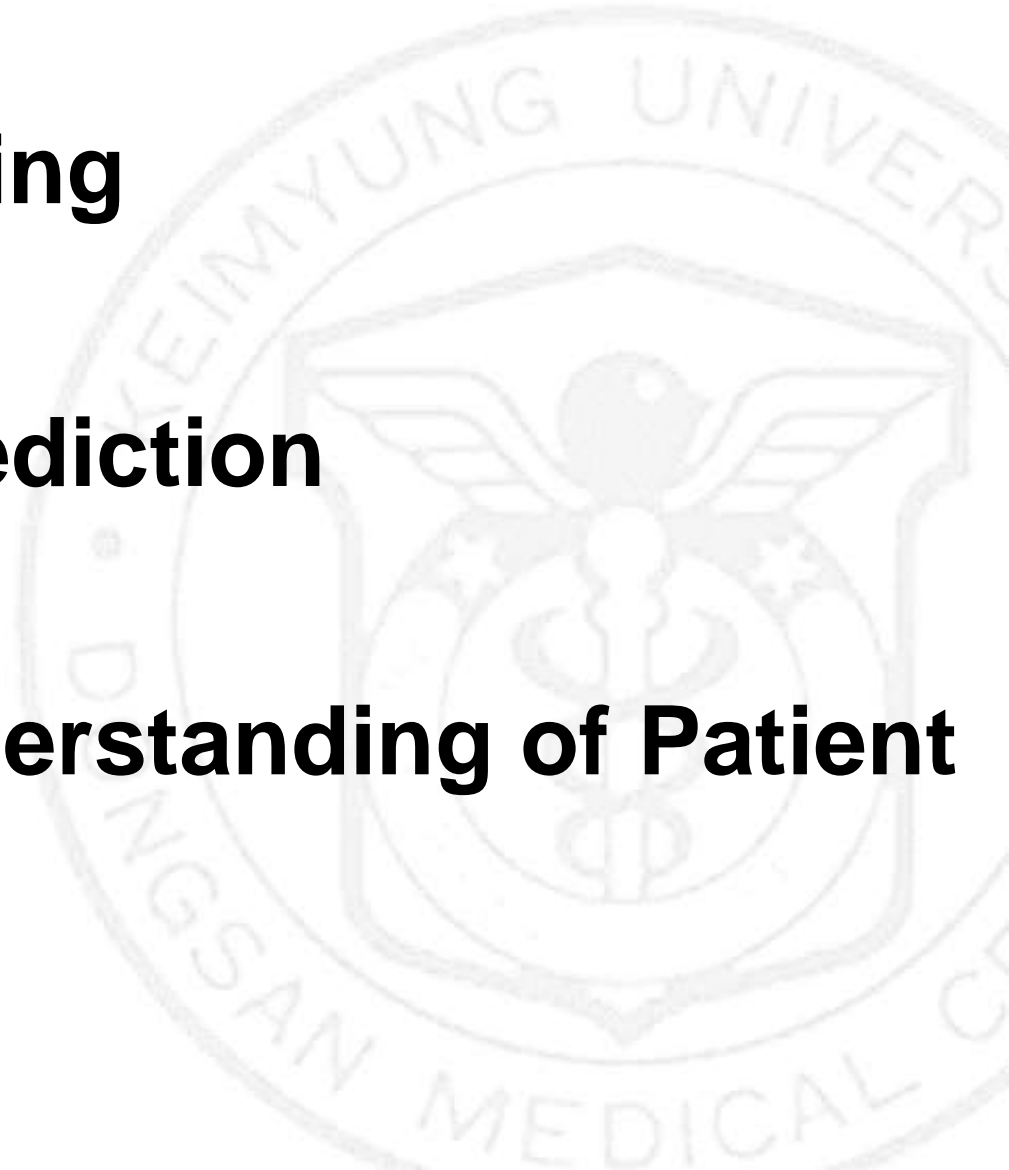
**Symptomatic
nonobstructive CAD**

Practical Usage of FFR

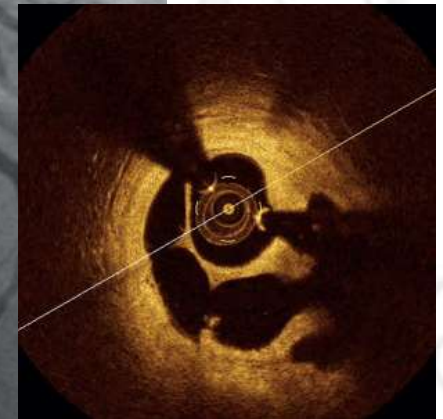
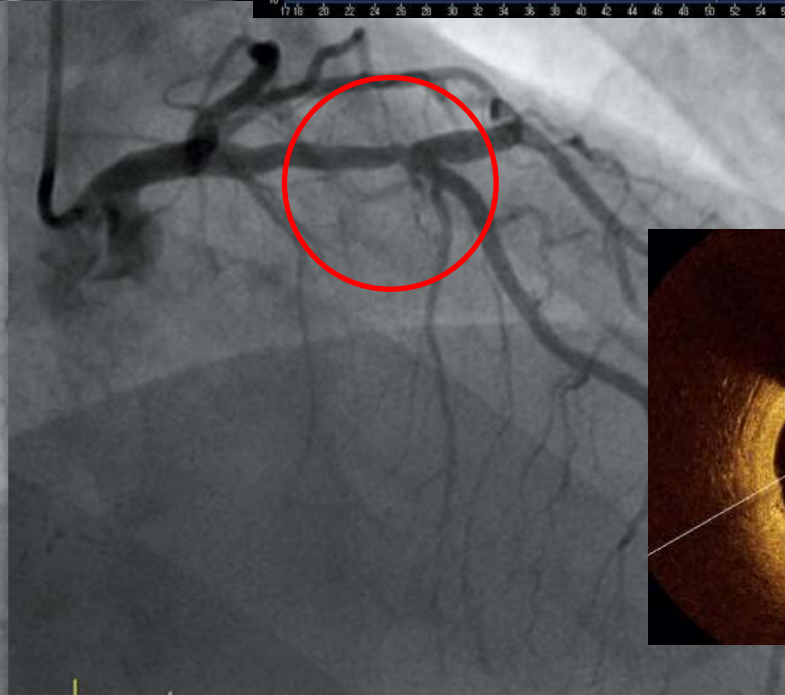
1 Decision Making

2 Prognosis Prediction

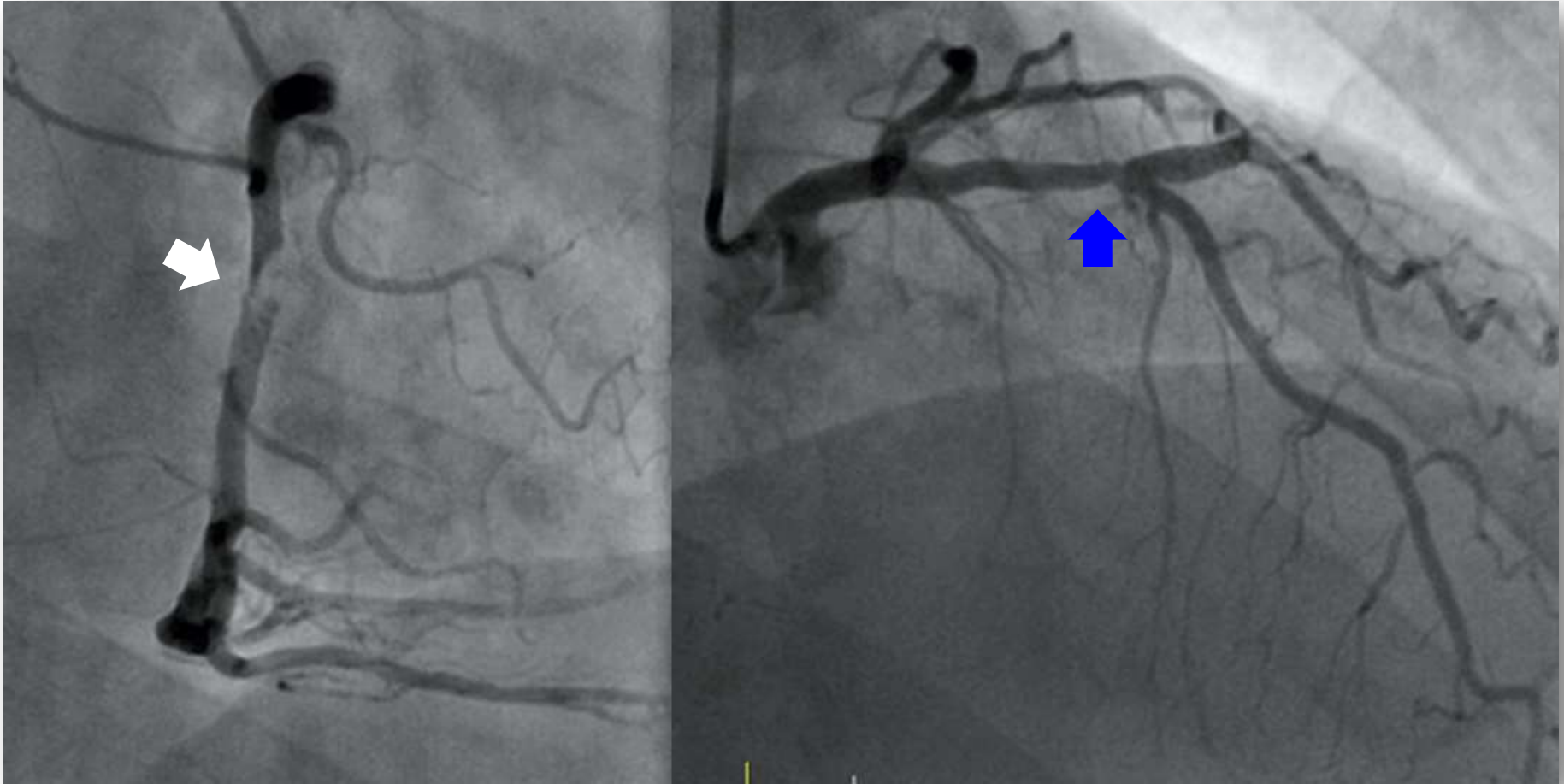
3 Extended Understanding of Patient



48YO/♂ Angina, Cardiac CT(+)



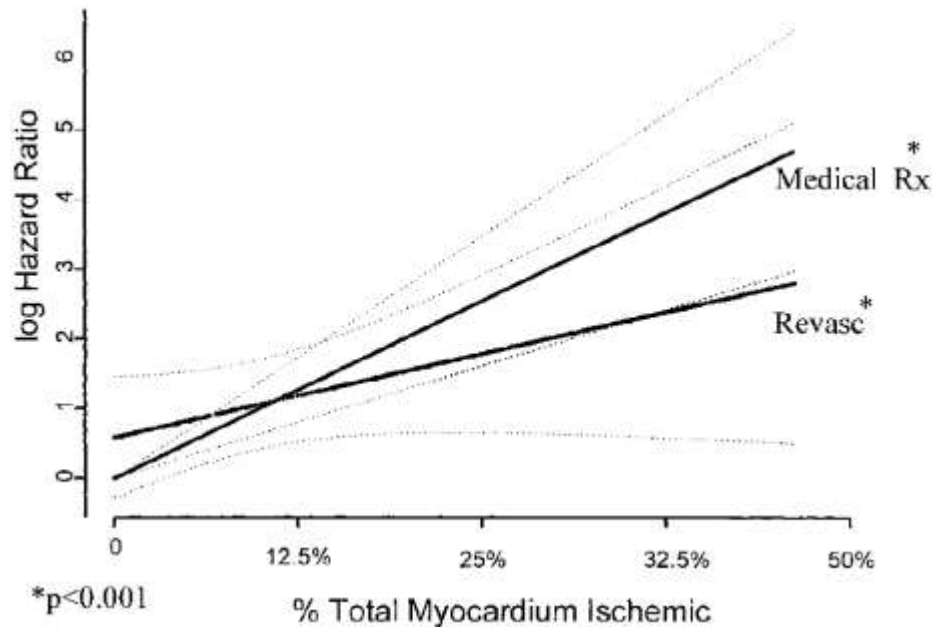
Visually, single vessel disease



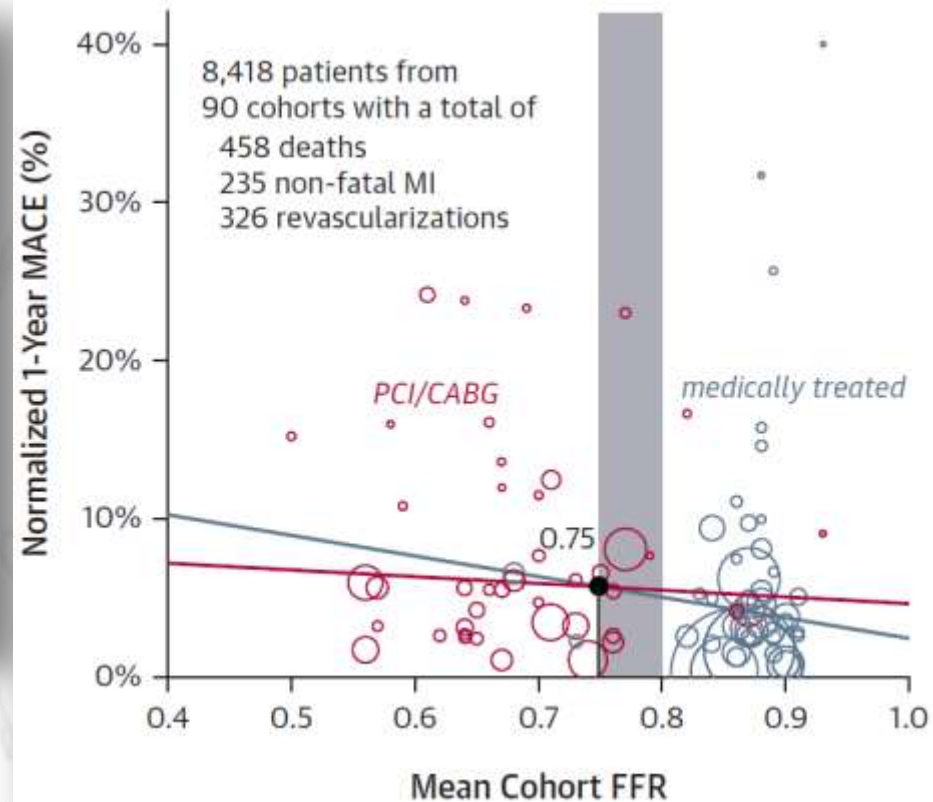
Functionally, multi-vessel disease

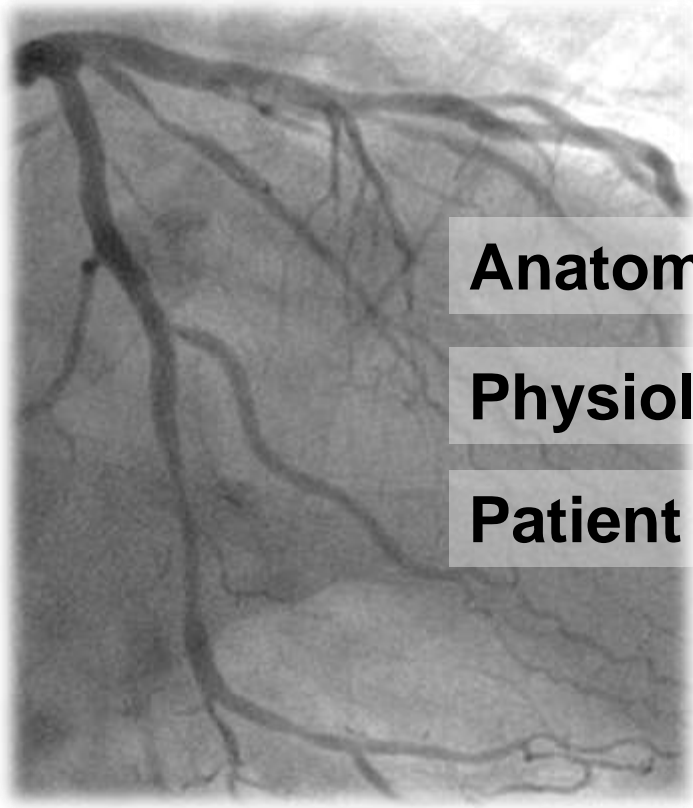
FFR & Burden of ischemia

Burden of Ischemia



FFR

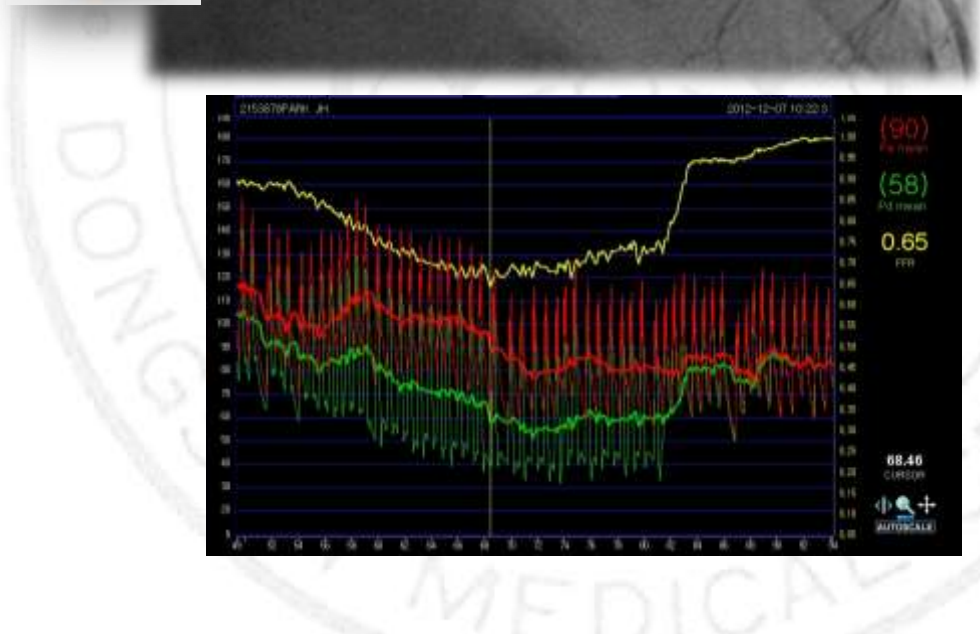
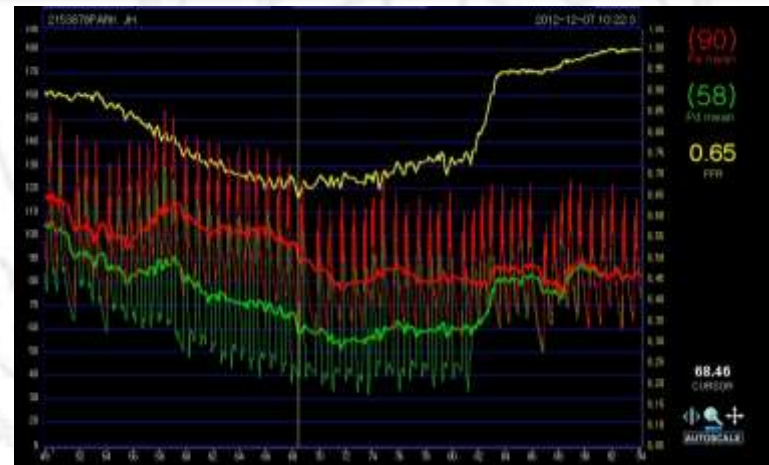
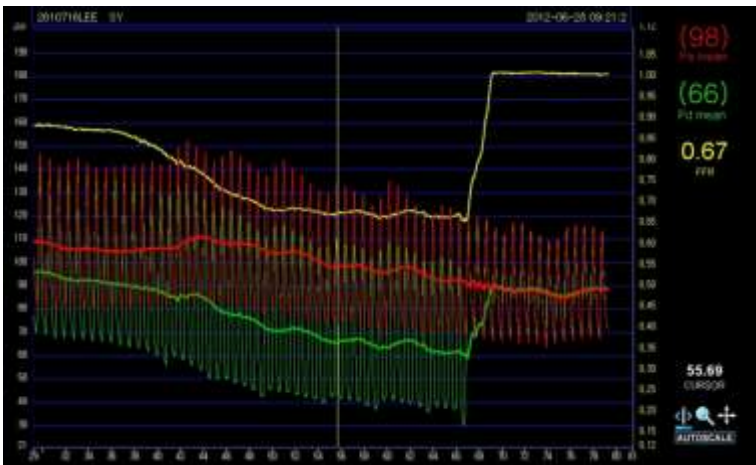
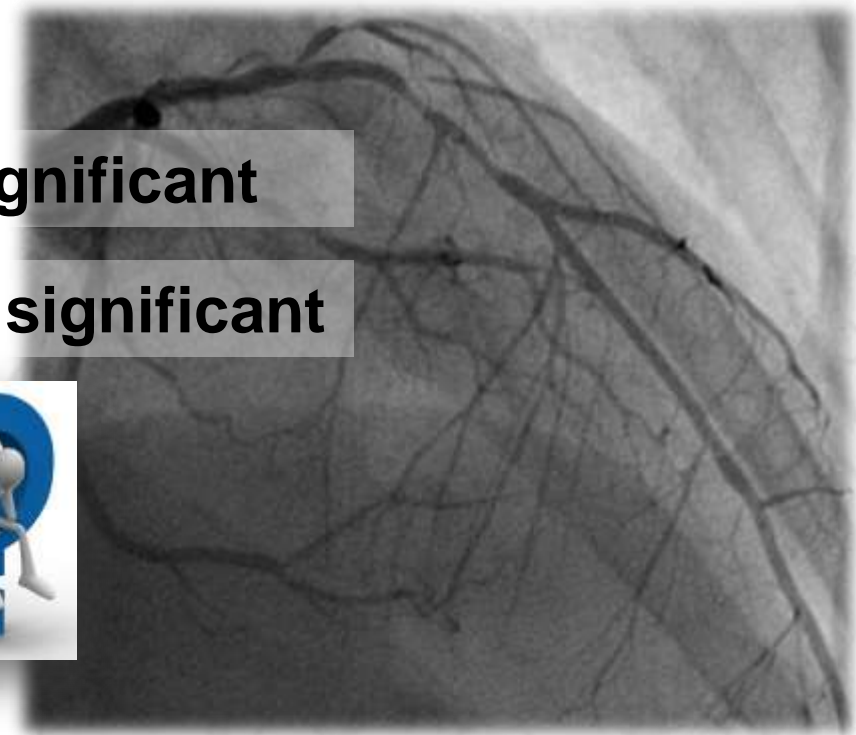




Anatomic view: significant

Physiologic view: significant

Patient view:



Take Home Message

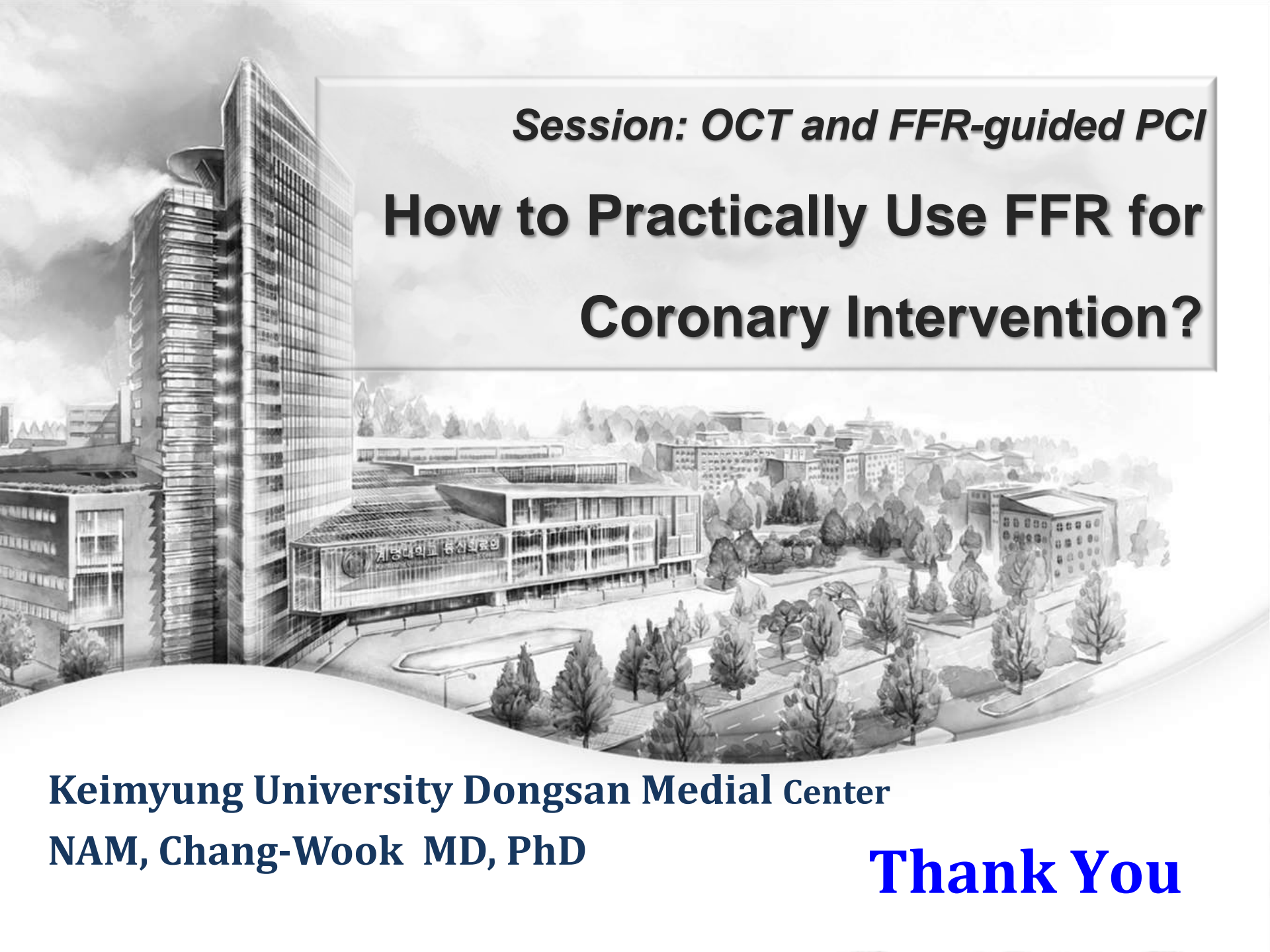


Practical Usage of FFR

- 1 Decision Making
- 2 Prognosis Prediction
- 3 Extended Understanding of Patient

Best coronary intervention should be based on the appropriate patient or lesion selection.

Therefore, FFR can help your best practical decision in your daily cath lab.



Session: OCT and FFR-guided PCI

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Thank You