FFR Guided Functional Angioplasty in Complex Anatomy

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Case 1.

- 45yo/M
- Chest pain for 4 months
- Risk factors: DM, HTN, ex-smoking

**Coronary CT at other hospital**

<table>
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<th>Conclusion</th>
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<td>1. Severe long segment stenosis at proximal to middle portion of LAD.</td>
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<td>2. Maximum stenosis: 75%</td>
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<td>2. About 40% stenosis with calcified plaque and about 45% stenosis with noncalcified plaque at distal portion of LAD.</td>
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<td>3. About 65% stenosis with noncalcified plaque at proximal portion of RCA.</td>
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<td>rez) Conventional coronary angiography.</td>
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Coronary Angiogram
Coronary Angiogram
Coronary Angiogram
Result of CAG

- Angiographic multivessel disease (2 Vessel Disease)
- Really same findings with coronary CT
- How to treat this patient ??

Just Stent it ?
FFR & IVUS

FFR: 0.84

IVUS
3.3 mm²
IVUS & FFR

FFR : 0.86

Angiographic 2 Vessel Disease
But, Functionally Normal Coronary

IVUS
2.2 mm²
Visual-Functional Mismatch

From FAME Study

Functionally Diseased Coronary Arteries

Angiographic 3VD

- 0VD (9%)
- 1VD (34%)
- 2VD (43%)
- 3VD (14%)

Angiographic 2VD

- 0VD (34%)
- 1VD (43%)
- 2VD (14%)

J Am Coll Cardiol 2010;55:2816–21
Non-Invasive functional study

- Thallium SPECT: WNL

- TMT: Stage 4, HR 173 (97% of Target HR)
Case 2.

- 62yo/M
- Recurrent Chest pain for 1 year
- Risk factors: None
Coronary Angiogram

LAD FFR

0.71
How to Treat?

• Simple cross over ?
• Two stent technique ?
• Side branch protection ?
Procedure

BMW in 1st Di & predilatation

Promus Element 4.0(28)

Promus Element 3.5(12)
After Stent at Main Vessel
What Would You Do?

FFR 0.84

Leave it alone.
FFR of the Jailed Side Branch

Only 27% among SB with > 75% has FFR < 0.75

Koo BK et al JACC 2005; 46: 633
Case 3.

- 47yo/M
- Recent onset chest pain
- Risk factors: HTN
Coronary Angiogram
Coronary Angiogram
IVUS & FFR

FFR : 0.84

IVUS
4.8 mm$^2$
“Mismatch” is 29% in equivocal LMCA

R = -0.38, p < 0.01

Isolated LMCA disease

Circulation 2009;120:1505-1512
FFR guided PCI in Equivocal LMCA

- In 213 patients with an equivocal LMCA stenosis
- FFR ≥0.80: DEFER (n=138) vs. FFR<0.80: CABG (n=75)

An FFR-guided strategy showed the favorable outcome.

*Circulation. 2009;120:1505-1512"
How to Treat

Angiographic multivessel disease

Functionally, Normal coronary artery

We just used 2 stents, simple cross over to treat these lesion subset including multivessel, bifurcation, and LM disease

All of them are still alive
Summary

• If you measured FFR in complex lesion subset, you could find the simple functional anatomy from complex angiographic findings.

• Therefore, FFR measurement makes treatment simplified.
“Simple” is the ultimate sophistication...

Leonardo Da Vinci said

Just FFR it

DEFER PCI
FFR measurement in Complex lesions may lead to

① Save stent and cost

② Avoid unnecessary PCI

③ Improve clinical outcomes of patients