Conclusive Remarks

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Selection Bias
"People who wish to analyze nature without using mathematics must settle for a reduced understanding",
- Richard P Feynman, PhD, Nobel Laureate of Physics in 1965

People who wish to treat CAD without physiology must settle for a reduced understanding
• Clinical outcome data

• Microvasculature

• KISS principle
Unmet clinical need

Clinician’s request to engineers/industry

(Not the contrary)
The value of FFR in terms of **Clinical Outcome**

Has been validated in patients with...

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<tr>
<td>2</td>
<td>Post-myocardial setting</td>
<td>(De Bruyne et al Circulation 2001)</td>
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<td>3</td>
<td>Multivessel disease</td>
<td>(Tonino et al. NEJM 2009)</td>
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<td>(Berger et al JACC 2005)</td>
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<td></td>
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<td>(Botman et al CCI 2004)</td>
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<td>(De Bruyne et al NEJM 2012)</td>
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<td>4</td>
<td>Left main stenosis</td>
<td>(Hamilos et al. Circulation 2009)</td>
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<td>5</td>
<td>Proximal LAD stenosis</td>
<td>(Muller et al. JACCInterv 2011)</td>
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<td>6</td>
<td>Bifurcation lesions</td>
<td>(Koo et al. Eur Heart J 2010)</td>
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<td>7</td>
<td>Hybrid revascularization</td>
<td>(Davidavicius et al Circulation 2005)</td>
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<tr>
<td>8</td>
<td>Post CABG</td>
<td>(Botman et al Ann Thor Surg 2007)</td>
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<td>9</td>
<td>Small vessel</td>
<td>(Puymirtat et al Circ Interv 2011)</td>
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FAME 3
PI: William F Fearon

All Comers with 3 V CAD (not involving LM)

Amenable to PCI/CABG and meet inclusion criteria
No exclusion criteria met and patient consents

Heart team identifies lesions for PCI/CABG and then patient is randomized

FFR-Guided PCI with DES
Stent all lesions with FFR < 0.80 (n=750)

Perform CABG based on coronary angiogram (n=750)

One Year follow-up for MACCE (1 month, 3 and 5 year follow-up)
• Clinical outcome data

• Microvasculature

• KISS principle
Absolute hyperemic coronary flow: 126 mL/min
Minimal microvascular resistance: 0.436 mm Hg/mL/min

FFR = 0.98
CFR = 4.15

IMR = 79 x 0.17 = 13.3
• Clinical outcome data

• Microvasculature

• KISS principle
ETP Course: Conclusions

The “KISS” Principle:
Keep It Simple, Stupid!
The “KISS” Principle: Keep It Simple, Stupid!

“Le contraire du vrai n’est pas le faux mais le complexe”

André Comte-Sponville
Petit traité des grandes vertus
PUF, 1995, p 245

The contrary of ‘true’ is not ‘false’, but ‘complicated’
The “KISS” Principle:

Keep It Simple, Stupid!

- \( FFR_{myo}, FFR_{cor}, FFR_{coll} \)
- RA pressure measurements
- Serial stenoses equations

\[
FFR = \frac{P_d}{P_a}
\]

During hyperemia
The “KISS” Principle:
Keep It Simple, Stupid!

Hyperemia

- Adenosine IV (140 µg/kg/min)
- Adenosine IC (100 – 200 µg bolus)
- Regadenosone IV bolus (IV peripheral bolus)
Diagnostic Algorithm in patients with (suspected) stable CAD

Patient With Chest Pain

Yes
Symptoms Stable? No

Myocardial Stress Evaluation (Gated-SPECT, MRI, or PET)*

Yes
Normal Myocardial Stress Evaluation? No

Coronary Angiography

Evaluate Nonischemic Cardiac and Noncardiac Causes of Chest Pain
Consider Tricyclic Antidepressant Therapy
Cardiac Risk Factor Management

Yes
Normal Angiography or Nonobstructive CAD (<50% Luminal Diameter Stenosis)?

No

Consider Coronary Vascular Function Study

Yes
Normal Coronary Vascular Function Study Results? No

Aggressive Medical and Symptom Management (Aspirin, β-Blockers, Statins, Angiotensin-Converting Enzyme Inhibitors, Tricyclic Antidepressants, Exercise Training)

Medical Management Consider Coronary Revascularization
Diagnostic Algorithm in patients with (suspected) stable CAD

Suspected ischemic heart disease
(or change in clinical status in a patient with known IHD)

Intermediate- or high-risk UA?*

No

Comprehensive clinical assessment of risk, including personal characteristics, coexisting cardiac and medical conditions, and health status

Technically adequate?

Yes

Recent exercise or cardiac imaging study

No

Contraindications to stress testing?

Yes

Patient able to exercise?

No

Previous coronary revascularization?

Yes

Previous coronary revascularization?

No

Intermediate- to high-likelihood IHD

Yes

Standard exercise ECG

No

MPI or echo with exercise

Yes

Pharmacologic stress MPI or echo

No

Pharmacologic stress echo

Low-likelihood IHD

Yes

Pharmacologic stress

Intermediate- to high-likelihood IHD

No

MPI or echo with exercise

No

Pharmacologic stress CMR or CCTA

Yes

Pharmacologic stress CMR

No

Standard exercise ECG

Yes

Low-likelihood IHD

Intermediate- to high-likelihood IHD

Test results suggest high-risk coronary lesion(s)?

Yes

Initiate guideline-directed medical therapy

Consider coronary revascularization to improve survival

See Figure 1 of reference 1

No

Successful treatment?

Yes

Regular monitoring

No

Consider coronary revascularization to improve symptoms

See Figure 3 of reference 1

See ACCF/AHA UA/NSTEMI guideline

Symptoms or findings suggest high-risk lesion(s)?

Yes

Prior sudden death or serious ventricular arrhythmia

No

Prior stent in unprotected left main coronary artery

Initiate guideline-directed medical therapy

Consider coronary revascularization to improve survival

See Figure 1 of reference 1
ETP, Sofia Antipolis, April 2013

Diagnostic Algorithm in patients with (suspected) stable CAD

Things have to be made as simple as possible, but not simpler
The “KISS” Principle:

Keep It Simple, Stupid!

Suspected Ischemic Heart Disease

Medical History
(+ Body Language !)

2013 ?

Coronary Angiogram + FFR, IMR, ... ± ad hoc appropriate treatment
FFR, ... life can be so simple

1.0
FFR
0.80
NO INDUCIBLE ISCHEMIA
INDUCIBLE ISCHEMIA
ISCHEMIA AT REST OR NECROSIS

Medical Therapy
Revascularization
"People who wish to analyze nature without using mathematics must settle for a reduced understanding",
- Richard P Feynman, PhD, Nobel Laureate of Physics in 1965

**People who wish to treat CAD without physiology must settle for a reduced understanding**

Thank you !!