What iF

FFR and iFR® Worked Together on One System?

Simplifying Workflow

- The iFR modality provides a hyperemia-free measurement in as few as five heartbeats

Providing Choice

- One wire, One system, Multi-modality
- An iFR of 0.89 is equivalent to an FFR of 0.80[1]

Building Evidence

- Over 4000 patients have been studied with iFR
- Numerous prospective iFR studies have been published in peer-reviewed journals
- Multicenter prospective outcome studies are currently enrolling

1. An iFR cut-point of 0.89 matches best with an FFR ischemic cut-point of 0.80 with a specificity of 87.8% and sensitivity of 73.0%. (iFR Operator's Manual 505-0101.23)

Using Pressure to Get Flow

- Coronary pressure is simple to measure
- Flow velocity is more challenging

Fundamental Equation for relating Pressure and Flow:

$$P = Q \times R$$

Pressure = Flow x Resistance

or

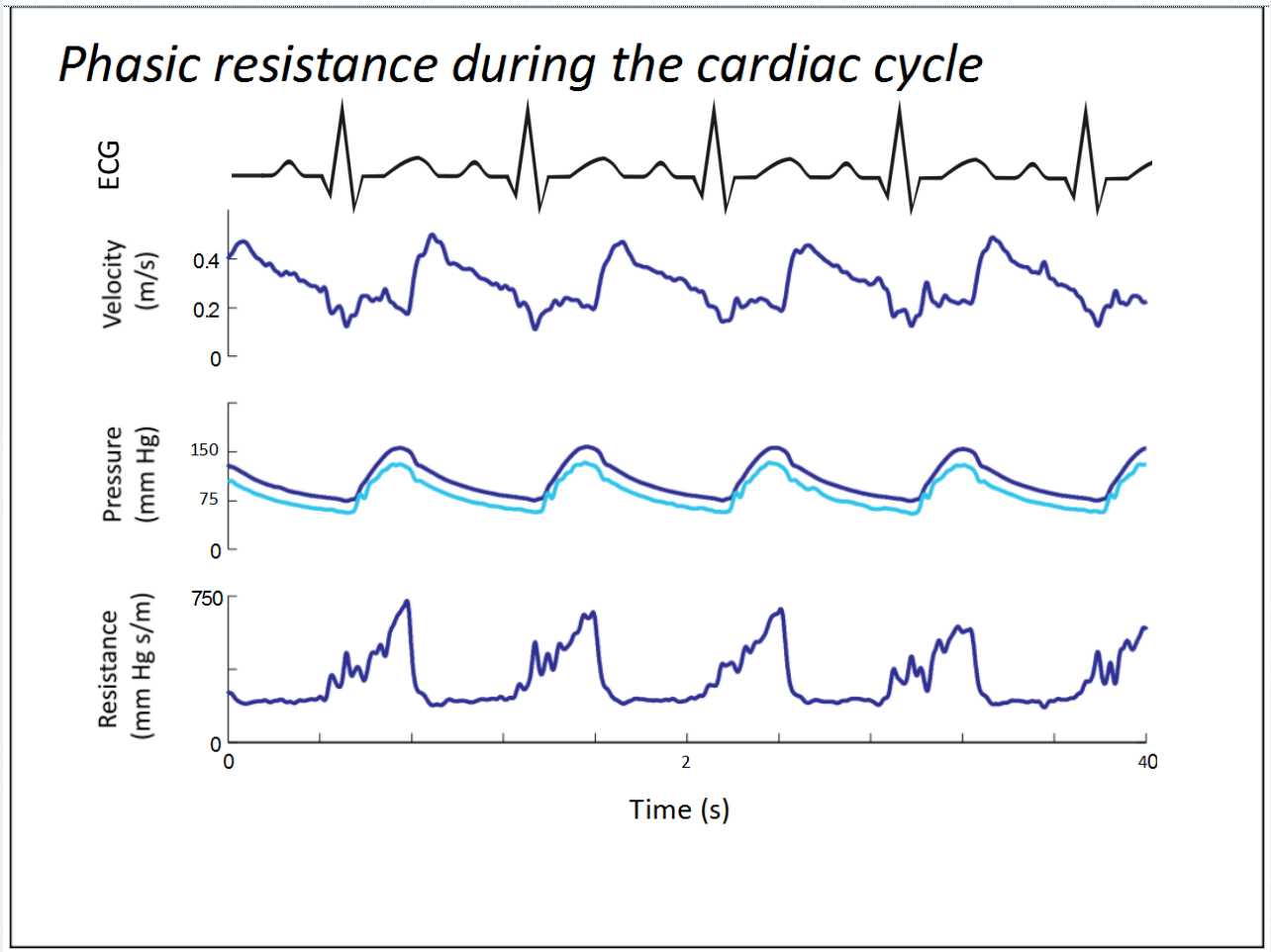
$$\Delta P \approx \Delta Q \times R$$

Change in Pressure = Change in Flow x Constant Resistance

When ***Resistance is Constant***, changes in Pressure are proportional to changes in Flow

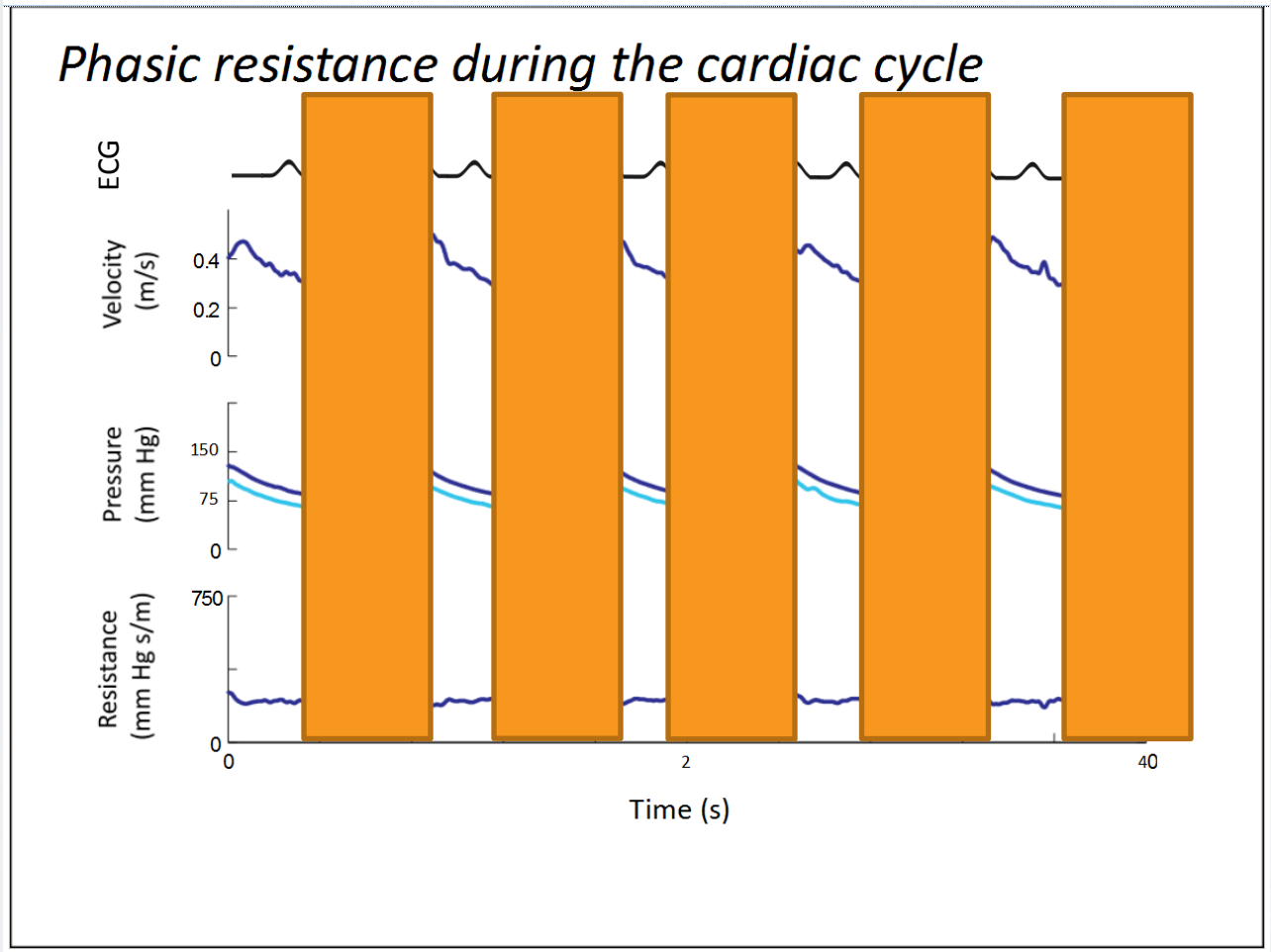
Derived from Poiseuille's Law for Fluid Dynamics

Resistance is Constant in the Wave-Free Period



Davies J. PRIMARY Results of ADVISE. TCT 2011. Lecture conducted from San Francisco, CA.

Resistance is Constant in the Wave-Free Period

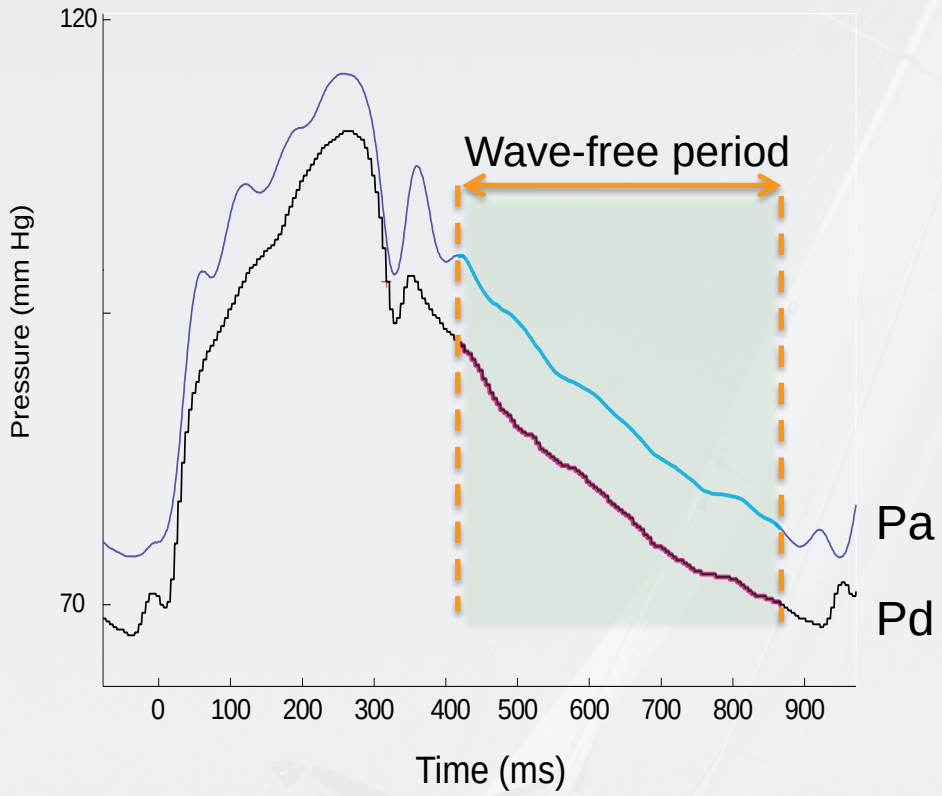


Davies J. PRIMARY Results of ADVISE. TCT 2011. Lecture conducted from San Francisco, CA.

Introduction of the iFR® Modality

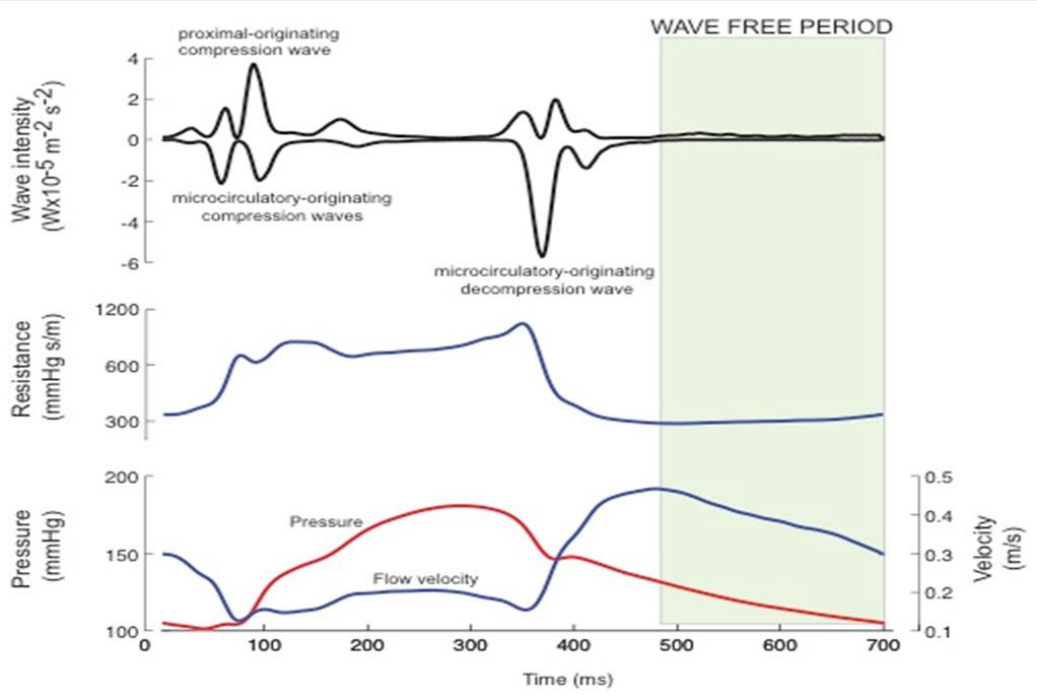
instant wave-Free Ratio™

Definition: Instantaneous pressure ratio, across a stenosis during the wave-free period, when ***resistance is naturally constant*** and minimized in the cardiac cycle



Escaned J. ADVISE II: A Prospective, Registry Evaluation of iFR vs. FFR. TCT 2013. Lecture conducted from San Francisco, CA.

Three Benefits to the iFR® Window



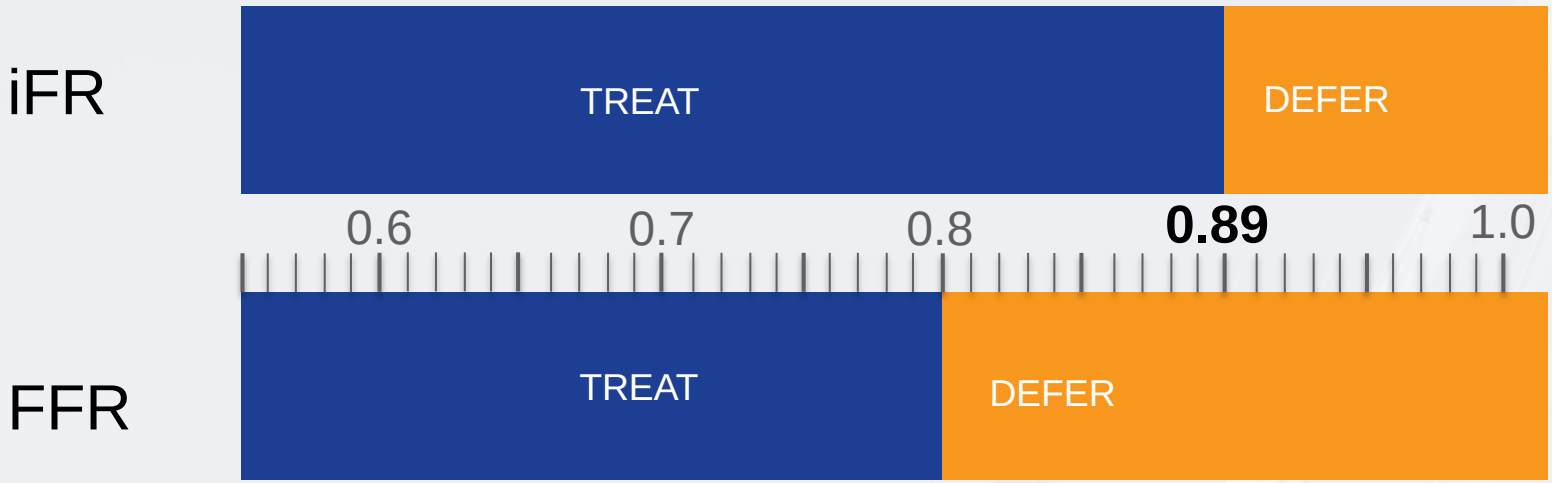
1. Noise from compression and suction waves is minimized
2. Resistance is constant so ΔP is proportional to ΔQ (flow)
3. Velocity is higher so better power to discriminate

Sen S, *et al.* Development and validation of a new adenosine-independent index of stenosis severity from coronary wave-intensity analysis: results of the ADVISE (ADenosine Vasodilator Independent Stenosis Evaluation) study. *J Am Coll Cardiol*. 2012 Apr 10;59(15):1392-402.

The iFR® Modality Cut Point

An iFR cut point of 0.89 matches an FFR cut point of 0.80[1]

- FFR and iFR have a different scale
- Celsius & Fahrenheit both measure temperature, but have a different scale



1. An iFR cut-point of 0.89 matches best with an FFR ischemic cut-point of 0.80 with a specificity of 87.8% and sensitivity of 73.0%. (iFR Operator's Manual 505-0101.23)

The Hybrid iFR®/FFR Approach

- 94.0% match to FFR[1]
- 65.1% of patients may be free from hyperemic agents[2]

1. Using the iFR cut points of 0.85 and 0.94 matches best with an FFR ischemic cut-point of 0.80 with a specificity of 90.7% and sensitivity of 96.2%.
2. The ADVISE II study illustrated a 5.8%, i.e. (17+23)/690, classification discordance between the iFR Hybrid Approach and FFR. Among 477 lesions that would be assessed without hyperemia by the iFR Hybrid Approach, 40 (17+23) were due to classification discordance.
3. An iFR cut-point of 0.89 matches best with an FFR ischemic cut-point of 0.80 with a specificity of 87.8% and sensitivity of 73.0%. (iFR Operator's Manual 505-0101.23)

Simplifying Workflow

The iFR® modality provides a hyperemia-free measurement in as few as five heartbeats

65.1% of patients may be free from hyperemic agents[1]

1. The ADVISE II study illustrated a 5.8%, i.e. (17+23)/690, classification discordance between the iFR Hybrid Approach and FFR. Among 477 lesions that would be assessed without hyperemia by the iFR Hybrid Approach, 40 (17+23) were due to classification discordance. (iFR Operator's Manual 505-0101.23)

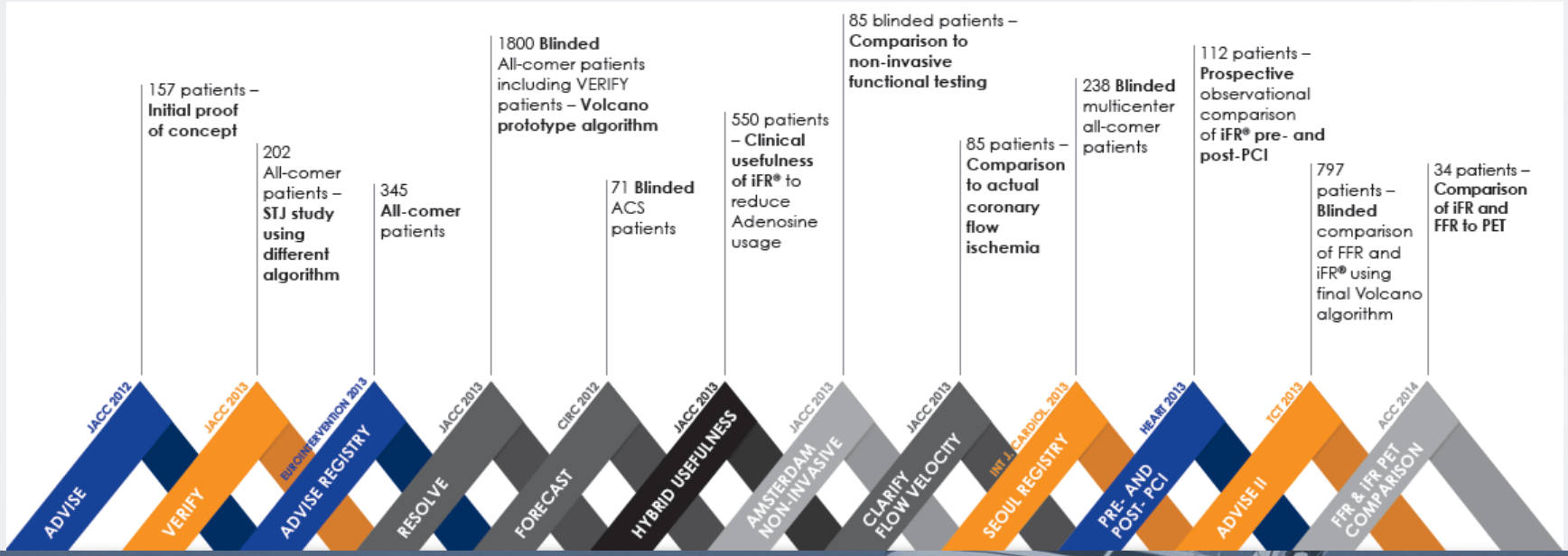
Providing Choice

Adjacent tabs on the screen

Building Evidence

iFR® modality clinical progress

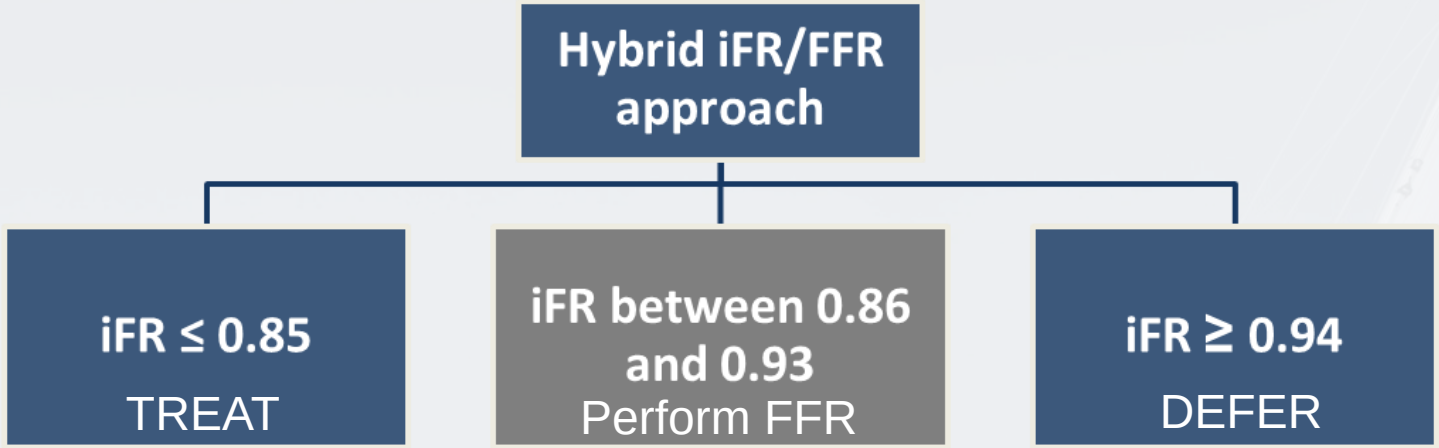
- Over 4000 patients have been studied with iFR
- Numerous prospective iFR studies have been published in peer-reviewed journals
- Multicenter prospective outcome studies are currently enrolling



Hybrid iFR®/FFR Approach: ADVISE II

94.0% match to FFR[1]

65.1% of patients may be free from hyperemic agents[2]



1. Using the iFR cut points of 0.85 and 0.94 matches best with an FFR ischemic cut-point of 0.80 with a specificity of 90.7% and sensitivity of 96.2%. (iFR Operator's Manual 505-0101.23)
2. The ADVISE II study illustrated a 5.8%, i.e. (17+23)/690, classification discordance between the iFR Hybrid Approach and FFR. Among 477 lesions that would be assessed without hyperemia by the iFR Hybrid Approach, 40 (17+23) were due to classification discordance.