

FFR & IFR PRIOR TO REVASCLARISATION

Presented by;

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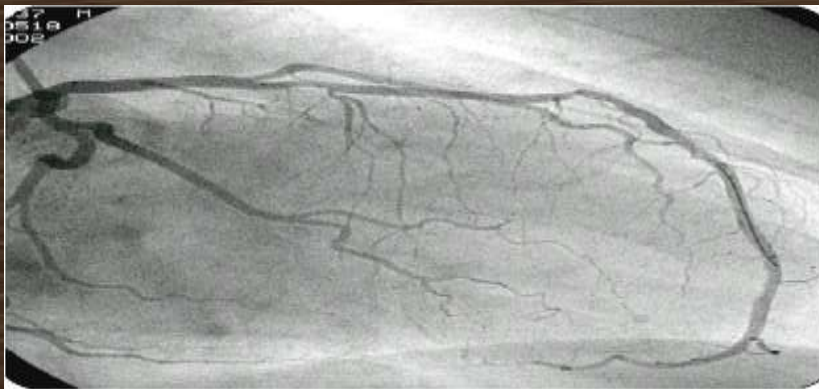
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Coronary artery disease

Improvement in the diagnosis and treatment of CAD can reduce the health and economic burden of this condition

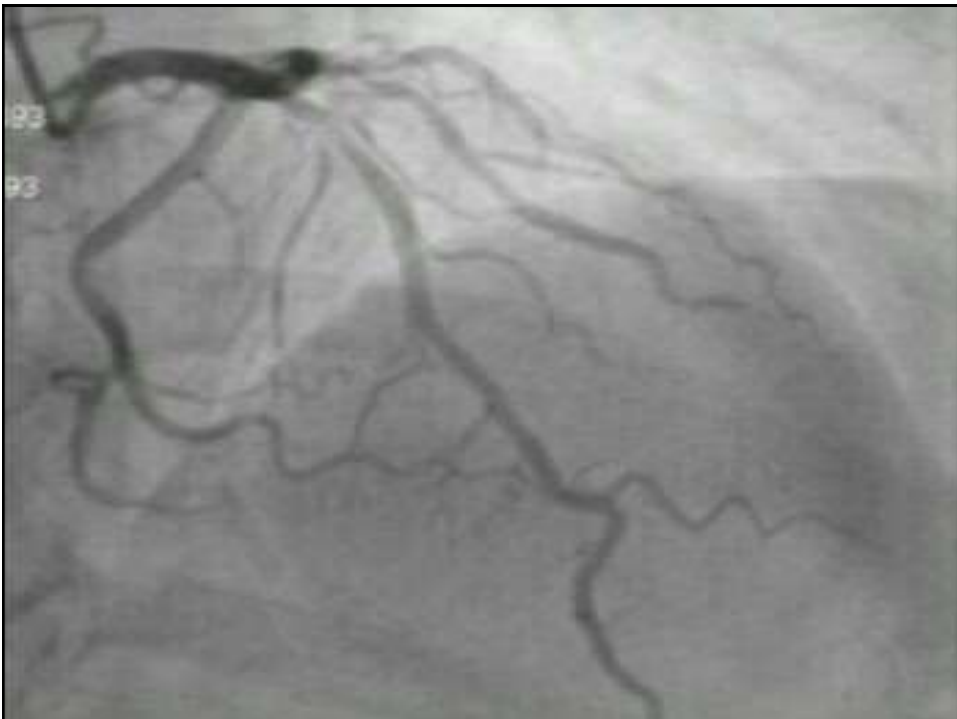
Coronary angiography

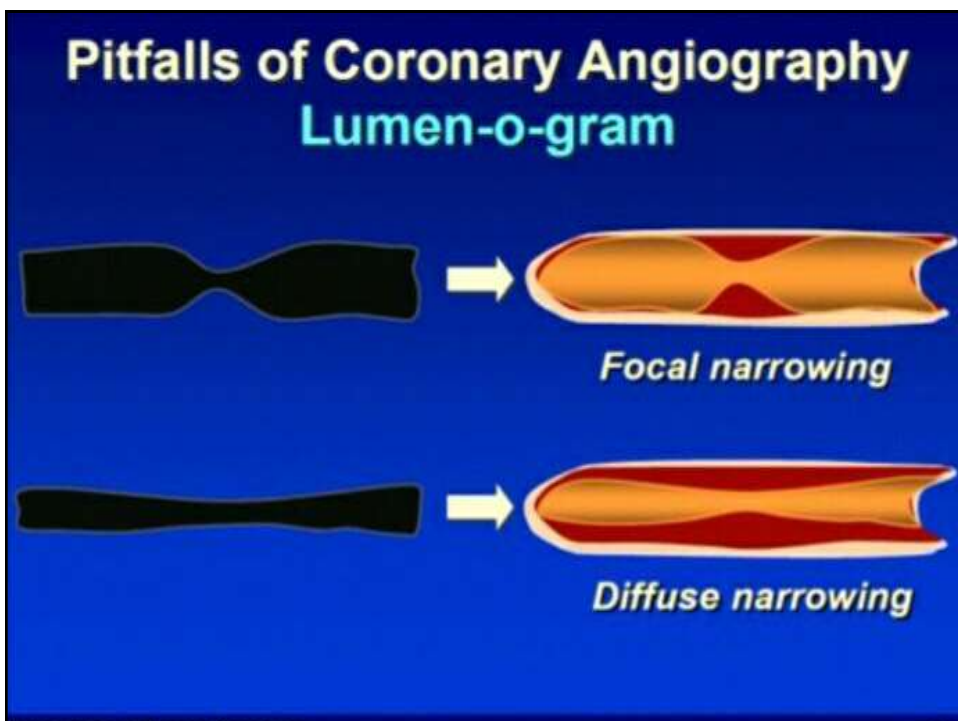
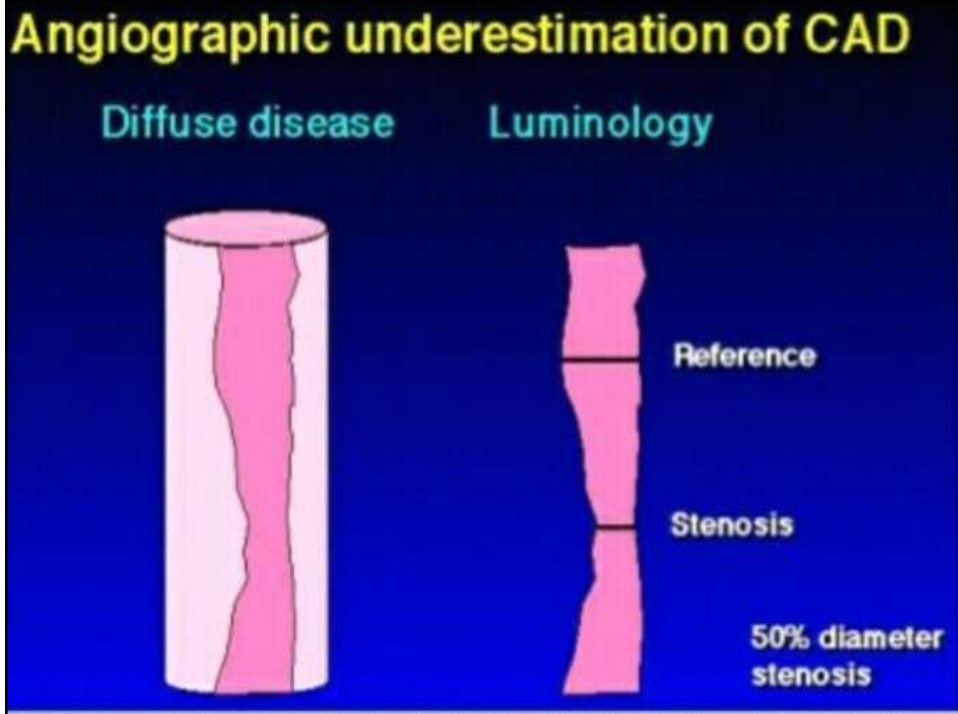
Remains the “gold standard” of assessment of atherosclerotic lesions.

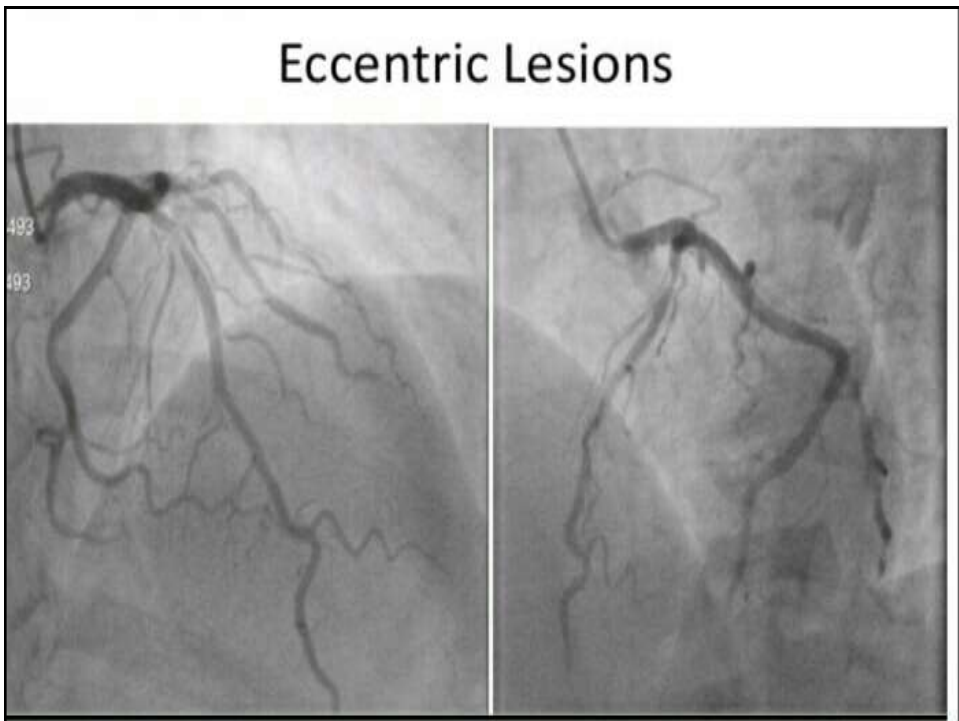
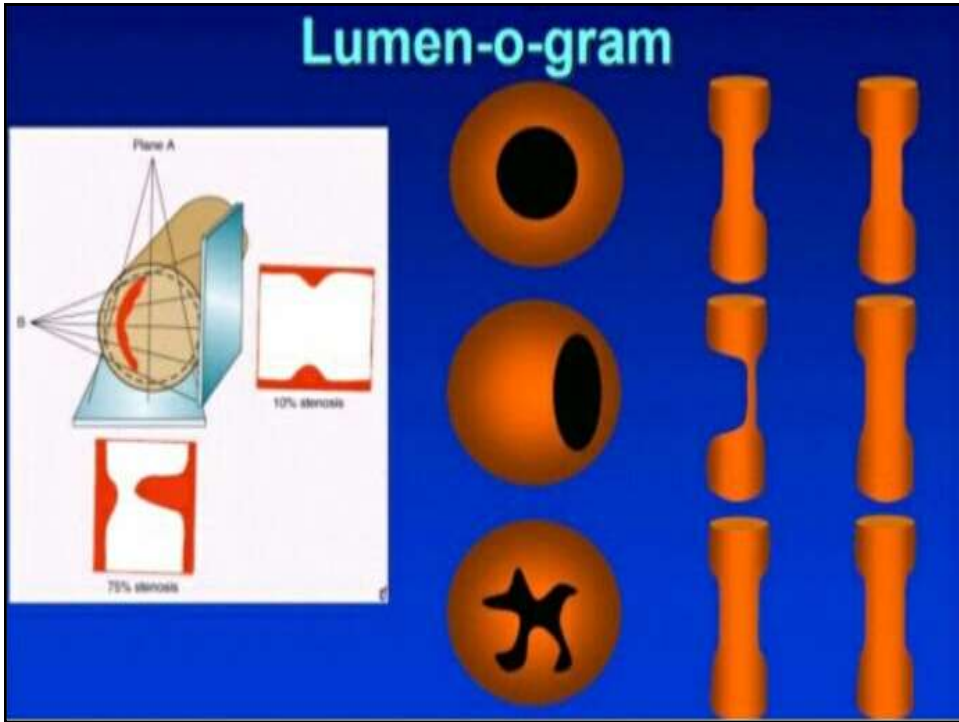


○ Need for Functional studies ?

- CA .. limited value in defining the functional significance of a coronary stenosis most imp factor related to outcome is the presence and extent of inducible ischemia.







Limitations of CA

- Intermediate lesion (40–70%) significance cannot be accurately determined
- Won't provide intraluminal detail ; vessel wall details ;
- diffuse disease, angiographic artifacts of contrast streaming, image foreshortening and calcification often complicates the interpretation ;
- Bifurcation or ostial lesion locations may be obscured by overlapping branch segments.

Option for evaluation of functional significance of a certain lesion.

- Functional flow reserve (FFR).
- Instantaneous wave free ratio (IFR).
- Myocardial perfusion imaging (e.g. by single photon emission tomography).
- Other methods of evaluation may include :

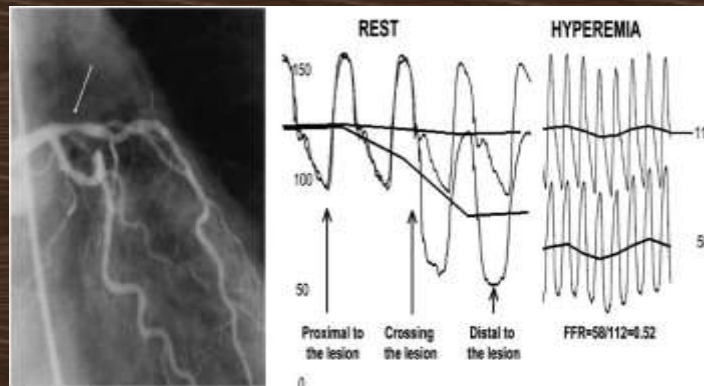
Other stress & imaging studies ; e.g. stress Echo, stress myocardial perfusion using PET scan or CMR .

Non-invasive assessment of FFR by CT coronary angiography.

FFR ..

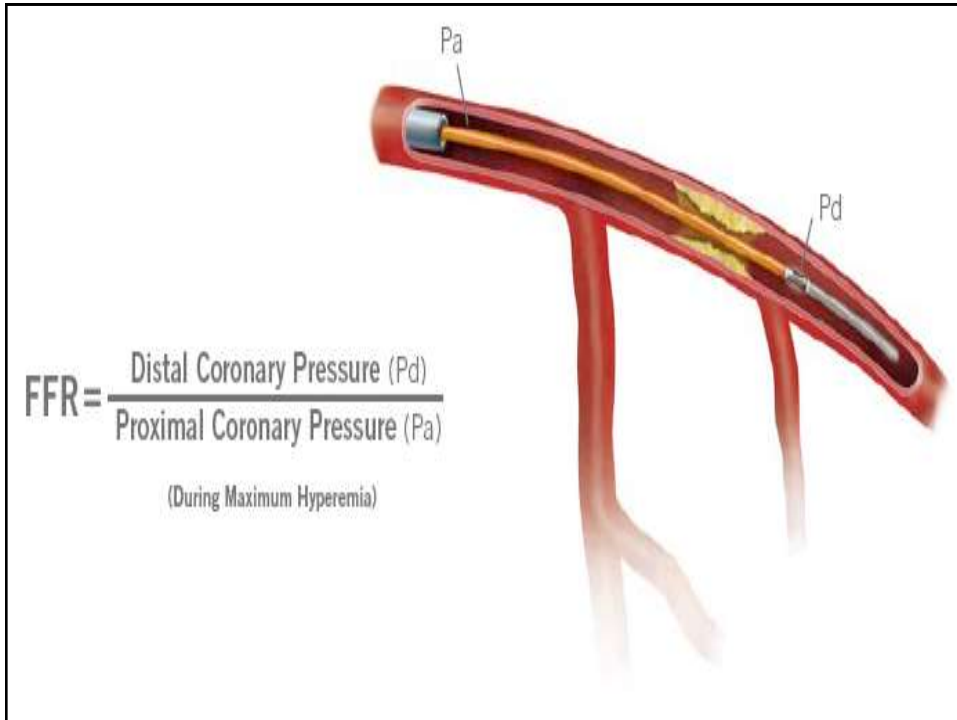
- Developed by Pijls et al
- gold standard for invasive assessment of physiologic stenosis significance.
- ratio of the coronary pressure distal to the stenosis to aortic pressure as the normal perfusion pressure (distal coronary pressure/aortic pressure) when the micro vascular resistance was minimal and assumed to be constant (ie at maximal hyperemia).
- FFR model assumes that under maximum arterial vasodilation, the resistance of the myocardium is minimal and constant across different myocardial vascular beds and thus blood flow to the myocardium is proportional to the driving pressure (myocardial perfusion pressure).

Normal value of FFR : 1



In this example...During maximal hyperemia (at the right side of the pressure tracing), the hyperemic distal pressure decreased to 58 mm Hg with aortic pressure of 112 mm Hg for an FFR of 0.52 (58/112).

Maximal blood flow to the myocardium of the anterior wall of this patient is decreased to 52% of expected normal flow.



PressureWire®

The distal pressure in the coronary artery is measured by a tiny sensor located 3 cm from the tip of an 0.014" guidewire, called PressureWire®.



Hyperemic stimuli

Intravenous Adenosine 140-160 μ g/kg/min

Intracoronary Adenosine LCA: 20-40 μ g

RCA: 15-30 μ g

Intracoronary Papaverine LCA: 15 mg

RCA: 10 mg

Adenosine Triphosphate (ATP) (ic. or iv)
(same dosages as for Adenosine)

- **iFR™** is also a pressure wire based technology for measuring the severity of coronary stenosis.
- **It doesn't require** administration of hyperemic agent.
- **The technique is identical to FFR** except that when the wire is advanced beyond the stenotic lesion, **the data from 5 beats** are taken at rest, after which computational analysis of iFR is made.

- **The basis of iFR simply rely on the fact that** pressure is proportional to flow when resistance is constant ($\text{Pressure} = \text{Flow} \times \text{Resistance}$)
- **Previously,** It was not possible to achieve a stable or constant resistance without using a hyperemic agent.
- **Now,** with advances in sensor technology & computational processing its possible to identify a period of stable & constant resistance during the wave free period in cardiac cycle (during diastole).

The iFR[®] Modality Workflow



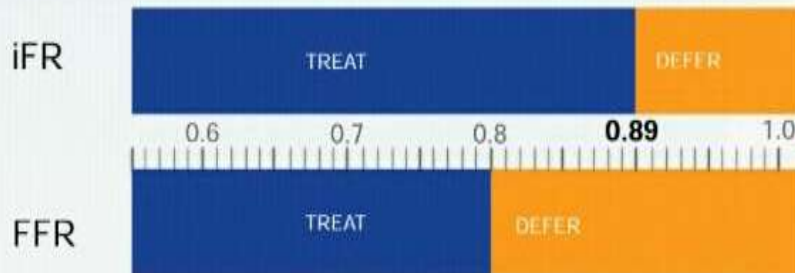
The FFR Modality Workflow



The iFR[®] Modality Cut Point

An iFR cut point of 0.89 matches an FFR cut point of 0.80¹

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



Message

Not every patient have coronary lesion not
need stent



Thank you