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How is FFR helpful to treat the Bifurcation lesions?

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CASE

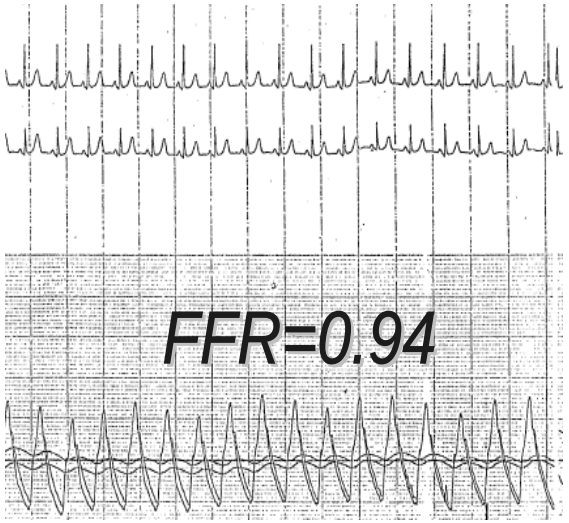
M/50 Preoperative angiography, peripheral vascular disease

Pitfalls of anatomical evaluation

- Angiography
  - Single directional assessment
  - Variability in stenosis assessment
  - No validated criteria for side branch intervention
  - Not physiologic
- IVUS/OCT
  - Can not be performed in tight stenosis (ex. jailed SB)
  - No validated criteria for side branch intervention
  - Not physiologic

Ostial lesions

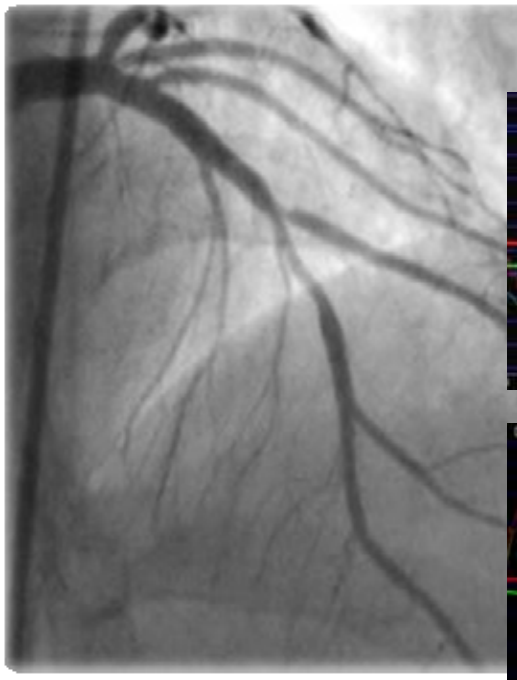
Angiographic severity ≠ Functional significance

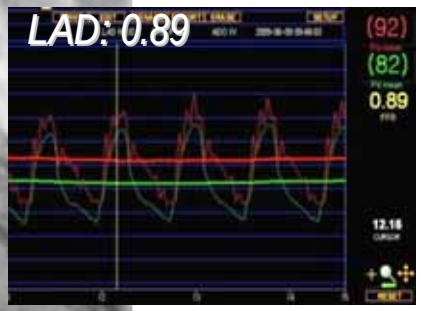


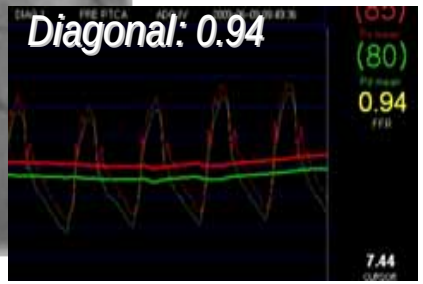
FFR	≥70% Angiographic Stenosis	50%–70% Angiographic Stenosis
≥0.75	20	30
<0.75	5	0

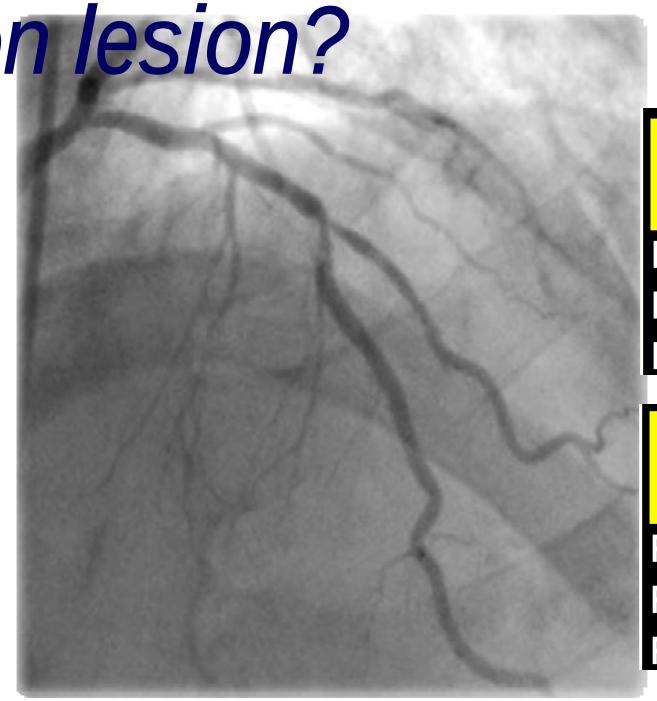
Sensitivity 100%, specificity 55%, and test accuracy 60%.

Bifurcation lesion?







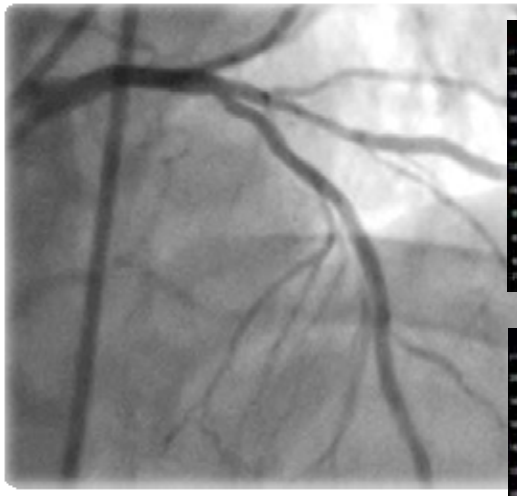


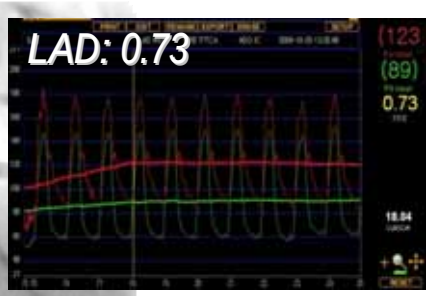
LAD: 0.82

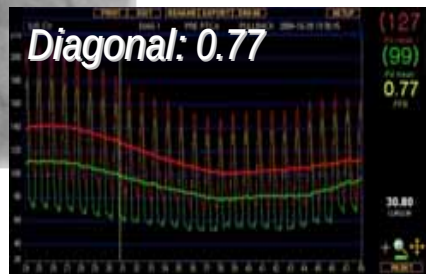
Pa:iPa	67: 91
Pd:iPd	55: 86
Pd/Pa	0.82

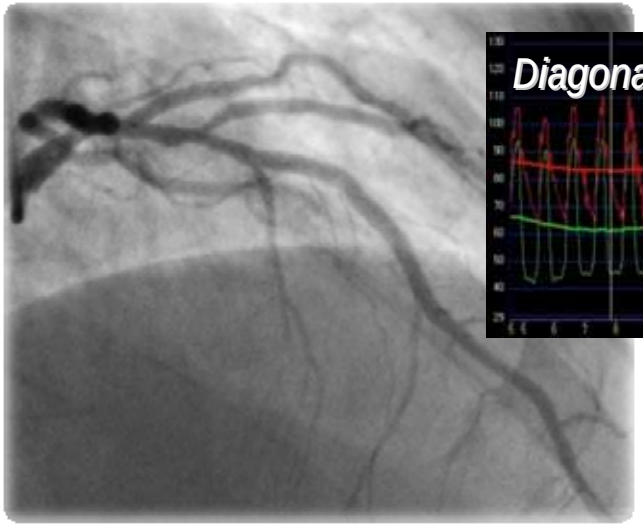
Diag: 0.98

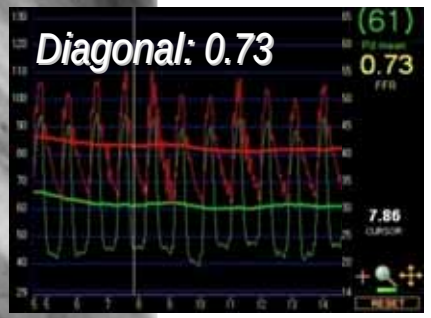
Pa:iPa	66: 78
Pd:iPd	65: 75
Pd/Pa	0.98



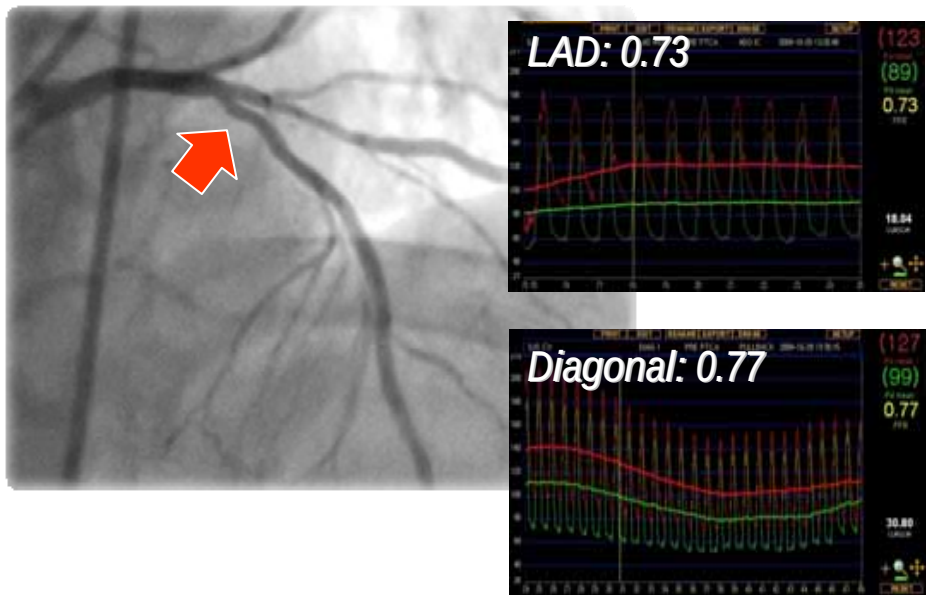


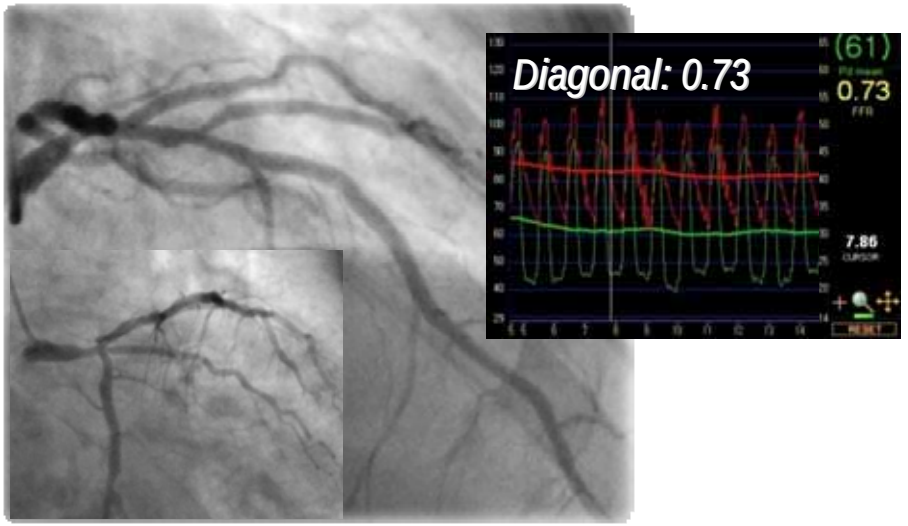


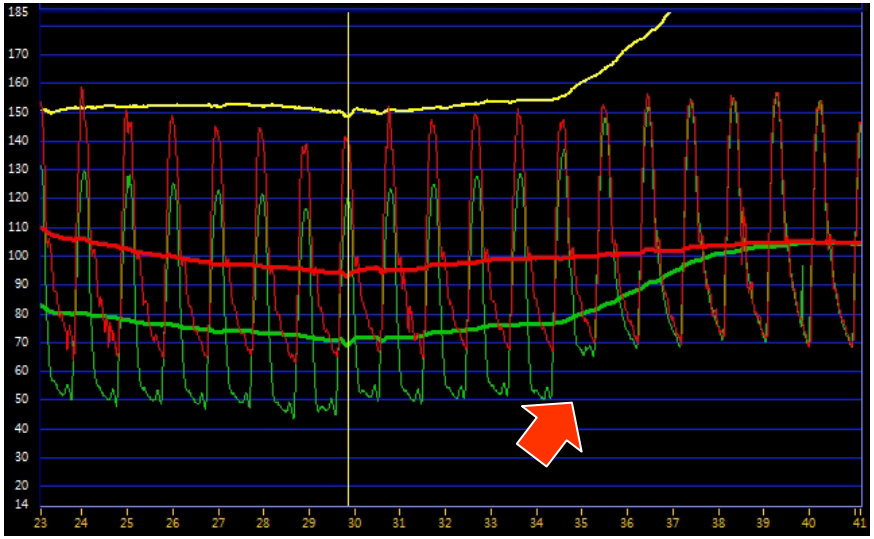


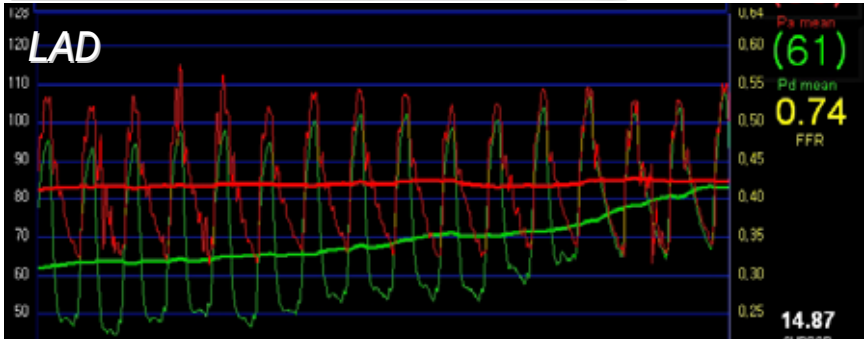


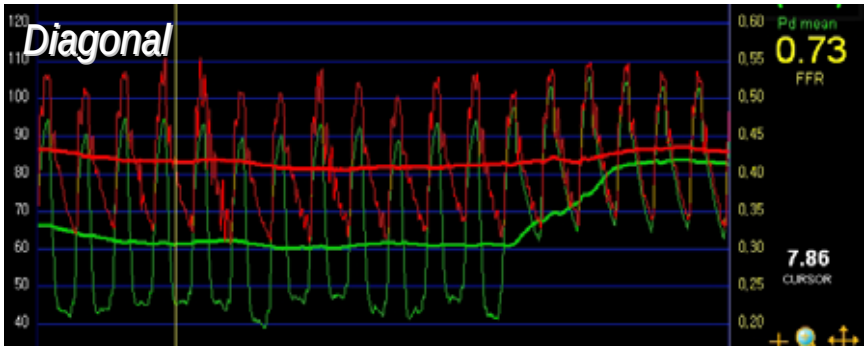
Bifurcation lesion?



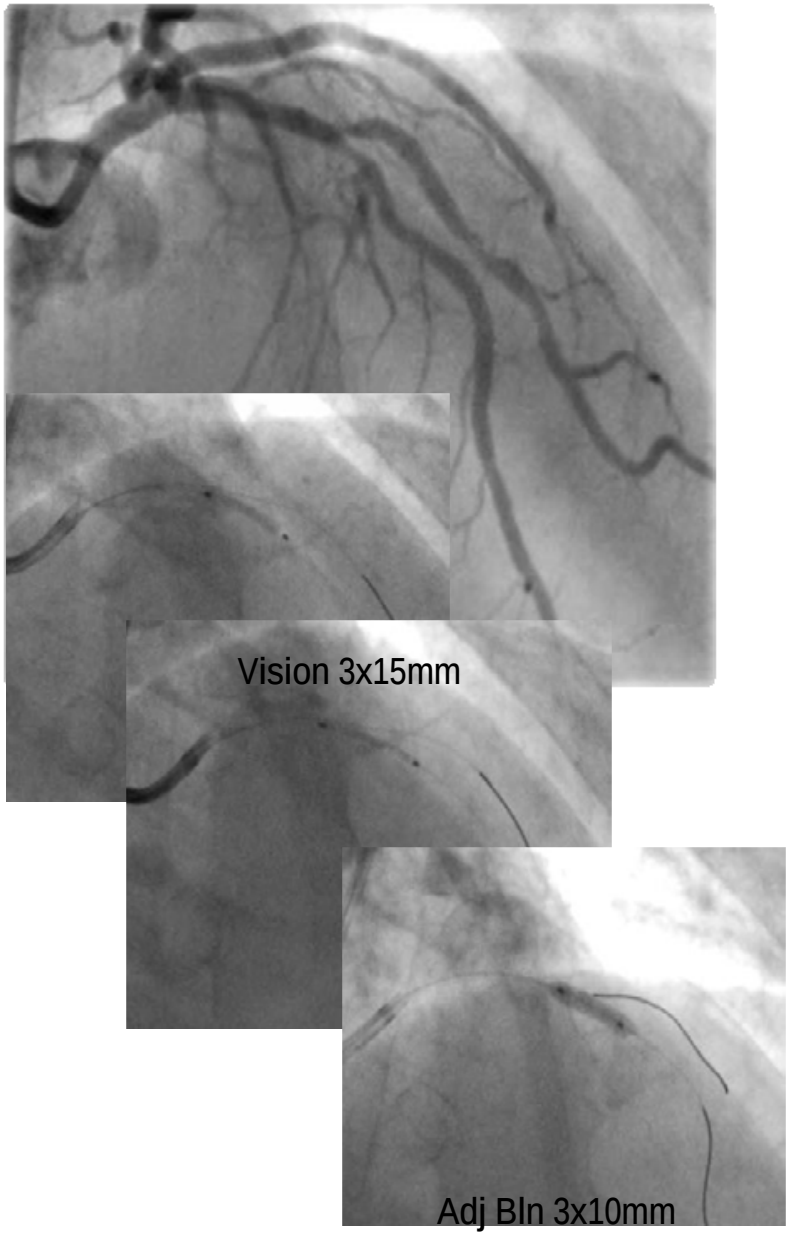


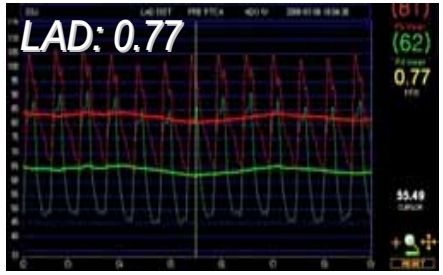


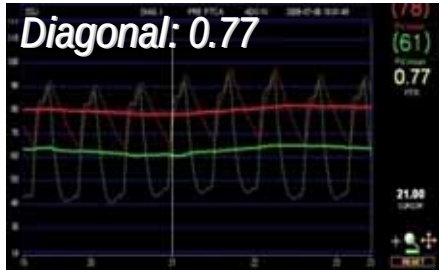




M/50 Preoperative angiography, peripheral vascular disease







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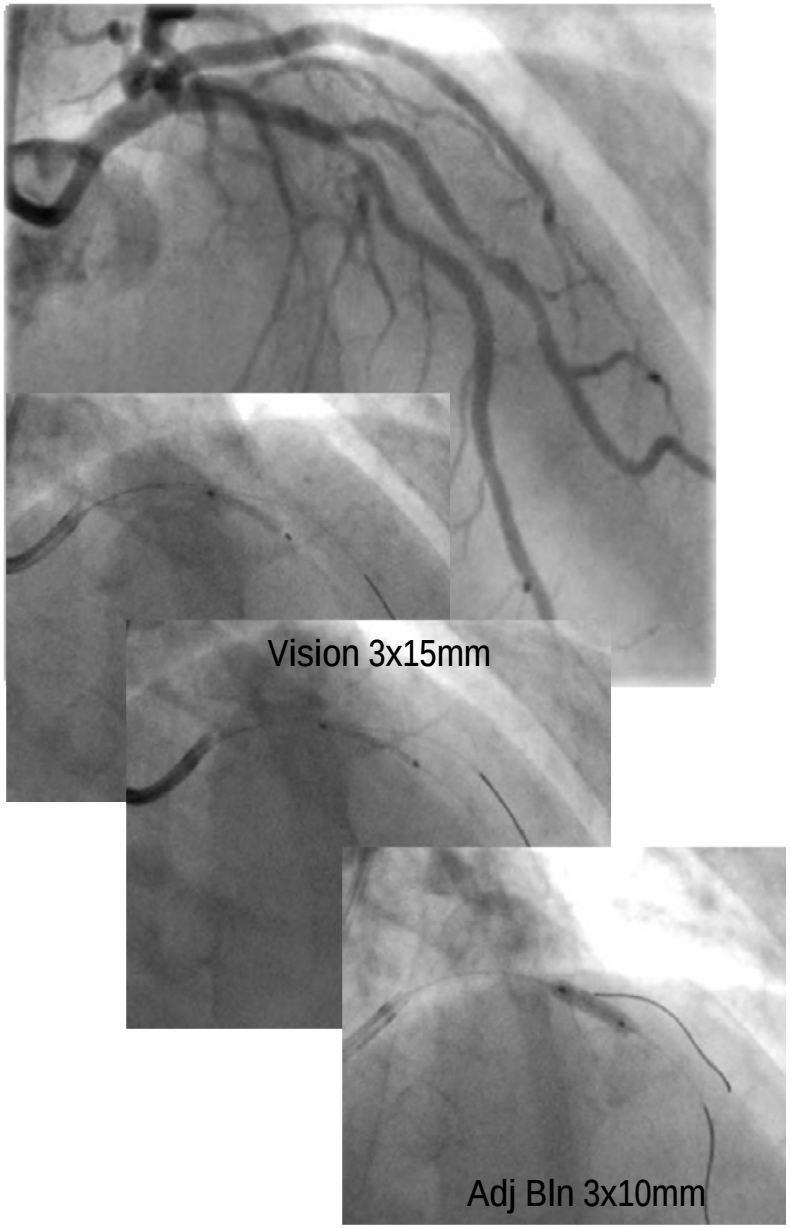
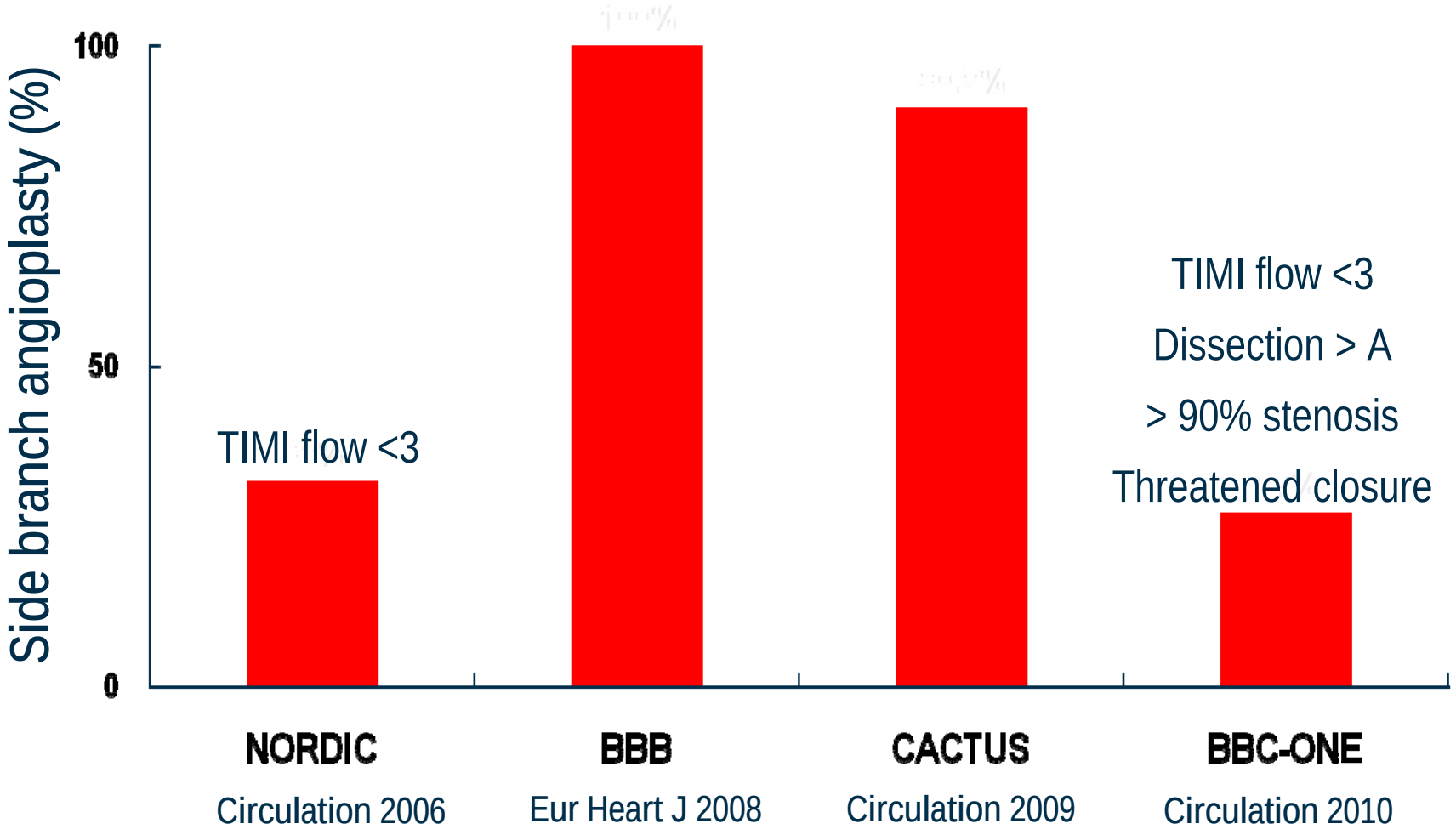


Side branch angioplasty?

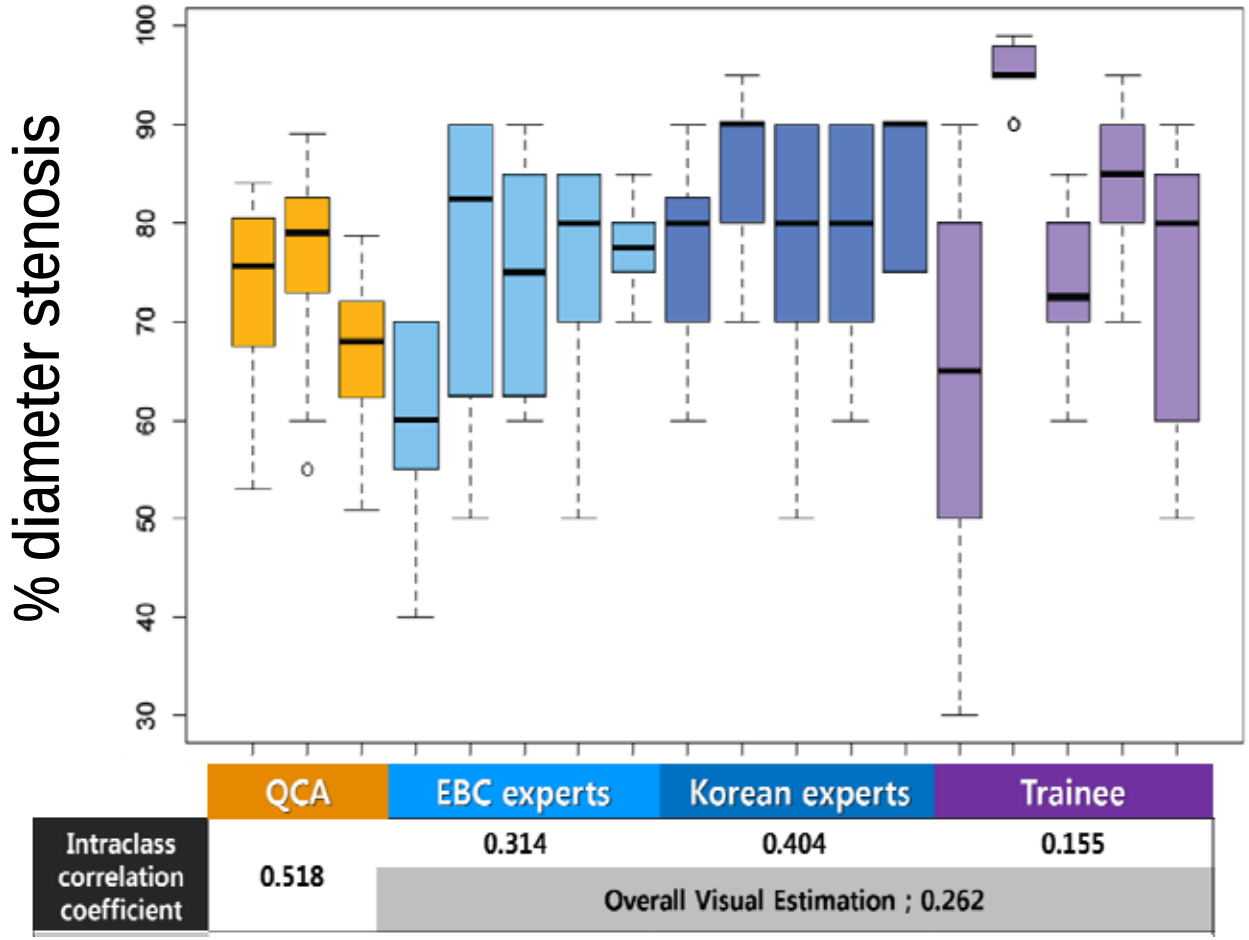
Do we have valid criteria for SB intervention?

Different criteria from different studies……



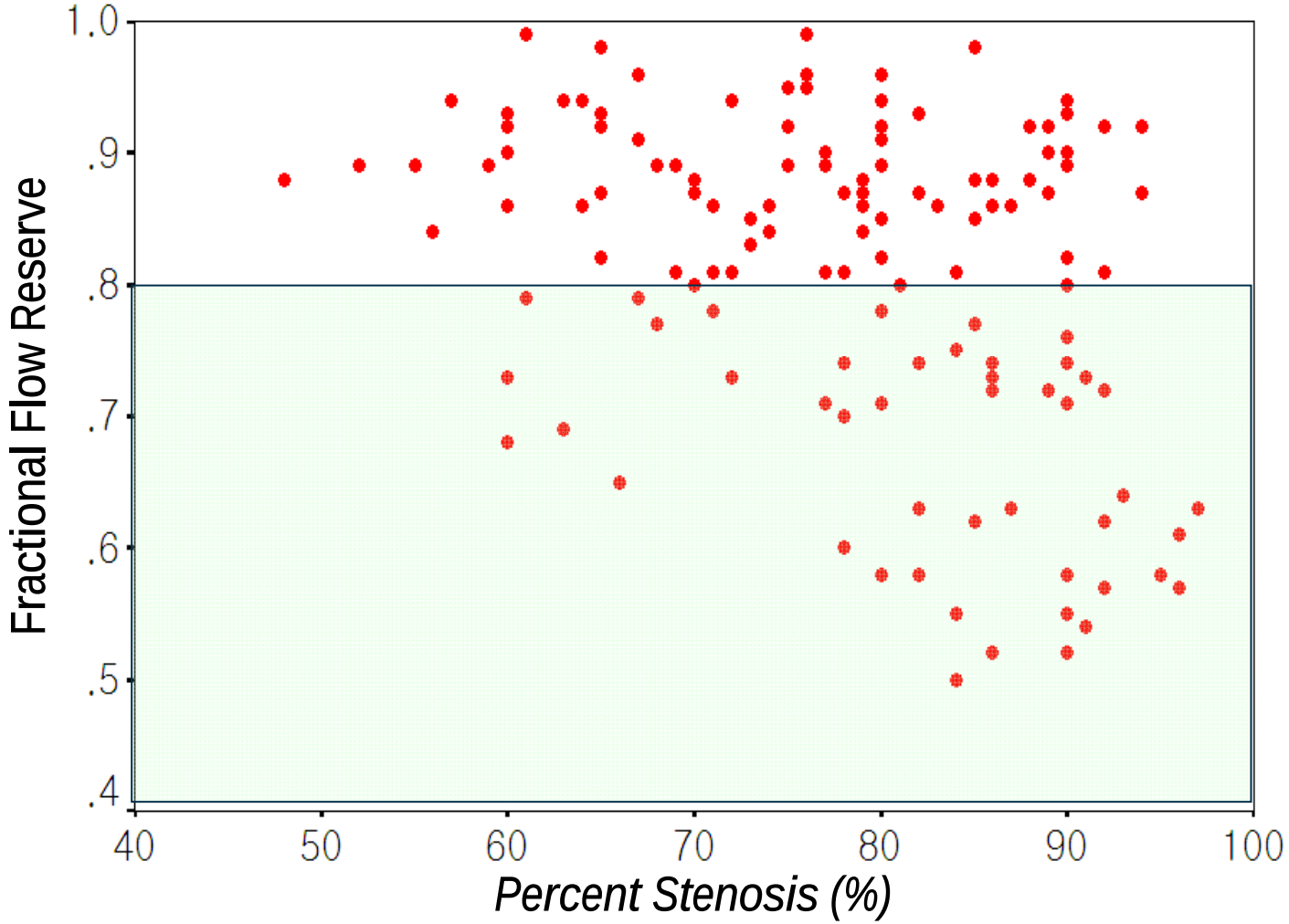
How accurate is our assessment?

Variability of QCA and visual estimation in 20 jailed SB lesions



Can anatomical evaluation predict the functional significant?

FFR vs. % diameter stenosis in Jailed side branches



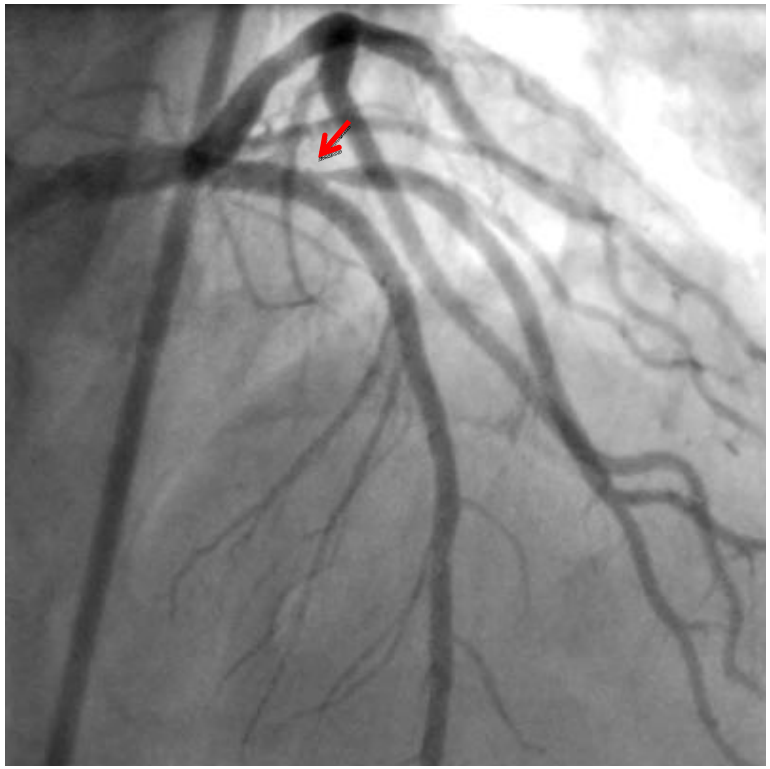
Why discrepancy between anatomy and physiology?

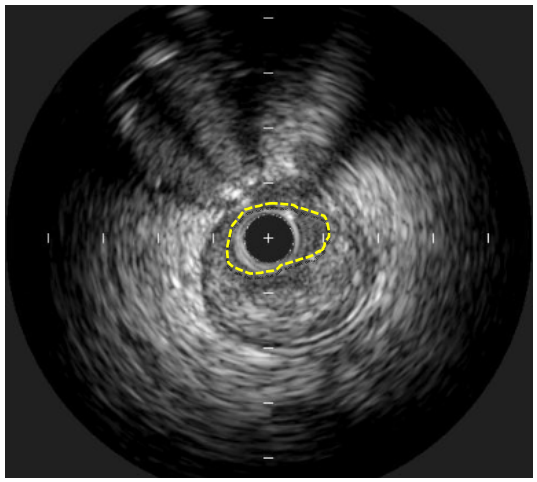
- Various size, various amount of supplying myocardium
- Side branch ostial lesion is unique
  - Underlying plaque → Eccentric plaque
  - Remodeling → Negative remodeling
  - Mechanisms of luminal narrowing
    - Carina shift, plaque shift, stent struts, thrombus…..

Koo BK. et al, *Circulation Intv* 2010

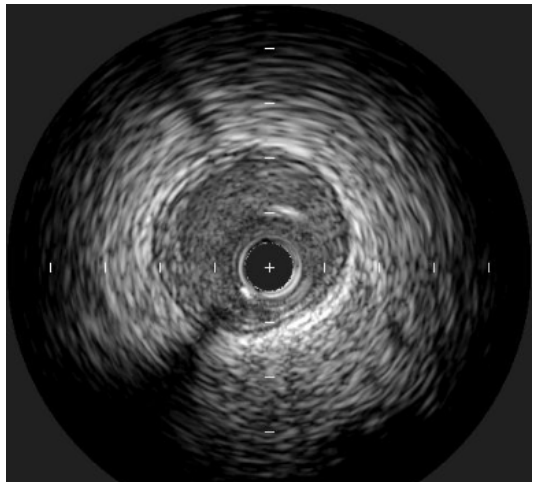
Anatomical severity vs. Functional significance

- IVUS vs. FFR in SB ostial lesions -

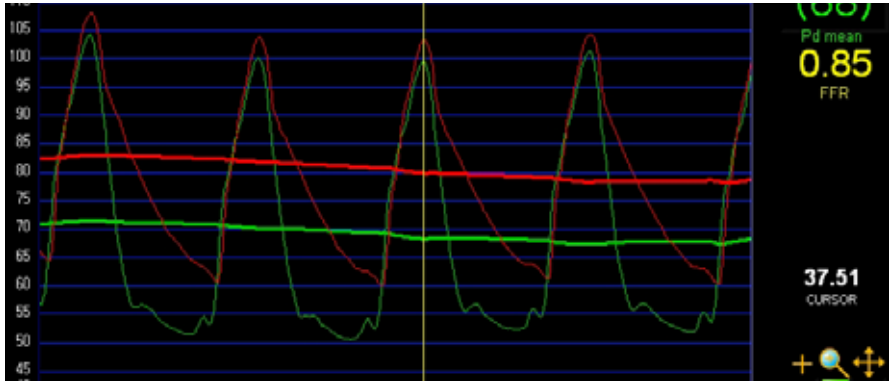




Min Lumen Area: 2.0mm^2
MLD: 1.2mm

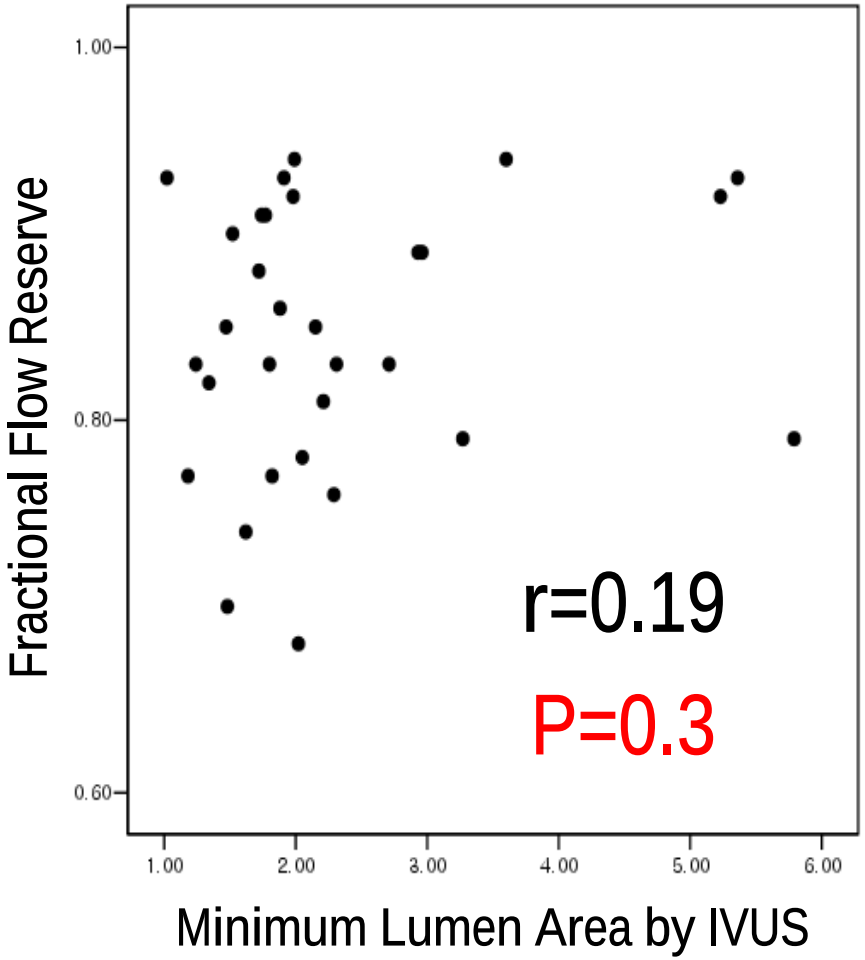


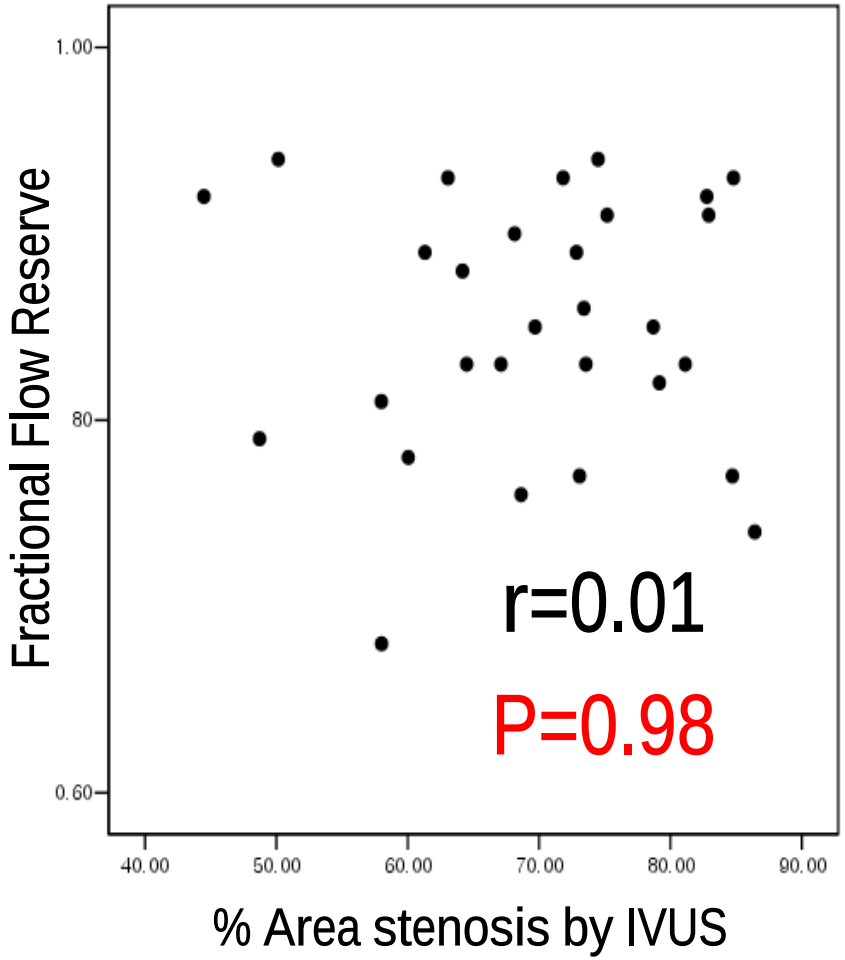
Reference segment



Anatomical severity vs. Functional significance

- IVUS vs. FFR in SB ostial lesions -





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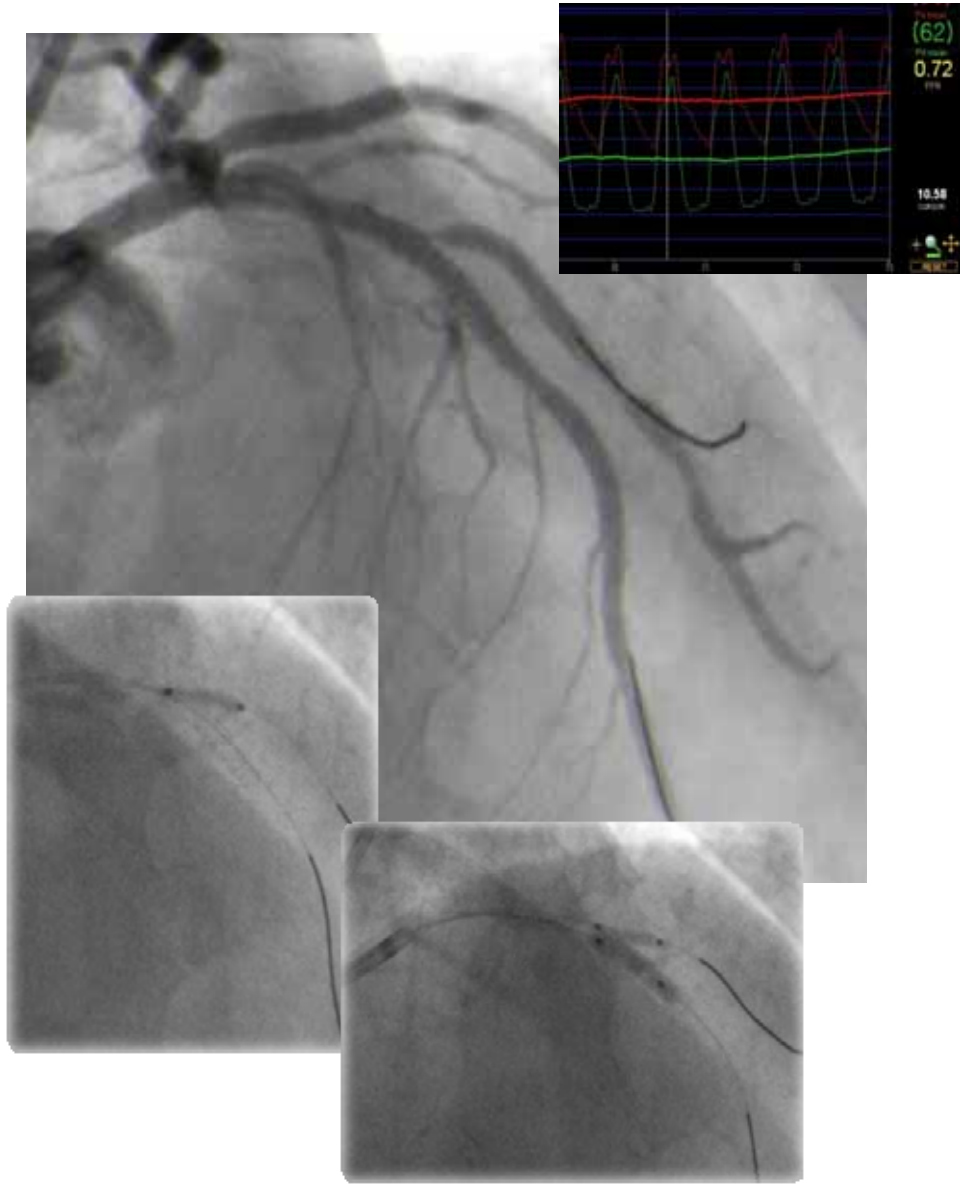

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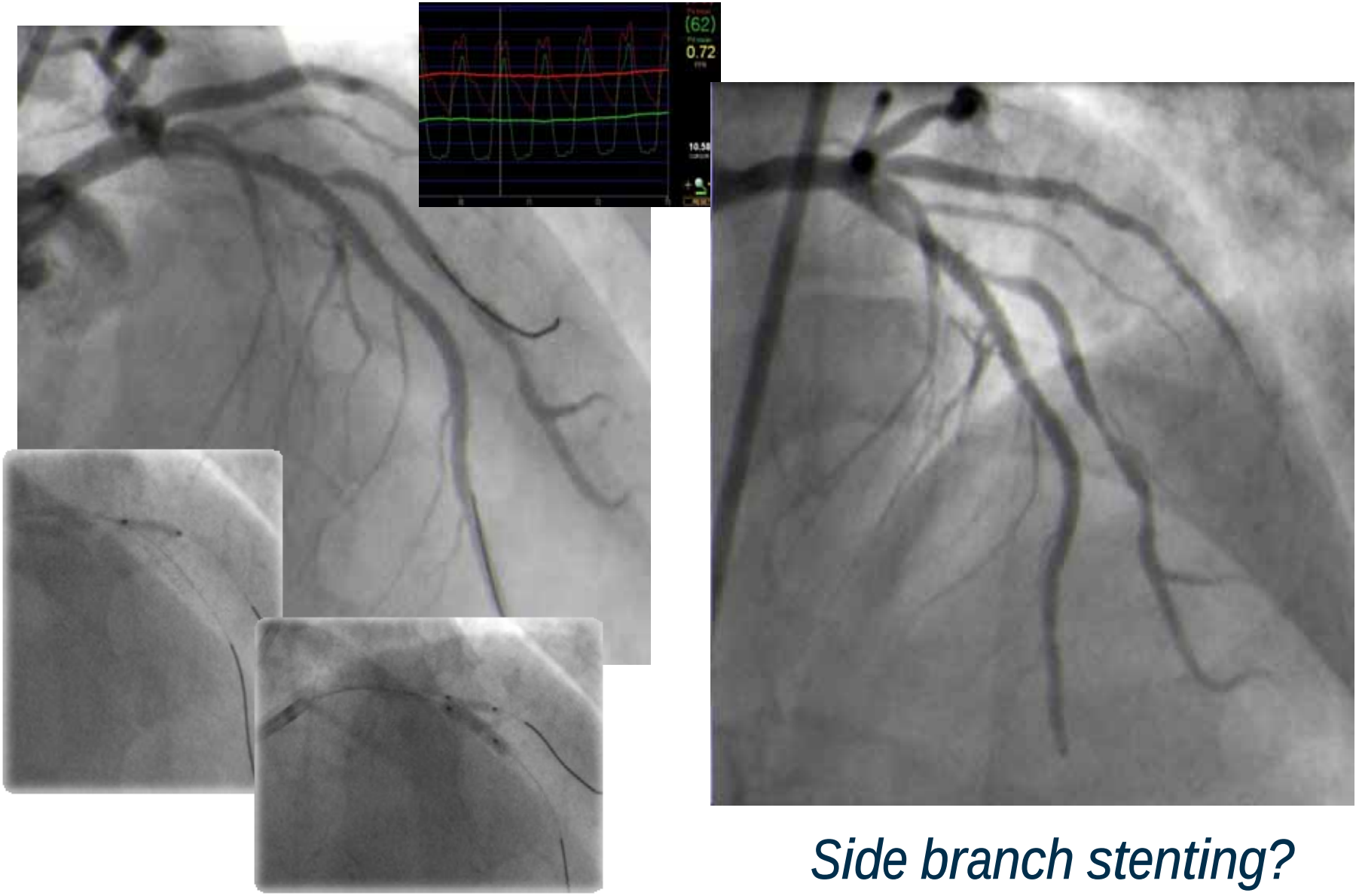
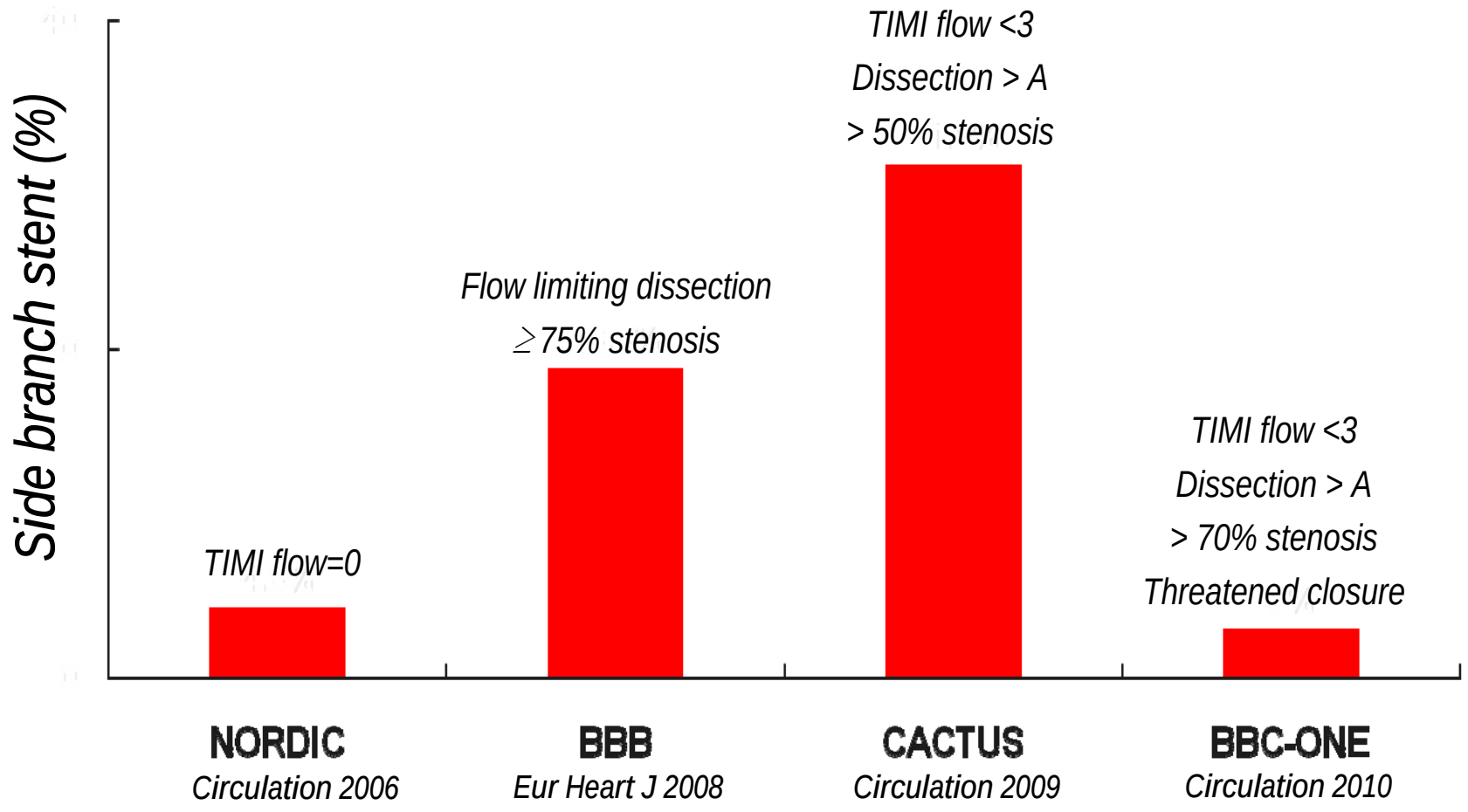


Side branch stenting?

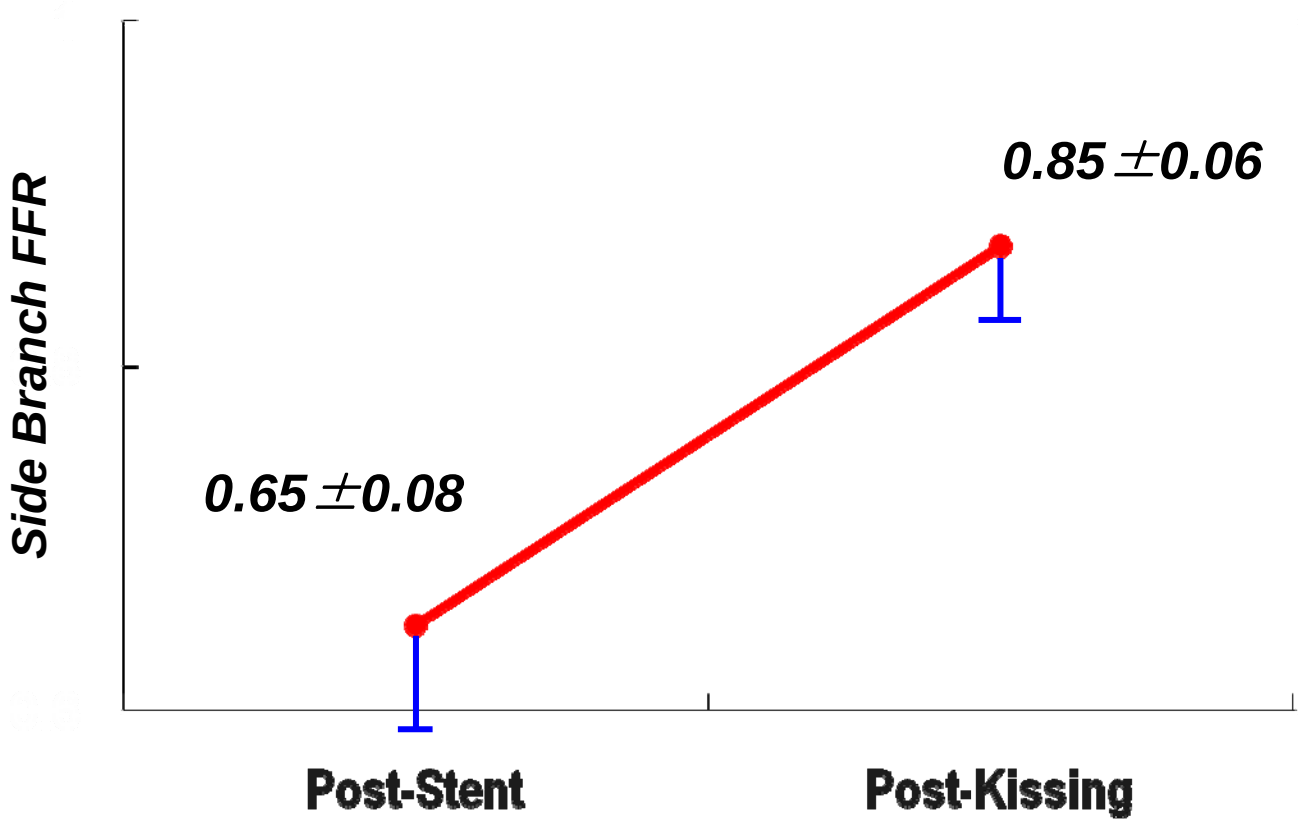
Side branch stenting ?

Different criteria from different studies……

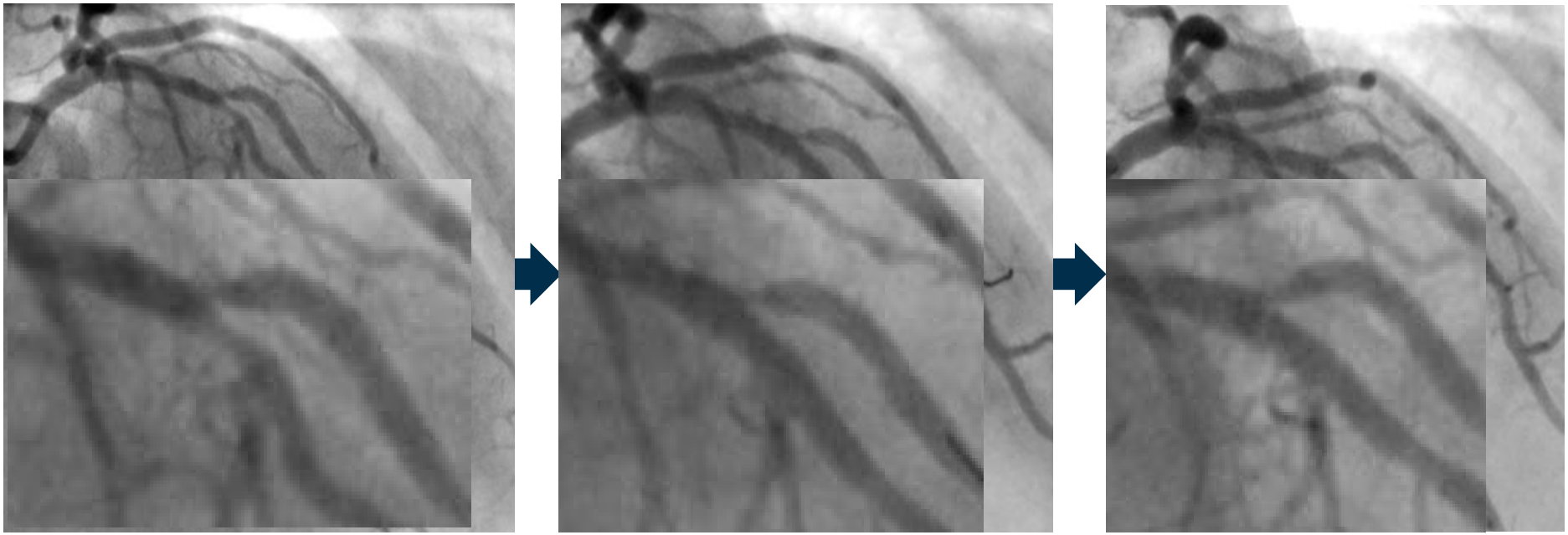


Changes of side branch FFR after kissing ballooning

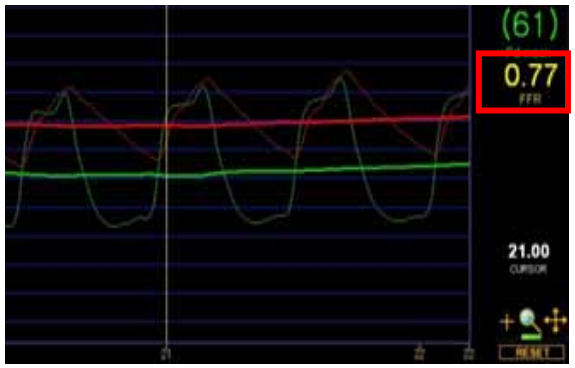
(Side branch balloon/artery ratio: 0.9 ±0.1)



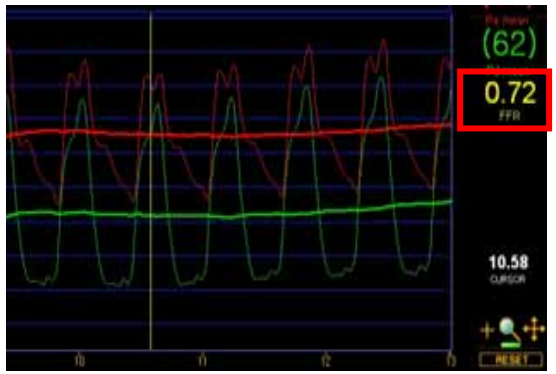
Discrepancy between angiogram and FFR during PCI



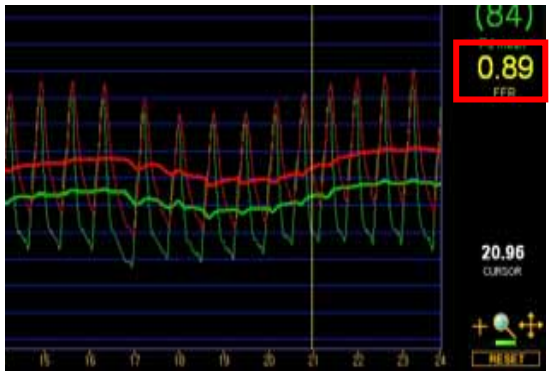
Before PCI



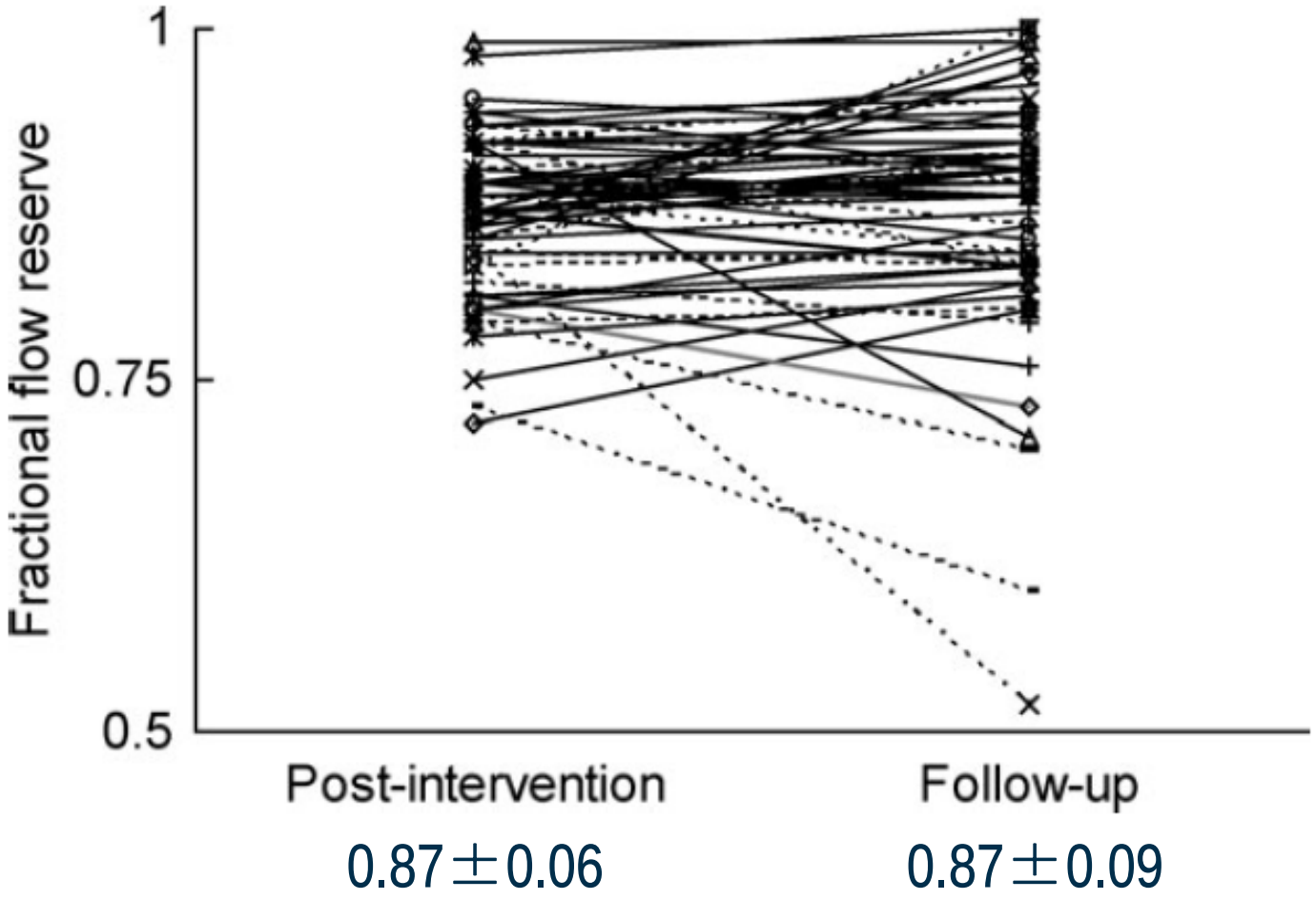
After MB stenting



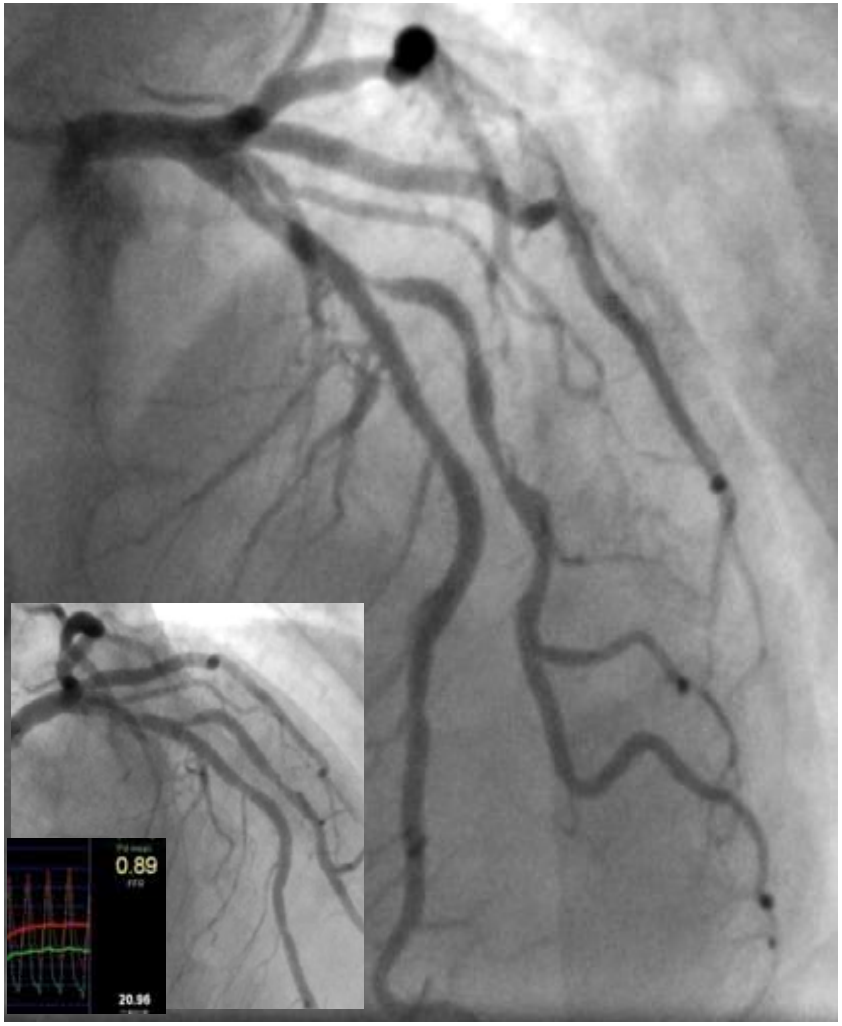
After kissing balloon



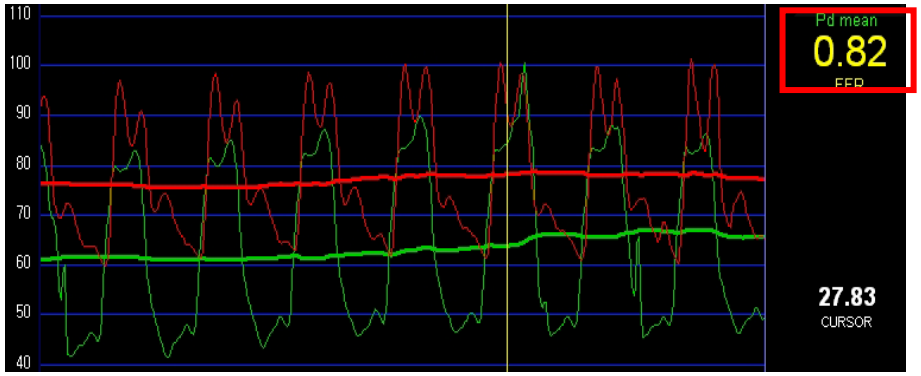
Functional outcome of Jailed side branches



Functional outcome of Jailed side branches



11 month Follow- Up



FFR in Bifurcation lesion

- FFR-guided PCI for bifurcation lesion is safe and feasible.
- FFR is helpful from the beginning to the “fine tuning” of PCI procedures in bifurcation lesions.