



Bifurcation PCI

Debate: Functional Evaluation Is Necessary ?

No , Conventional Conventional Treatment is Enough

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Pressure wire in the management of bifurcations treatment

PCI in Bifurcation Treatment

- **Crossing a side branch is common in PCI**
- **The optimal strategy for treatment of the side branch is still controversial**
- **All randomized trials : equivalence simple vs. complex**
- **Even “normal” side branches (Medina 1,1, 0) often looked stenosed when jailed**
- **Unknown when we should and how to treat jailed side branches**

Pressure wire in the management of bifurcations treatment

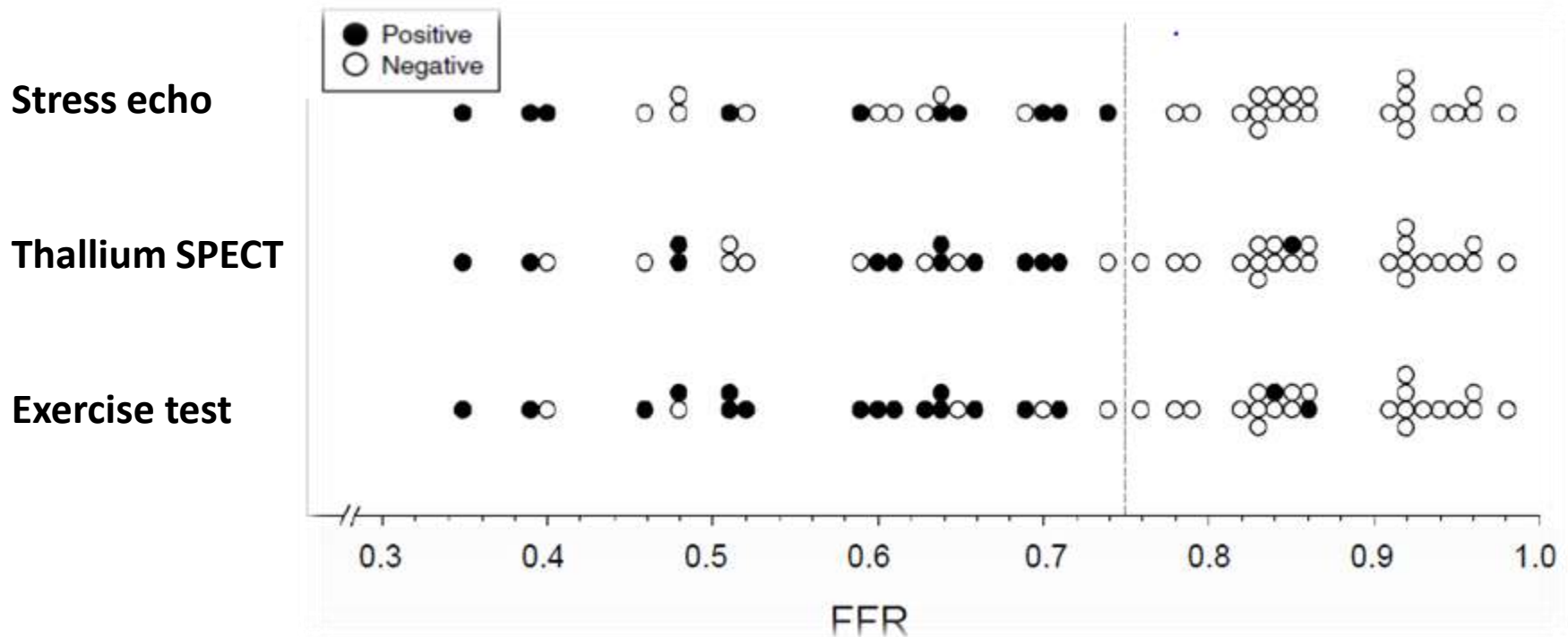
- **How will we evaluate the jailed side branch?**
 - QCA?
 - IVUS ?
 - Enzyme rise?
 - Subsequent MACE rates?

- **FFR is the only tool for a functional evaluation during PCI**

- **What level of FFR is “significant” for a jailedSB?**
 - <0.75 as in other coronaries?
 - <0.80 as an optimal “post-stent” result?
 - Is there an Intermediate value ?

FFR is a test of gold standard for myocardial ischemia?

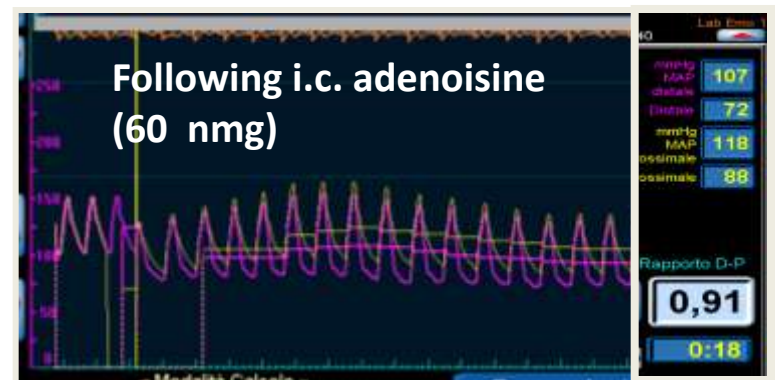
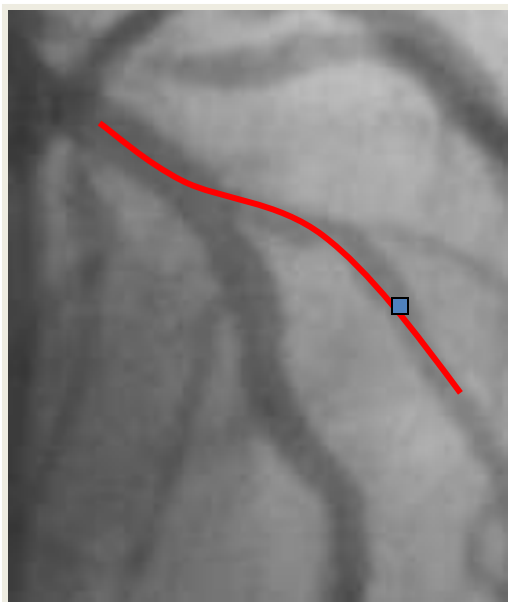
N=45, IV adenosine 140 ug/kg/min FFR < 0.75 for any ischemia
Sensitivity 85%, Specificity 100%



Cut off value determined by non-invasive functional tests

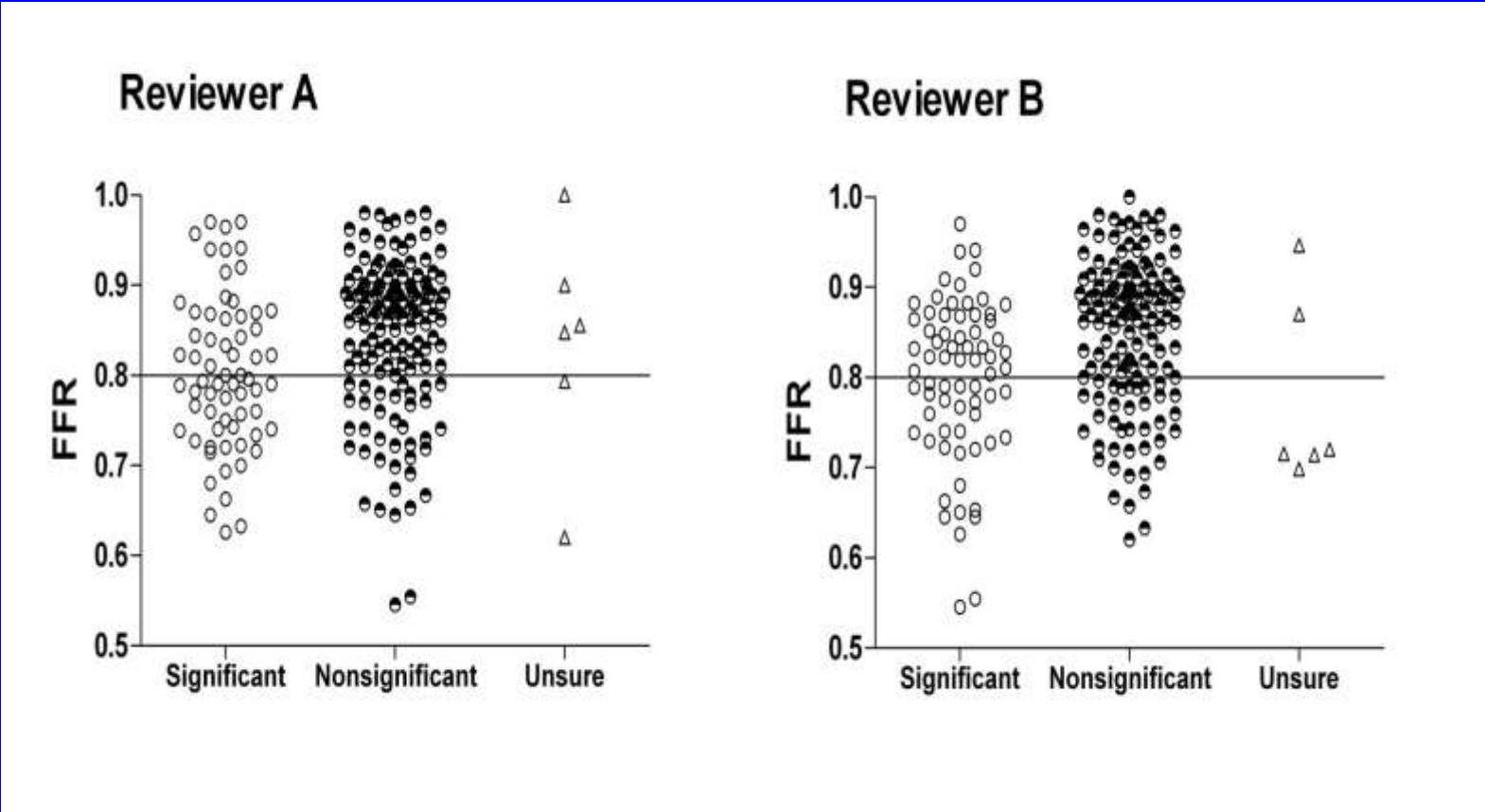
Fractional Flow Reserve

- FFR reflects both degree of stenosis and extension of myocardial territory
- $FFR < 0.75$ → Functionally significant stenosis that can cause myocardial ischemia



Use of pressure wire in the management of bifurcations treatment

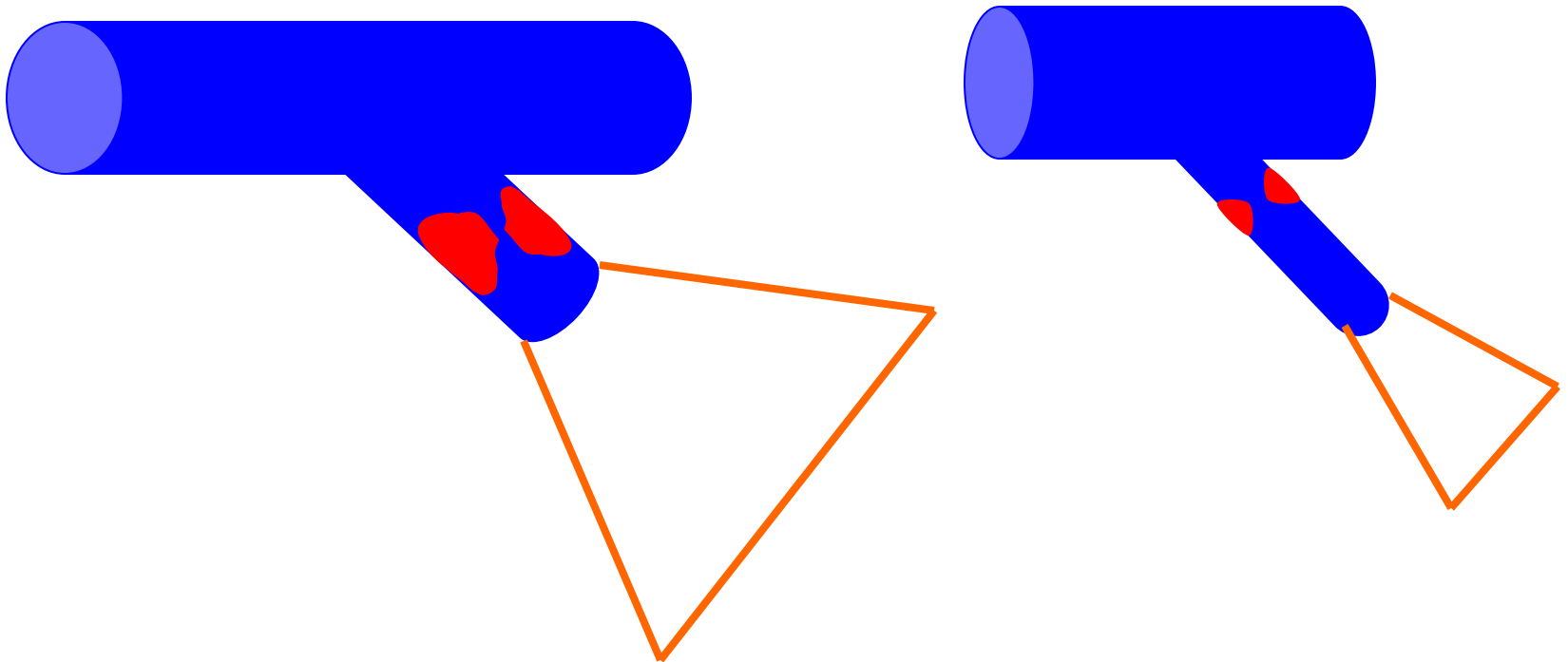
No correlation between angiographic stenosis and FFR



Why this discrepancy ?

□ Functional significance of stenosis

- Vessel size
- Degree of stenosis
- Amount of myocardium



Stent Struts



Jailed Side-Branch Ostial lesion :

- **Originally eccentric plaque with negative remodelling**
- **Following stenting in main branch :**

Stent struts

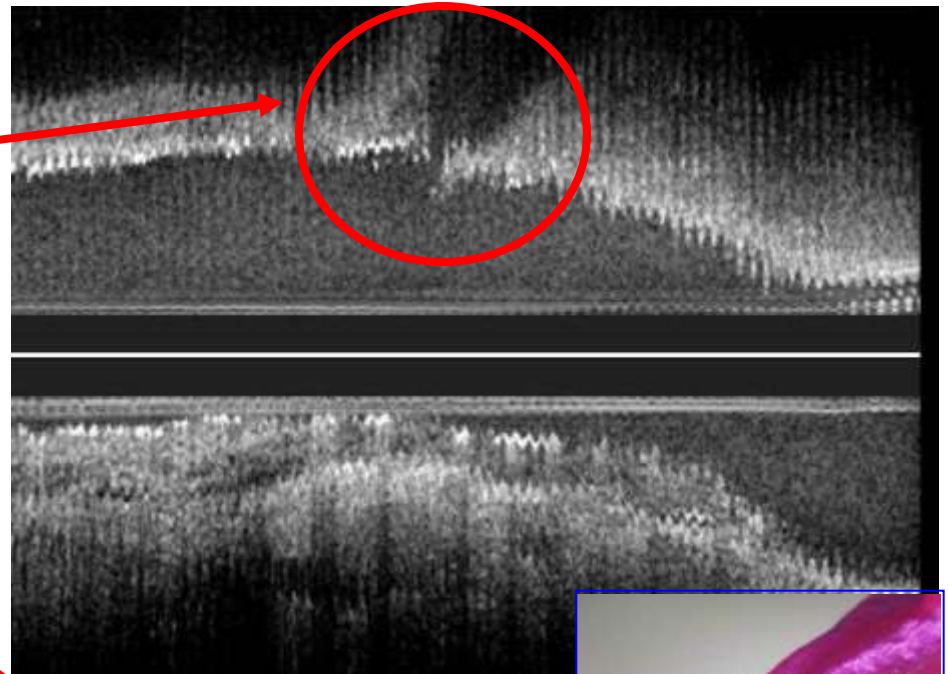
Plaque shift

Carina shift



Meccanisms of luminal narrowing

Carina Shift

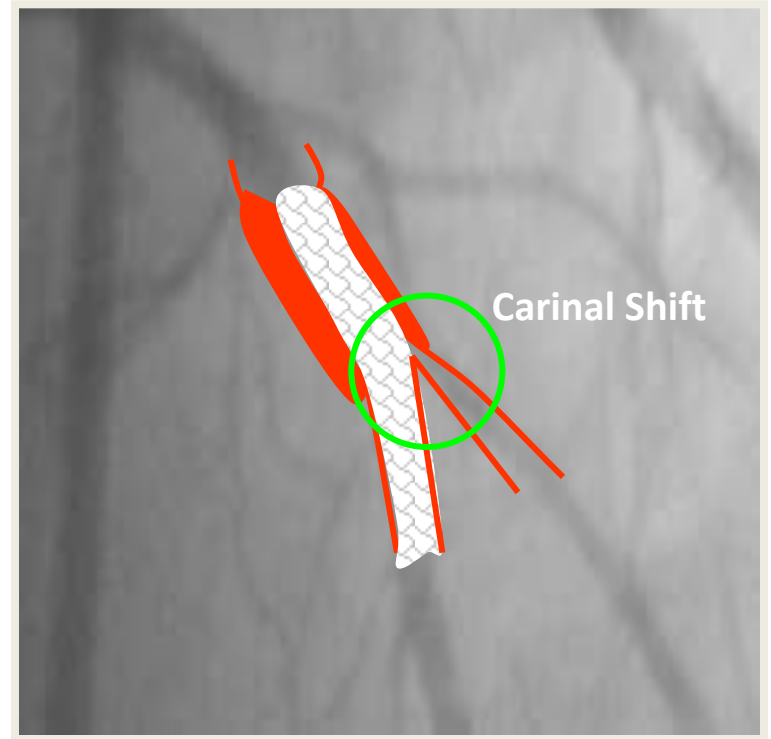
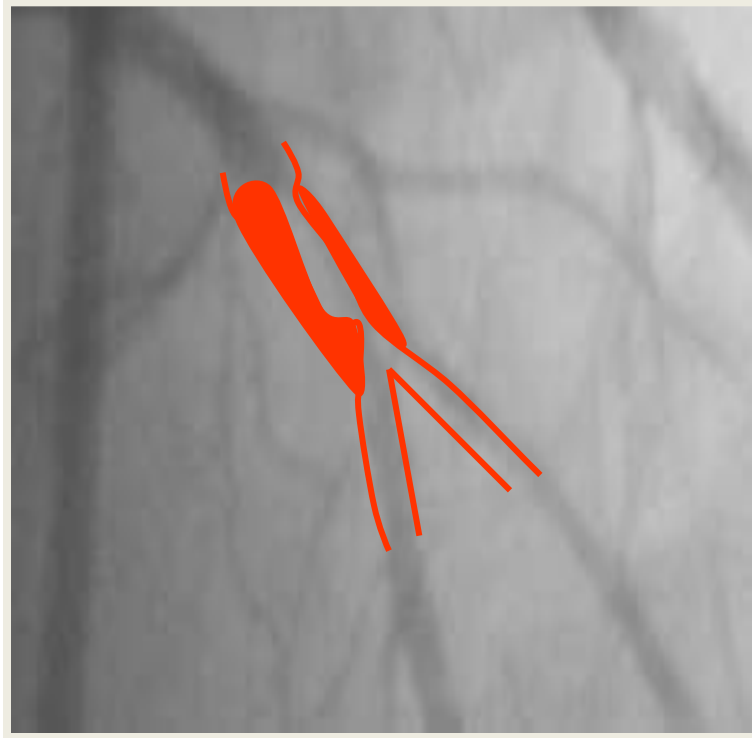


FFR = 0.69

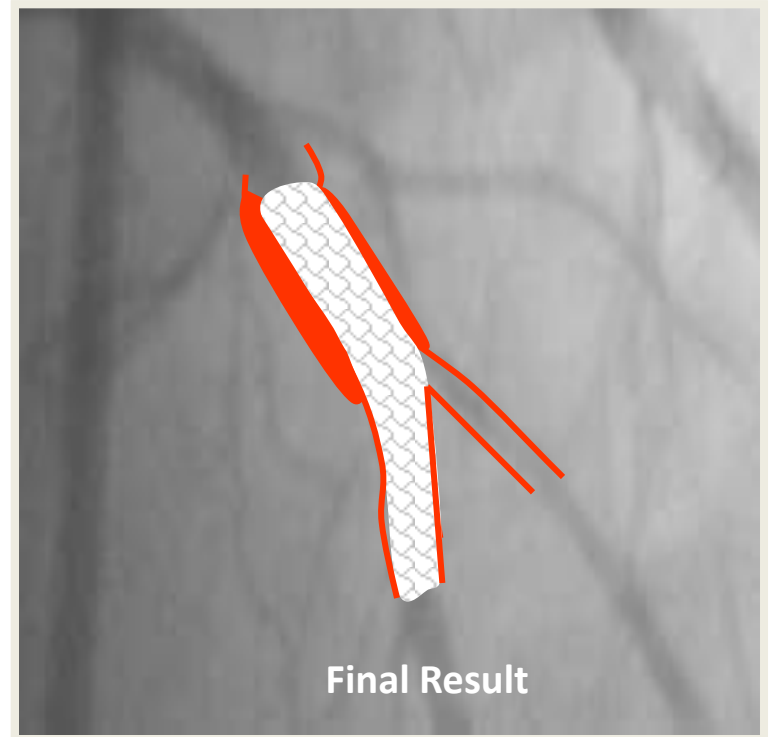
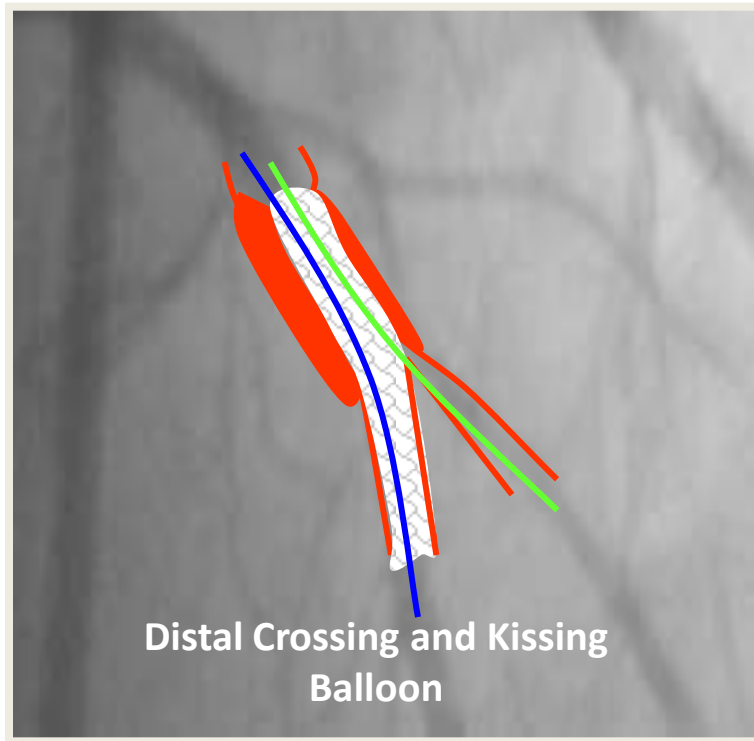


“Gentle” kissing balloon can relocate the carina :
relatively small balloon & low pressure inflation

Jailed SB compromised by carinal shift



Final Kissing Balloon can reallocate the carina



Pressure wire in the management of bifurcations treatment



- Is it necessary to perform functional evaluation with FFR ?
- Alternatively , balloon dilatation of SB ostium with undersized balloon ?

Pressure wire in the management of bifurcations treatment



Can this stenosis be ignored (even with negative FFR ?

However , not always can resolve the problem ...

Similar angiographic pattern , FFR and negative in both patients



Asymptomatic patient , with negative stress test ..



Patient with typical angina and negative stress test ..

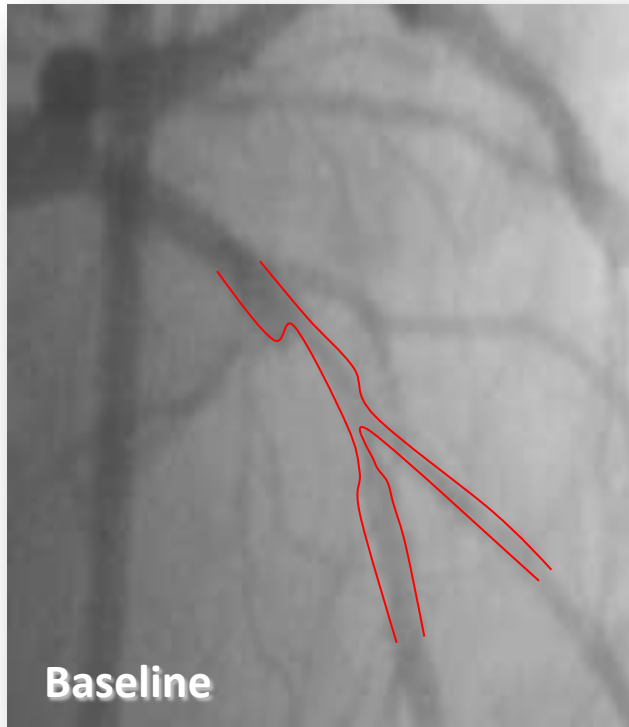
Treatment of Bifurcation Lesion with two stents



**Stent in Main Vessel , POBA in SB (Conventional Treatment) ,
Should FFR evaluation be done ?**

Treatment of Bifurcation Lesion with two stents

Medina 1,1, 0 - SB > 2.5 mm



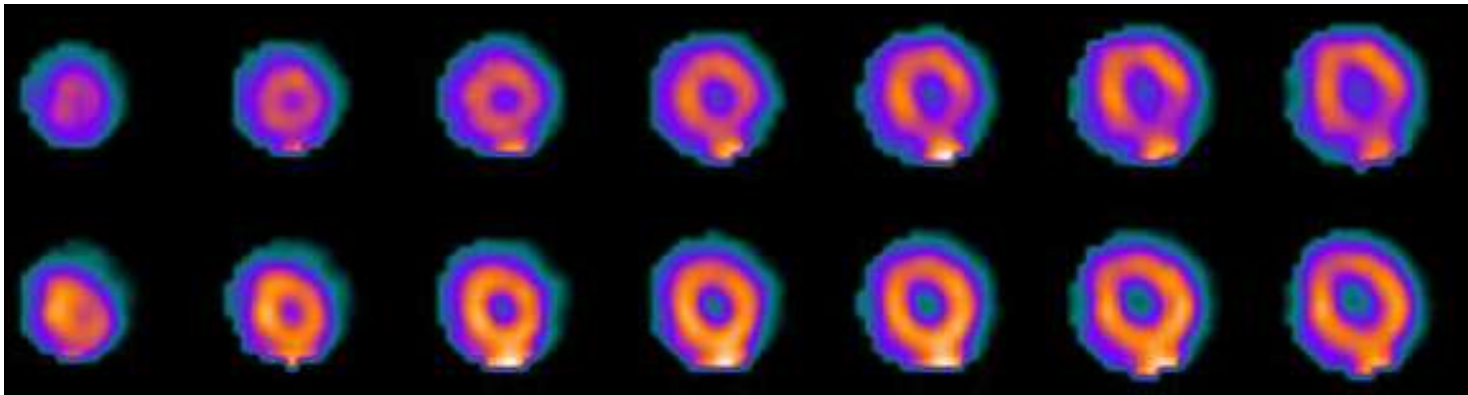
Stent in Main Vessel , PTCA in SB + Final kissing balloon (TIMI III flow in SB) –Residual angiographic stenosis is intermediate . I will not do anything more

65 yrs male,

Hyperlipidemia .Hypertension and diabetes

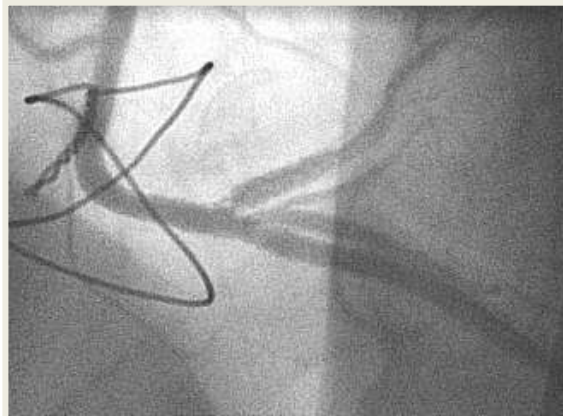
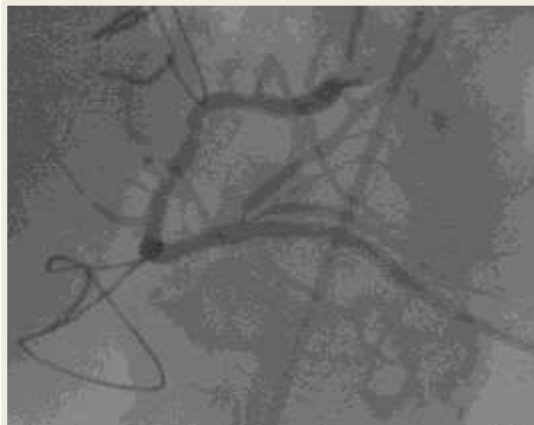
Typical chest pain on exerction despite optimal medical therapy .

Stress



Rest

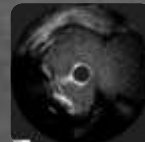
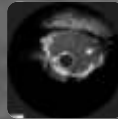
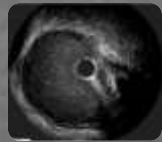
Infero-lateral inducible ischemia



No need for further functional **evaluation**

Do we need functional evaluation ?

57yrs Male, Typical chest pain

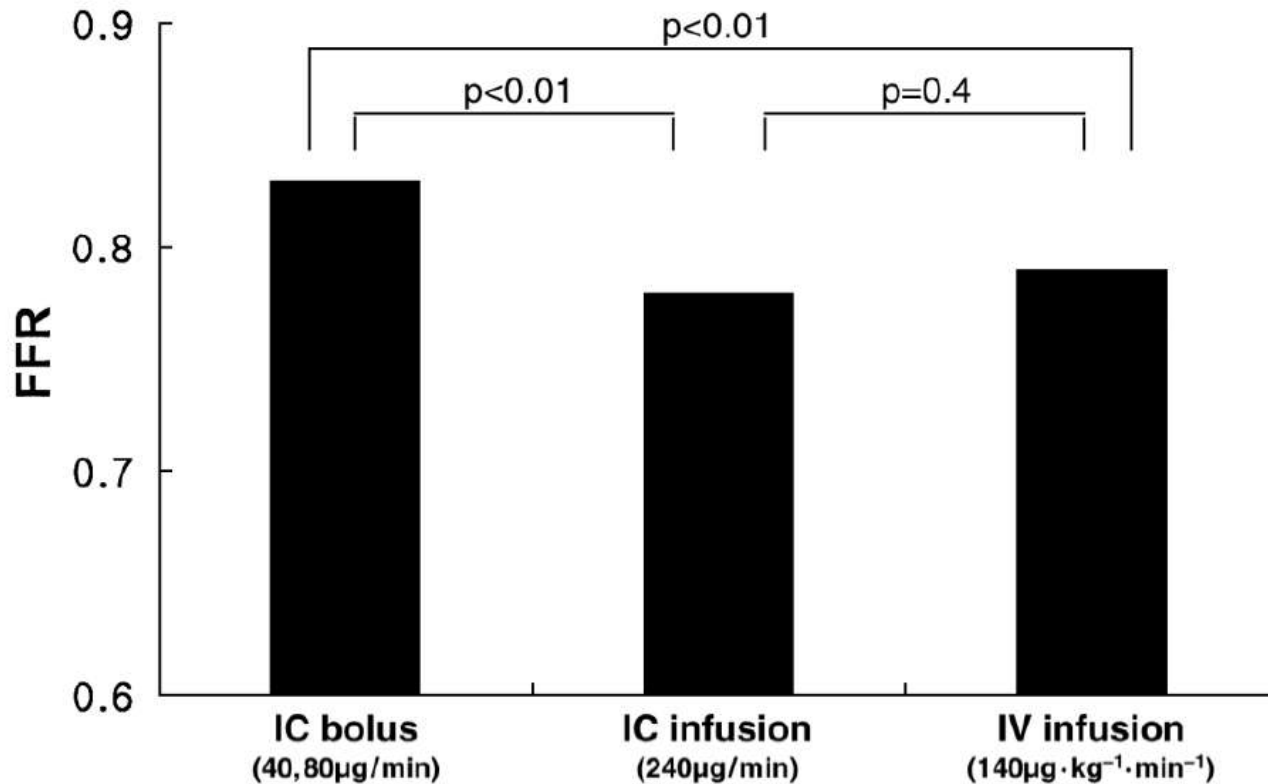


Distal Lm MLA = 4,7 mm² ; Any need for functional evaluation

Different technique, different result

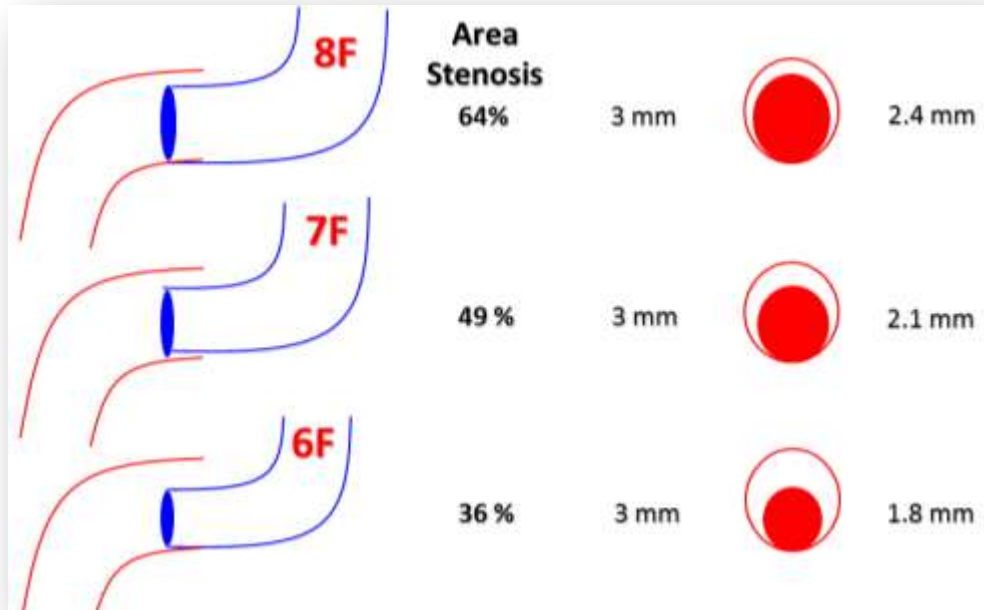
We need a different cut-off value

- IC bolus vs. IC infusion vs. IV infusion of Adenosine



Some limitations of FFR

- **Guiding Catheter in Ostium = Stenosis**

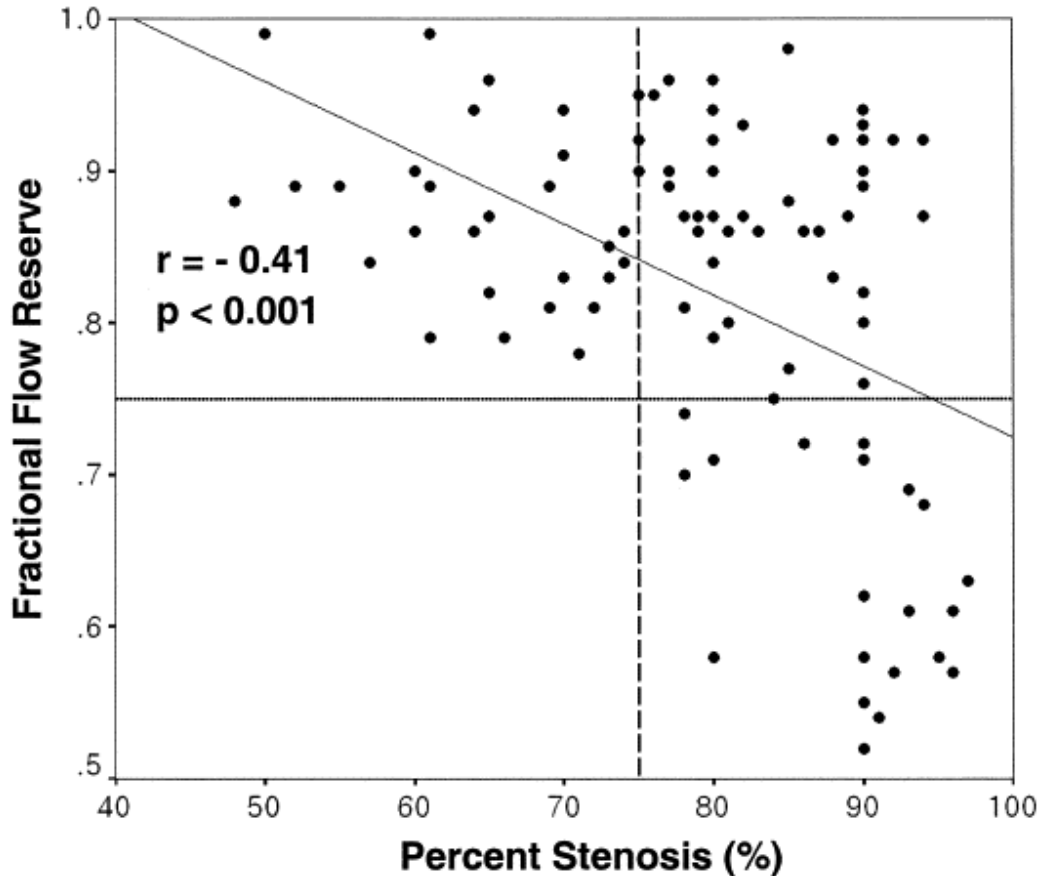


- **Myocardial Hypertrophy ,**
- **Lesion length**
- **Vessel Size**
- **ACS**

Anatomical, functional and clinical relevance of side branch

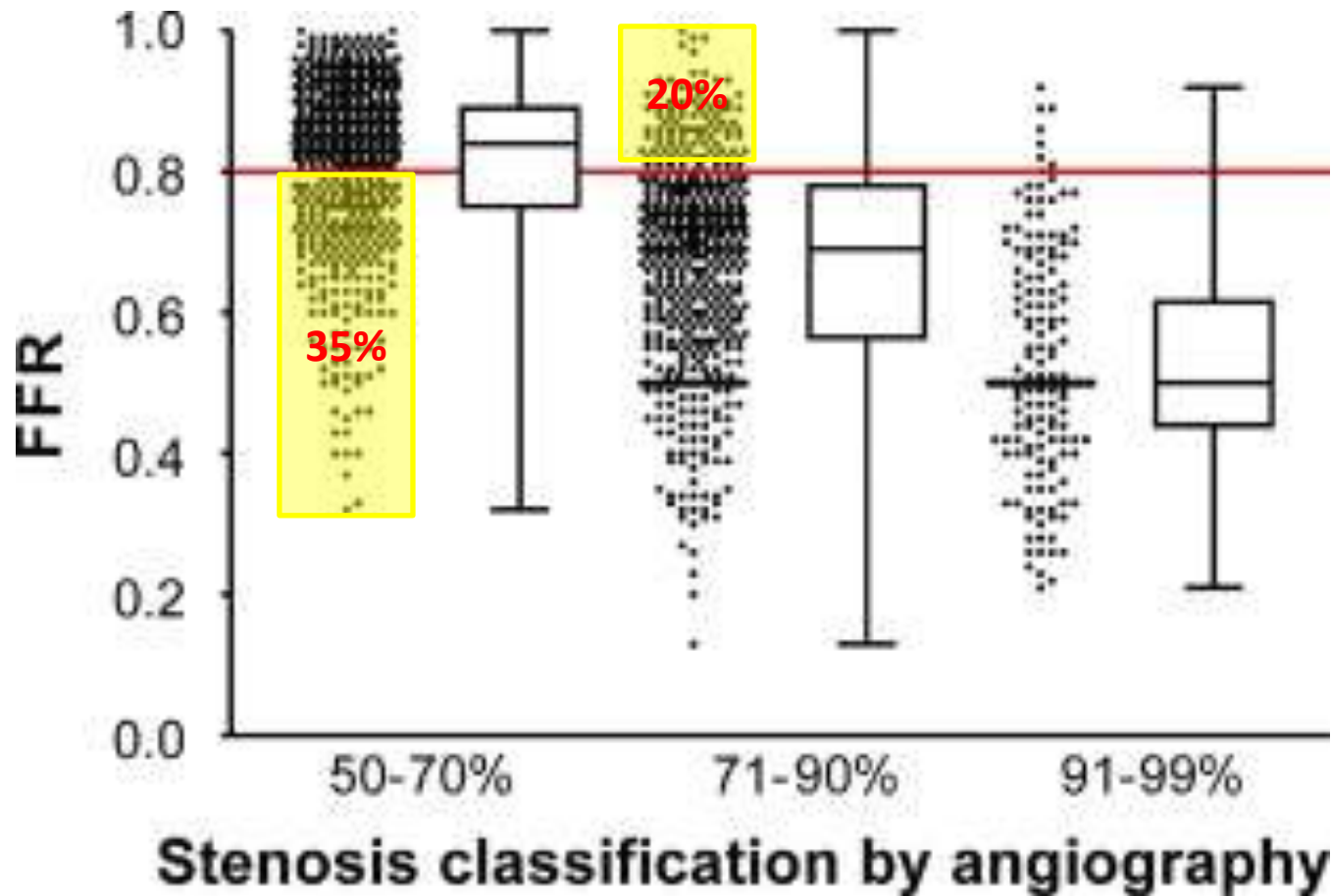
Anatomically significant stenosis is frequently functionally insignificant

Functionally significant stenosis is frequently clinically insignificant



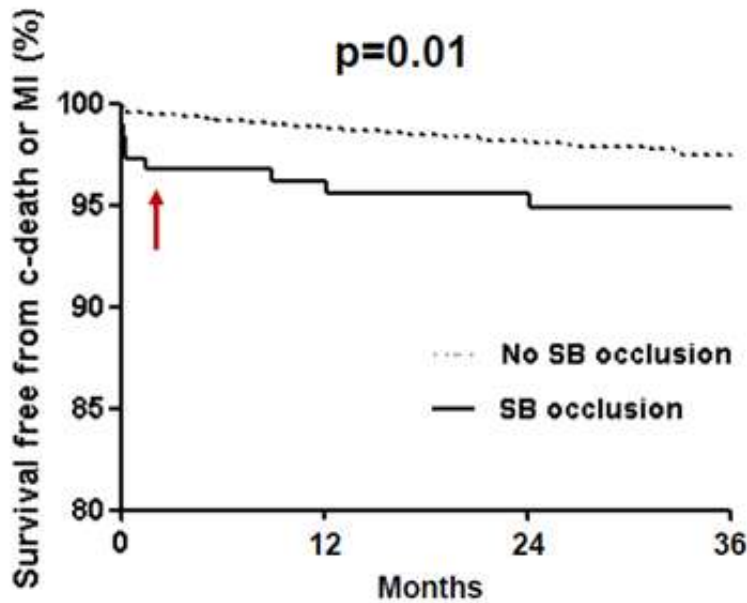
- Poor exercise capacity
- Small area of ischemia

Angiographic Versus Functional Severity of Coronary Artery Stenoses (FAME Study)



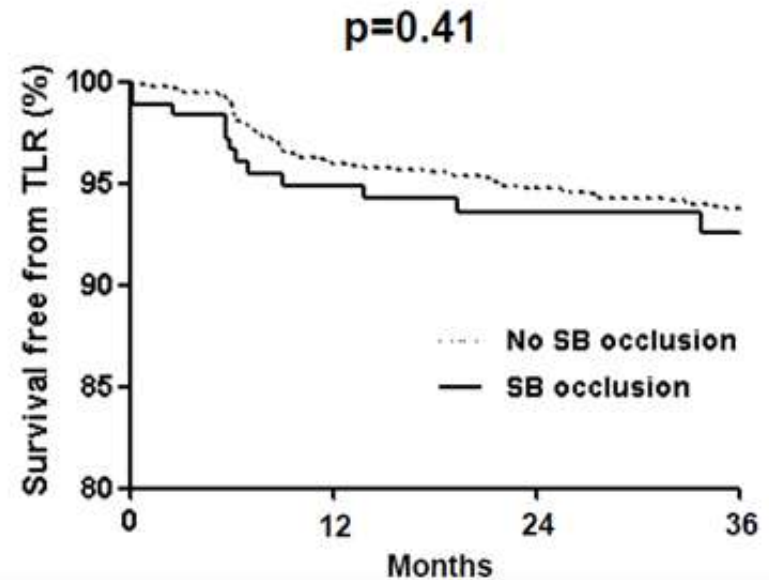
Clinical impact of SB occlusion COBIS II registry (N=2,227)

Cardiac Death / MI



SB occlusion	187	163	128	83
No SB occlusion	2040	1851	1542	991

TLR



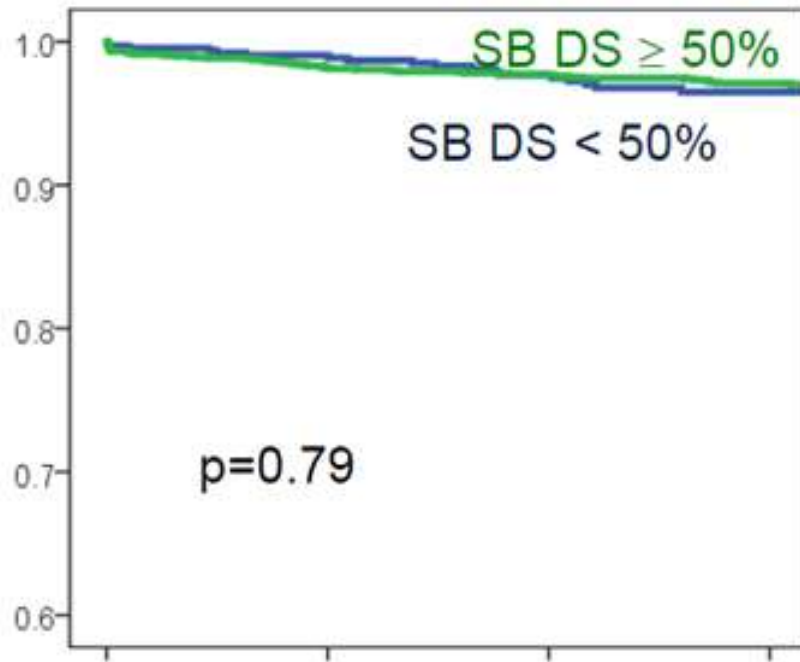
SB occlusion	187	156	121	80
No SB occlusion	2040	1790	1478	950

Hahn JY, Gwon HC, J Am Coll Cardiol 2013

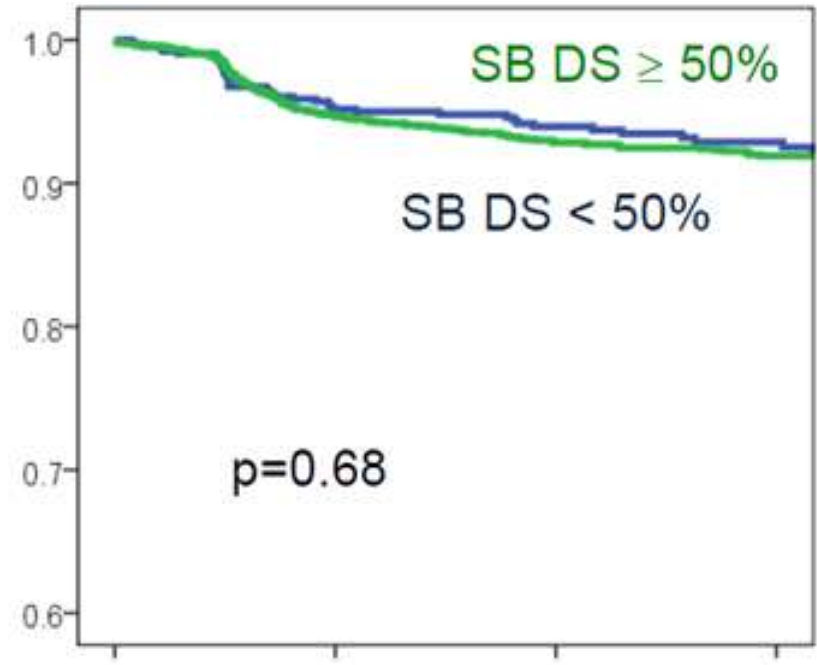
Impact of non-occlusive SB compromise COBIS II Registry

- Preliminary analysis of SB compromise (DS < 50%)
- Excluding SB TIMI flow < 3

Cardiac death / MI

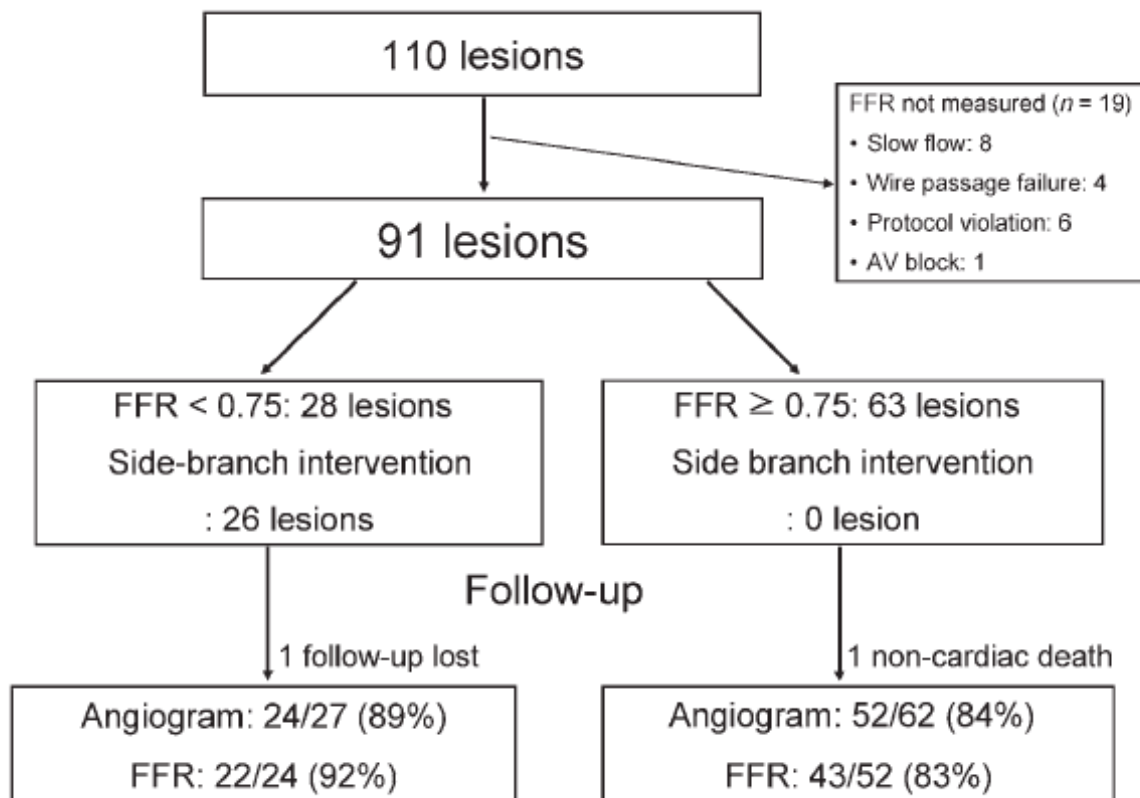


TLR



Clinical Outcome of FFR-guided PCI for the bifurcation stenting?

- *FFR-guided PCI vs. Angiography-guided PCI for bifurcation lesions*
- *No difference in 9-month cardiac event rates*



Clinical Outcome of FFR-guided PCI for the bifurcation stenting?

- *FFR-guided PCI vs. Angiography-guided PCI for bifurcation lesions*
- *No difference in 9-month cardiac event rates*

Table 3 Comparison of 9-month clinical outcomes between fractional flow reserve-guided side-branch intervention group (FFR group) and conventional intervention group (conventional group)

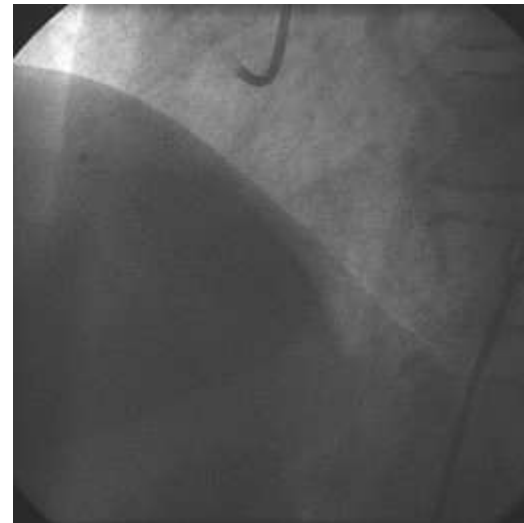
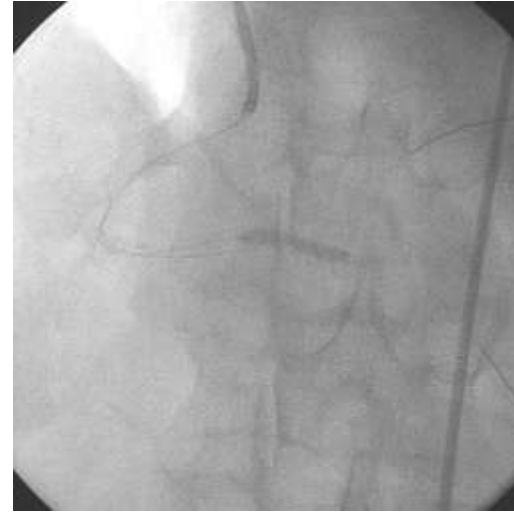
	FFR group, n = 108 ^a	Conventional group, n = 108 ^b	P-value ^c
Cardiac death	0	0	1
Myocardial infarction	0	0	1
Target vessel revascularization, n (%)	5 (4.6)	4 (3.7)	0.7

^aOne follow-up loss; one non-cardiac death.

^bTwo follow-up losses.

^cNot adjusted for multiple comparisons.

What I'm doing and continue to do in bifurcation PCI :



Final Remarks

- ❖ It is difficult to predict the functional significance of jailed SB ostial lesions
- ❖ The use of Pressure wire for the assessment of bifurcation lesions is technically easy and safe but FFR guidance cannot tell you the clinical significance of non-occlusive SB compromise
- ❖ FFR re-assessment of jailed side branches after treatment often result the same as pre-treatment
- ❖ Should we use FFR always in the treatment of bifurcation PCI ? No , FFR should be limited to small number of occasions. No impact on clinical outcome .
- ❖ In majority of patients conventional management of SB is safe and widely acceptable



Thanks for your kind attention!!!!