PCI for Bifurcation Coronary Lesion

Bifurcation Lesions

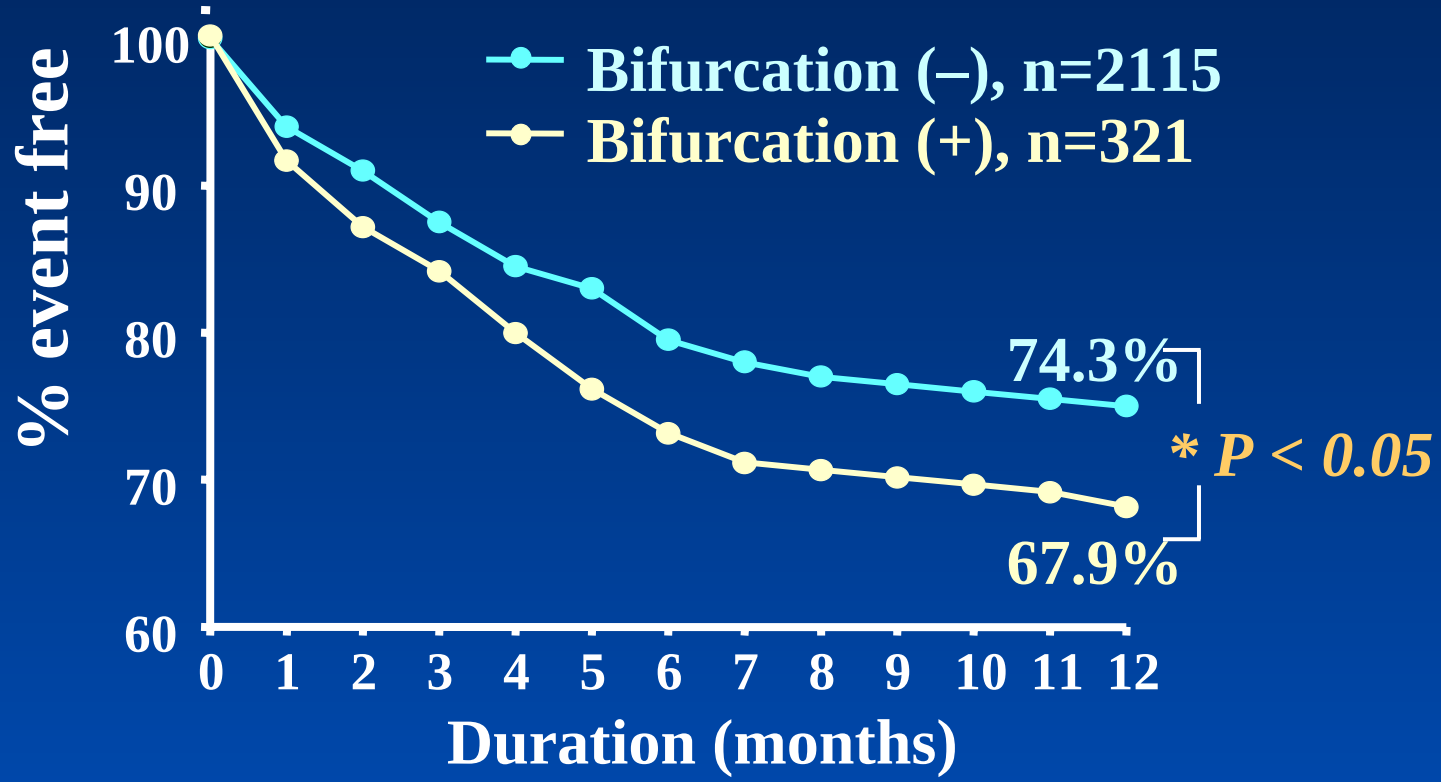
PCI is Challenging

- Higher acute complication
- Lower success rates
- Higher restenosis & TLR

Restenosis Rate	**21 ~ 57%**
TLR	**8 ~ 43%**

Event Free Survival after PCI

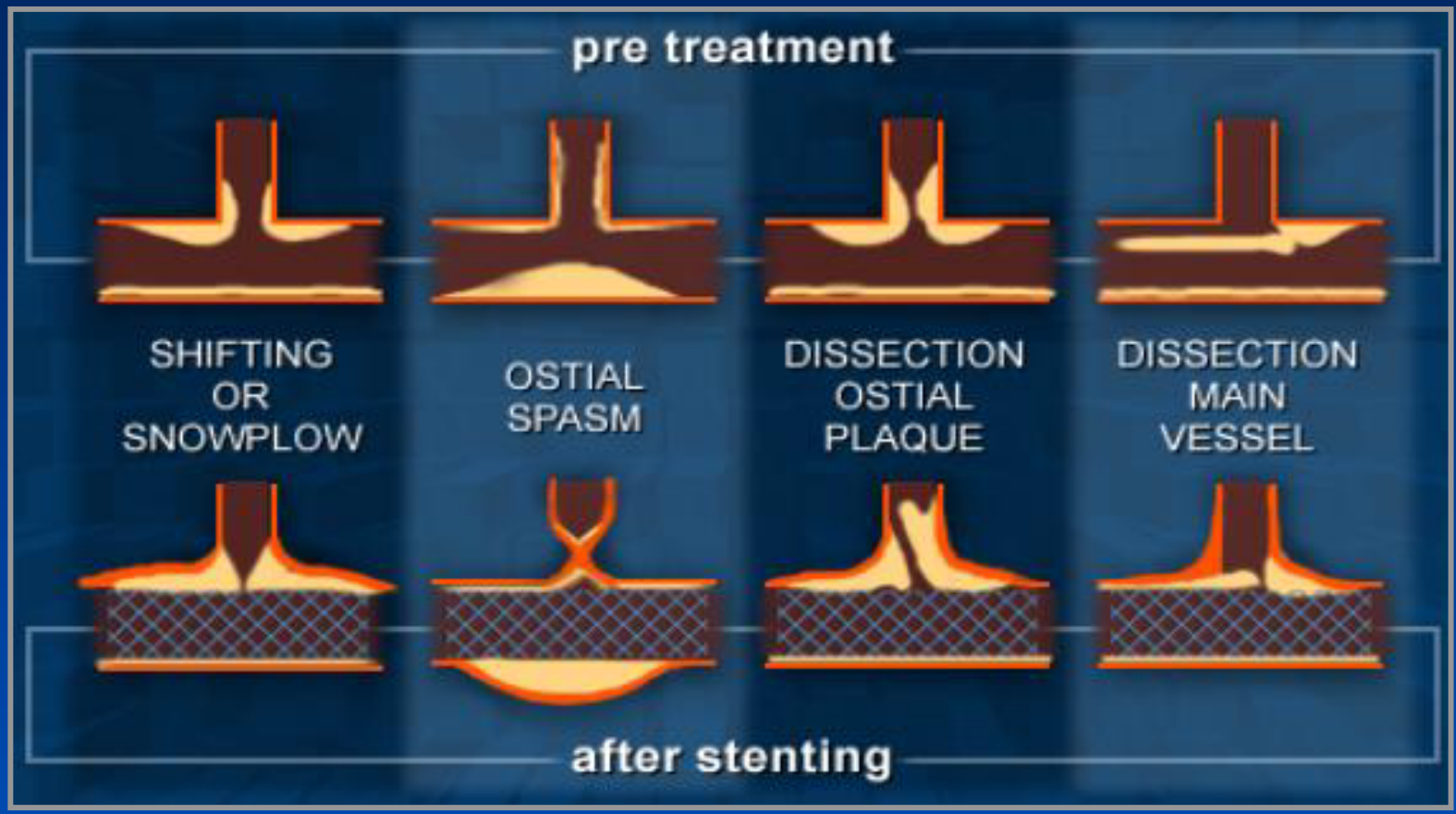
NHLBI Registry



Suwaidi J, et al. AJC 2001;87:1139-44

Side Branch Loss

Main Mechanism of Adverse Outcomes



Predictors of Side Branch Occlusion

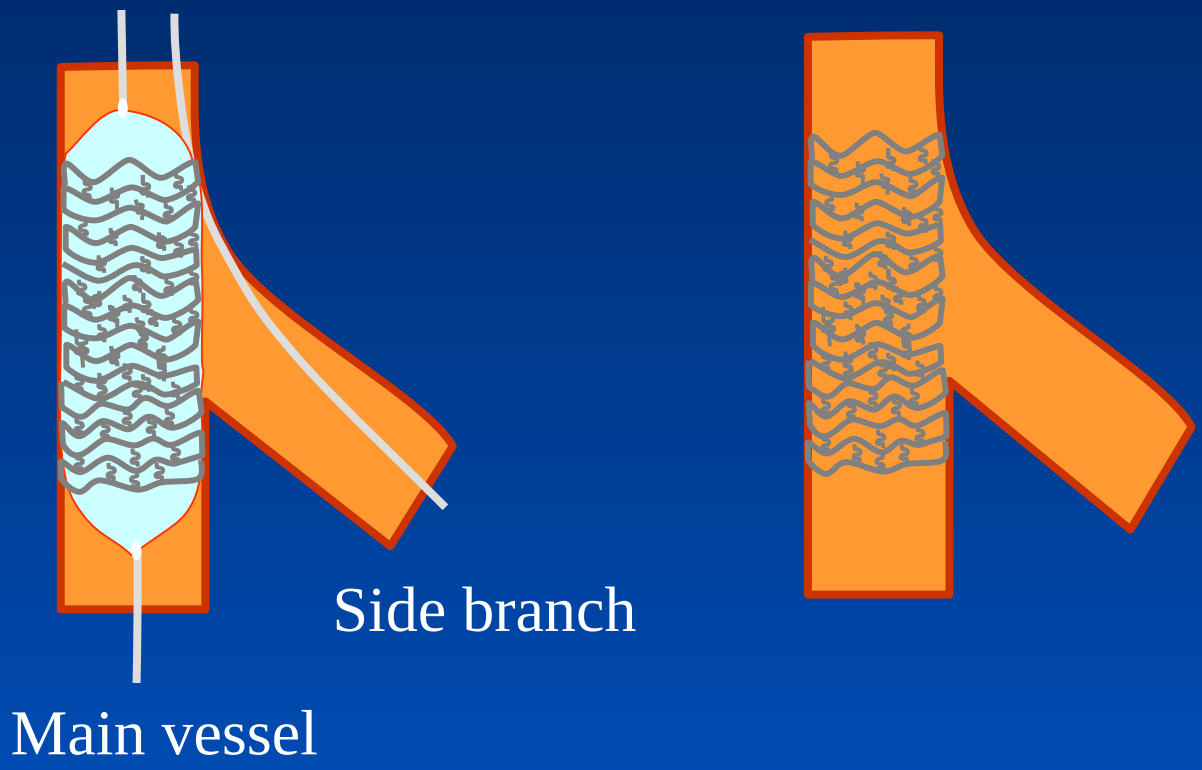
- Side branch DS > 50 %
- Disease burden in parent vessel at take-off of side branch
- Dissection of parent vessel

How to Stent ?

Stenting Technique

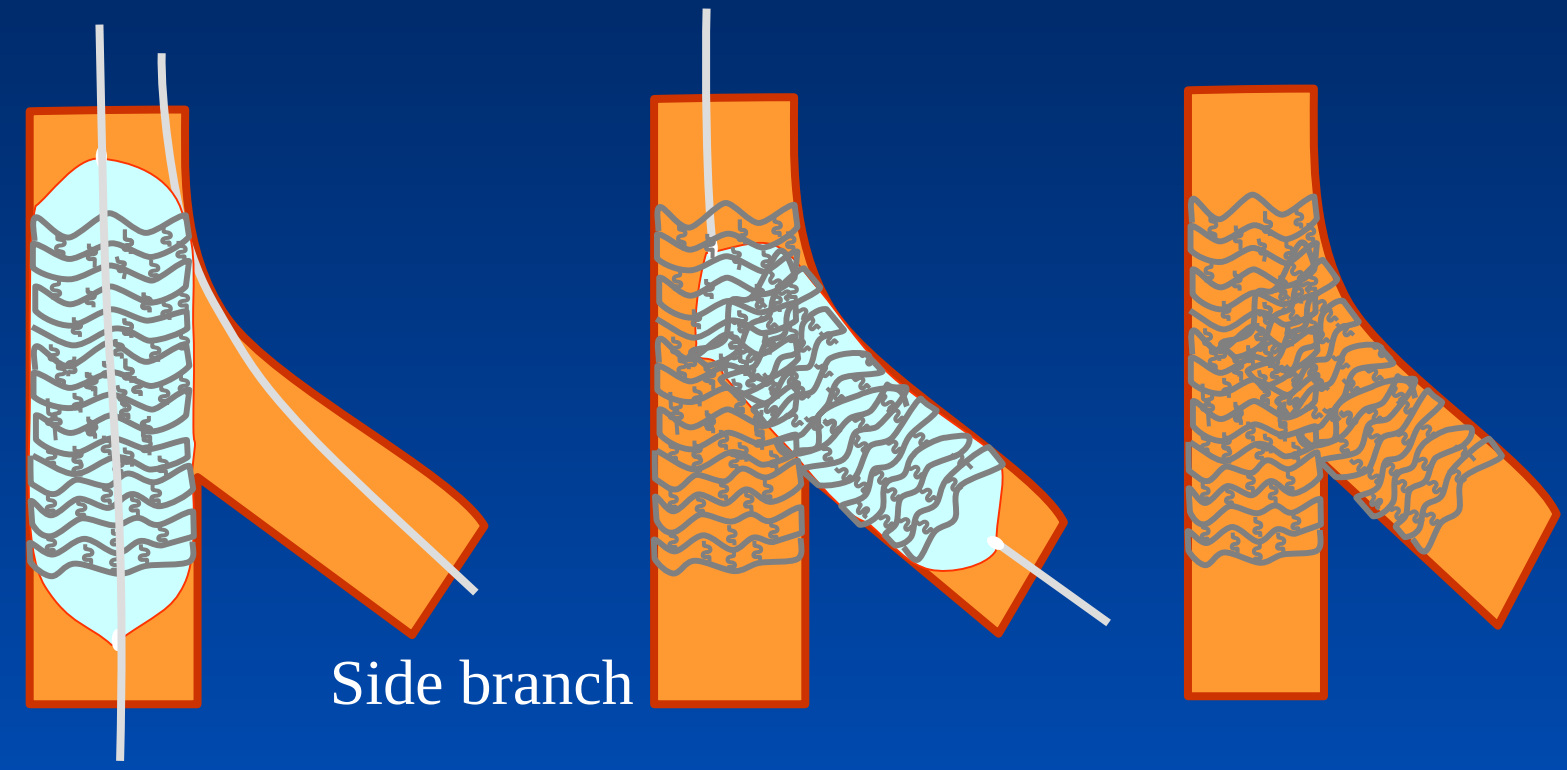
Single Stenting

Single stenting in the parent vessel with or without balloon dilatation in the side branch



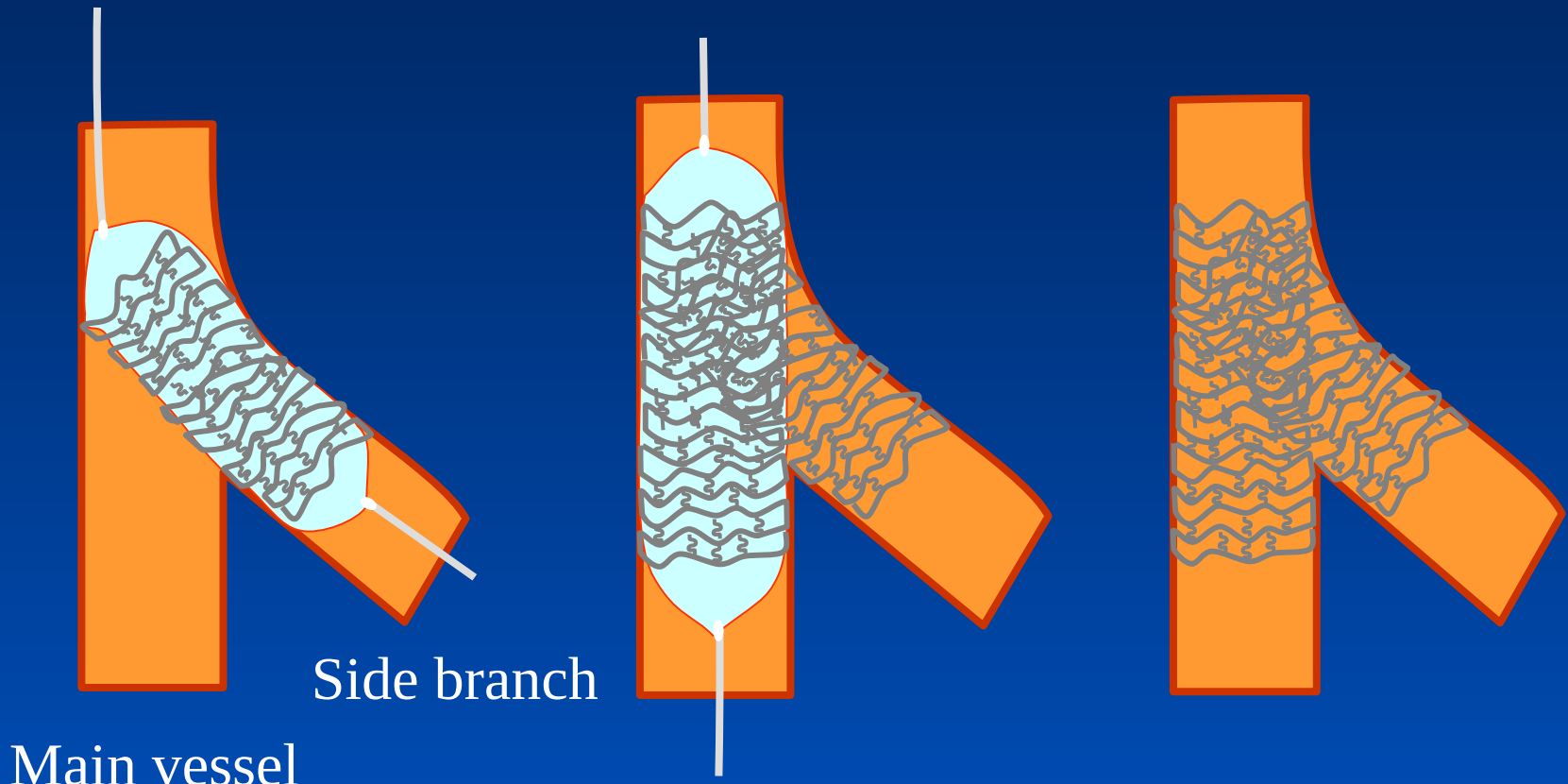
Two Stenting : T Stenting

Sequential stenting in the main vessel and the side branch



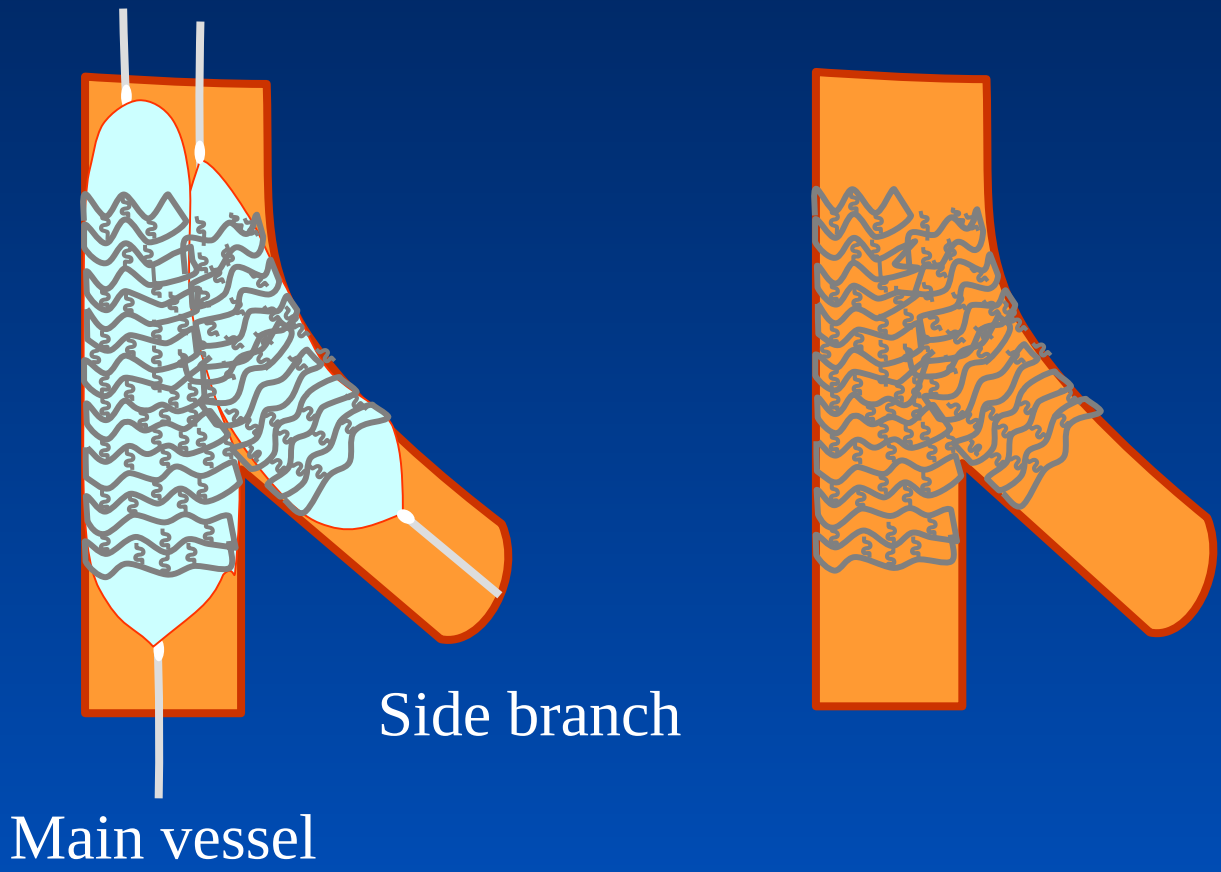
Two Stenting : Y (Culotte) Stenting

Stenting in the side branch followed by in the main vessel



Two Stenting : Kissing Stenting

Simultaneous stenting in the main vessel and the side branch



Single Stent vs. Two Stent

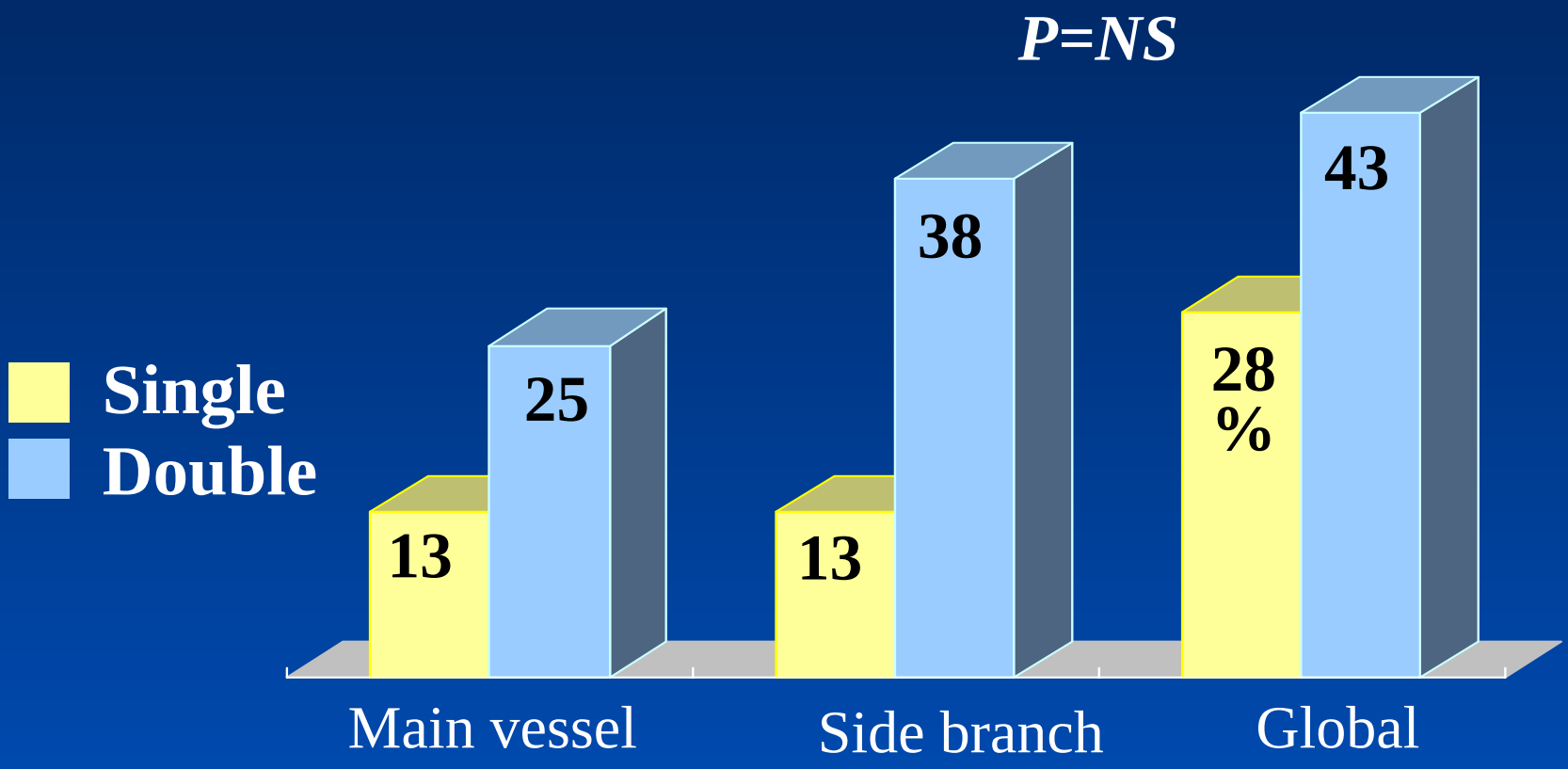
Procedural Results

	Single (n=39)	Double (n=53)	*P*
Ref. vessel(mm)	3.0 ± 0.4	3.1 ± 0.6	NS
Kissing balloon (%)	56	92	< 0.05
Procedural time (min)	98 ± 45	127 ± 52	< 0.05
Success (%)	92	87	NS
In-hosp. MACE (%)	0	13	< 0.05

Yamashita T, et al. JACC 2000;35:1145-51

Single Stent vs. Two Stent

6 Month Restenosis Rate

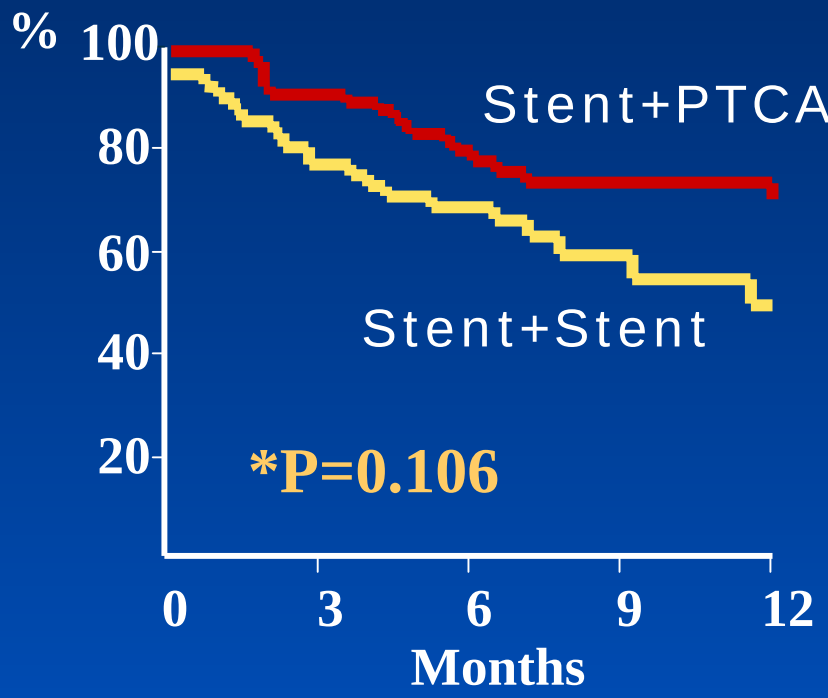


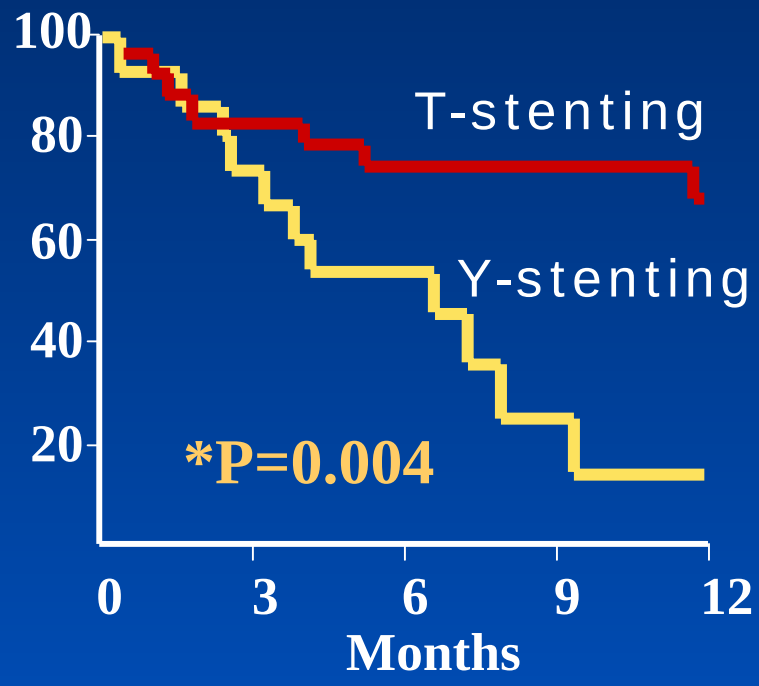
Anzuini A, et al. Am J Cardiol 2001;88:1246-50

Single Stent vs. Two Stent

Event Free Survival

Freedom from
death, MI, CABG, rePTCA & severe angina

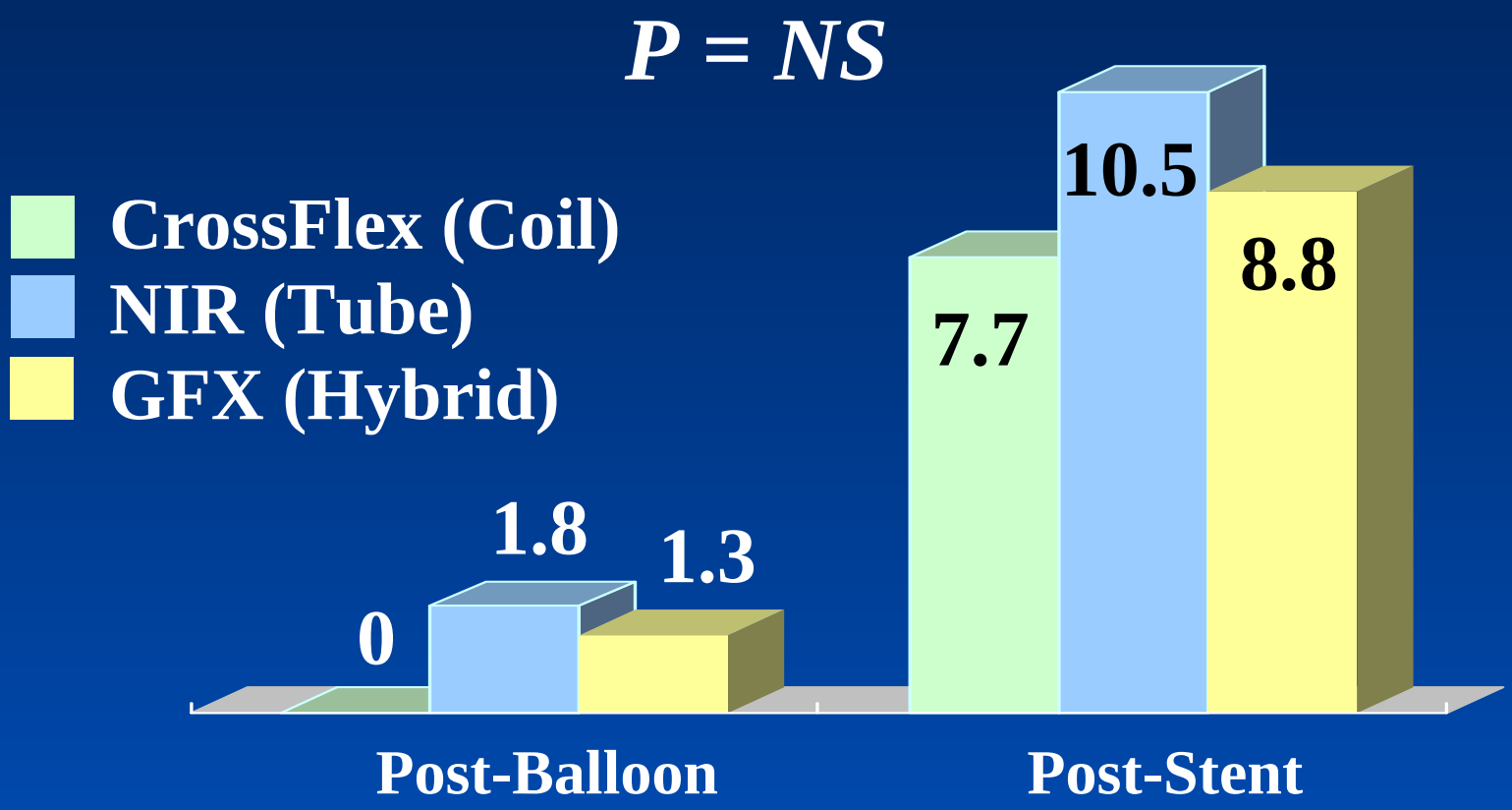




Suwaidi J, et al. JACC 2000;35:929-36

Tube Stent vs. Coil Stent

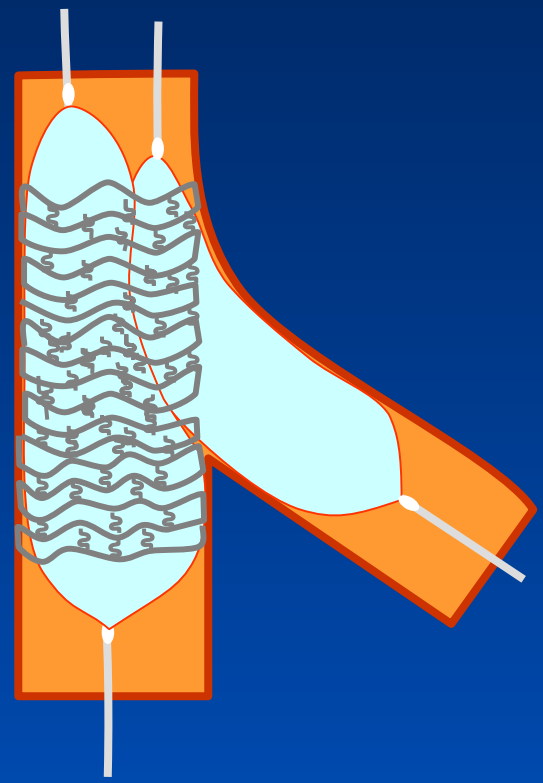
Side Branch Occlusion (%) *AMC Data*



Cho GY, et al. Cathet Cardiovasc intervent 2001;52:18-23

Two bare metal stents are not better than single stent.

Stent in main vessel and POBA in side branch with Optional kissing balloon



Importance of Stenting Technique

	Period Ⅰ (n=182)	Period Ⅱ (n=191)	*P*
Tube stent (main vessel)	59 %	94 %	< 0.01
Final Kissing balloon	18 %	75 %	< 0.001
Both branch stent		30 %	
6 Fr catheter	73 %	93 %	< 0.01
MACE	29 %	17 %	< 0.01
TVR(7 months)	21 %	14 %	< 0.05

Lefevre T, et al. Cathet Cardiovasc Intervent 2000 ;49:274-83

Plaque Reduction in Main Vessel ?

Debulking

Atherectomy

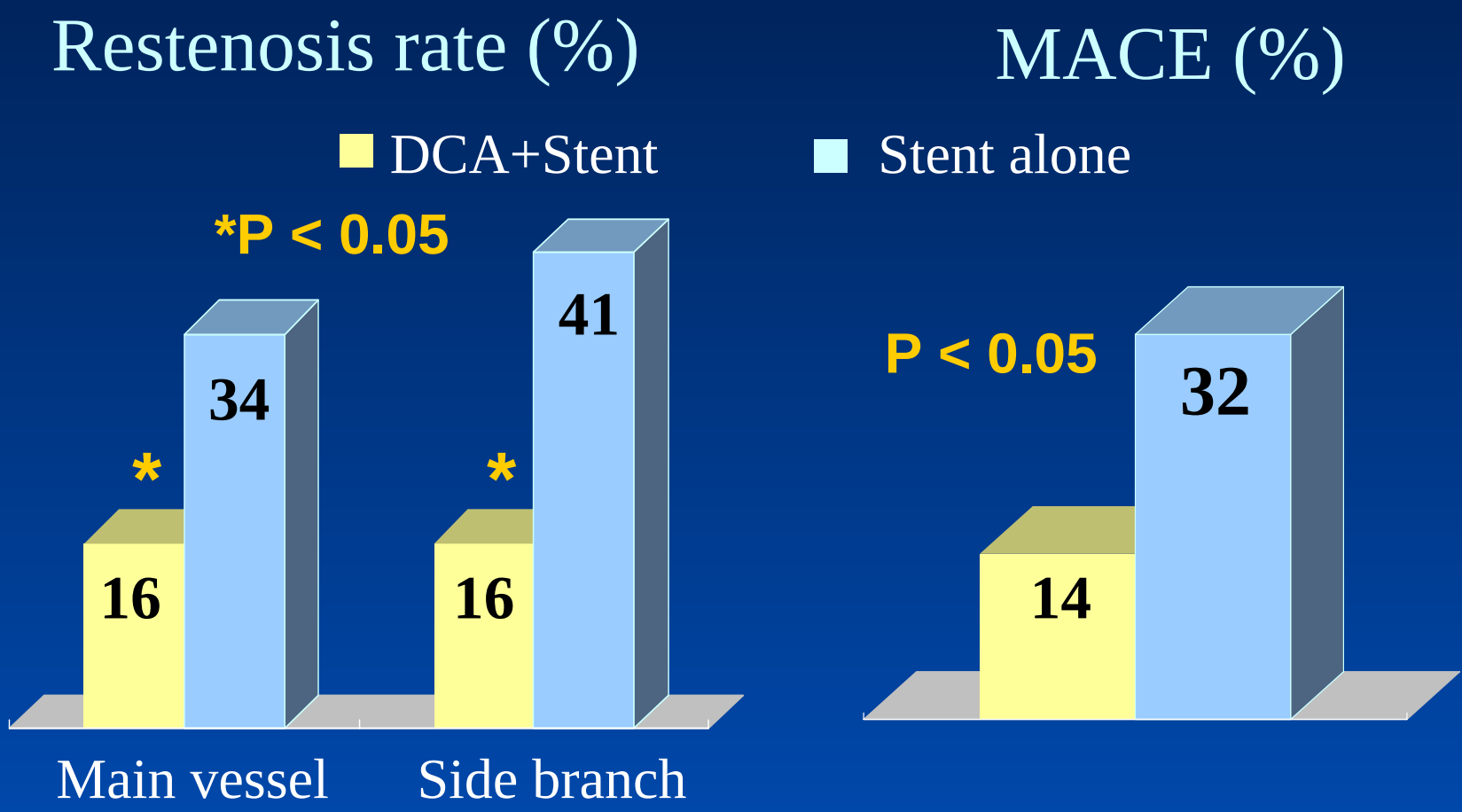
Role of DCA before Stenting

Minimal Lumen Diameter

	DCA + S (n=58)	Stent alone (n=332)	*P*
Main Vessel			
MLD post (mm)	3.2 ± 0.5	3.0 ± 0.6	0.01
MLD F/U (mm)	2.2 ± 1.1	1.6 ± 0.9	0.01
Side Branch			
MLD post (mm)	2.4 ± 0.5	2.0 ± 0.6	0.01
MLD F/U (mm	1.6 ± 0.7	1.2 ± 0.7	0.03

Chieffo A, et al. Am J Cardiol 2002;90:44H

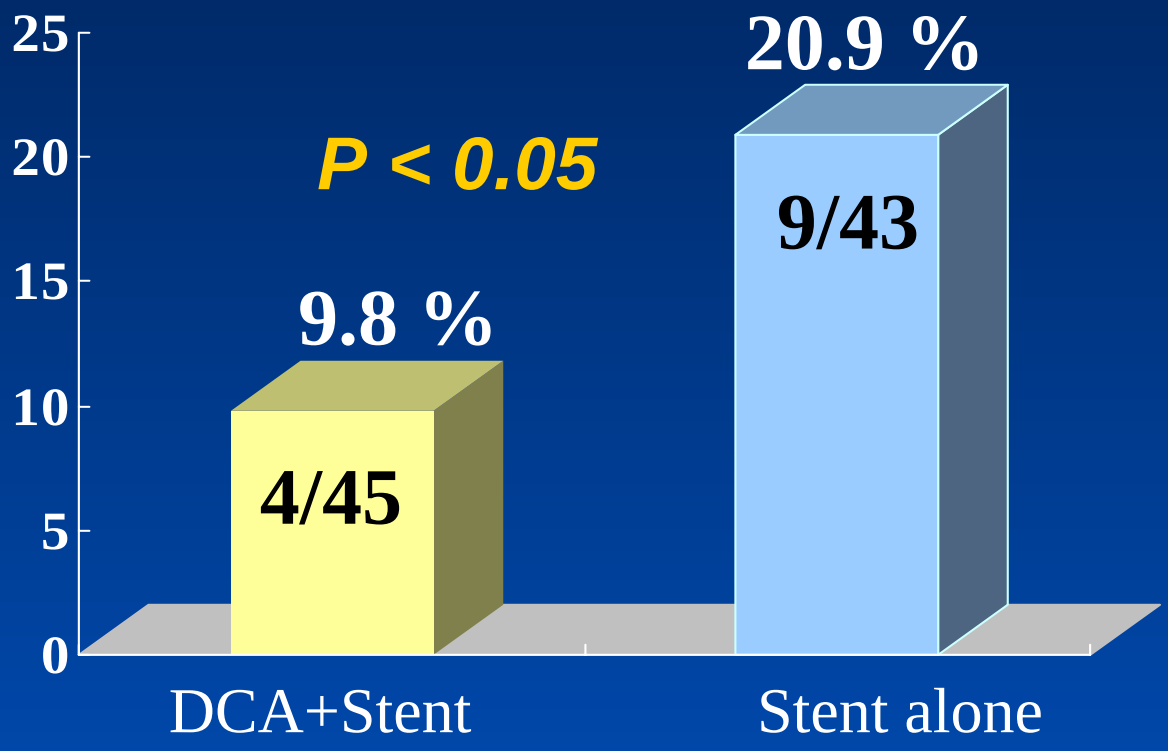
Role of DCA before Stenting



Chieffo A, et al. Am J Cardiol 2002;90:44H

Subgroup of AMIGO Trial

Restenosis Rate



Braden G, et al. TCT 2002

Debulking Followed By Stenting

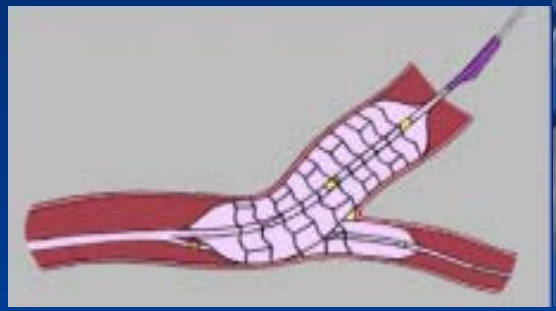
Might be beneficial in lesions with large plaque burden

New Modality for Bifurcation Lesion ?

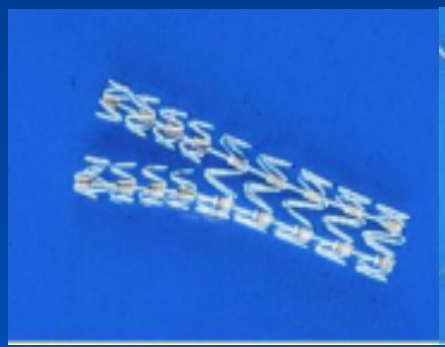
- *True Bifurcated Stent*
- *Drug Eluting Stent*

Bifurcated Stents

NIRSIDE Stent



Guidant Frontier Stent



BARD Bifurcate XT

Bifurcated Stent

Cordis DBS Stent

34 patients (mean 64 years)

- ***Technical Success 94%***
- ***MACE @ 30 days 0%***
- ***Restenosis @ 6 Mo 33%***
- ***TLR 19%***

Dibie A, et al. Am J Cardiol 2002;90:13H

Bifurcated Stents

AST SLK -View

Stent length = 17mm

Catheter length = 140 cm

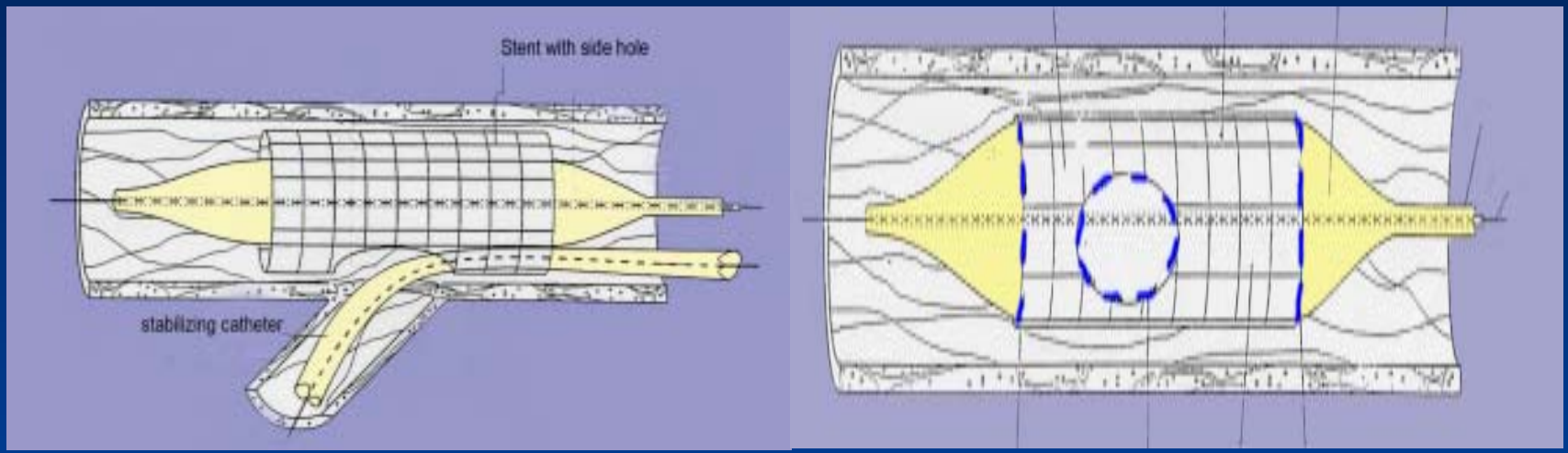
Crossing profile = 0.055 IN

Available in two sizes

- 3.0mm with 2.5mm side hole
- 3.5mm with 3.0mm side hole

Bifurcated Stents

AST SLK -View



Main catheter system comprises of a main stent with a side hole and a stabilizing catheter, which allows access to side branch after stenting

AST SLK-View Stent

AMC Experience

48 pts (mean 58 years) 50 lesions

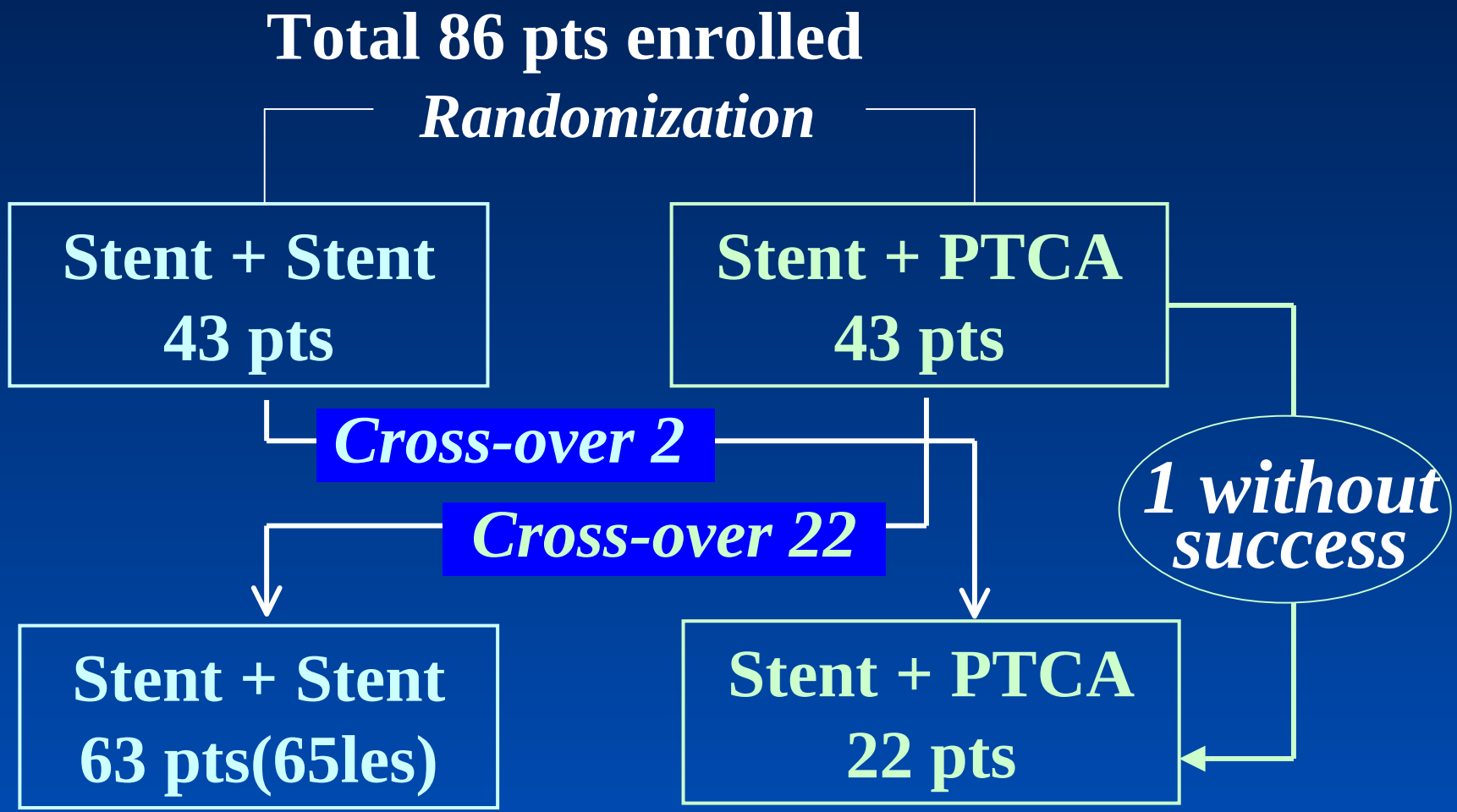
	Parent vessel	**Side** branch
Technical Success	**100 %**	**100 %**
Side branch accessibility		**100 %**
Side branch preservation after stenting		**100 %**

Kim YH, et al. TCT 2002

Drug Eluting Stent

SIRIUS Bifurcation Study

Sirolimus Eluting Stent



A Colombo, et al. AHA 2002

Procedural Technique

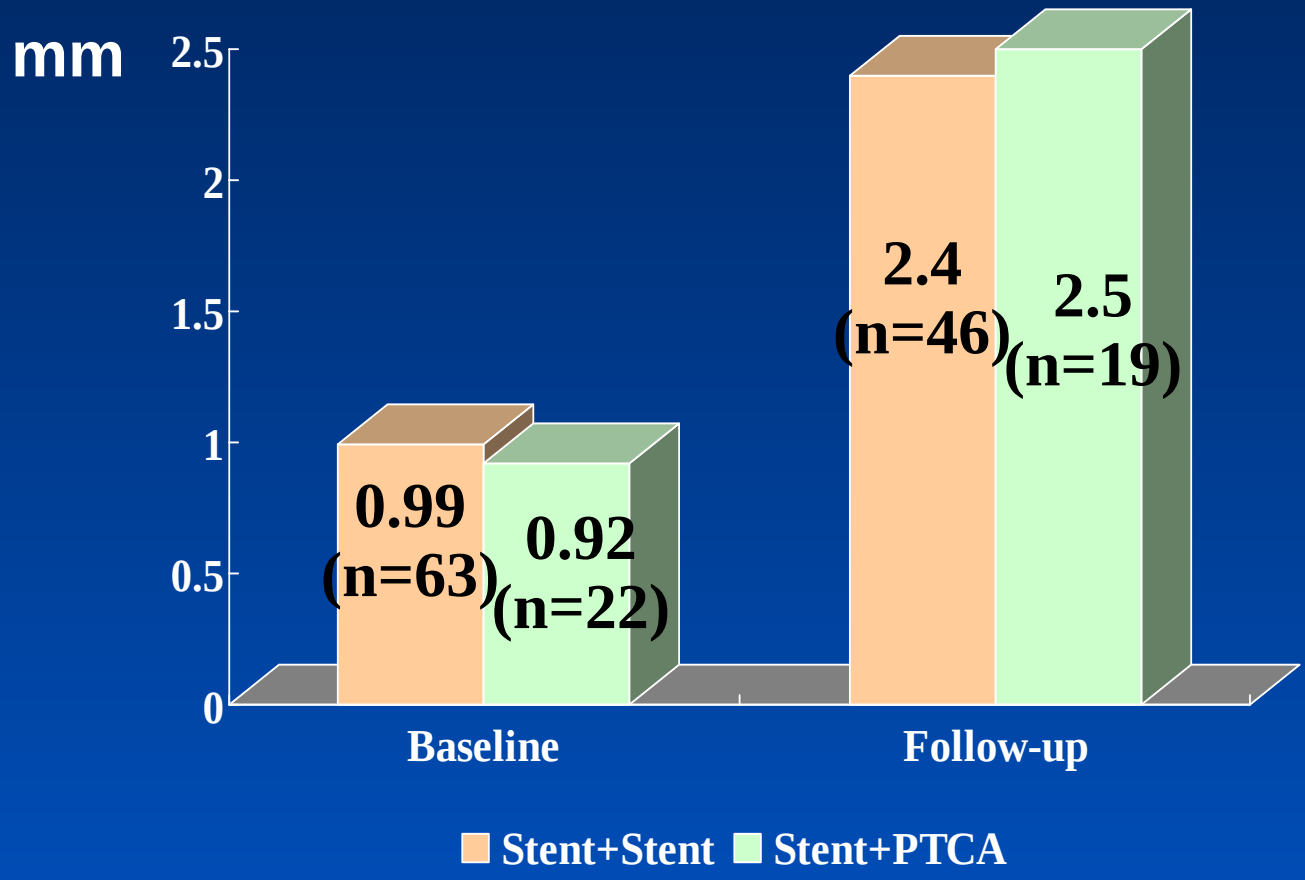
SIRIUS Bifurcation Study

Technique	Stent / Stent (n=63)	Stent / PTCA (n=22)
T- stenting	60	
Side branch first	40	
Main vessel first	20	
V- stenting	1	
Y- stenting	2	
Kissing balloon	60 (95%)	19 (86%)
GP IIb/IIIa inhibitor	27 (43%)	8 (37%)

A Colombo, et al. AHA 2002

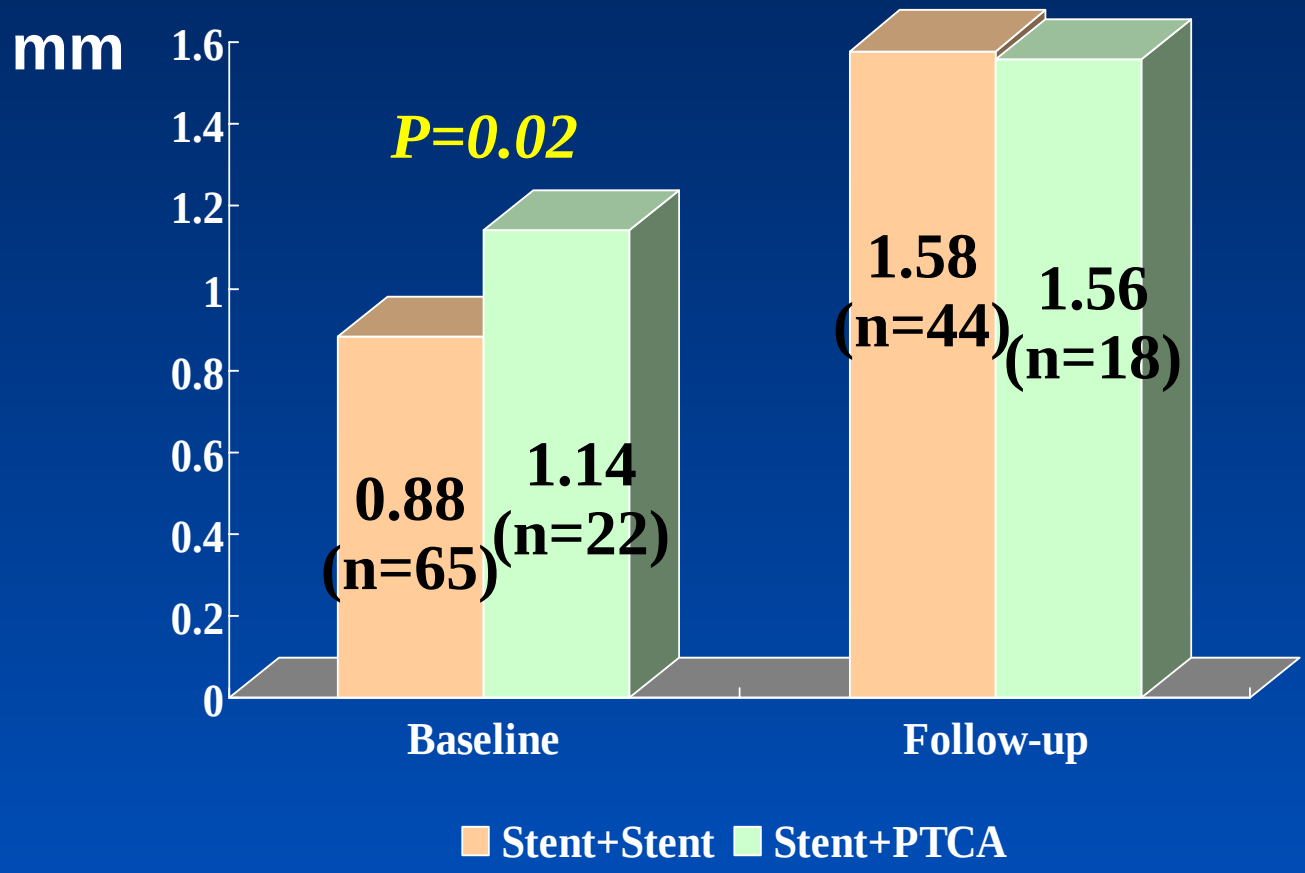
Main Vessel
Minimal Lumen Diameter

SIRIUS Bifurcation



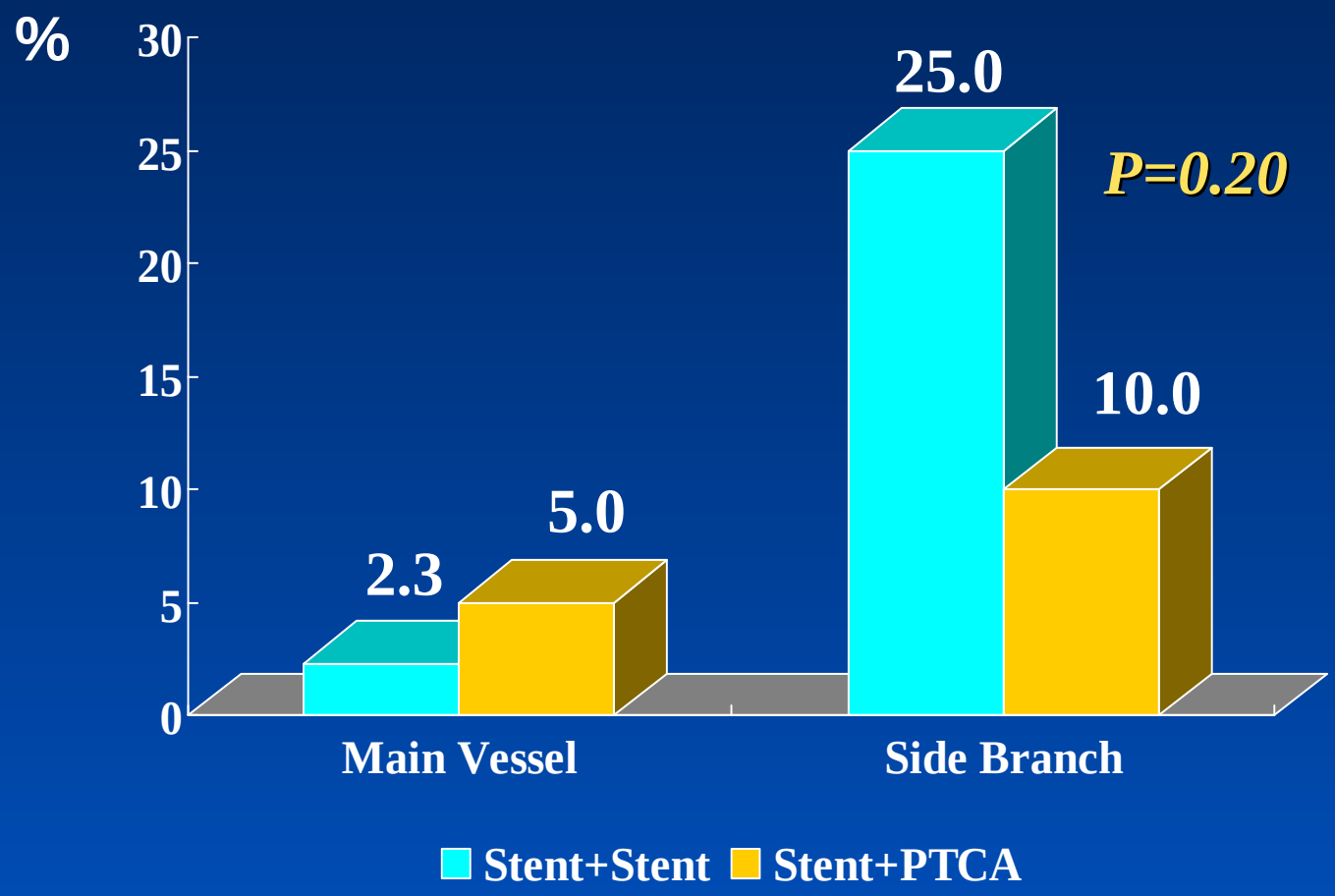
Side Branch
Minimal Lumen Diameter

SIRIUS Bifurcation



In-Segment Restenosis

SIRIUS Bifurcation



6 Months Restenosis Rate

SIRIUS Bifurcation

	Main, S+S (n=1)	Main, S+P (n=1)	Side, S+S (n=11)	Side, S+P (n=2)
Ostium of the side branch	0	0	10	2
Distal to the stent	0	0	1	0
Proximal to the stent	1	1	0	0

What We Learned

DES In Bifurcation Lesion

- **Effective**

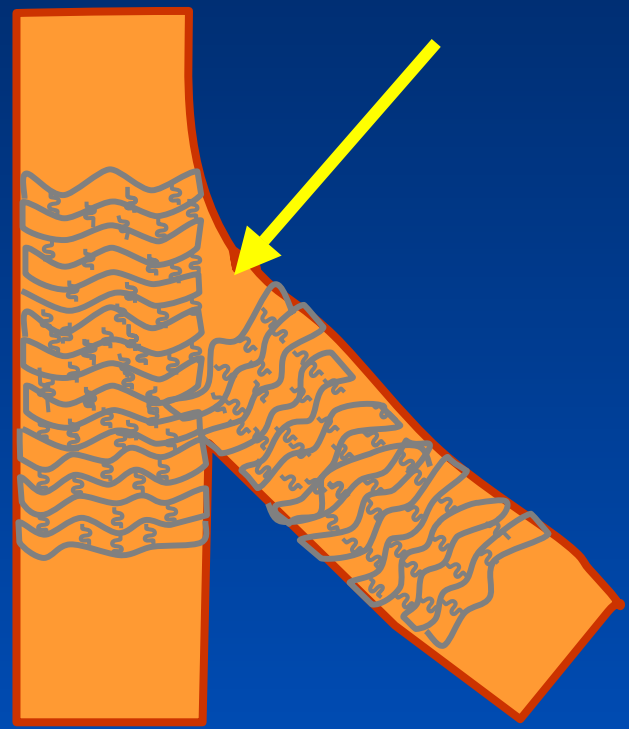
  Nearly eliminate restenosis in the main vessel

- **Ineffective**

  Persistent disturbingly high restenosis at the uncovered side branch ostium

Two Stenting Strategy in SIRIUS Bifurcation Study

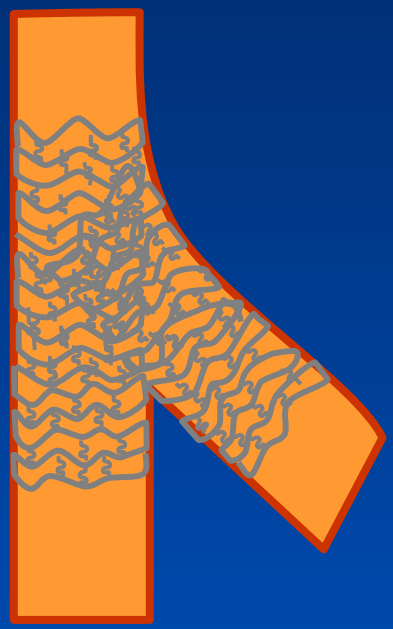
Potential gap susceptible to restenosis



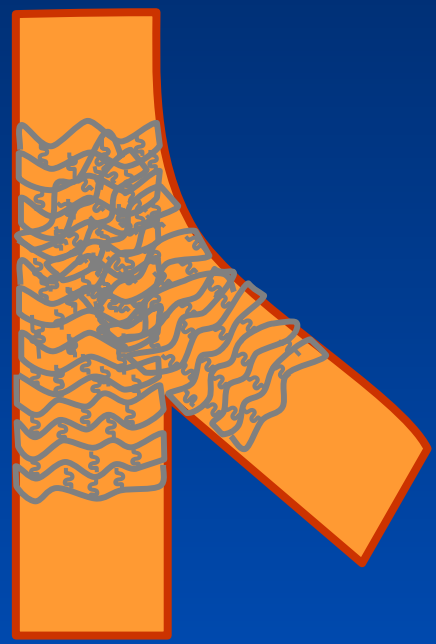
Proposed Stenting Strategy In the Era of DES

Complete coverage of side branch ostium

Modified T



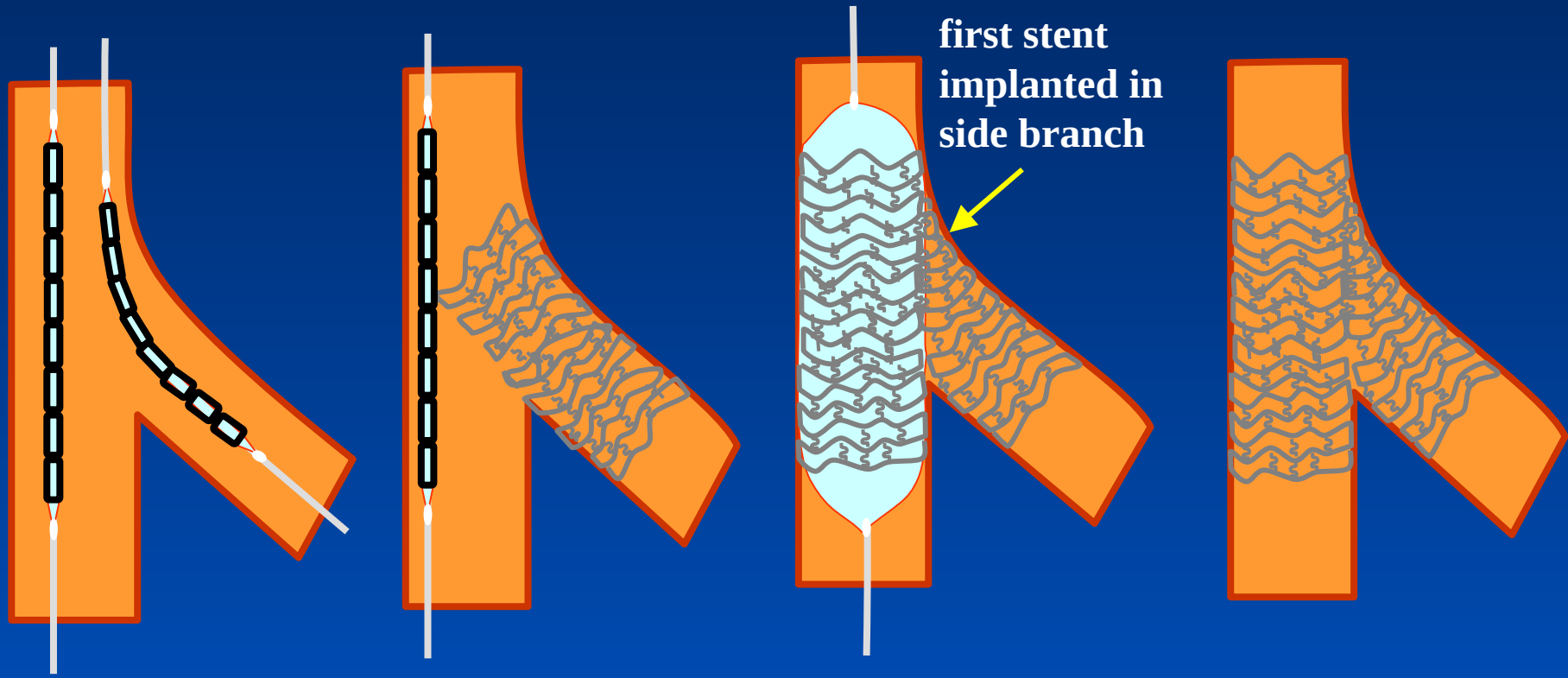
Y (Culotte)



Kissing

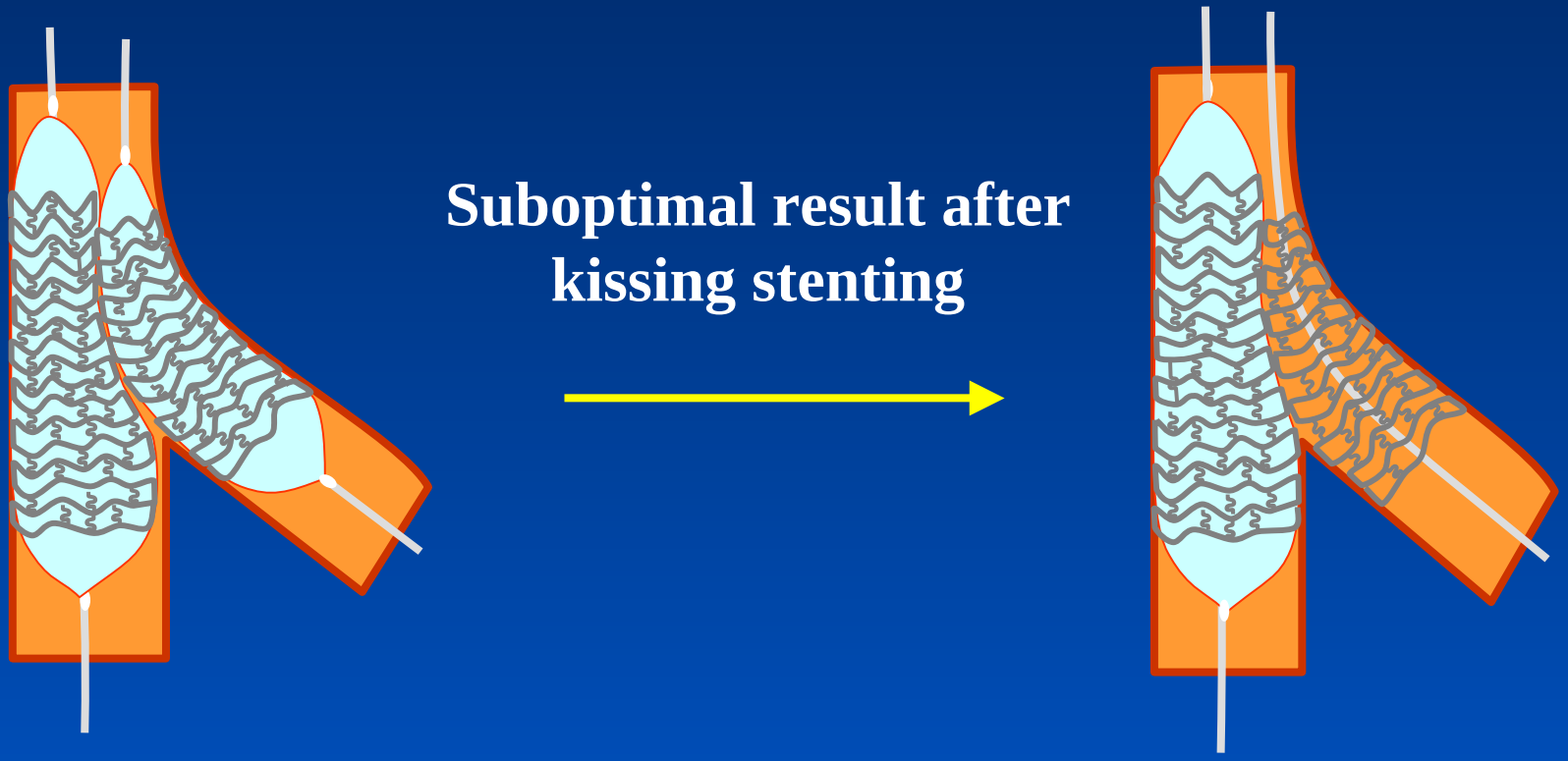
Emerging New Technique

Stent-Crush



AMC Proposal

Kissing Stenting with Optional Stent-Crush



Future Perspectives in the Era of DES

Following consideration should be evaluated

- The role of debulking atherectomy
- The fate of side branch after PCI with DES
- Large randomized comparison of two DES and single DES