

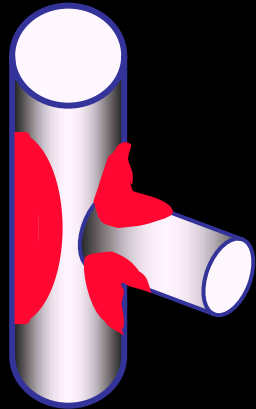
Clinical Outcome of Drug Eluting Stent for LMT Lesions

Toshiya Muramatsu MD

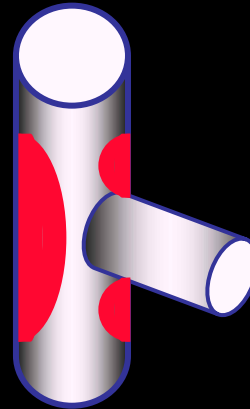
Kawasaki Social Insurance Hospital

Classification of Bifurcation Lesion

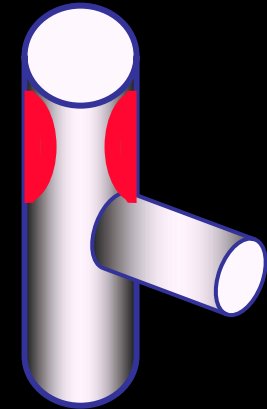
-ICPS classification-



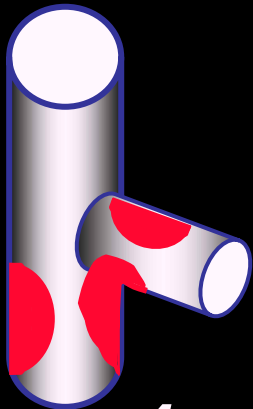
Type.1



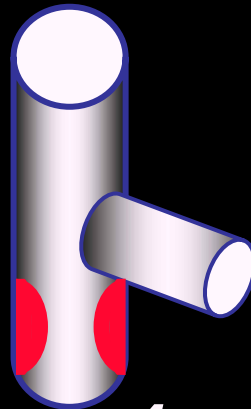
Type.2



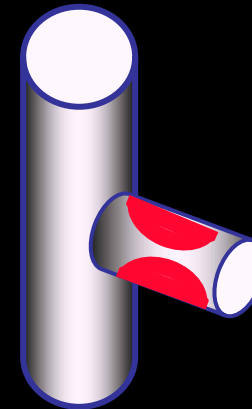
Type.3



Type.4

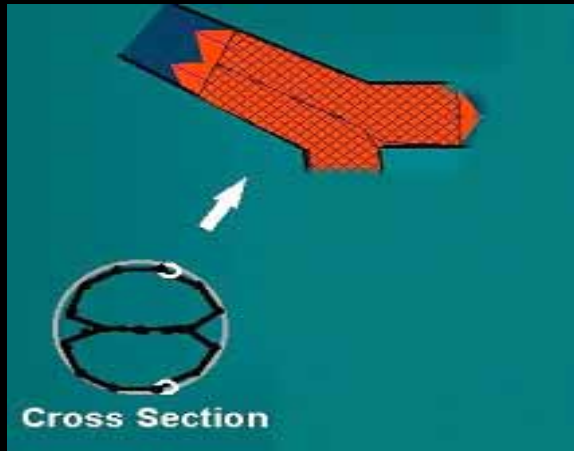


Type.4a



Type.4b

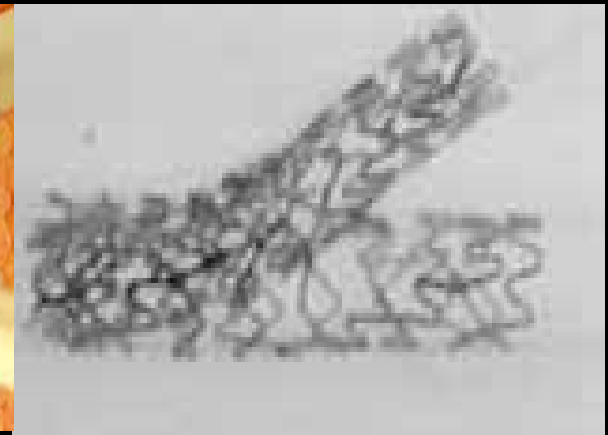
Treatment for bifurcation lesions



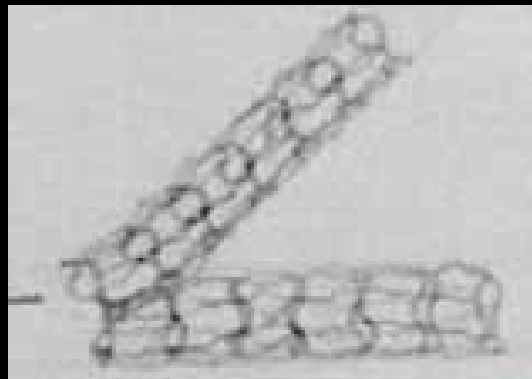
Kissing stents



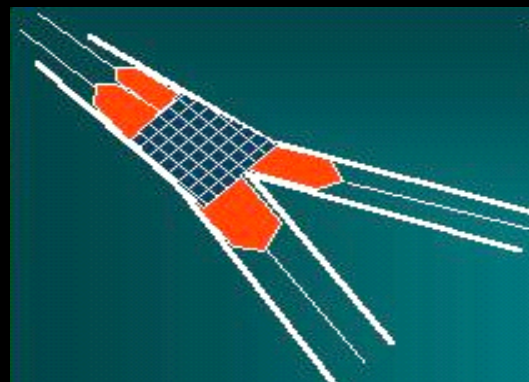
**T-stenting /
Modified T-stenting**



“Culotte” or Y stenting



V-stenting



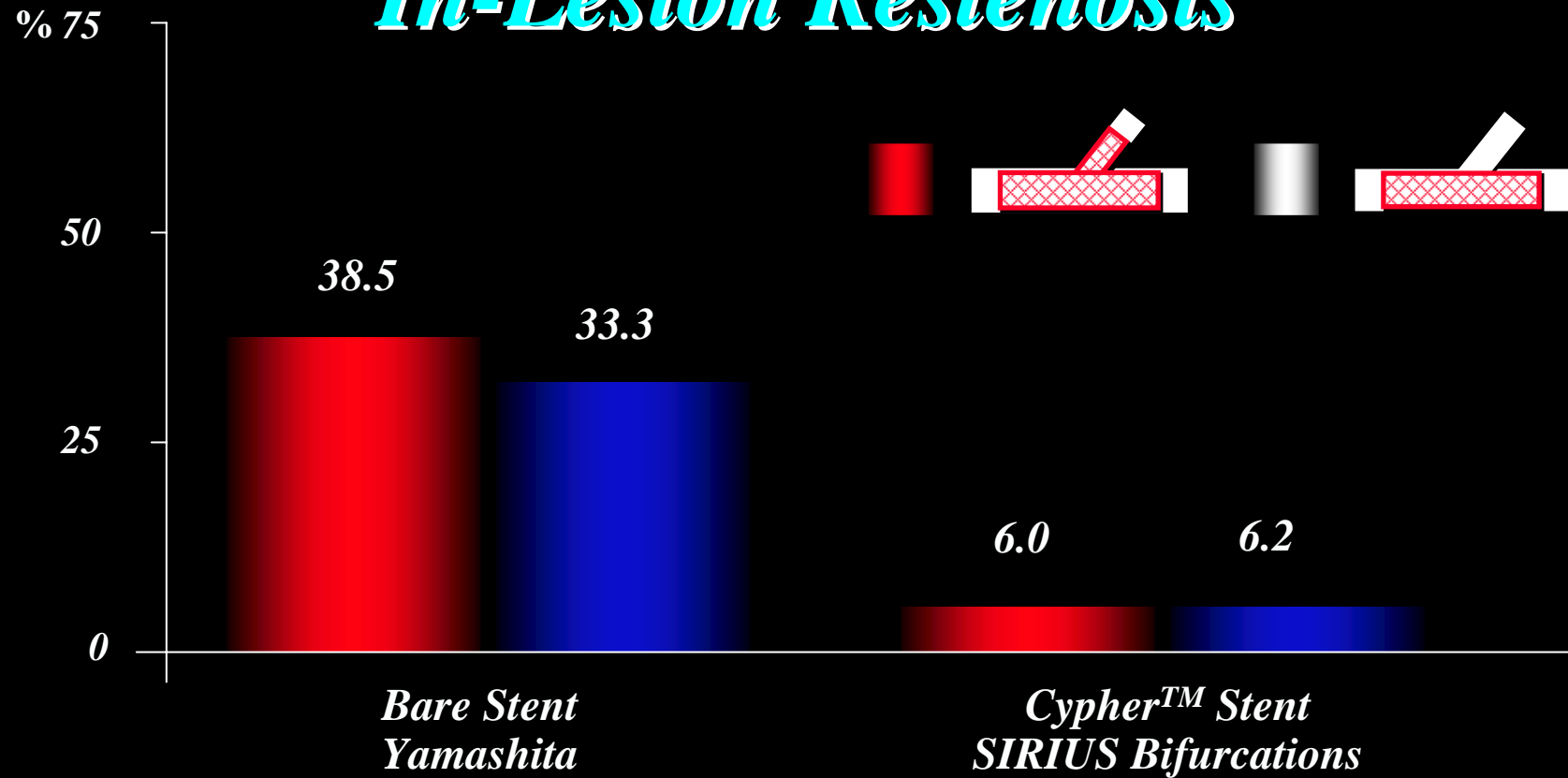
Skirt stenting



**Crushing /
Reverse-Crushing**

Cypher™ Compared with Bare Stents

Main Vessel In-Lesion Restenosis

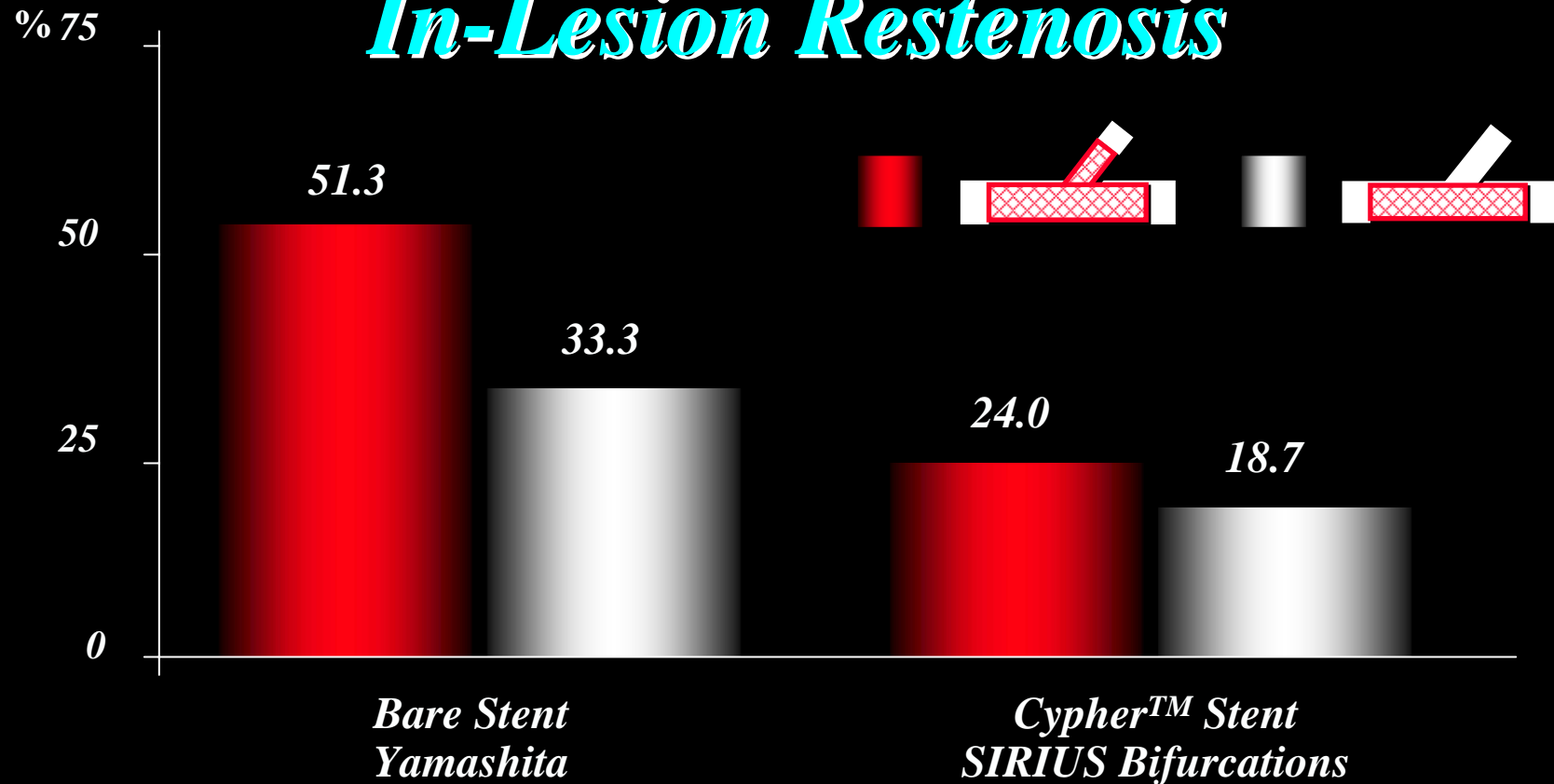


From SIRIUS data

Kawasaki Social Insurance Hospital, Kanagawa, Japan

Cypher™ Compared with Bare Stents

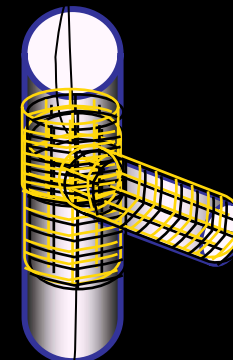
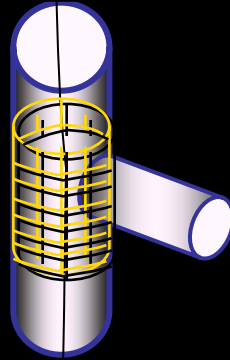
Side-Branch In-Lesion Restenosis



From SIRIUS data

Kawasaki Social Insurance Hospital, Kanagawa, Japan

Complex DES vs simple DES stenting

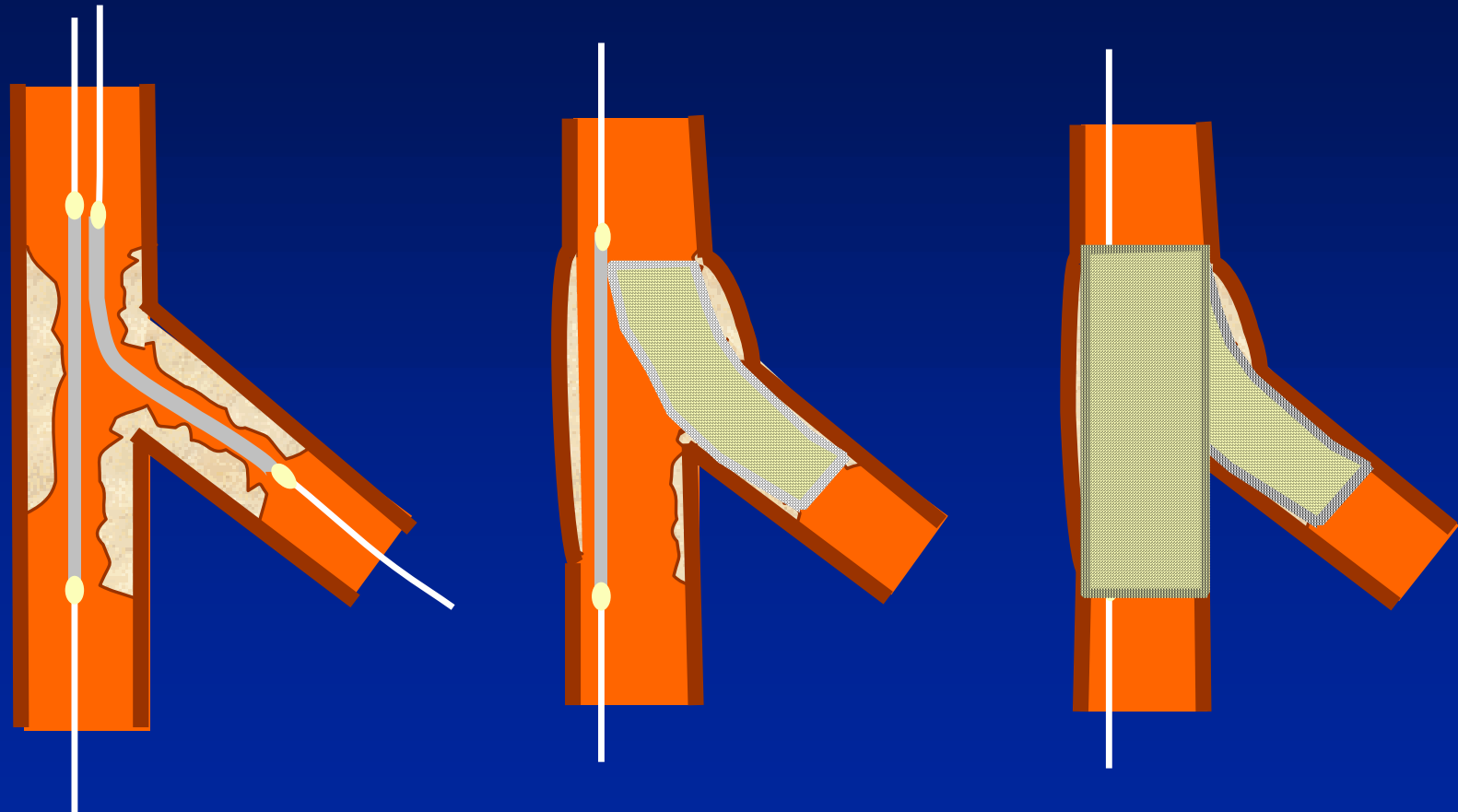


<i>N</i>	<i>47</i>	<i>44</i>
<i>main</i>	<i>2%</i>	<i>5%</i>
<i>side</i>	<i>5%</i>	<i>10%</i>
<i>both</i>	<i>0</i>	<i>5%</i>
<i>restenosis</i>	<i>7%</i>	<i>20%</i>

Pan M : Am Heart J 2004

Crush Technique
or
Y stenting

Crush Technique



Institut Cardi ovasculaire Paris Sud

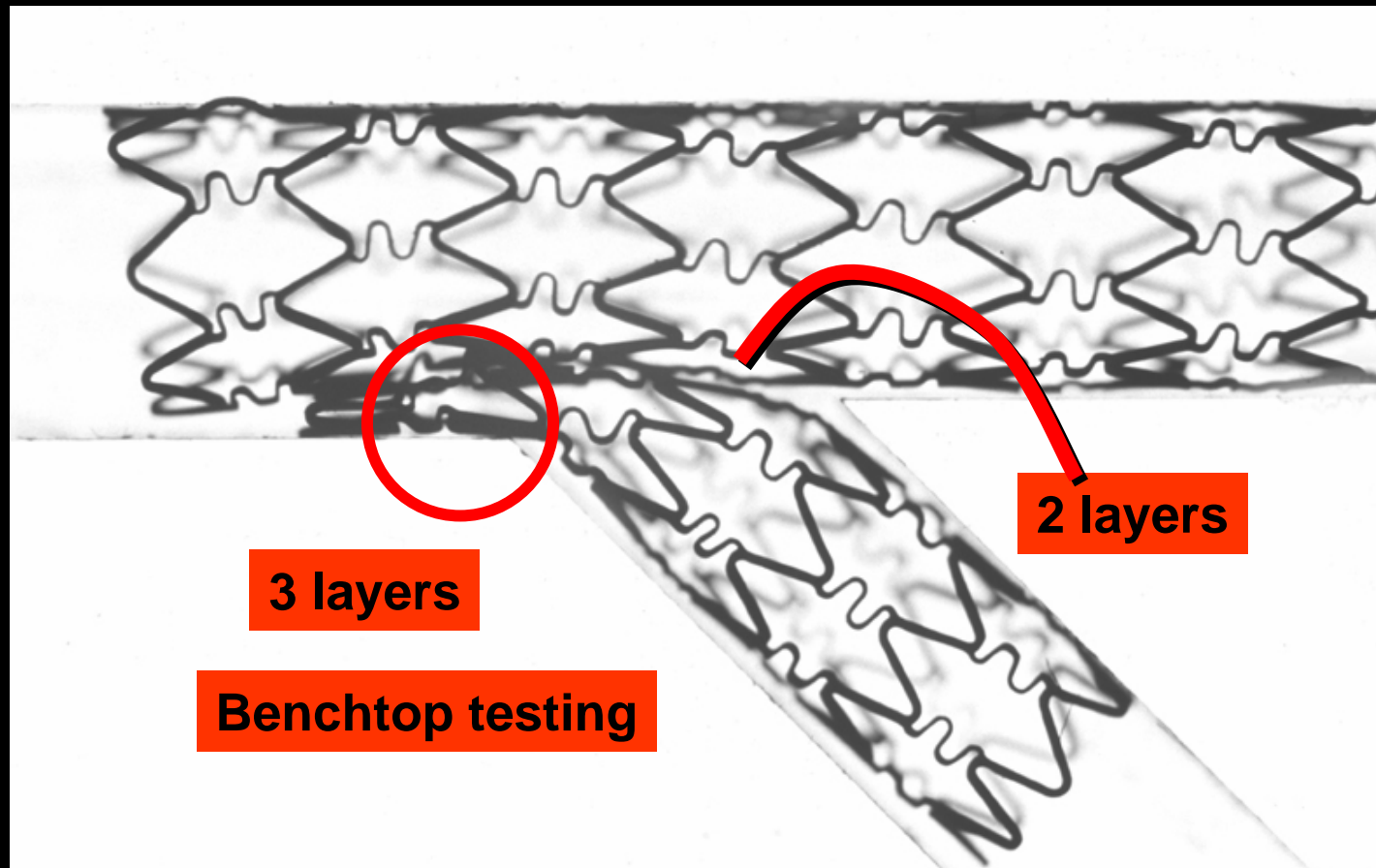
Derived from Sharma et al



Kawasaki Social Insurance Hospital, Kanagawa, Japan

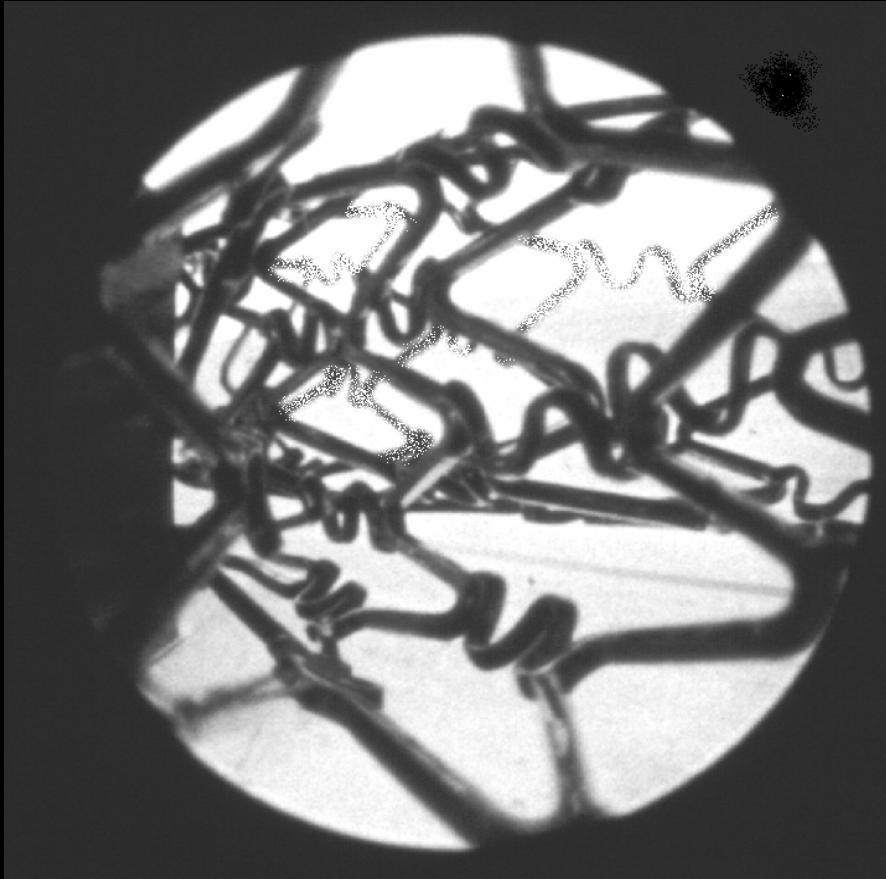


Problem of Crush!

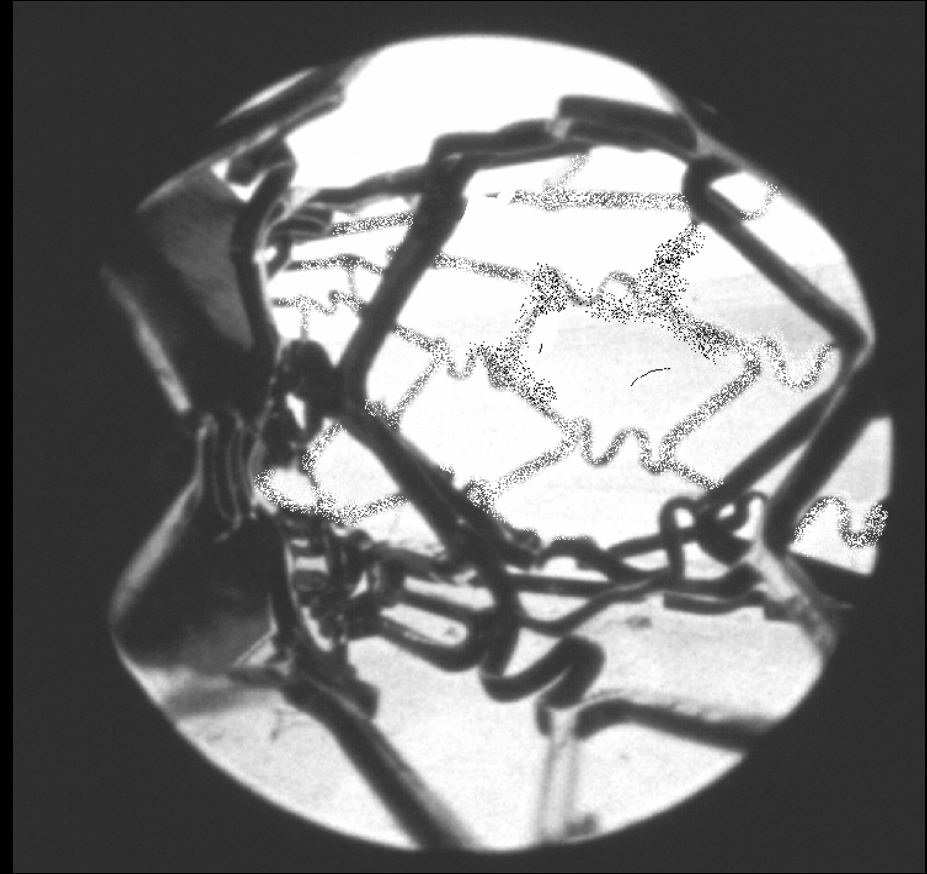


Ormiston 2003

Kawasaki Social Insurance Hospital, Kanagawa, Japan



After “crush”

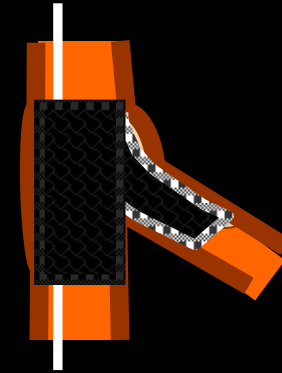


**“Kissing” releases side-br
from jail**

Ormiston 2003

Kawasaki Social Insurance Hospital, Kanagawa, Japan

Crush Technique+ KBT



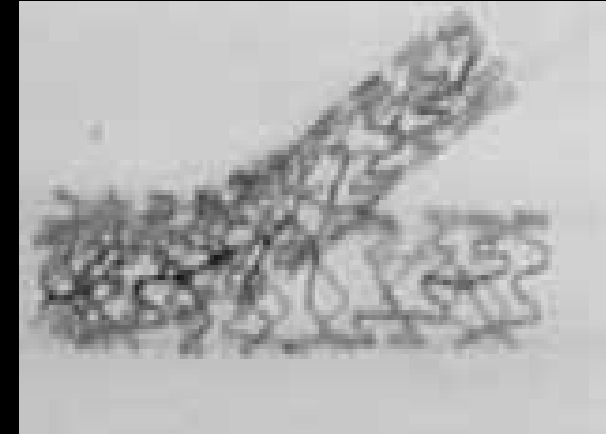
Role of Final Kissing Balloon Inflation

	Kissing	No Kissing	p value
Acute angiographic results			
MB residual stenosis (%)	2 \pm 4	9 \pm 15	<0.05
SB residual stenosis (%)	7 \pm 8	20 \pm 18	<0.0001
TVR (%)	10	22	NS

Moussa et al, ACC 2004

Clulotte Stenting

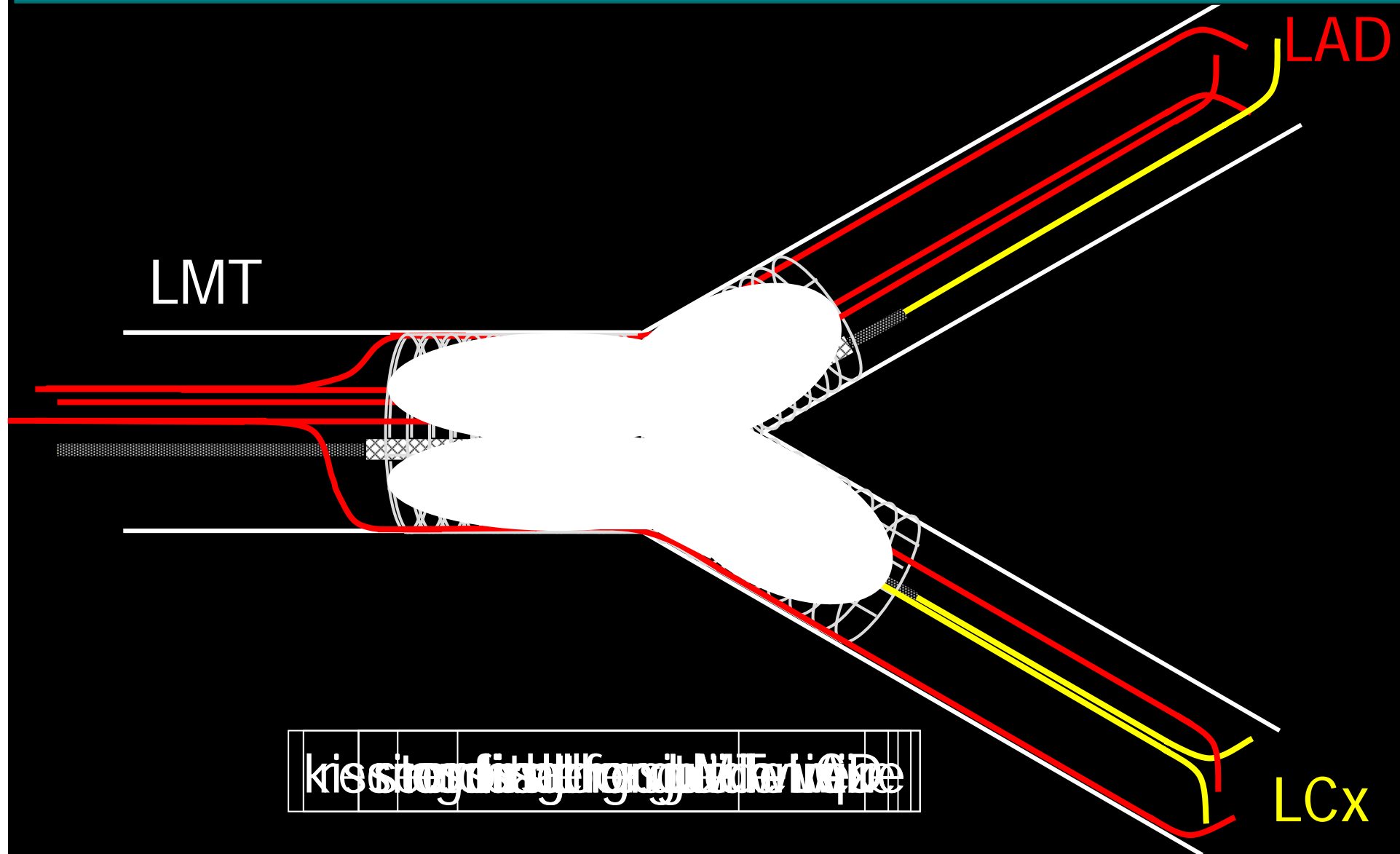
- *Full coverage of bifurcation*
- *No gap*



Pit hole

- *2 times guide wire exchange*
- *Sometimes, Balloon or guidewire is difficult to cross beyond the stent strut.*
- *Chance to trapping guidewire*
- *Small Stent CSA at intersection point*

Y-stent (culotte stent) technique



© 2010 Medtronic AVEA

Left Main Trunk Disease in DES

Cypher stent for LMT

N=78patients 78 lesions 2004.8~2005.11

Age 70.7 ± 10.0 y.o.

Sex female 17

Diagnosis

AMI 4case

UAP 12case

AP 62case

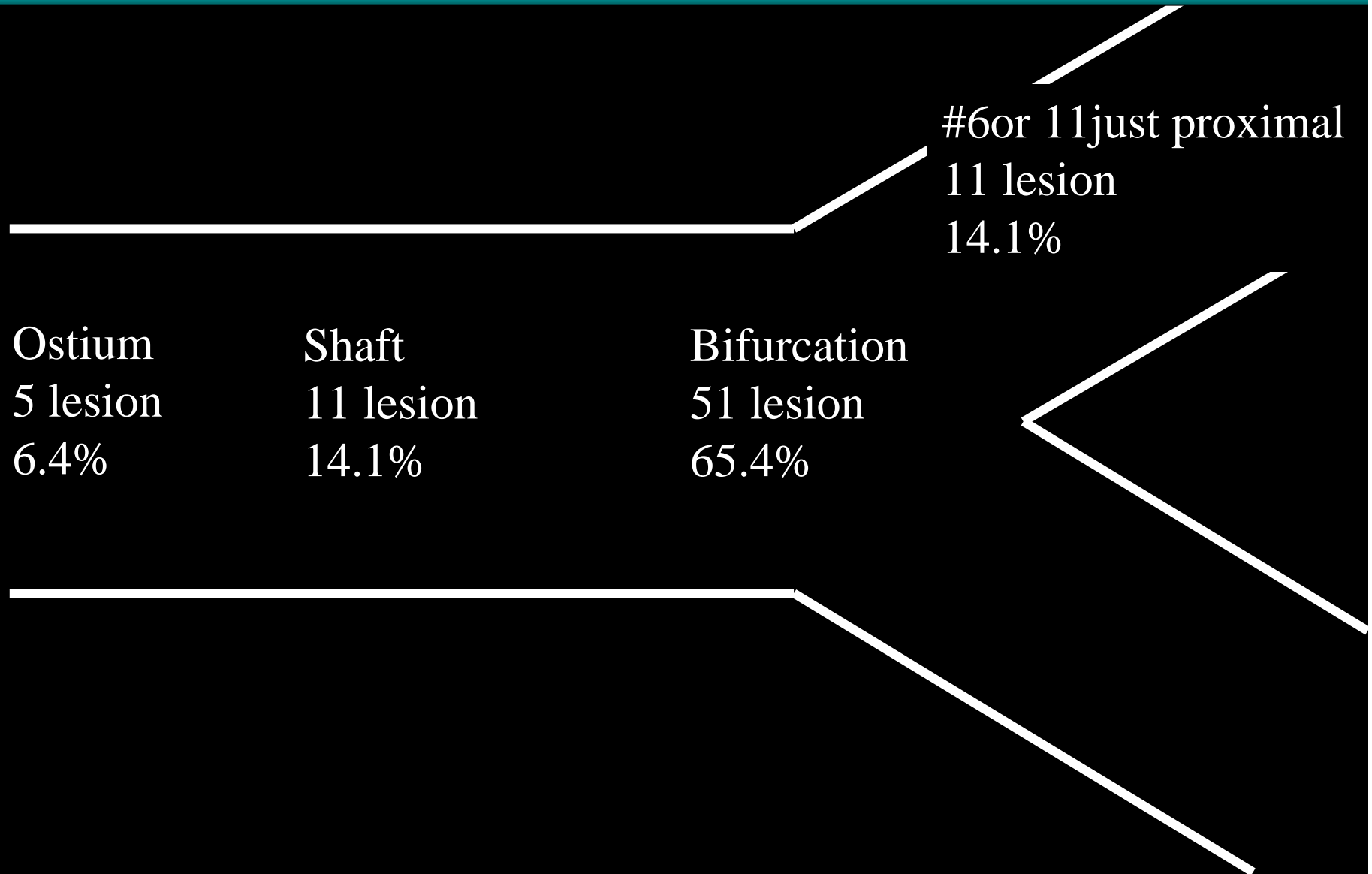
De novo lesion 63 lesion

Stent restenosis 15 lesion

Non protected LMT lesion 75lesion (96.1%)

IABP support 4 case

Lesion location



Strategy for LMT

	De novo n=63	ISR lesion n=15
Single stent		
LMT-LAD single	29	3
LMT-Cx single	1	1
γ stent	1	0
Cutting stent	1	1
Two stent		
T-stent	1	1
Modified T	1	0
Crush stent	2	0
Reverse Crush	1	0
Y-stent	21	9
Modified V	5	0
SKS	0	0

QCA results : LMT-LAD

Angiographical FU 58 cases (74.4%)

	De novo n=46	ISR lesion n=12
Pre MLD	1.1 ± 0.4	0.8 ± 0.4
Ref.d	3.2 ± 0.7	2.7 ± 0.6
%DS	66.8 ± 10.6	70.1 ± 14.3
Post MLD	3.1 ± 0.6	3.1 ± 0.6
%DS	9.0 ± 8.8	6.3 ± 13.4
FU MLD	2.9 ± 0.8	2.5 ± 0.7
Ref.d	3.5 ± 0.7	3.1 ± 0.4
%DS	16.8 ± 17.4	21.1 ± 17.9

QCA results : LMT-Cx

	De novo n=46	ISR lesion n=12
Post MLD	2.52±0.45	2.45±0.62
Ref.d	3.05±0.52	2.91±0.51
%DS	17.11±9.79	15.66±16.34
FU MLD	1.98±0.81	1.86±0.93
Ref.d	3.21±0.69	2.92±0.60
%DS	36.82±25.94	36.62±27.3

Clinical results

Initial success 78(100%)

In hospital MACE 0(0%)

FU 213 ± 97 days

Restenosis 11case

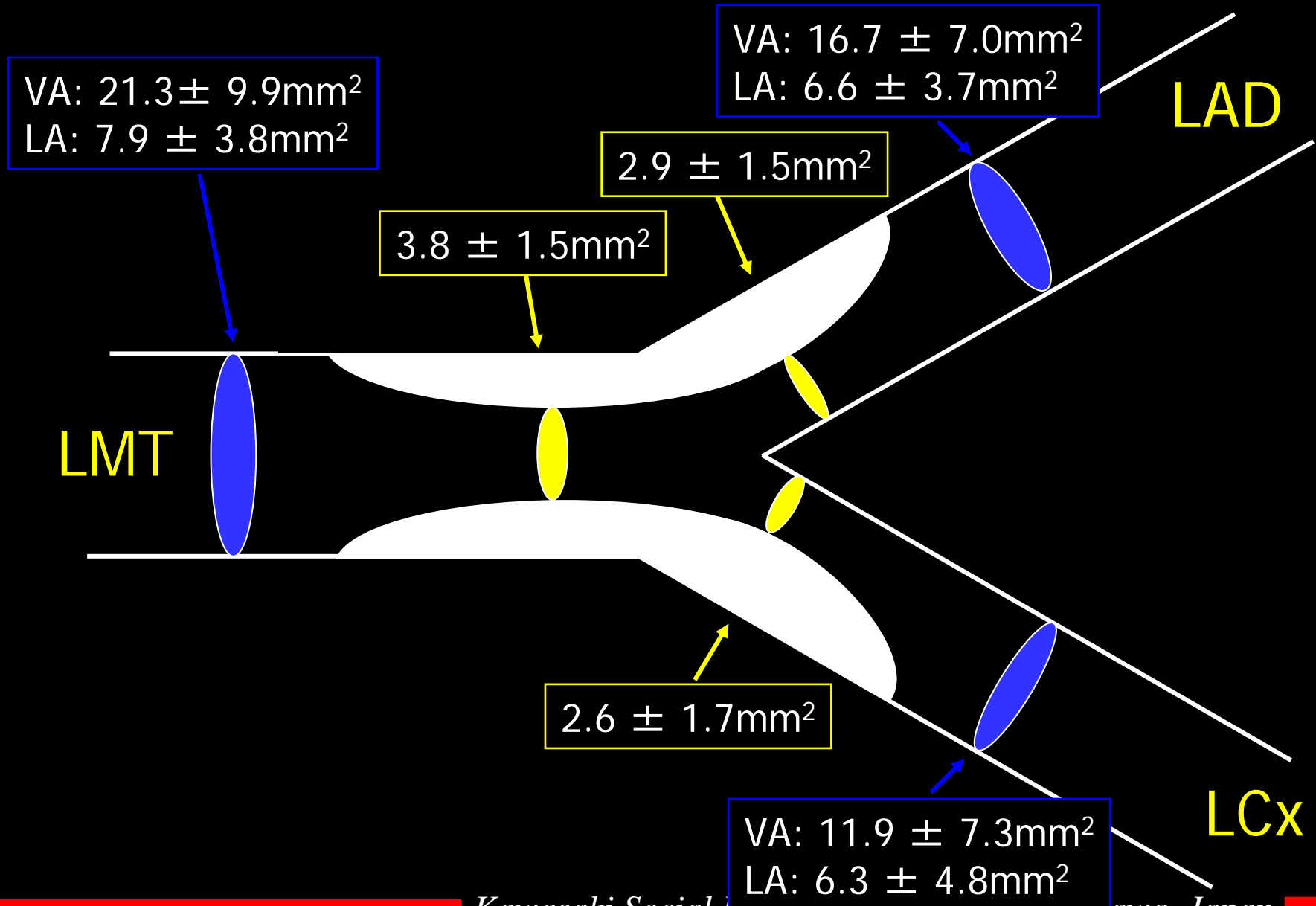
TVR 10case(17.2%)

	Binary restenosis	TVR
LAD and Cx	2case	2case
LAD	0case	
LCx	9case	8case

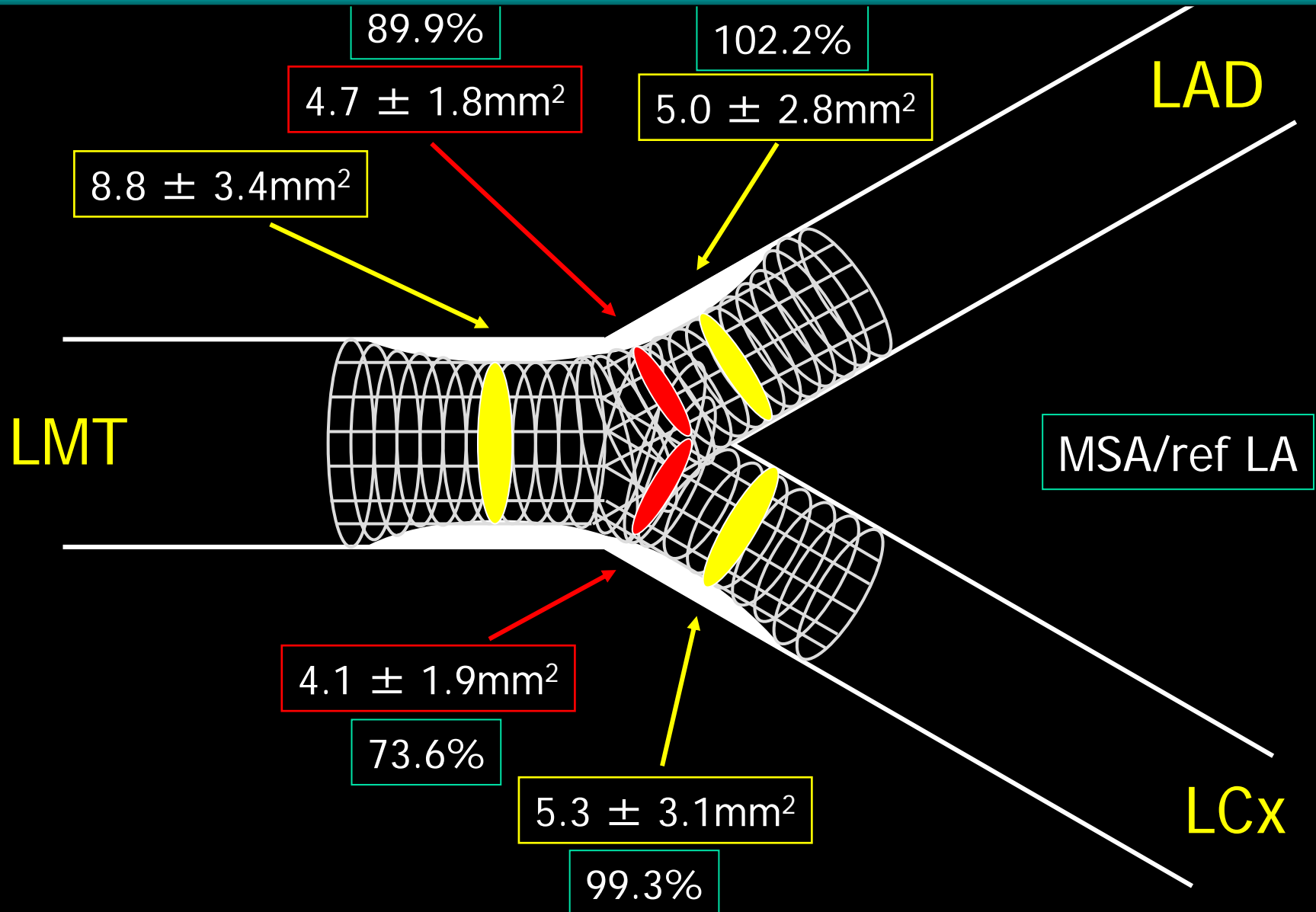
TVR case

	Type of restenosis Focal/Diffuse	Previous PCI	LMT type
Both restenosis	2/0	Ystent 2	Bif 2(100%)
Cx restenosis	8/0	Ystent 4 Tstent 1 Mod.V 3	Bif 8(100%)

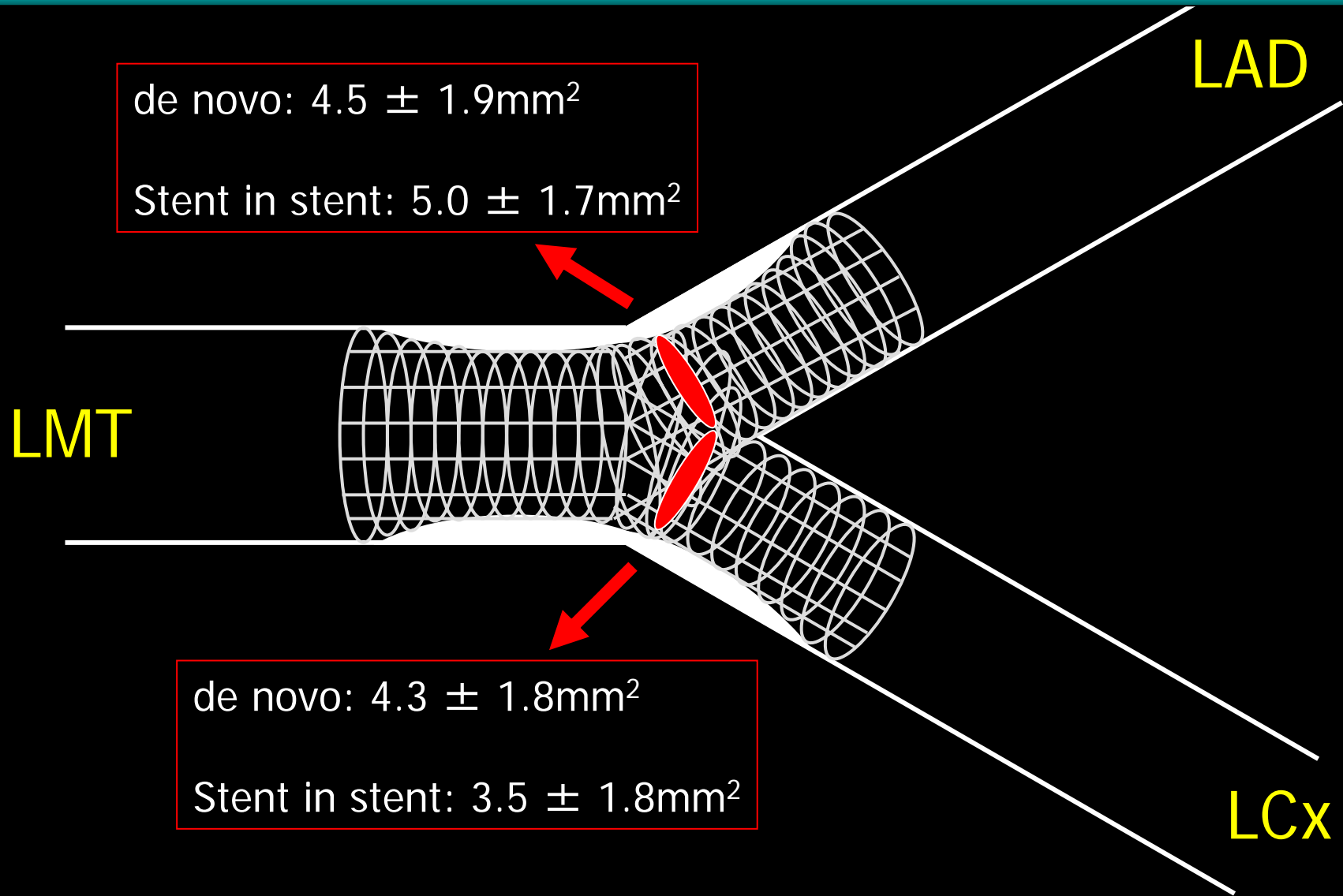
Pre-procedure



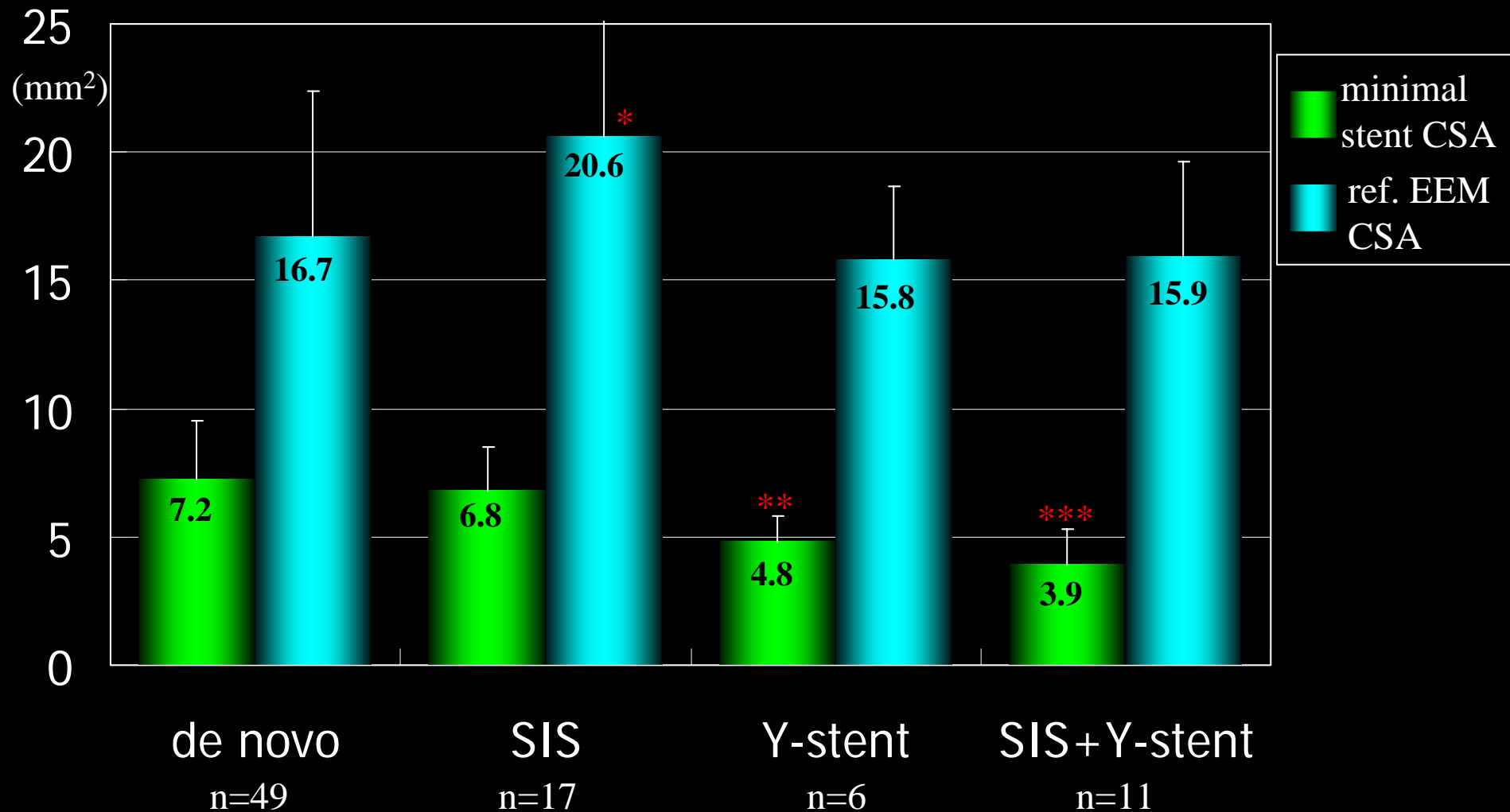
Post-procedure



Post-procedure



Minimal stent CSA, ref. EEM CSA



* p<0.05 vs de novo, Y-stent, SIS+Y-stent
** p<0.05 vs de novo, SIS
*** p<0.0001 vs de novo, SIS

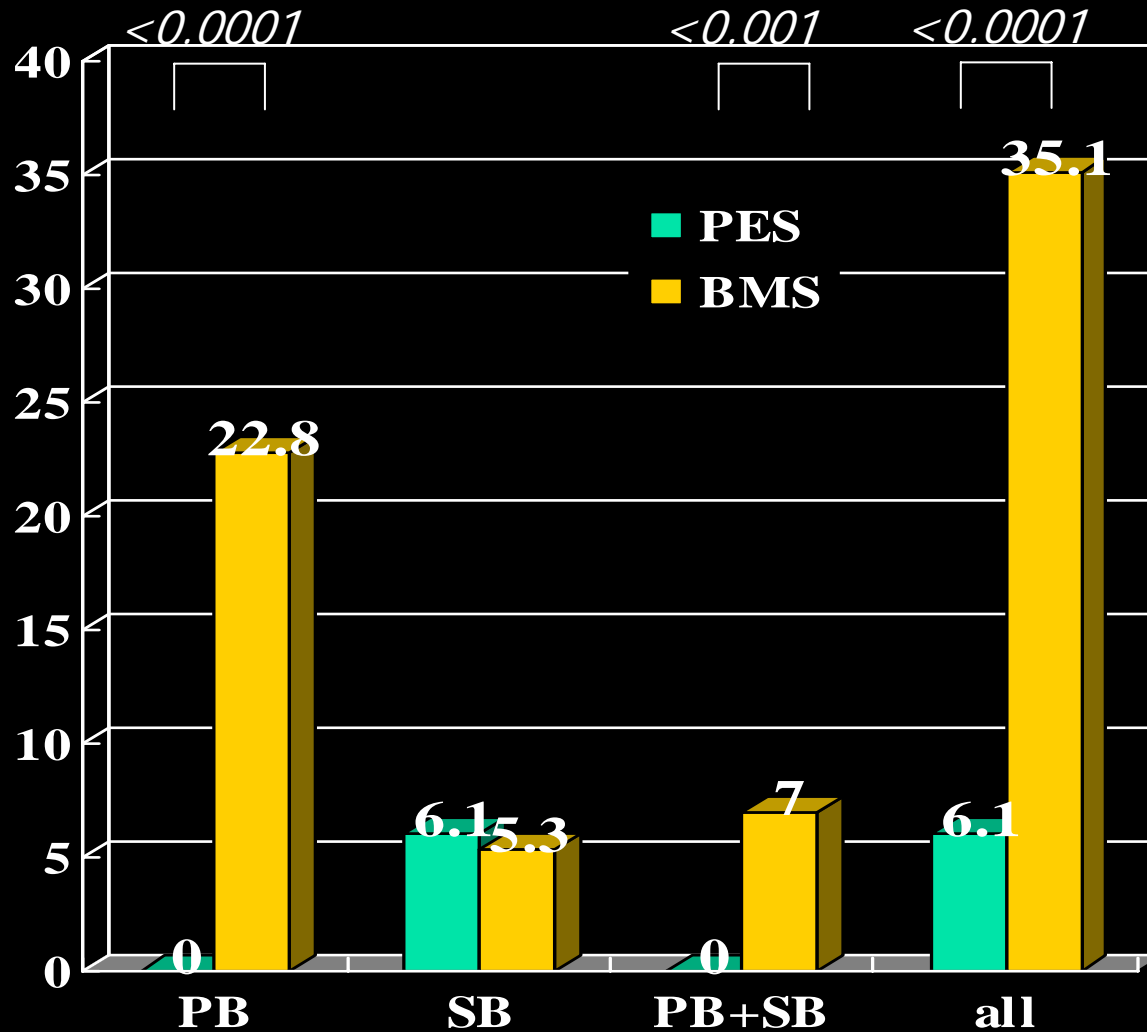
Paclitaxel eluting stent for LMT bifurcation

	PES	BMS	P value
N	49	57	
Death	0	4	<0.001
Death or MI	1	5	<0.001
TVR			
Repeat PCI	0	6(10.5%)	<0.001
CABG	1(2%)	9(15.7%)	<0.001
Death or MI or TVR	2(4%)	20(35%)	<0.001

Carrie D et al : Eur Interv 1. 396-402

Paclitaxel eluting stent for LMT bifurcation

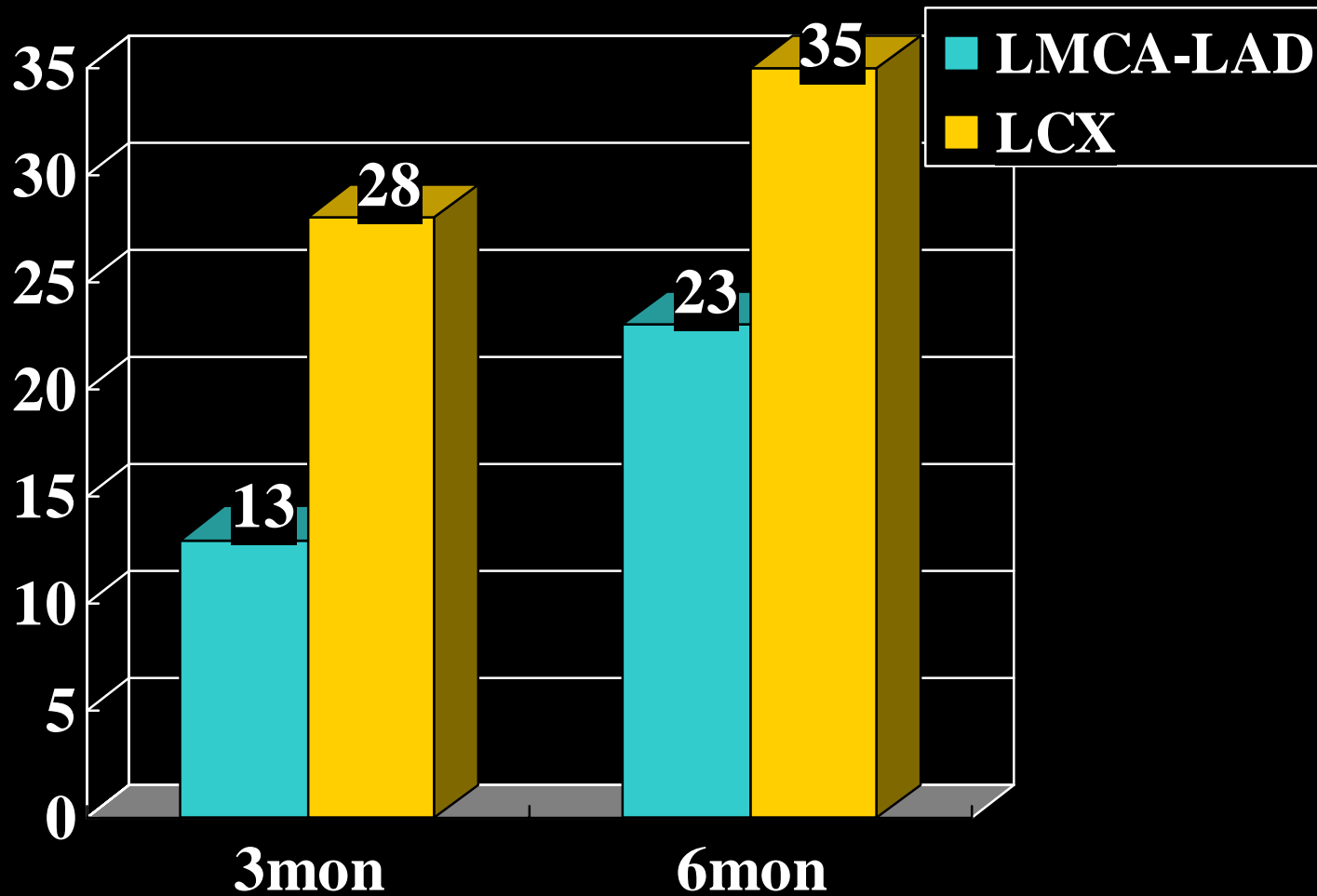
-Angiographic Restenosis-



Carrie D et al. : Eur Interv 1. 396-402

Kawasaki Social Insurance Hospital, Kanagawa, Japan

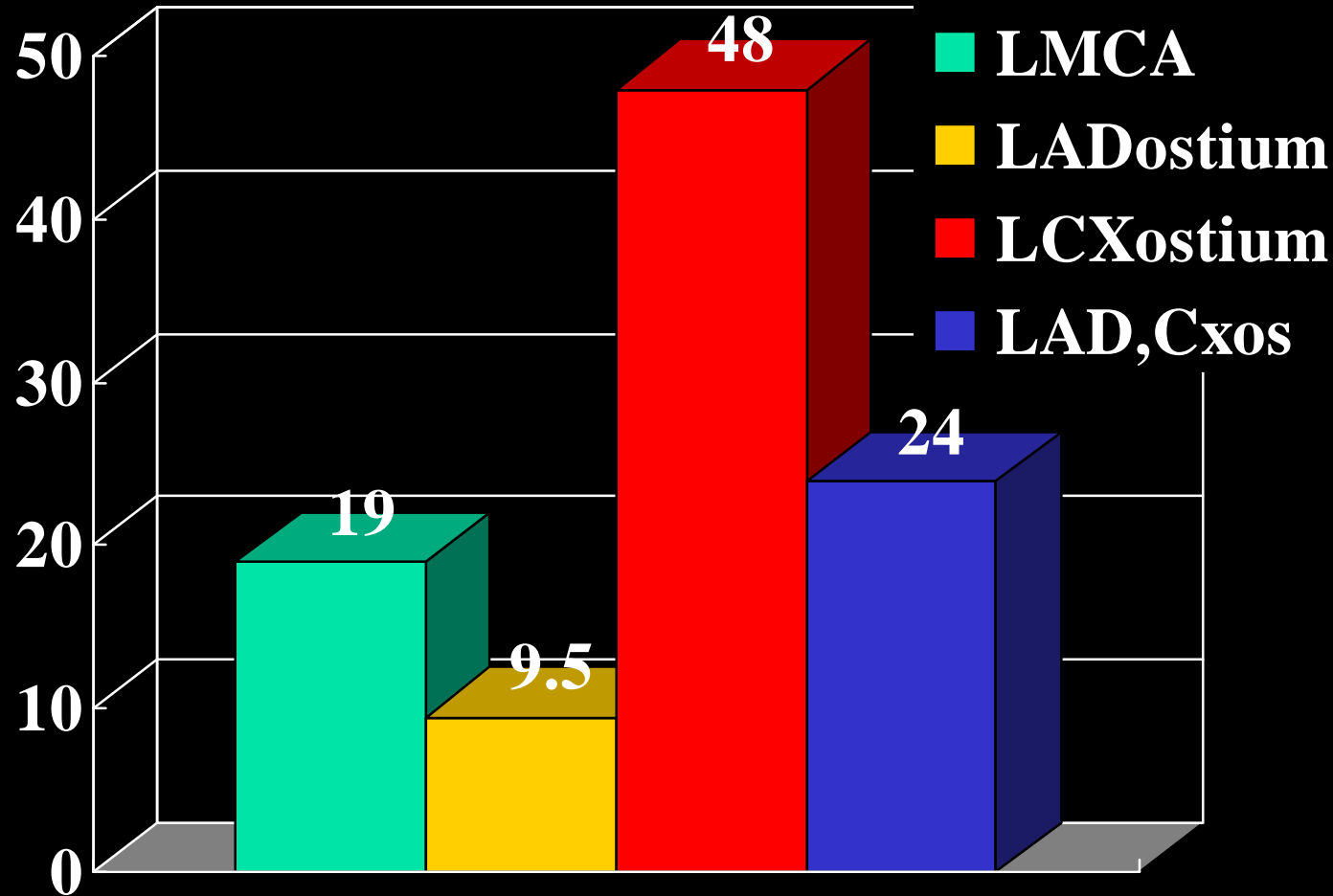
Sirolimus eluting stent for LMT bifurcation



Price MJ et al : JACC 47,871,06

Kawasaki Social Insurance Hospital, Kanagawa, Japan

Sirolimus eluting stent for LMT bifurcation



Price MJ et al : JACC 47,871,06

Kawasaki Social Insurance Hospital, Kanagawa, Japan

Technical Point of DES for Bifurcation

1. Preserve for main vessel is important.
2. Almost GW and Balloon can access the strut to side branch.
3. However, it care about $RD < 3.0\text{mm}$, calcium, tortous vessel.
3. Safe use of coating wire cross to side branch.
4. If Trapped wire occurred, 1.5mm balloon dilatation is useful
5. Never strongly withdraw of trapped guidewire.
6. Insufficient dilatation frequently occurred at intersection point especially LMT to CX.
7. Bifucation ISR lesion is highly restenosis cases.
8. Modified T-stenting will be hopeful??

Even DES Era

*One stent better than two stents
for Bifurcation*