

*Sirolimus-eluting Stent versus Balloon Angioplasty
for Sirolimus-eluting Stent Restenosis:*

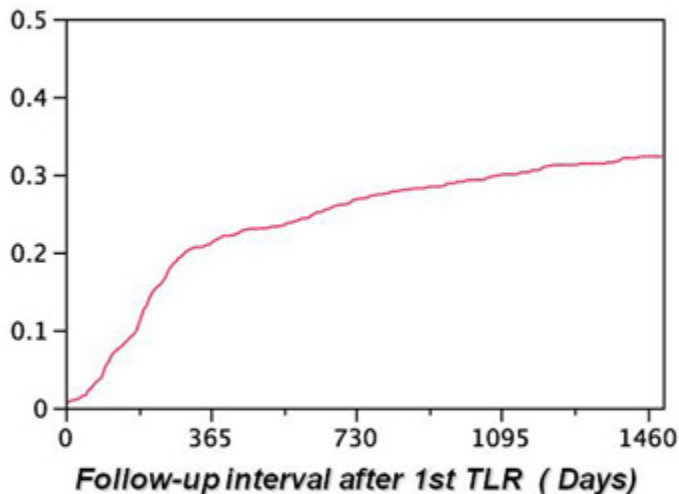
Insights from the j-Cypher Registry

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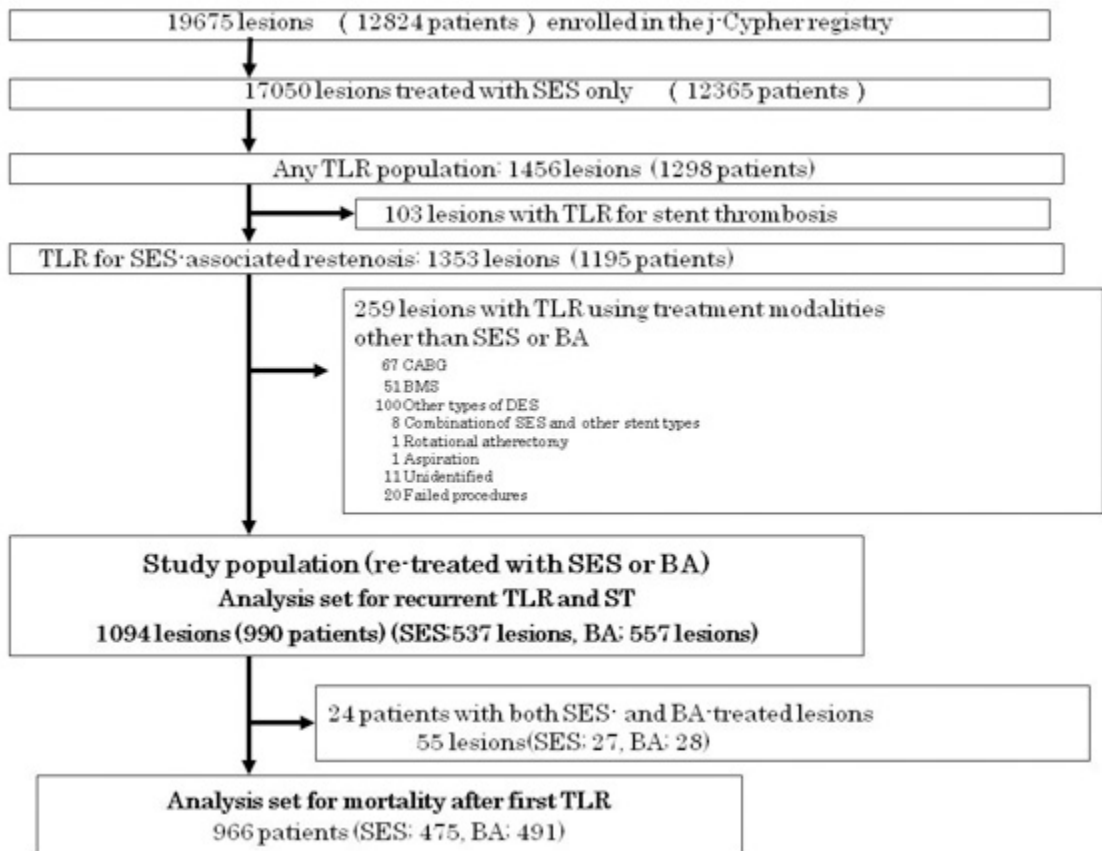


Kyoto University Hospital Cardiovascular Medicine

After Successful First TLR for SES Restenosis

	180 Days	1 Yr	2 Yrs	3 Yrs	4 Yrs	
	10.1%	21.1%	26.8%	30.1%	32.3%	
<i>N of lesions at risk</i>	1984	1577	1192	835	572	345

*Restenosis of SES is relatively refractory to repeated treatment.
Optimal strategy to manage SES restenosis has not been defined yet.*



Baseline Clinical Characteristics (*Initial SES Implantation*)

Characteristics	SES (n=475)	BA (n=491)	P Value
Age, years	67.4±10.2	67.7±10.0	0.6
Male	366 (77%)	382 (78%)	0.8
Body mass index	23.7±3.5	23.9±3.3	0.4
Hypertension	361 (76%)	373 (76%)	1.0
Diabetes mellitus	225 (47%)	286 (58%)	0.0007
Current smoking	89 (19%)	86 (18%)	0.6
eGFR<30,without hemodialysis	23 (6%)	26 (6%)	0.7
Hemodialysis	61 (13%)	76 (15%)	0.2
Acute coronary syndrome	110 (23%)	95 (19%)	0.1
Prior myocardial infarction	135 (28%)	149 (30%)	0.5
Prior stroke	51 (11%)	49 (10%)	0.7
Peripheral vascular disease	82 (17%)	65 (13%)	0.08
Prior heart failure	60 (13%)	57 (12%)	0.6
Single-vessel disease	163 (34%)	183 (37%)	0.1
Ejection fraction =<40%	55 (12%)	57 (12%)	1.0

Baseline Lesion Characteristics (Initial SES Implantation)

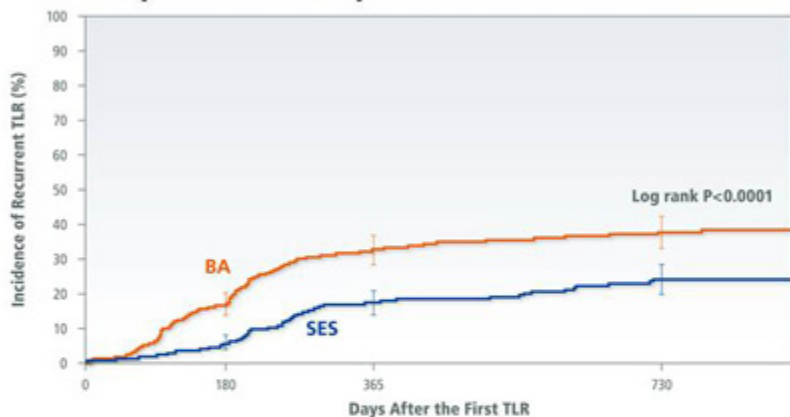
	SES (n=537)	BA (n=557)	P Value
Lesion location			0.003
LAD	223 (42%)	200 (36%)	
LCx	66 (12%)	101 (18%)	
RCA	205 (38%)	210 (38%)	
LMCA	22 (4%)	37 (7%)	
Saphenous vein graft	19 (4%)	7 (1%)	
De novo lesion	388 (72%)	359 (64%)	0.006
In-stent restenosis	80 (15%)	145 (26%)	<0.0001
Chronic total occlusion	57 (11%)	81 (15%)	0.050
Severe calcification	84 (16%)	89 (16%)	0.9
Bifurcation lesion	121 (23%)	143 (26%)	0.2
Side branch stenting	34 (6%)	58 (10%)	0.01
Lesion length \geq 30 mm	125 (23%)	169 (30%)	0.01
Reference diameter $<$ 2.5 mm	166 (31%)	170 (31%)	0.9

Procedural Characteristics (*Initial SES Implantation*)

	SES (n=537)	BA (n=557)	P Value
Use of intravascular ultrasound	258 (48%)	210 (38%)	0.0005
Direct stenting	100 (19%)	55 (10%)	<0.0001
Additional dilatation	267 (50%)	281 (50%)	0.8
Maximum inflation pressure, atm	18.2±3.4	18.5±3.5	0.2
Number of stents used, median (IQR)	1 (1-2)	1 (1-2)	0.0003
Length of stents used, median (IQR), mm	28 (18-46)	33 (23-51)	0.0003
Minimal stent size, median (IQR), mm	3.0 (2.5-3.0)	2.5 (2.5-3.0)	0.001

Incidence of Recurrent TLR

Repeated SES Implantation versus BA

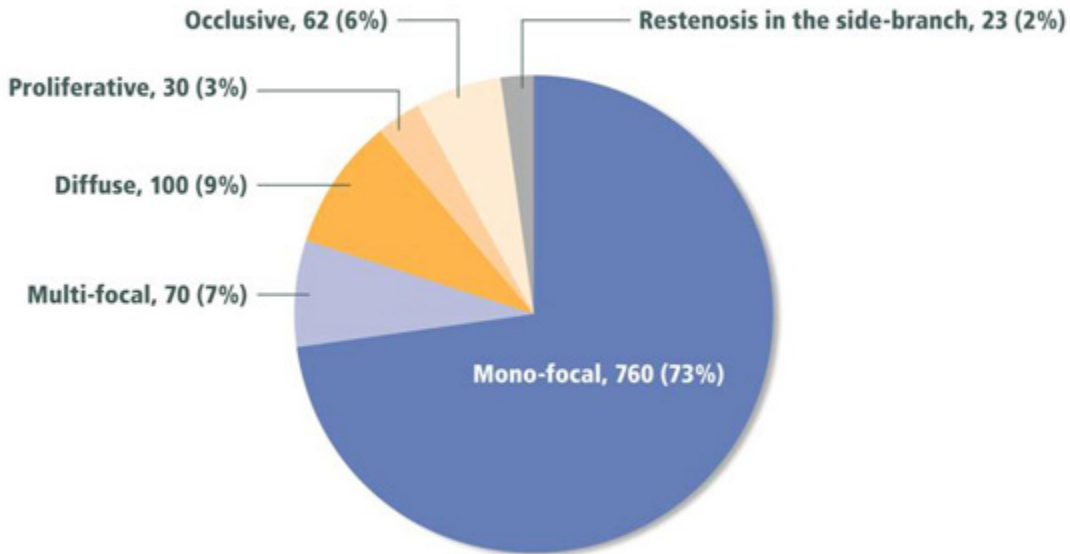


Days after the First TLR	0	180	365	730
BA				
Cumulative incidence		16.8%	32.4%	37.7%
Number of events		85	154	171
Number of lesions at risk	557	387	270	123
SES				
Cumulative incidence		5.7%	17.0%	23.8%
Number of events		28	77	97
Number of lesions at risk	537	440	327	156

Univariate and Multivariable Analysis Risk Factors for Recurrent TLR Within One Year after Treatment of SES-associated Restenosis

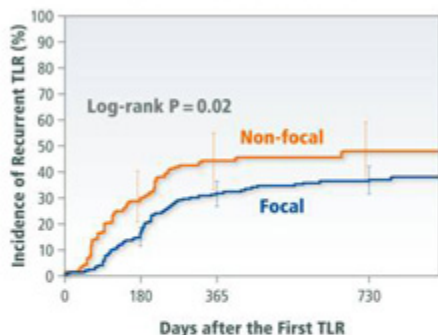
	Univariate	Multivariable	p value
	O.R. (95%CI)	O.R. (95%CI)	
SES-implantation (vs. BA)	0.41 (0.30 to 0.56)	0.44 (0.32 to 0.61)	<0.0001
Hemodialysis	1.95 (1.29 to 2.94)	1.61 (1.02 to 2.53)	0.04
Prior heart failure	1.62 (1.05 to 2.48)	1.44 (0.91 to 2.26)	0.1
De novo lesion	0.70 (0.51 to 0.96)	0.90 (0.55 to 1.51)	0.7
In-stent restenosis	1.56 (1.09 to 2.22)	1.21 (0.69 to 2.16)	0.5
Severe calcification	1.74 (1.10 to 2.54)	1.53 (0.99 to 2.33)	0.054
Use of IVUS	0.69 (0.50 to 0.94)	0.78 (0.56 to 1.09)	0.1
Direct stenting	0.49 (0.27 to 0.82)	0.70 (0.39 to 1.22)	0.2

Angiographic Patterns of SES-associated Restenosis

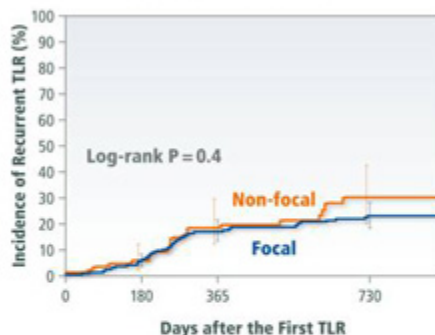


Cumulative Incidence of Recurrent TLR: Focal versus Non-focal RES

(A) BA-treated Lesions



(B) SES-treated Lesions

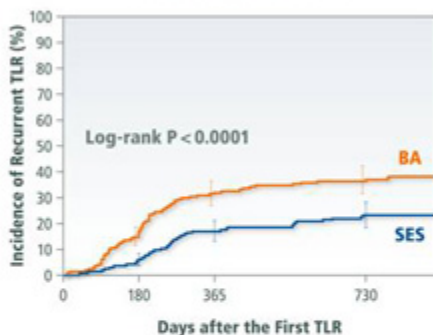


Days after the First TLR	0	180	365	730
Non-focal				
Cumulative incidence		29.8%	43.8%	47.7%
Number of events		25	35	37
Number of lesions at risk	92	54	38	22
Focal				
Cumulative incidence		14.7%	31.5%	36.8%
Number of events		56	112	125
Number of lesions at risk	422	301	206	90

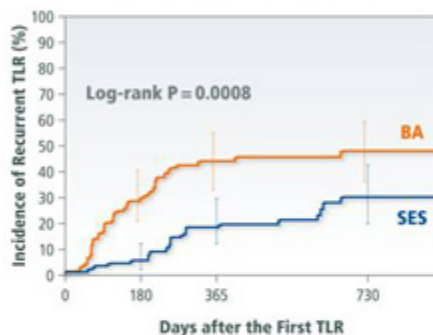
Days after the First TLR	0	180	365	730
Non-focal				
Cumulative incidence		5.4%	19.5%	30.1%
Number of events		5	16	21
Number of lesions at risk	100	80	59	23
Focal				
Cumulative incidence		5.6%	16.8%	23.0%
Number of events		21	58	72
Number of lesions at risk	408	337	249	120

Cumulative Incidence of Recurrent TLR: SES versus BA

(A) Focal Restenosis



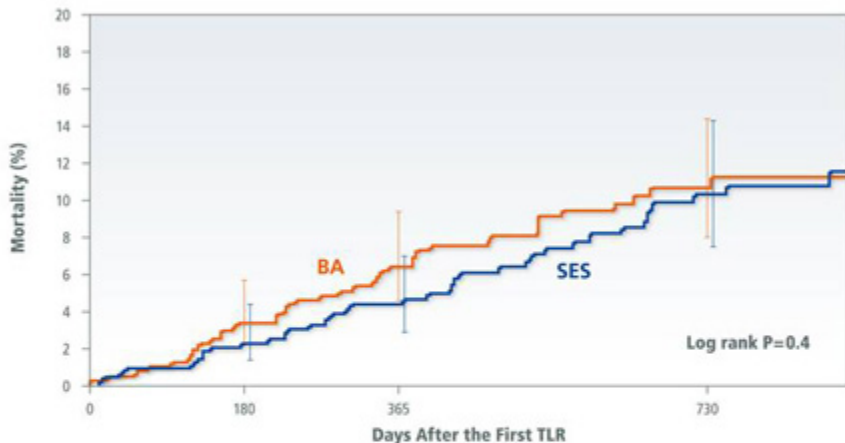
(B) Non-focal Restenosis



Days after the First TLR	0	180	365	730
BA				
Cumulative incidence		14.7%	31.5%	36.8%
Number of events		56	112	125
Number of lesions at risk	422	301	206	90
SES				
Cumulative incidence		5.6%	16.8%	23.0%
Number of events		21	58	72
Number of lesions at risk	408	337	249	120

Days after the First TLR	0	180	365	730
BA				
Cumulative incidence		29.8%	43.8%	47.7%
Number of events		25	35	37
Number of lesions at risk	92	54	38	22
SES				
Cumulative incidence		5.4%	19.5%	30.1%
Number of events		5	16	21
Number of lesions at risk	100	80	59	23

Cumulative Incidence of Death after First TLR: SES versus BA



Days after the First TLR	0	180	365	730
BA				
Overall mortality		3.5%	6.6%	10.8%
Number of events		16	28	41
Number of patients at risk	491	414	354	174
SES				
Overall mortality		2.5%	4.5%	10.4%
Number of events		11	19	36
Number of patients at risk	475	414	350	186

Cumulative Incidence of Stent Thrombosis: SES versus BA



Days after the First TLR	0	180	365	730
BA				
Cumulative incidence		0.4%	0.6%	0.6%
Number of events		2	3	3
Number of lesions at risk	557	462	393	191
SES				
Cumulative incidence		0.2%	0.2%	0.6%
Number of events		1	1	2
Number of lesions at risk	537	464	393	209

Study Limitations

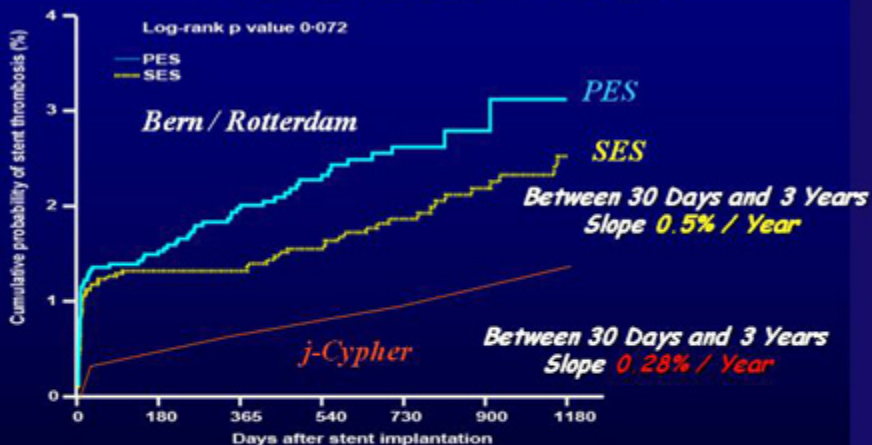
1. Selection of treatment strategies for SES-associated restenosis were not randomized but were left to the discretion of the individual operators.
2. TLR procedures constituting the study population were follow-up events in the j-Cypher registry. Although we had extensive data on clinical, lesion and procedural characteristics at the time of the index procedures, information other than treatment modalities for TLR and angiographic findings were not collected at the time of the TLR procedures.
3. We could not discriminate between clinically- and angiographically-driven TLR. It is likely that the routine follow-up angiography performed in many Japanese centers might increase the rate of angiographically-driven TLR.

Conclusions

Repeated implantation of SES for treatment of SES-associated restenosis is more effective in preventing recurrent TLR than treatment with BA, without signals suggesting safety concerns.

Definite Stent Thrombosis

Bern/Rotterdam vs j-Cypher



Bern / Rotterdam

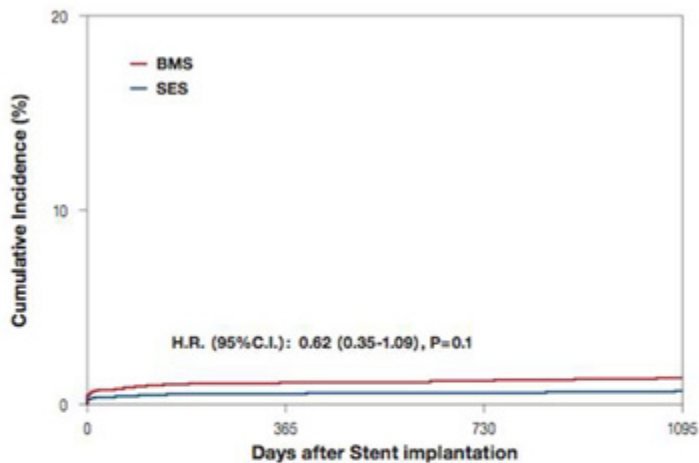
Incidence, PES (%)	1.2	1.3	2.0	2.7	3.2
Patients at risk (n)	3626	3493	2667	1131	68
Incidence, SES (%)	1.0	1.1	1.3	1.9	2.5
Patients at Risk (n)	3535	3508	2671	1710	903

j-Cypher

Cumulative Incidence (%)	0.3	0.4	0.6	0.8	1.2
Patients at Risk (n)	12682	12625	11843	9036	4191

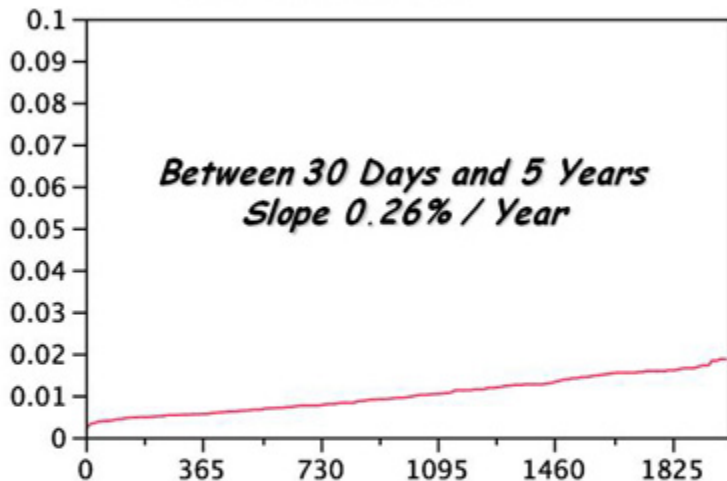
CREDO-Kyoto PCI/CABG Registry Cohort-2

Adjusted Event Curves for Definite ST



Interval	0 day	30 days	1 year	2 years	3 years
BMS group					
N of patients at risk	5405	5097	4673	3631	2027
Incidence		0.7%	1.0%	1.1%	1.3%
SES group					
N of patients at risk	5092	4994	4753	3889	2029
Incidence		0.3%	0.5%	0.6%	0.6%

ARC Definite



Follow-up interval (Days)

	30 Days	1 Yr.	2 Yrs.	3 Yrs.	4 Yrs.	5 Yrs.
<i>Cumulative incidences</i>	0.34%	0.55%	0.76%	1.03%	1.33%	1.6%
<i>N of pts at risk</i>	12812	12627	11967	10813	9244	7640

4431

Characteristics of Late ST

	Early ST	Late ST	Very late ST	p value		
	N=322	N=105	N=184	EST vs. LST	EST vs. VLST	LST vs. VLST
Body mass index	23.8±3.4	22.3±3.4	24.2±3.4	0.0002	0.23	0.0001
Heart failure	19%	33%	13%	0.003	0.11	0.0001
Diabetes	43%	54%	32%	0.04	0.02	0.0002
Insulin use	11%	22%	5.1%	0.005	0.03	0.0001
Hypertension	72%	84%	69%	0.01	0.54	0.006
Hemodialysis	4.4%	29%	4.9%	0.0001	0.78	0.0001

Characteristics of Very Late ST

	Early ST	Late ST	Very late ST	p value		
	N=322	N=105	N=184	EST vs. LST	EST vs. VLST	LST vs. VLST
Age (years)	67.1 ± 10.7	68.0±10.8	62.9±12.3	0.46	0.0001	0.0003
Diabetes	43%	54%	32%	0.04	0.02	0.0002
Insulin use	11%	22%	5.1%	0.005	0.03	0.0001
Current smoker	31%	27%	42%	0.38	0.01	0.0007
Statin use	46%	43%	57%	0.67	0.02	0.03
Average stent diameter (mm)	2.88±0.36	2.88±0.34	2.96±0.35	0.99	0.01	0.06
Single vessel disease	37%	33%	45%	0.52	0.08	0.06

Risk Factors for Early ST of SES CYPHER Registry

Variables	Present	Absent	Univariate	p value	Multivariable	p Value
	N of events /N of patients	N of events /N of patients	H.R. (95%CI)		H.R. (95%CI)	
Acute coronary syndrome	19/3178 (0.6%)	25/9634 (0.3%)	2.32 (1.26-4.19)	0.008	2.16 (1.17-3.92)	0.01
Proximal LAD target	30/6590 (0.5%)	14/6222 (0.2%)	2.03 (1.1-3.94)	0.02	1.87 (1.01-3.64)	0.048
Prior heart failure	11/1791 (0.6%)	33/11021 (0.3%)	2.07 (0.997-3.96)	0.051		
Male gender	38/9643 (0.4%)	6/3169 (0.2%)	2.08 (0.95-5.47)	0.07		
Body mass index < 25.0	23/8332 (0.3%)	21/4476 (0.5%)	0.59 (0.33-1.07)	0.08		
IVUS-use	26/6063 (0.4%)	18/6698 (0.3%)	1.6 (0.88-2.96)	0.12		
Side-branch stenting	5/730 (0.7%)	39/12072 (0.3%)	2.13 (0.73-4.92)	0.15		
Age ≥ 80 years	3/1664 (0.2%)	41/11148 (0.4%)	0.49 (0.12-1.35)	0.19		

Risk Factors for Late ST of SES J-CYPHER Registry

Variables	Present	Absent	Univariate	p value	Multivariable	p Value
	N of events/N of patients	N of events/N of patients	H.R. (95%CI)		H.R. (95%CI)	
	(1-Year Incidence)	(1-Year Incidence)				
Diabetes mellitus	20/5312 (0.4%)	6/7500 (0.1%)	4.75 (2.03-13.0)	0.0002	1.51 (1.3-1.76)	<0.001
Hemodialysis	7/680 (1.2%)	19/12132 (0.2%)	7.19 (2.81-16.4)	0.0002	5.61 (2.1-13.62)	0.001
Side-branch stenting	7/730 (1.0%)	19/12072 (0.2%)	6.21 (2.43-14.14)	0.0005	5.1 (1.83-12.5)	<0.001
Body mass index < 25.0	22/8332 (0.3%)	4/4476 (0.1%)	3.0 (1.15-10.27)	0.02	2.75 (1.04-9.45)	0.04
ESRD without hemodialysis	4/628 (0.7%)	22/12184 (0.2%)	3.86 (1.13-10.1)	0.03	4.21 (1.19-11.73)	0.03
Unprotected LMCA target	4/582 (0.7%)	22/12230 (0.2%)	3.93 (1.15-10.3)	0.03	1.72 (0.47-5.09)	0.38

Risk Factors for Very Late ST of SES

J-CYPHER Registry

Variables	Present	Absent	Univariate	p value	Multivariable	p Value
	N of events /N of patients	N of events /N of patients	H.R. (95%CI)		H.R. (95%CI)	
	(5-Year Incidence)	(5-Year Incidence)				
Current smoking	37/2604 (2.0%)	65/10208 (0.8%)	2.32 (1.53-3.45)	0.0001	2.02 (1.33-3.04)	0.001
Multi-vessel stenting	36/3568 (1.3%)	66/9244 (0.9%)	1.55 (1.02-2.31)	0.04	1.54 (1.02-2.3)	0.04
Male gender	88/9643 (1.2%)	14/3169 (0.6%)	2.0 (1.18-3.66)	0.009	1.61 (0.93-2.99)	0.09
Age \geq 80 years	4/1664 (0.3%)	98/11050 (1.1%)	0.36 (0.11-0.87)	0.02	0.44 (0.14-1.07)	0.07
Acute coronary syndrome	32/3178 (1.5%)	70/9634 (0.9%)	1.52 (0.99-2.29)	0.06		
Prior heart failure	6/1791 (0.3%)	96/11028 (1.1%)	0.51 (0.2-1.07)	0.08		
Lesion length \geq 30 mm	27/2574 (1.5%)	74/9954 (1.0%)	1.48 (0.93-2.26)	0.09		
Peripheral vascular disease	7/1523 (0.7%)	95/11289 (1.1%)	0.62 (0.26-1.24)	0.19		

Early ST

Acute Coronary Syndrome, Proximal LAD Target

Late ST

Diabetes, Hemodialysis, Side-branch Stenting,
Small BMI, ESRD pre HD

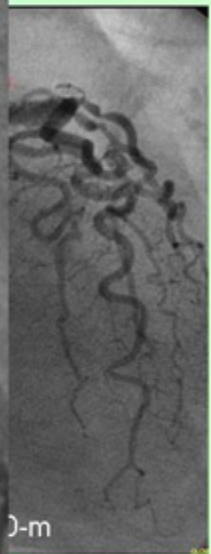
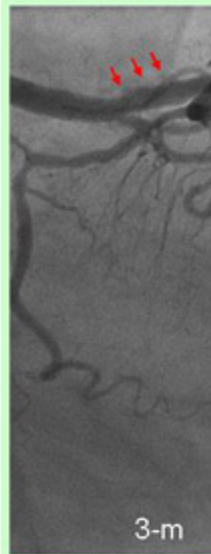
Very Late ST

Current Smoking, Multi-vessel Stenting

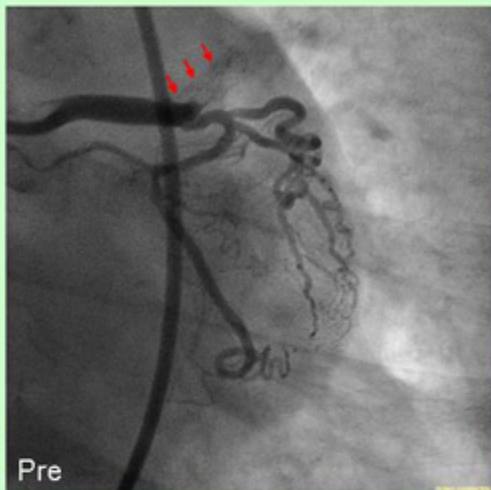
PSS+VLST

f/u CAG

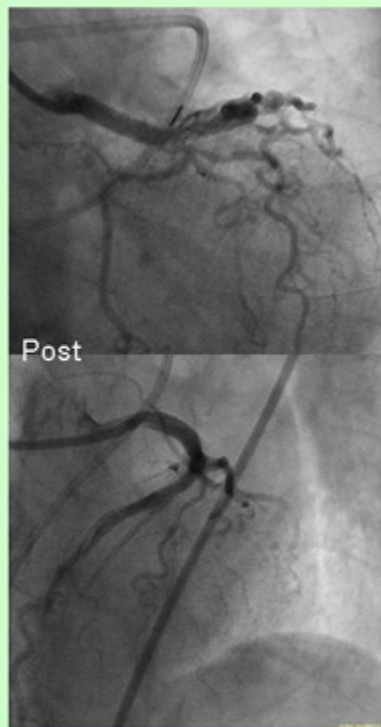
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Courtesy of Dr Imai (Kurashiki Central Hospital)



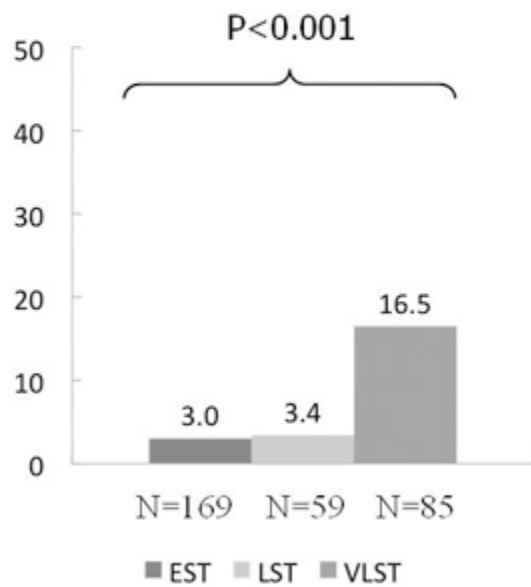
Driver 3.0x30mm



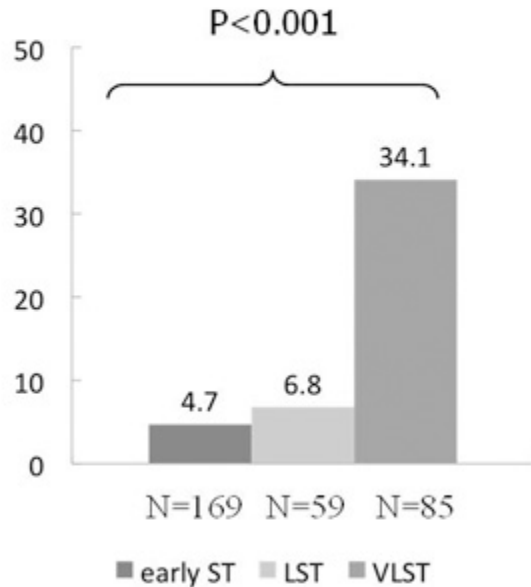
AMI due to very late stent thrombosis
After 3 years of SES implantation

RESTART Angiographic Substudy in 313 Patients

Prevalence of Stent Fracture and PSS

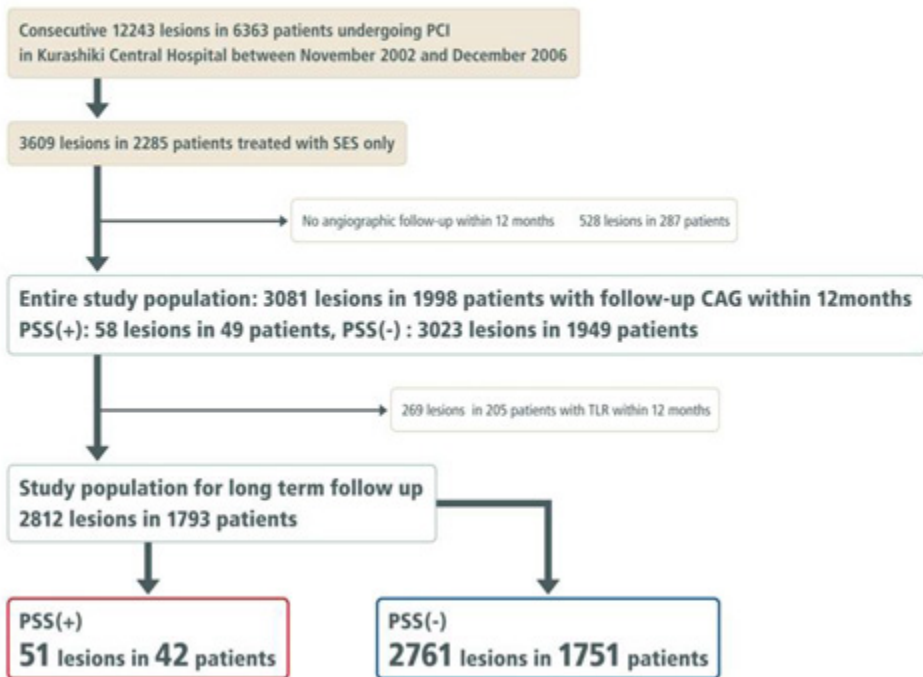


Stent Fracture

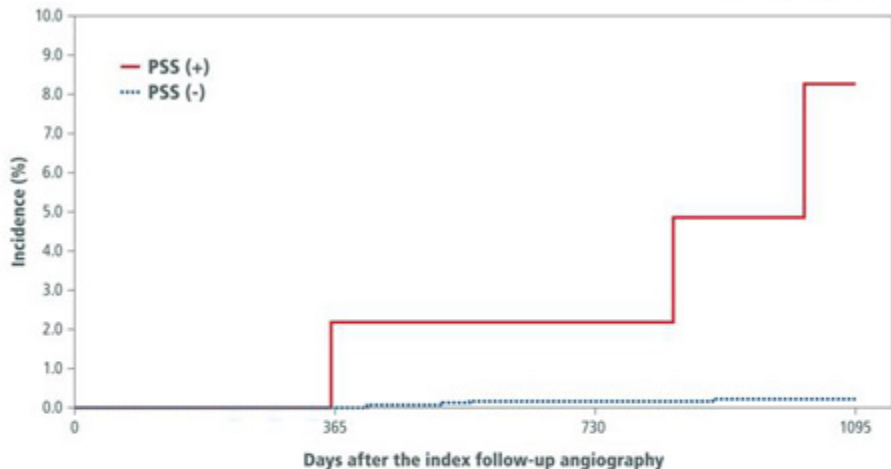


PSS

Incidence, Risk Factors, and Clinical Sequelae of Angiographic Peri-Stent Contrast Staining after Sirolimus-eluting Stent Implantation



Cumulative Incidence of ST After the Index Follow-up Angiography



Days	0	365	730	1095
PSS (+) N of lesions at risk	51	46	40	26
N of lesions with events	0	1	1	3
Cumulative incidence	0%	2.1%	2.1%	8.2%
PSS (-) N of lesions at risk	2761	2532	1847	580
N of lesions with events	0	0	3	4
Cumulative incidence	0%	0%	0.13%	0.2%

j-Cypher PSS

Definition & Morphological Classification: Peri-Stent contrast Staining (PSS)

Definition*:

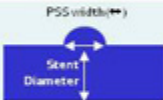





PSS was defined as contrast staining outside the stent extending to $\geq 20\%$ of stent diameter

Maximum contrast staining outside the stent $> 20\%$ of stent diameter at the same site

Example:

If measured stent diameter at the site of maximum contrast staining was 3.0mm, PSS was defined as contrast staining outside the stent $\geq 0.6\text{mm}$ (20%).

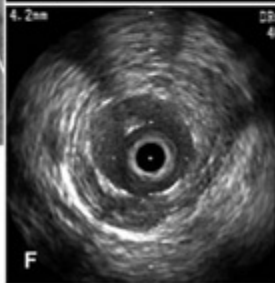
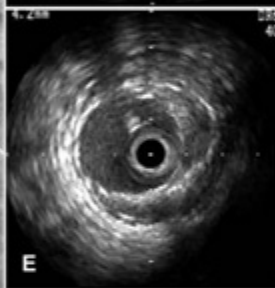
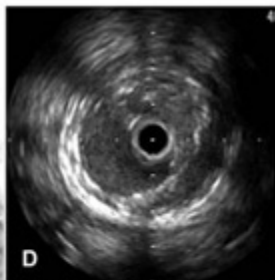
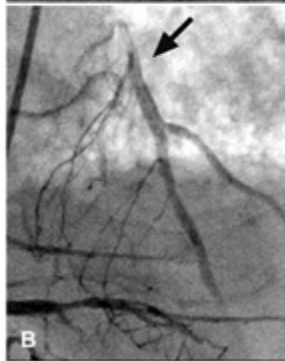
Stent diameter

Classification of PSS Morphology	Definition
Focal 	PSS width \leq Stent diameter
Mono-focal 	Single focal PSS at the stented segment
Multi-focal 	Multiple focal PSS at the stented segment
Segmental** 	PSS width $>$ Stent diameter
Irregular-contour*** 	Segmental PSS with irregular contour
Smooth-contour 	Segmental PSS with smooth contour

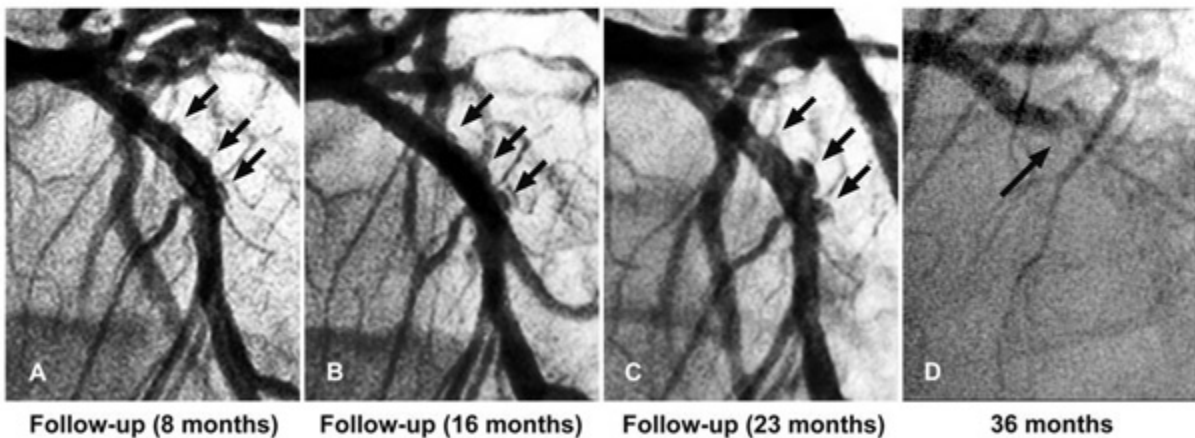
*:including aneurysm

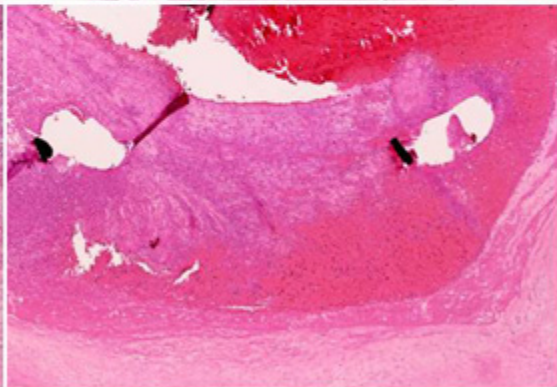
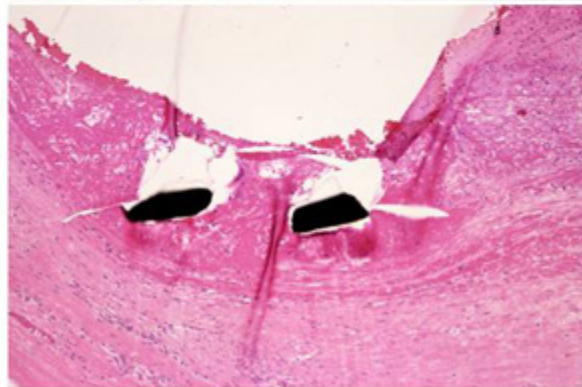
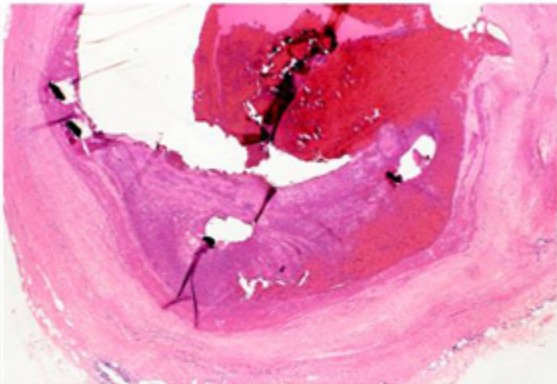
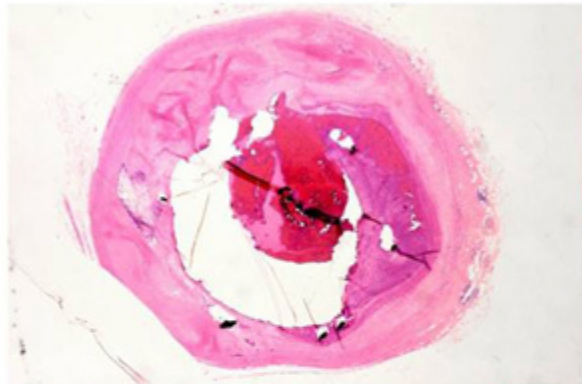
** :including coexisting focal type PSS

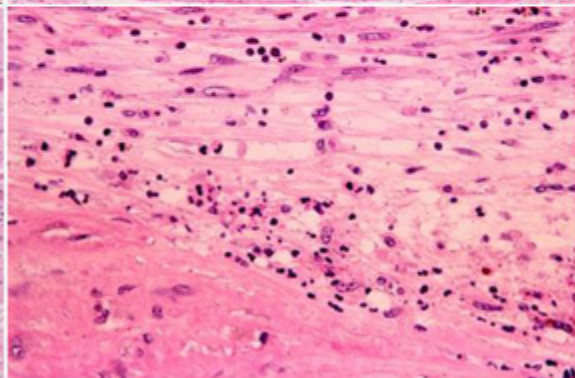
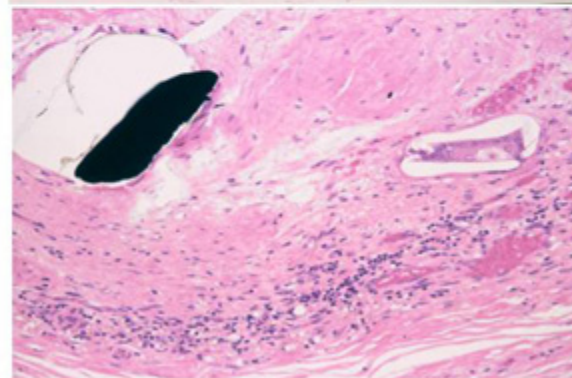
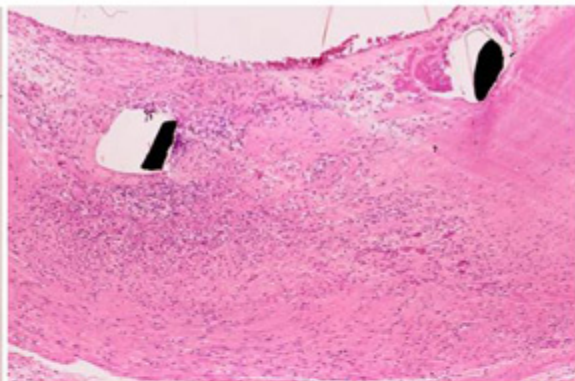
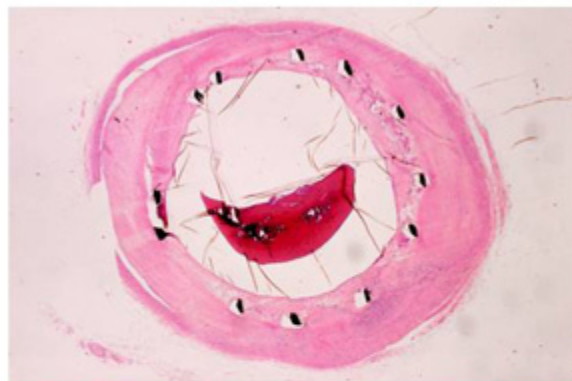
***:including coexisting smooth contour type

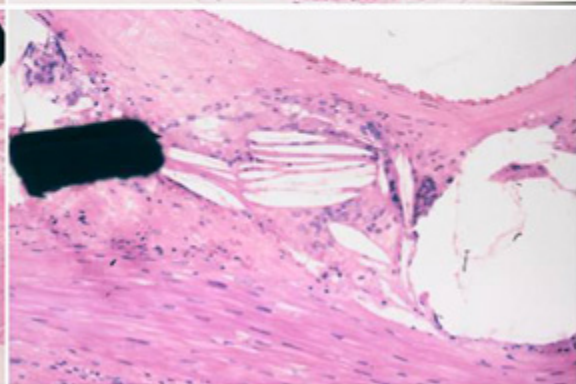
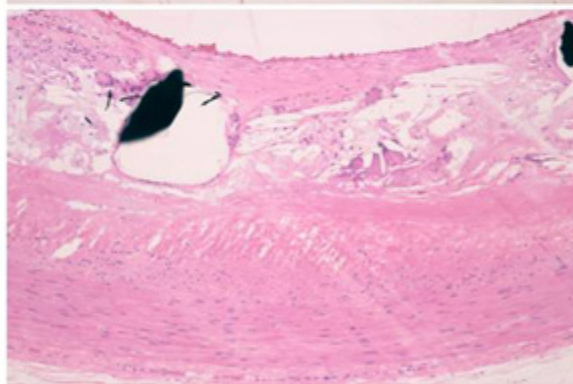
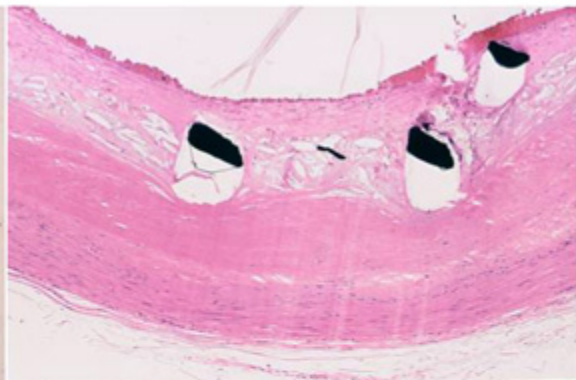
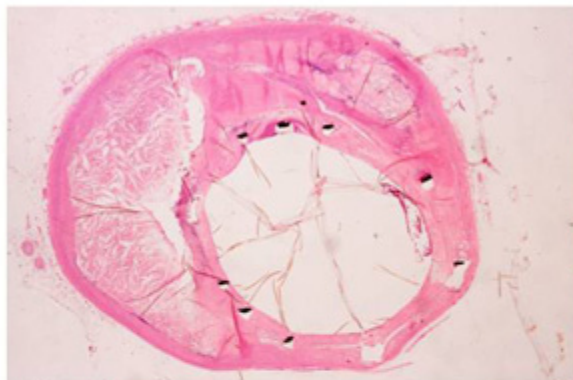


Progressive PSS and Very Late Stent Thrombosis









Mechanisms of Stent Thrombosis

Multi-factorial and Different According to the Timing of ST

Procedural Factors

- Inadequate stent expansion*
- Residual dissection*
- Bifurcation stenting using 2-stents approach*
- Multiple stenting in diffuse disease*

Pro-thrombotic Milieu

- Acute coronary syndrome*
- Diabetes*
- Renal failure*



*Stent
Thrombosis*

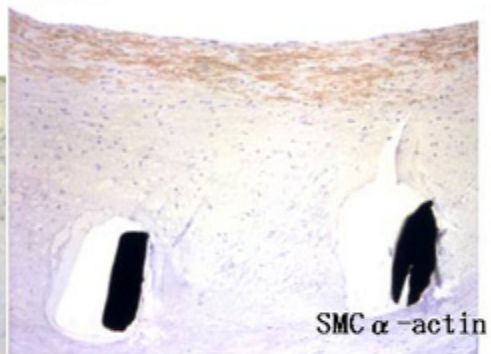
Platelet Activation

- Discontinuation of anti-platelet Tx.*
- Resistance to anti-platelet Tx.*
- Activation of platelets (e.g. surgery)*

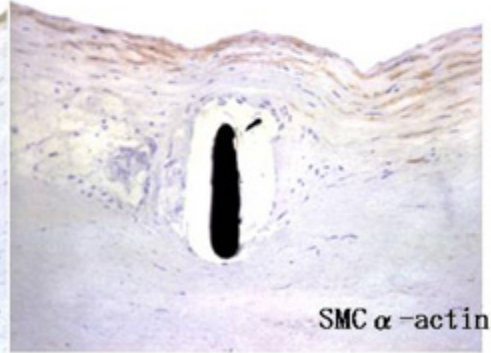
Pathology of the Vessel Wall

- Delayed healing*
- Inflammation*
- Hypersensitivity*
- Vulnerable neointima*

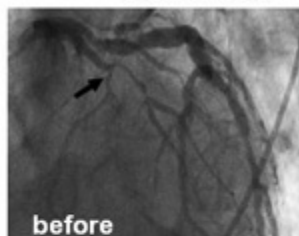
SES 1Y1M



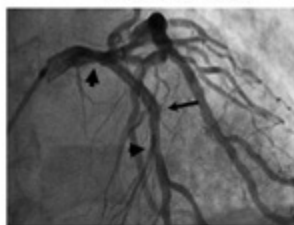
SES 2Y2M



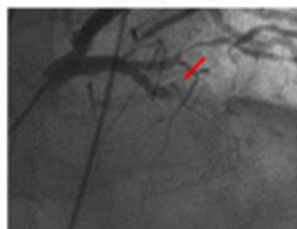
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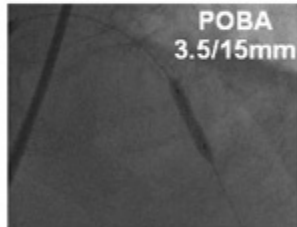
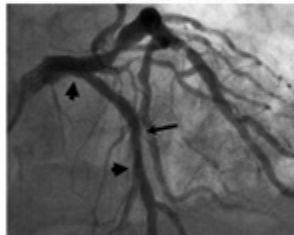
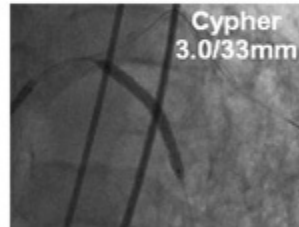
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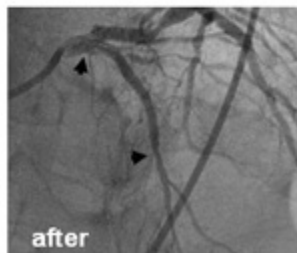
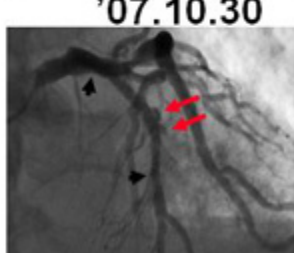
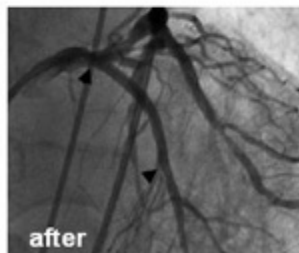
'08.02.10



'07.03.03

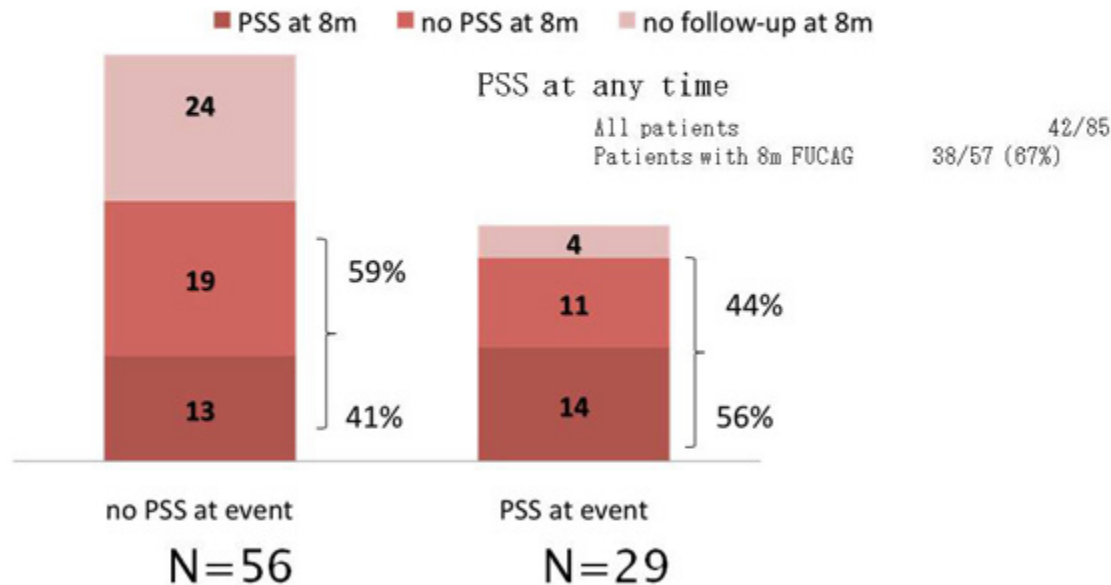


'07.10.30



RESTART Angiographic Substudy

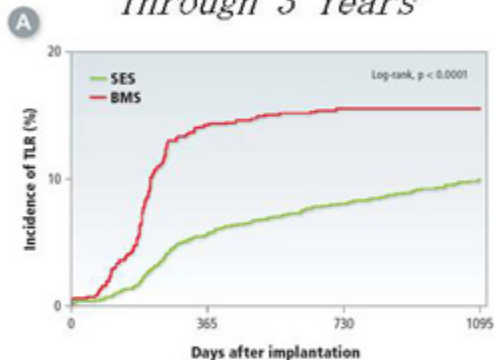
Prevalence of PSS at 8-month FUCAG in Patients with VLST



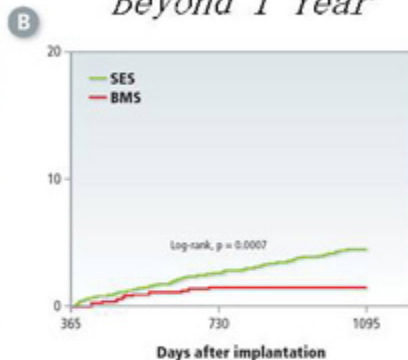
Late Catch-up Phenomenon

Incidences of TLR: SES vs. BMS

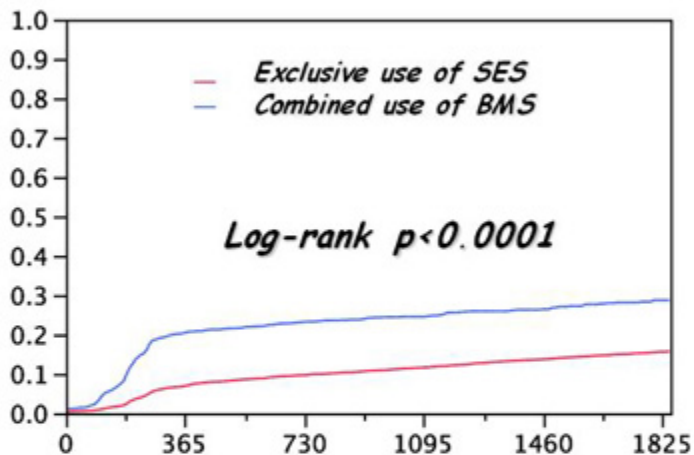
Through 3 Years



Beyond 1 Year



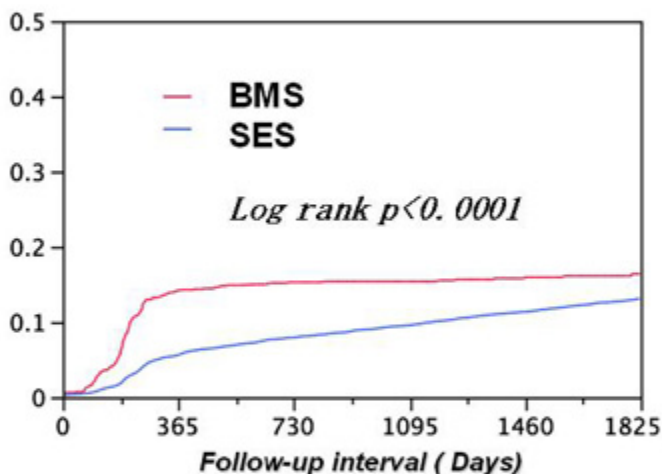
Days after implantation	0	365	730	1095	365	730	1095
Incidence of TLR							
SES	0%	5.7%	8.1%	10.0%	0%	2.6%	4.5%
BMS	0%	14.2%	15.5%	15.5%	0%	1.4%	1.4%
Number of events							
SES	0	926	1260	1409	0	334	483
BMS	0	169	181	181	0	12	12
Number of lesions at risk							
SES	17050	14944	11142	5054	14944	11142	5054
BMS	1259	980	721	329	980	721	329



Follow-up interval (Days)

	30 Days	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs
<i>Combined use of BMS</i>	1.2%	20.5%	23.2%	24.5%	26.3%	28.7%
<i>n of pts at risk</i>	1456	1076	928	744	582	332
<i>Exclusive use of SES</i>	0.5%	6.9%	9.7%	11.7%	13.7%	15.6%
<i>n of pts at risk</i>	10778	10623	9450	8358	7142	5933

(Based on Lesion)

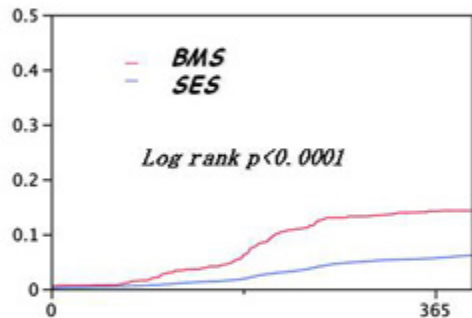


		1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs
BMS		14.2%	15.3%	15.4%	15.8%	16.4%
<i>N at risk</i>	1259	993	881	728	558	295
SES		5.7%	8.0%	9.6%	11.3%	13.1%
<i>N at risk</i>	17050	15100	13322	11205	9213	5154

Target Lesion Revascularization J-CYPHER Registry

(Based on Lesion)

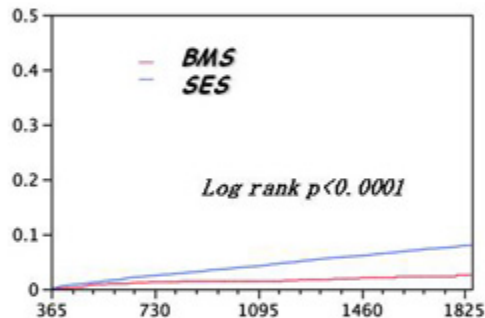
During the First Year



Follow-up interval (Days)

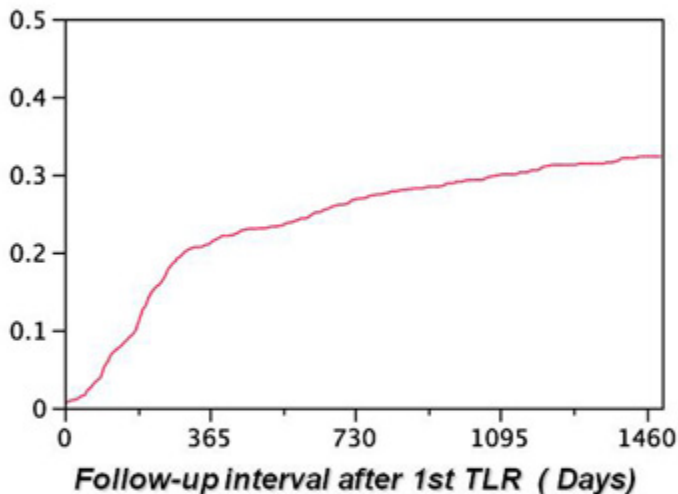
	30 Days	180 Days	365 Days
BMS	0.6%	5.6%	14.2%
N at risk	1259	1221	993
SES	0.4%	1.8%	5.7%
N at risk	17050	16799	16175

Beyond One Year



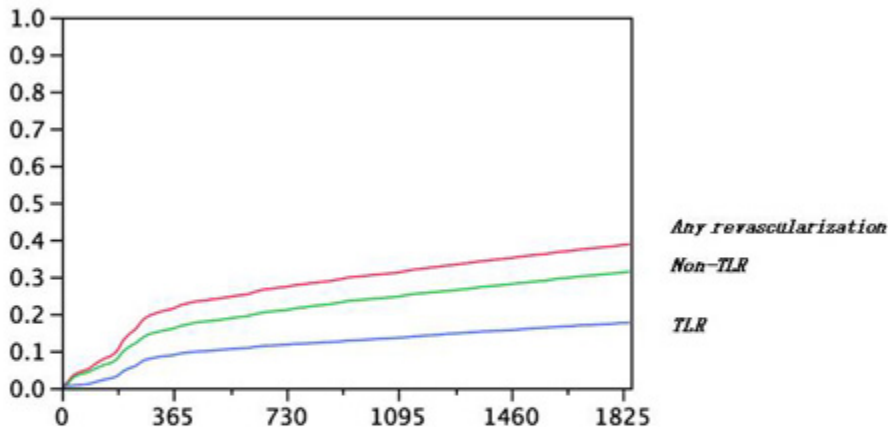
Follow-up interval (Days)

	2 Yrs	3 Yrs	4 Yrs	5 Yrs
BMS	1.3%	1.4%	1.9%	2.6%
N at risk	991	881	728	555
SES	2.4%	4.2%	6.0%	7.9%
N at risk	15075	13322	11205	9213

After Successful First TLR for SES

	<i>180 Days</i>	<i>1 Yr</i>	<i>2 Yrs</i>	<i>3 Yrs</i>	<i>4 Yrs</i>	
	<i>10.1%</i>	<i>21.1%</i>	<i>26.8%</i>	<i>30.1%</i>	<i>32.3%</i>	
<i>N of lesions at risk</i>	<i>1984</i>	<i>1577</i>	<i>1192</i>	<i>835</i>	<i>572</i>	<i>345</i>

TLR versus Non-TLR



Follow-up interval (Days)

	180 Days	1 Yr.	2 Yrs.	3 Yrs.	4 Yrs.	5 Yrs.
Any revascularization	10.0%	21.5%	27.3%	31.2%	34.9%	38.6%
Non-TLR	7.8%	16.1%	21.1%	24.7%	27.8%	31.2%
TLR	3.2%	8.9%	11.7%	13.5%	15.5%	17.5%
N of pts at risk	12824	11179	9355	7934	6505	5203

Risk Factors for TLR of SES Within 1 Year

J-CYPHER Registry

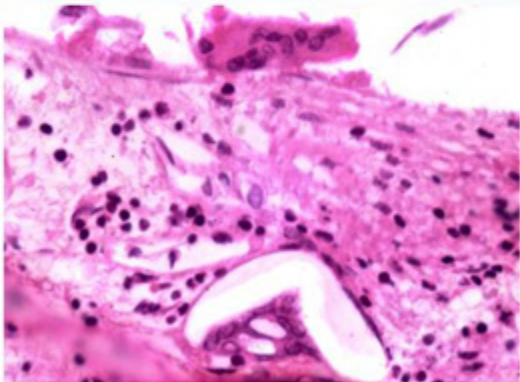
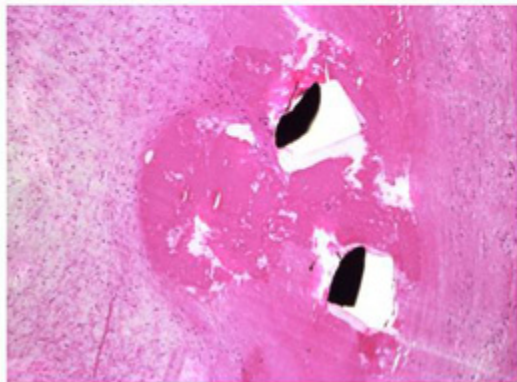
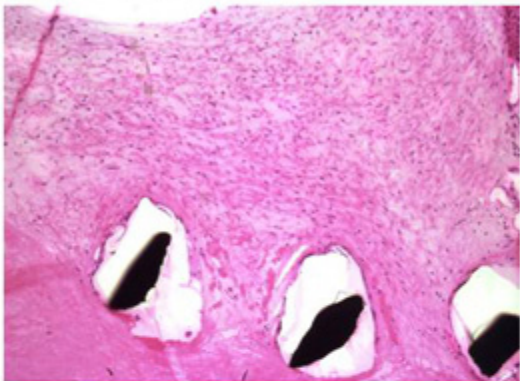
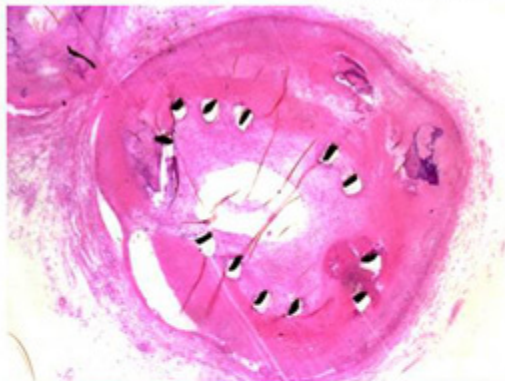
Variables	Present	Absent	Univariate	p value	Multivariable	p value
	N of events/N of patients	N of events/N of patients	H.R. (95%CI)		H.R. (95%CI)	
Hemodialysis	145/680 (24.2%)	760/12132 (6.5%)	4.23 (3.53-5.04)	<0.0001	3.78 (3.12-4.55)	<0.0001
Side-branch stenting	122/730 (17.6%)	781/12072 (6.7%)	2.76 (2.27-3.32)	<0.0001	2.31 (1.88-2.82)	<0.0001
Lesion length \geq 30 mm	311/2574 (12.6%)	584/9954 (6.1%)	2.13 (1.86-2.44)	<0.0001	1.86 (1.6-2.15)	<0.0001
ISR target	186/1947 (9.9%)	719/10858 (6.9%)	1.45 (1.23-1.7)	<0.0001	1.47 (1.25-1.73)	<0.0001
Diabetes mellitus	391/5312 (10.5%)	457/7500 (6.3%)	1.72 (1.51-1.96)	<0.0001	1.45 (1.27-1.66)	<0.0001
Multi-vessel stenting	352/3568 (10.3%)	553/9244 (6.2%)	1.7 (1.49-1.94)	<0.0001	1.37 (1.18-1.58)	<0.0001
RD pre < 2.5 mm	375/4618 (8.5%)	522/7958 (6.8%)	1.26 (1.11-1.44)	0.0006	1.25 (1.09-1.43)	0.002
Male gender	712/9643 (7.6%)	193/3169 (6.4%)	1.2 (1.03-1.41)	0.03	1.18 (1.002-1.39)	0.047
CTO target	160/1590 (10.5%)	744/11197 (6.9%)	1.54 (1.3-1.83)	<0.0001	1.2 (1.001-1.44)	0.049
Prior heart failure	169/1791 (10.5%)	736/11021 (6.9%)	1.57 (1.33-1.86)	<0.0001	1.19 (0.996-1.41)	0.06
Body mass index < 25.0	612/8332 (7.7%)	293/4476 (6.7%)	1.15 (1.001-1.32)	0.049	1.11 (0.96-1.28)	0.16
Age \geq 80 years	93/1664 (6.1%)	812/11148 (7.5%)	0.8 (0.64-0.99)	0.04	0.89 (0.7-1.1)	0.29
Unprotected LMCA target	69/582 (12.7%)	836/12230 (7.1%)	1.86 (1.44-2.35)	<0.0001	1.24 (0.94-1.61)	0.44
Peripheral vascular disease	128/1523 (9.0%)	777/11289 (7.1%)	1.26 (1.04-1.52)	0.02	1.08 (0.89-1.3)	0.44

Risk Factors for TLR of SES Beyond 1 Year

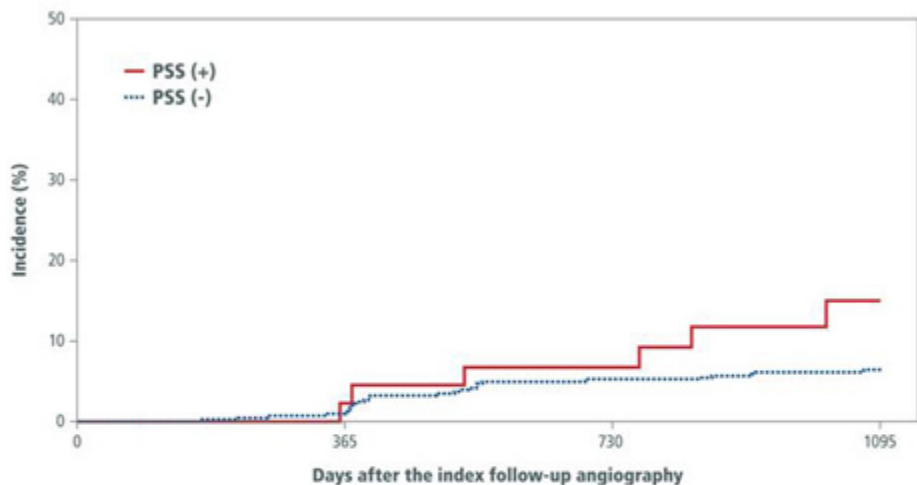
J-CYPHER Registry

Variables	Present	Absent	Univariate	p value	Multivariable	p Value
	N of events/N of patients	N of events/N of patients	H.R. (95%CI)		H.R. (95%CI)	
Hemodialysis	57/680 (20.0%)	791/12132 (8.9%)	2.48 (1.88-3.22)	<0.0001	2.34 (1.75-3.06)	<0.0001
ISR target	179/1947 (12.1%)	668/10858 (8.7%)	1.46 (1.23-1.71)	<0.0001	1.43 (1.2-1.69)	<0.0001
Lesion length \geq 30 mm	220/2574 (12.4%)	605/9954 (8.4%)	1.61 (1.37-1.87)	<0.0001	1.44 (1.22-1.69)	<0.0001
Multi-vessel stenting	280/3568 (11.9%)	568/9244 (8.3%)	1.47 (1.27-1.7)	<0.0001	1.36 (1.16-1.69)	0.0001
Peripheral vascular disease	123/1523 (12.2%)	725/11289 (8.9%)	1.47 (1.21-1.77)	0.0002	1.33 (1.08-1.62)	0.007
Male gender	678/9643 (9.7%)	170/3169 (7.6%)	1.28 (1.09-1.52)	0.003	1.24 (1.04-1.48)	0.01
Diabetes mellitus	391/5312 (10.5%)	457/7500 (8.3%)	1.32 (1.15-1.51)	<0.0001	1.2 (1.04-1.48)	0.01
Age \geq 80 years	62/1664 (6.8%)	786/11148 (9.5%)	0.67 (0.51-0.86)	0.001	0.73 (0.55-0.94)	0.02
RD pre < 2.5 mm	327/4618 (10.4%)	502/7958 (8.5%)	1.2 (1.04-1.38)	0.01	1.16 (1.01-1.34)	0.04
CTO target	132/1590 (12.1%)	715/11197 (8.8%)	1.44 (1.19-1.72)	0.0002	1.2 (0.98-1.46)	0.07
Side-branch stenting	52/730 (11.9%)	795/12072 (9.1%)	1.39 (1.04-1.82)	0.03	1.31 (0.97-1.72)	0.08
IVUS-use	373/6063 (8.4%)	471/6698 (9.9%)	0.87 (0.76-0.996)	0.04	0.89 (0.77-1.02)	0.09
Prior MI	262/3484 (10.0%)	586/9328 (8.9%)	1.17 (1.01-1.35)	0.04	1.06 (0.91-1.24)	0.26

炎症こそがDESの遅発性有害事象の本態？



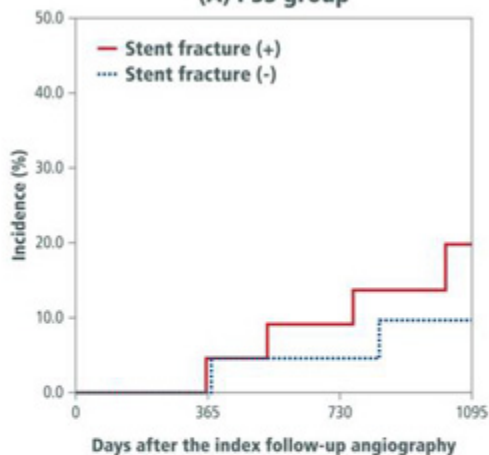
Cumulative Incidence of TLR After the Index Follow-up Angiography



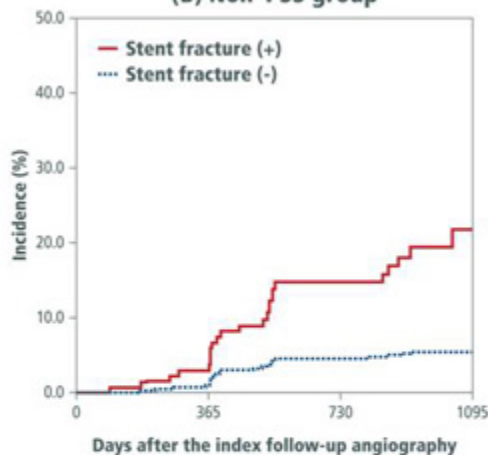
Days	0	365	730	1095
PSS (+) N of lesions at risk	51	46	38	26
N of lesions with events	0	1	3	6
Cumulative incidence	0%	2.1%	6.7%	15.0%
PSS (-) N of lesions at risk	2761	2510	1750	537
N of lesions with events	0	28	125	142
Cumulative incidence	0%	1.1%	5.2%	6.5%

Influence of Stent Fracture on Cumulative Incidence of TLR after the Index Follow-up Angiography

(A) PSS group



(B) Non-PSS group



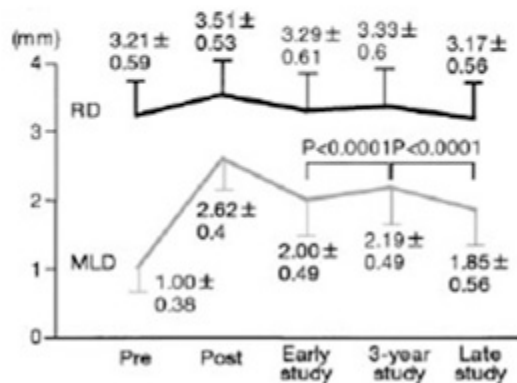
Days	0	365	730	1095
SF (+) N of lesions at risk	23	21	20	13
N of lesions with events	0	1	2	4
Cumulative incidence	0%	4.6%	9.1%	19.8%
SF (-) N of lesions at risk	28	25	18	13
N of lesions with events	0	0	1	2
Cumulative incidence	0%	0%	4.6%	9.9%

Days	0	365	730	1095
SF (+) N of lesions at risk	142	131	89	30
N of lesions with events	0	4	19	24
Cumulative incidence	0%	2.9%	14.7%	21.7%
SF (-) N of lesions at risk	2619	2379	1661	507
N of lesions with events	0	24	106	118
Cumulative incidence	0%	0.97%	4.6%	5.6%

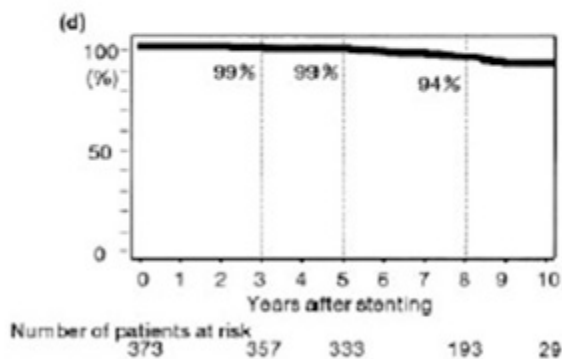
Long-Term Clinical and Angiographic Follow-Up After Coronary Stent Placement in Native Coronary Arteries

Takeshi Kimura, MD; Kenichi Abe, MD; Satoshi Shizuta, MD; Keita Odashiro, MD; Yoshinori Yoshida, MD; Koyu Sakai, MD; Kazuaki Kaitani, MD; Katsumi Inoue, MD; Yoshihisa Nakagawa, MD; Hiroyoshi Yokoi, MD; Masashi Iwabuchi, MD; Naoya Hamasaki, MD; Hideyuki Nosaka, MD; Masakiyo Nobuyoshi, MD

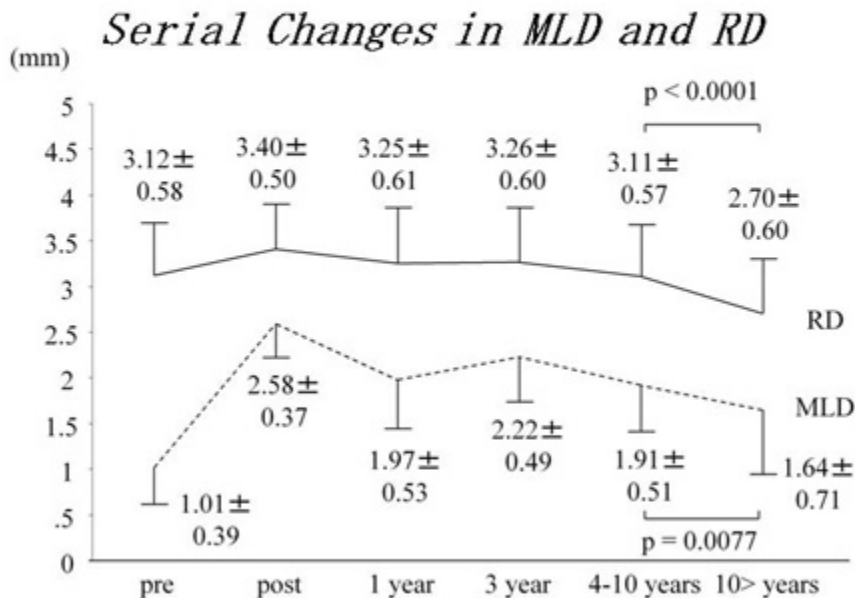
Serial Changes in MLD



Freedom From Late TLR

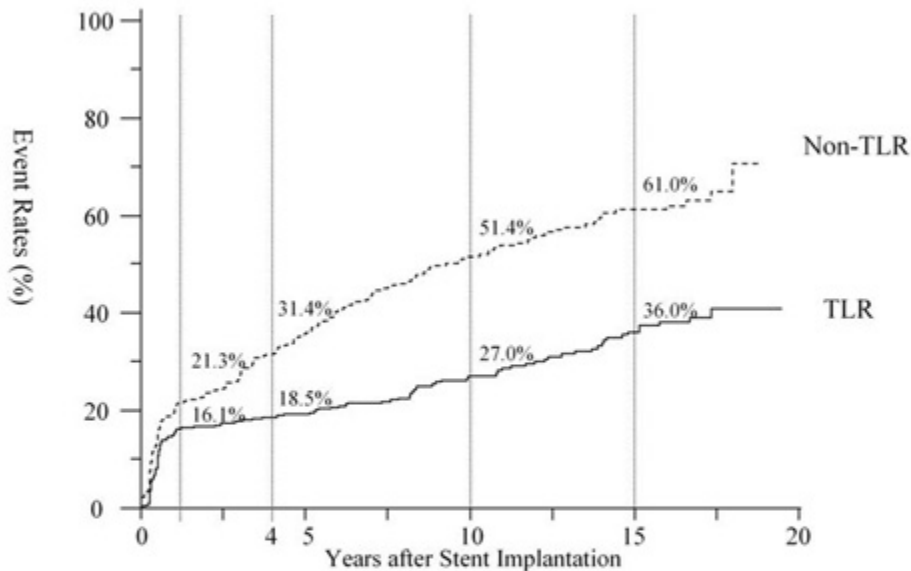


*Very Long-term (15-19 Years) Follow-up
After Palmaz-Schatz Stent Implantation*



43 patients (44 lesions) with complete serial follow-up

Very Long-term (15-20 Years) Outcome after Palmaz-Schatz Stent Implantation



No. of Events / No. of Patients at risk

Target lesion revascularization	0/405	64/323	73/291	98/160	115/109
Non-target lesion revascularization	0/405	85/302	122/242	185/107	203/62

Pathological analyses of long-term intracoronary Palmaz-Schatz stenting Is its efficacy permanent?

Katsumi Inoue^{a,*}, Kenichi Abe^b, Kenji Ando^b, Shinichi Shirai^b, Kei Nishiyama^b,
Michio Nakanishi^b, Takashi Yamada^b, Koyu Sakai^b, Yoshihisa Nakagawa^b, Naoya Hamasaki^b,
Takeshi Kimura^b, Masakiyo Nobuyoshi^b, Tadaomi Alfonso Miyamoto^c

Post-BMS Stenting 7 Years

