The Year in Intervention: Imaging & Functional Assessment

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Conflicts of Interest

Speaker's name : Adrian, LOW, Singapore

- ☑ I have the following potential conflicts of interest to report:
- Receipt of honoraria or consultation fees: Abbott

A modified frequency domain optical coherence tomography procedure for imaging severely stenotic coronary artery lesions

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AsiaIntervention 2017;3:35

TECHNICAL REPORT

A novel procedure for imaging acute coronary syndrome lesions using frequency-domain optical coherence tomography

Yuji Yamaguchi[1], BE; Eisuke Kagawa[2]*, MD; Masaya Kato[2], MD, PhD; Shota Sasaki[2], MD, PhD; Yoshinori Nakano[2], MD; Yusuke Ochiumi[2], MD; Yu Takiguchi[2], MD; Yasuo Arakawa[1]; Ai Ishimaru[1]; Akira Ueda[1]; Keigo Dote[2], MD, PhD

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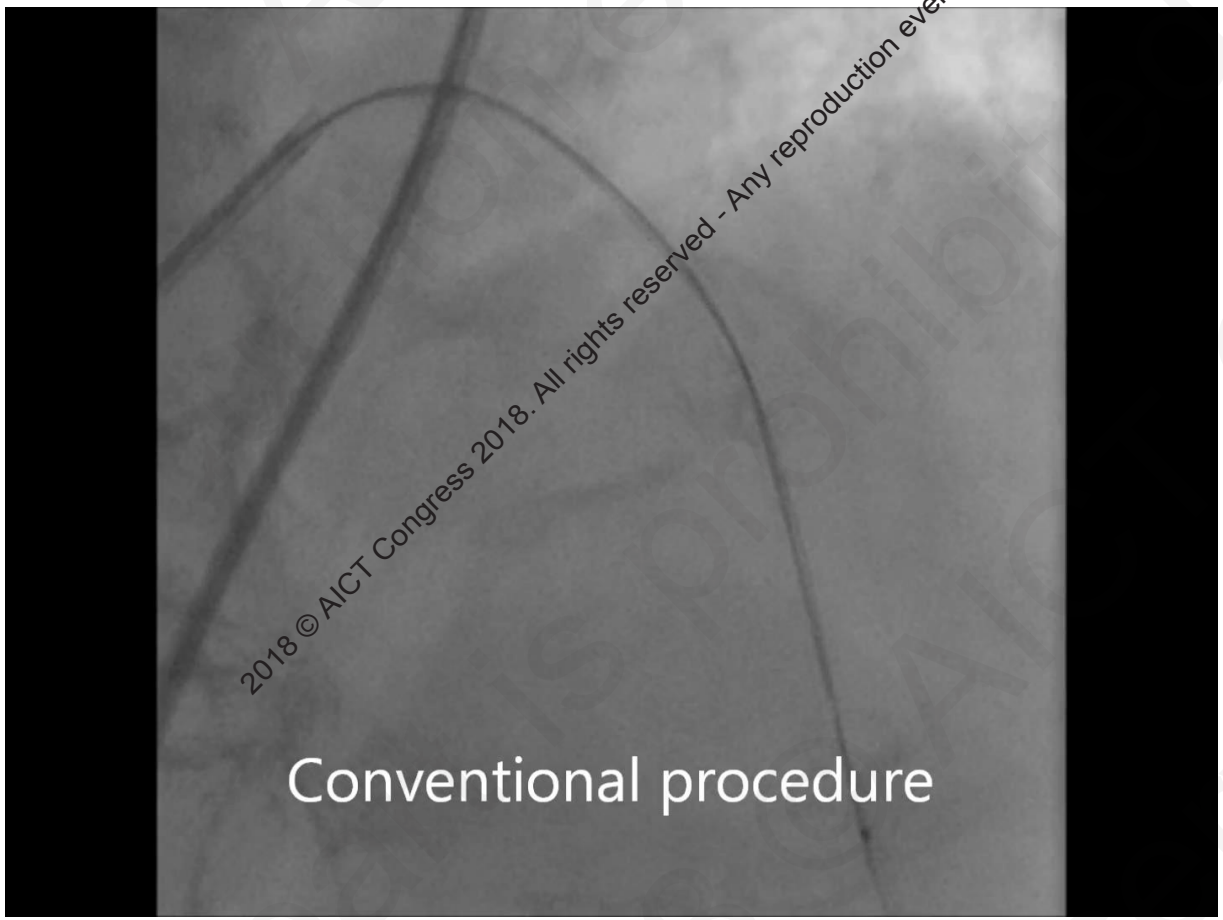
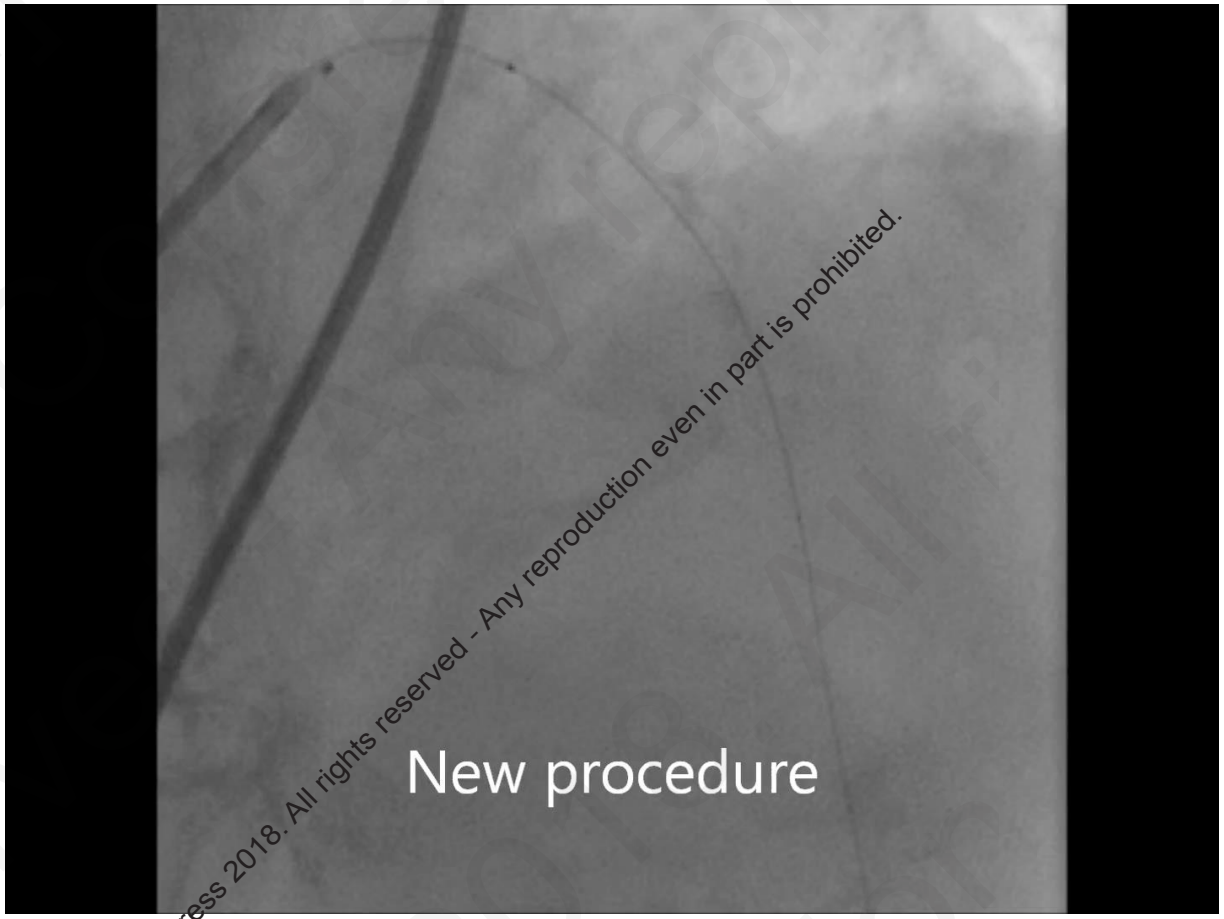
EuroIntervention 2013;9:996





EuroIntervention 2013;9:996

Method of Tian

- 5 ml 1:1 saline:contrast mix connect to flush port of OCT catheter
- Advance OCT catheter across lesion
- Automatic pullback; live-view
- Manually inject 5 ml 1:1 saline:contrast mix (~1 ml/s)
- Auto-inject contrast (3 ml/s, 9 ml)
- Discontinue contrast after pullback complete

Method of Yamaguchi

- 2 ml contrast connect to flush port of OCT catheter
- Confirm passage of OCT catheter across lesion
- Manual pullback; live-view
- Inject contrast (LCA: 4 ml/s, 14 ml; RCA: 3 ml/s, 12 ml)
- Advance OCT catheter across catheter
- Initiate pullback when in position
- Discontinue contrast after pullback complete

Tian Yamaguchi

	Group A (n=23)	Group B (n=23)	*p*-value
Procedure success, n (%)	23 (100)	20 (86.96)	0.233
Clear images			
Proximal segment, n (%)	23 (100)	20 (100)	–
Maximal stenosis segment, n (%)	23 (100)	19 (95)	0.465
Distal segment, n (%)	22 (95.65)	17 (85)	0.323
Contrast medium, ml	7.87±1.01	9.74±1.57	<0.001
Complications, n (%)	0 (0)	1 (5)	0.465

Impact of target lesion coronary calcium score on outcomes following drug-eluting stent implantation

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Number of patients		124
Age, years		67.9±10.3
Male		103 (83.1)
BMI		24.1±3.5
Hypertension		96 (77.4)
Dyslipidaemia		112 (90.3)
Diabetes mellitus		52 (41.9)
Current smoker		19 (15.3)
Haemodialysis		8 (6.5)
Previous MI		12 (9.7)
Previous PCI		23 (18.5)
Previous CABG		6 (4.8)
Acute coronary syndrome		10 (8.0)
Multivessel disease		31 (25.0)
Baseline medication	Dual antiplatelet therapy	124 (100)
	Aspirin+clopidogrel	119 (96.0)
	Aspirin+ticlopidine	4 (3.2)
	Aspirin+prasugrel	1 (0.8)
	Statin	119 (96.0)
Total calcium score		420.5 [96.0-1,040.2]

Numbers are reported as n (%), mean±standard deviation, or median [interquartile range]. BMI: body mass index; CABG: coronary artery bypass grafting; MI: myocardial infarction; PCI: percutaneous coronary intervention

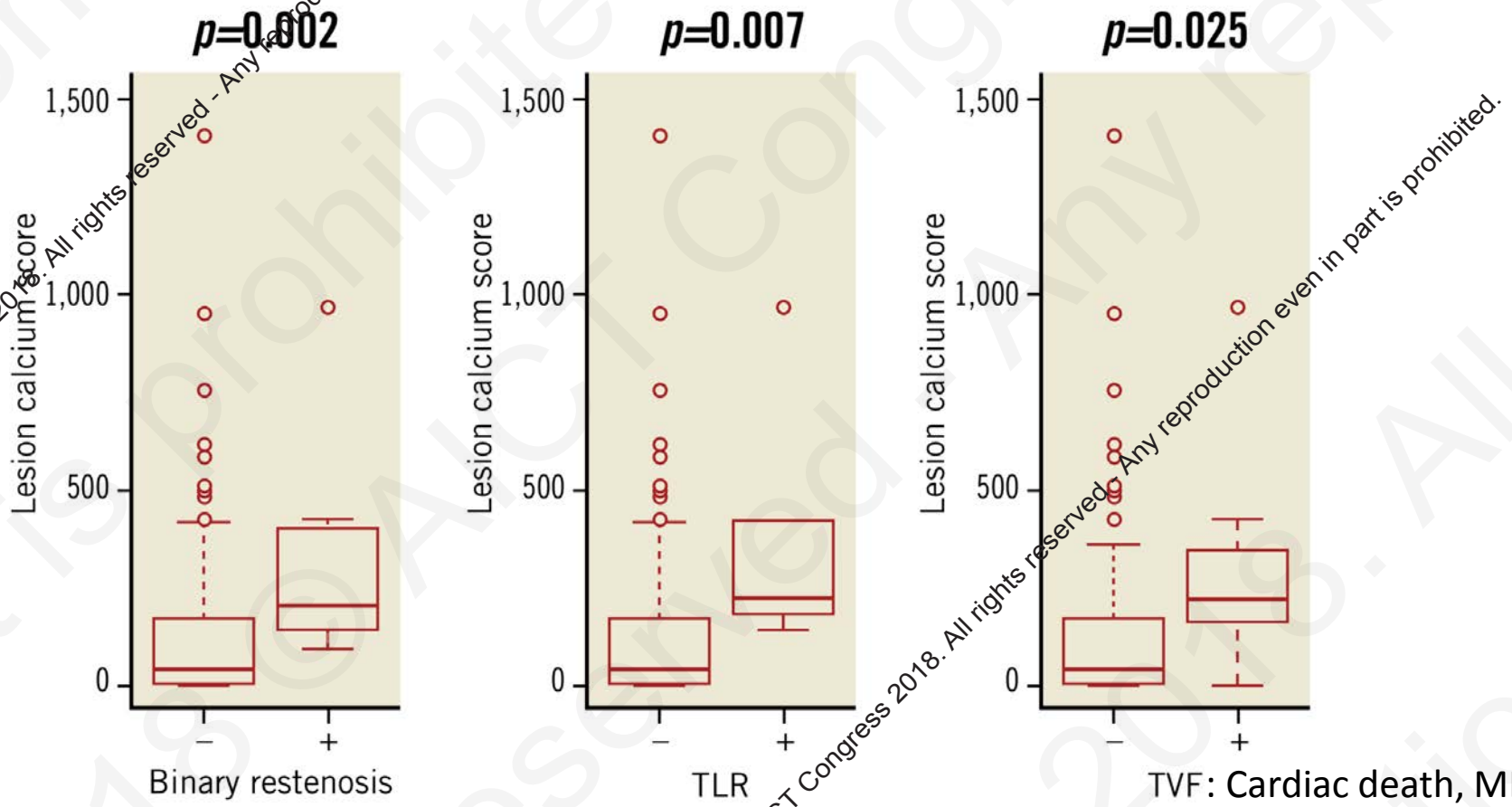
Number of lesions		149
Target vessel	LMCA	4 (2.7)
	LAD	66 (44.3)
	LCX	48 (32.2)
	RCA	31 (20.8)
ACC/AHA classification	A	4 (2.7)
	B1	29 (19.5)
	B2	56 (37.6)
	C	60 (40.3)
Angiographic moderate/severe calcification		24 (16.1)
Bifurcation lesion		51 (34.2)
Average number of stents		1.18±0.44
Average stent diameter, mm		2.98±0.43
Total stent length, mm		25.4±12.6
Balloon-to-artery ratio		1.17±0.20
Maximum stent deployment pressure, atm		13.8±3.5
Rotablator use		3 (2.0)
Post-dilatation		76 (51.0)
Bail-out procedure		2 (1.3)
Lesion calcium score		42.6 [4.8-180.1]
Lesion success		149 (100)

Numbers are reported as n (%), mean±standard deviation, or median [interquartile range]. LAD: left anterior descending; LCX: left circumflex; LMCA: left main coronary artery; RCA: right coronary artery

Median
41.1 vs 202.4

Median
42.8 vs 216.7

Median
42.8 vs 216.7



TVF: Cardiac death, MI, Revascularization

Logistic regression for TVF

	Univariate			Multivariate		
	OR	95% CI	*p*-value	OR	95% CI	*p*-value
Lesion calcium score ≥140	16.2	1.92–137.0	0.011	9.62	1.03–90.0	0.047
Age, every 10 years	0.98	0.49–1.97	0.96			
Male sex	0.59	0.11–3.13	0.53			
BMI, every 1.0	0.97	0.78–1.21	0.78			
Hypertension	0.46	0.10–2.05	0.31			
Dyslipidaemia	0.73	0.08–6.52	0.78			
Diabetes mellitus	2.45	0.56–10.7	0.24			
Current smoker	0.78	0.09–6.71	0.82			
Haemodialysis	6.11	1.01–36.9	0.049	3.73	0.49–28.6	0.21
Multivessel disease	0.41	0.048–3.47	0.41			
Statin use	0.25	0.025–2.55	0.24			
Bifurcation lesion	2.63	0.60–11.5	0.20			
LL, every 1.0 mm	1.08	1.02–1.16	0.013	1.05	0.99–1.12	0.13
RD, every 0.5 mm	1.39	0.77–2.51	0.27			
Rotablator use	8.14	0.66–101.0	0.10			

BMI: body mass index; CABG: coronary artery bypass grafting; CI: confidence interval; LL: lesion length; MI: myocardial infarction; PCI: percutaneous coronary intervention; RD: reference diameter; TVF: target vessel failure

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Intravascular ultrasound-guided versus angiography-guided percutaneous coronary intervention with drug-eluting stents: five-year outcomes from the CREDO-Kyoto PCI/CABG registry

Hiroki Watanabe[1], MD; Takeshi Morimoto[2], MD; Hiroki Shiomi[1], MD; Yutaka Furukawa[3], MD; Yoshihisa Nakagawa[4], MD; Kenji Ando[5], MD; Kazushige Kadota[6], MD; Takeshi Kimura[1]*, MD; on behalf of the CREDO-Kyoto PCI/CABG registry investigators

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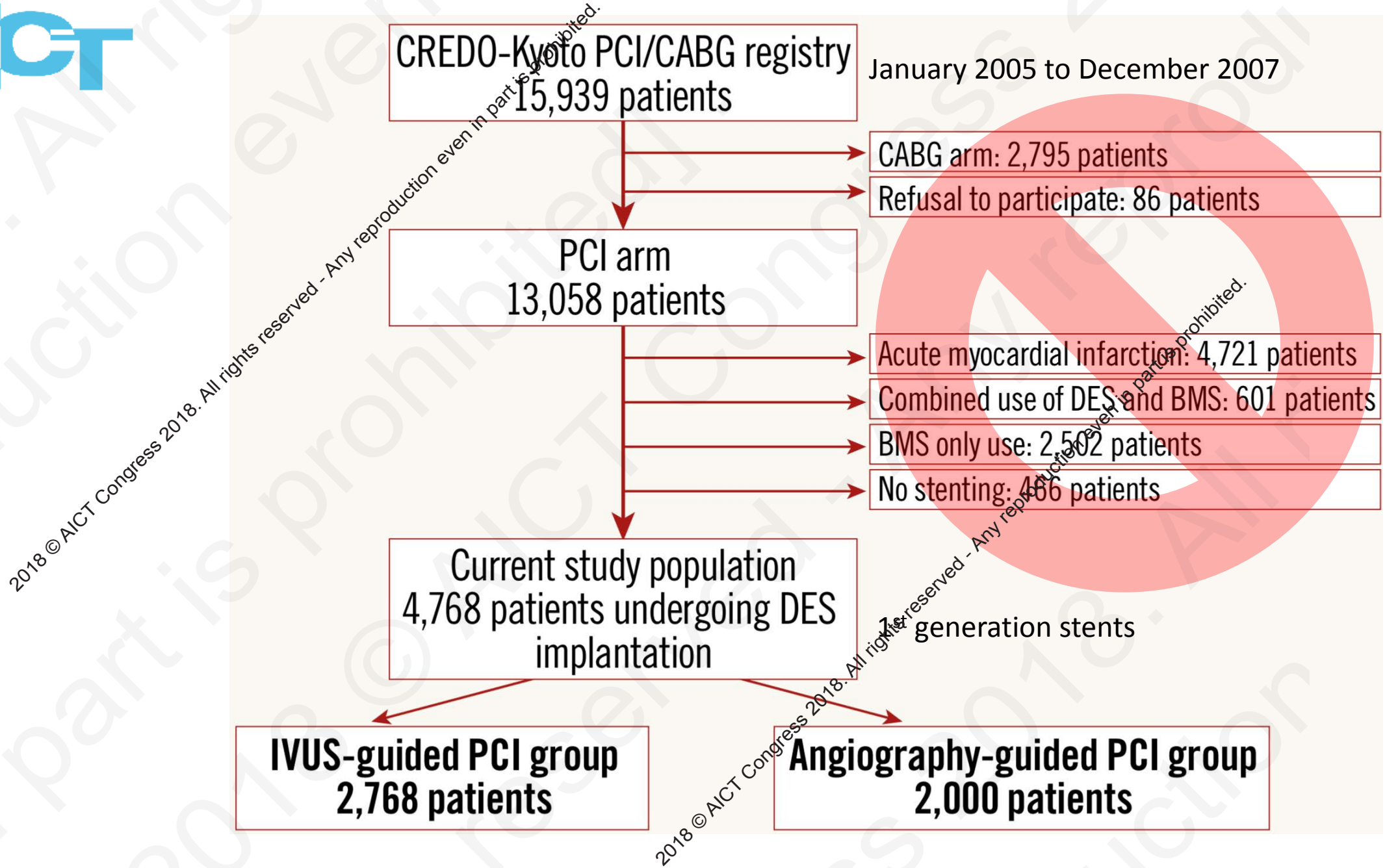
AsiaIntervention 2018;4:26



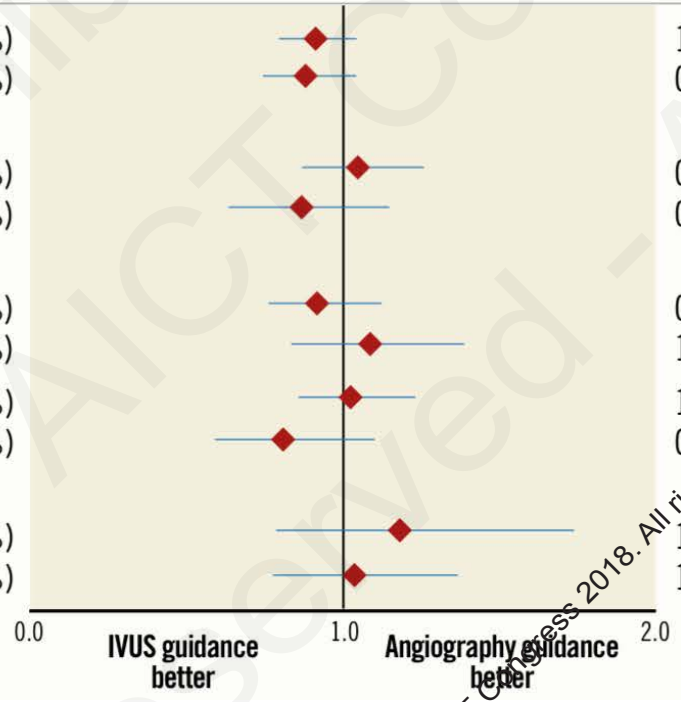
Variables	IVUS group N=2,768	Angiography group N=2,000	*p*-value
Target lesion			
*Unprotected LMCA	117 (4.2%)	62 (3.1%)	0.04
*Proximal LAD	1,827 (66.0%)	1,167 (58.4%)	<0.001
LAD	1,892 (68.4%)	1,218 (60.9%)	<0.001
LCX	799 (28.9%)	659 (33.0%)	0.003
RCA	993 (35.9%)	789 (39.5%)	0.01
*Bifurcated lesion	1,208 (43.6%)	770 (38.5%)	0.0004
*Chronic total occlusion	353 (12.8%)	383 (19.2%)	<0.0001
*Side branch stenting	142 (5.1%)	128 (6.4%)	0.06
Sirolimus-eluting stent use	2,537 (91.7%)	1,892 (94.6%)	<0.0001
Implanted stents	2 (1-2)	2 (1-2)	0.26
Total stent length (mm)	36 (23-56)	33 (18-56)	0.14
*>28 mm	1,570 (56.7%)	1,053 (52.7%)	0.005
Minimal stent diameter (mm)	2.75 (2.5-3.0)	2.5 (2.5-3.0)	0.004
*<3.0 mm	1,425 (51.5%)	1,082 (54.1%)	0.07
Final balloon pressure (atmosphere)	18.4±3.5 (3,752/3,984)	17.2±3.6 (2,631/2,830)	<0.0001

Variables	IVUS group Number of patients with events (cumulative 5-year incidence) N=2,768	Angio group Number of patients with events (cumulative 5-year incidence) N=2,000	Crude HR (95% CI)	*p*-value (log-rank)	Adjusted HR (95% CI)	*p*-value
TVR	556 (21.5%)	408 (22.2%)	0.97 (0.85-1.09)	0.57	1.09 (0.90-1.32)	0.37
Clinically driven TVR	281 (11.3%)	211 (11.8%)	0.94 (0.79-1.11)	0.44	1.01 (0.78-1.31)	0.93
TLR	413 (16.0%)	292 (15.9%)	1.01 (0.87-1.17)	0.93	1.04 (0.89-1.20)	0.65
Clinically driven TLR	192 (7.9%)	134 (7.7%)	1.00 (0.81-1.23)	0.97	1.00 (0.80-1.24)	0.99
All-cause death	368 (14.1%)	303 (16.0%)	0.85 (0.74-0.98)	0.02	0.82 (0.65-1.02)	0.08
Myocardial infarction	177 (6.8%)	143 (7.4%)	0.84 (0.68-1.04)	0.12	0.87 (0.62-1.22)	0.41
Stent thrombosis (definite)	31 (1.2%)	20 (1.1%)	1.14 (0.68-1.98)	0.62	–	–
MACE	905 (33.9%)	697 (36.2%)	0.90 (0.82-0.99)	0.02	0.96 (0.83-1.11)	0.64

Cumulative incidence was estimated by the Kaplan-Meier method. CI: confidence interval; HR: hazard ratio; IVUS: intravascular ultrasound; MACE: major adverse cardiac events; TLR: target lesion revascularisation; TVR: target vessel revascularisation

MACE: All-cause death, MI, or TVR

Variable	IVUS group No. of patients with TVR (Cumulative incidence) N=2,768	Angiography group No. of patients with TVR (Cumulative incidence) N=2,000	Crude HR (95% CI)	Log-rank *p*	Adjusted HR (95% CI)	*p*-Value	Interaction *p*
Diabetes	291 (27.3%)	208 (26.7%)	1.04 (0.88-1.24)	0.65	0.92 (0.83-1.03)	0.14	0.35
Non-diabetes	265 (17.9%)	200 (18.9%)	0.90 (0.75-1.07)	0.23	0.91 (0.78-1.09)	0.31	
Total stent length							
>28 mm	406 (27.5%)	271 (27.9%)	0.99 (0.85-1.15)	0.88	1.04 (0.89-1.21)	0.66	0.14
≤28 mm	150 (13.7%)	137 (15.9%)	0.83 (0.67-1.04)	0.11	0.89 (0.71-1.12)	0.31	
Minimal stent diameter							
<3 mm	351 (26.3%)	273 (27.5%)	0.96 (0.53-1.12)	0.61	0.93 (0.80-1.10)	0.41	<0.0001
≥3 mm	205 (16.5%)	135 (16.1%)	1.01 (0.82-1.25)	0.93	1.07 (0.86-1.32)	0.55	
Multivessel disease	420 (27.0%)	291 (27.0%)	1.00 (0.87-1.16)	0.97	1.02 (0.88-1.19)	0.76	0.13
Single-vessel disease	136 (13.3%)	117 (15.4%)	0.85 (0.67-1.07)	0.169	0.84 (0.66-1.08)	0.18	
IVUS use per centres							
Frequent use (>70%)	470 (21.3%)	33 (16.8%)	1.23 (0.90-1.74)	0.22	1.15 (0.82-1.61)	0.42	0.36
Non-frequent use (≤70%)	86 (22.7%)	375 (22.8%)	1.02 (0.81-1.28)	0.84	1.03 (0.81-1.30)	0.81	



Why might this be so?

- Imprecise definition of IVUS-use
  - Unclear timing of use; to define lesion?
  - To guide PCI with stent optimization?
  - No quantitative measurements for correlation; absent criteria for stent optimization
- Observational cohort study; ?under-powered
  - Adequate matching?
- Obsolete management?
  - 1st generation DES only
  - Aspirin & ticlopidine predominate

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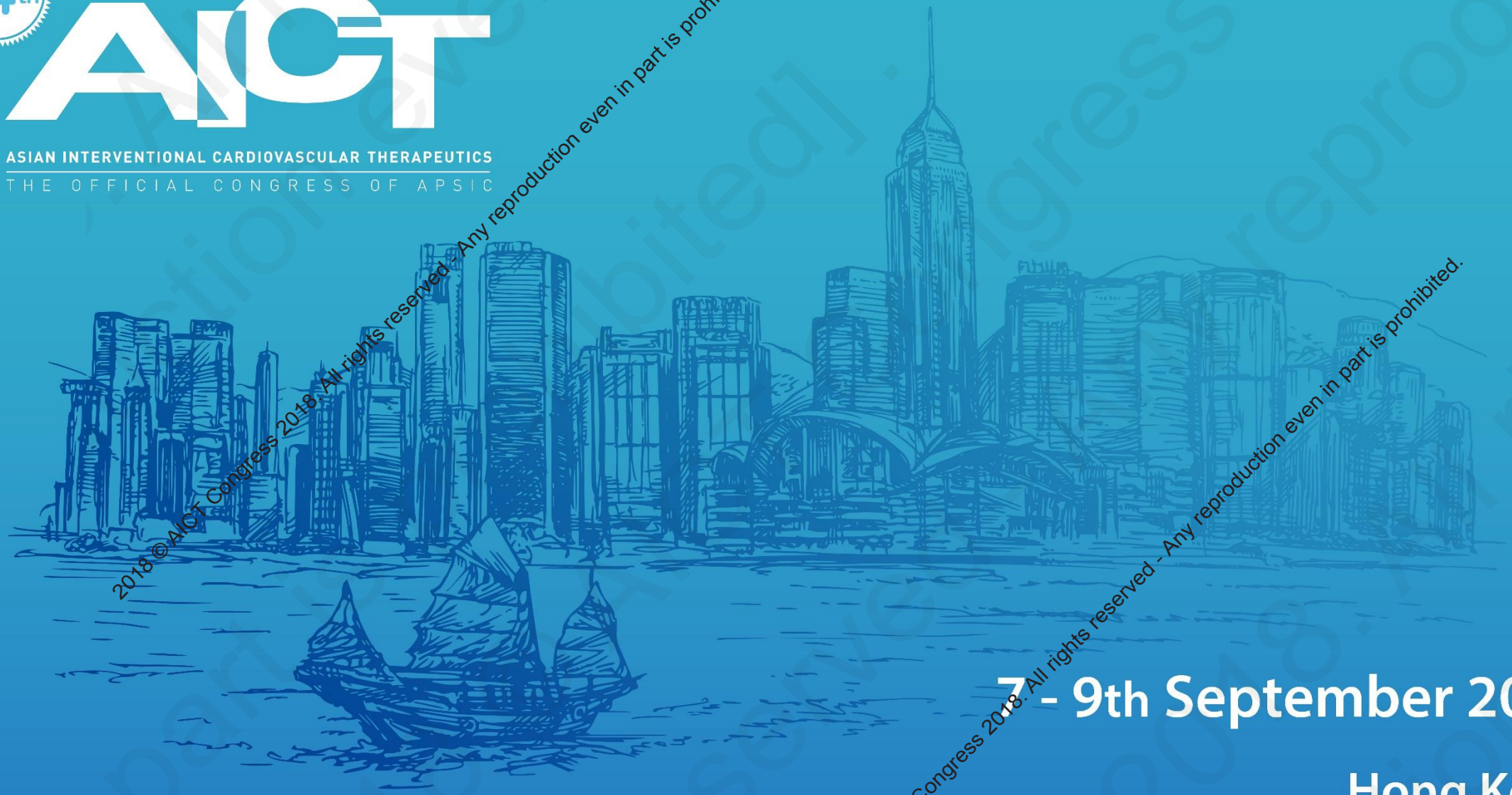
Take Home Message

- Refinement of current techniques possible
- Incremental information from adjunct modalities to guide PCI
- Imaging modalities are increasingly available
  - Routine use unlikely helpful
  - Careful measurements and correct interpretation paramount
- Dearth of functional studies; potential for growth and acceptance

14th AICT

ASIAN INTERVENTIONAL CARDIOVASCULAR THERAPEUTICS

THE OFFICIAL CONGRESS OF APSIC



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