

Newer Developments in Treatment of CTOs in Japan

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Disclosure

Within the past 12 months, the presenter or their spouse/partner have had a financial interest/arrangement or affiliation with the organizations listed below.

Physician Name

Etsuo Tsuchikane, MD, PhD

Company/Relationship

Boston Scientific, Japan Consultant

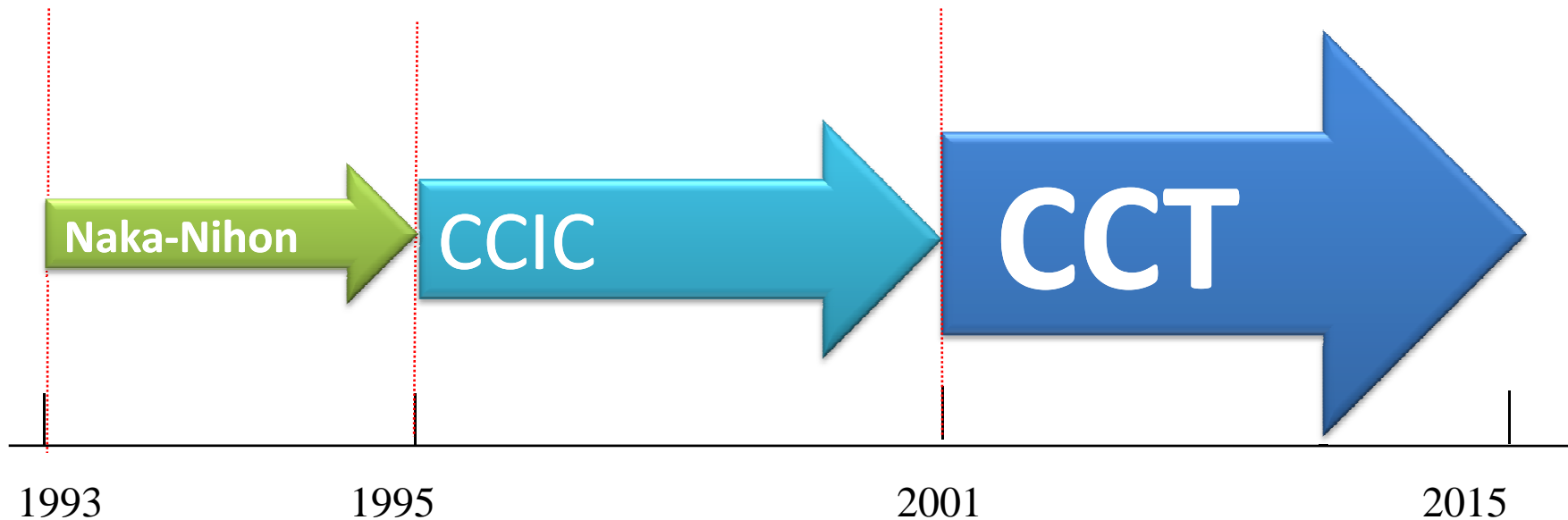
Asahi Intecc, Japan Consultant

NIPRO, Japan Consultant

● CCT History

CCT was started in early 1990', as "Osaka intervention meeting".

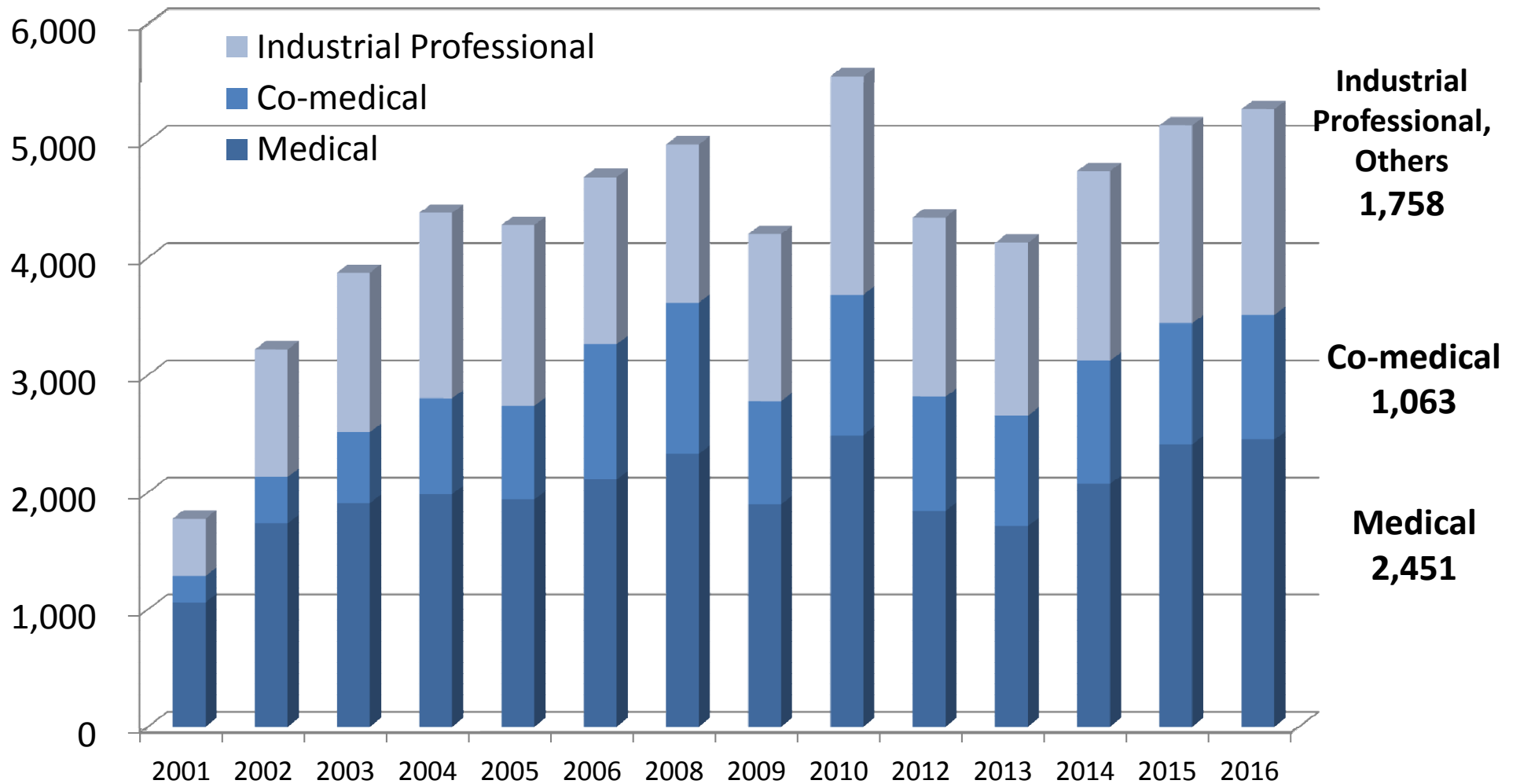
1992	Osaka Intervention Meeting
1993-1994	Naka-Nihon Live Demonstrations
1995-2000	CCIC
2001-present	CCT (Complex Cardiovascular Therapeutics)



Complex **C**ardiovascular **T**herapeutics



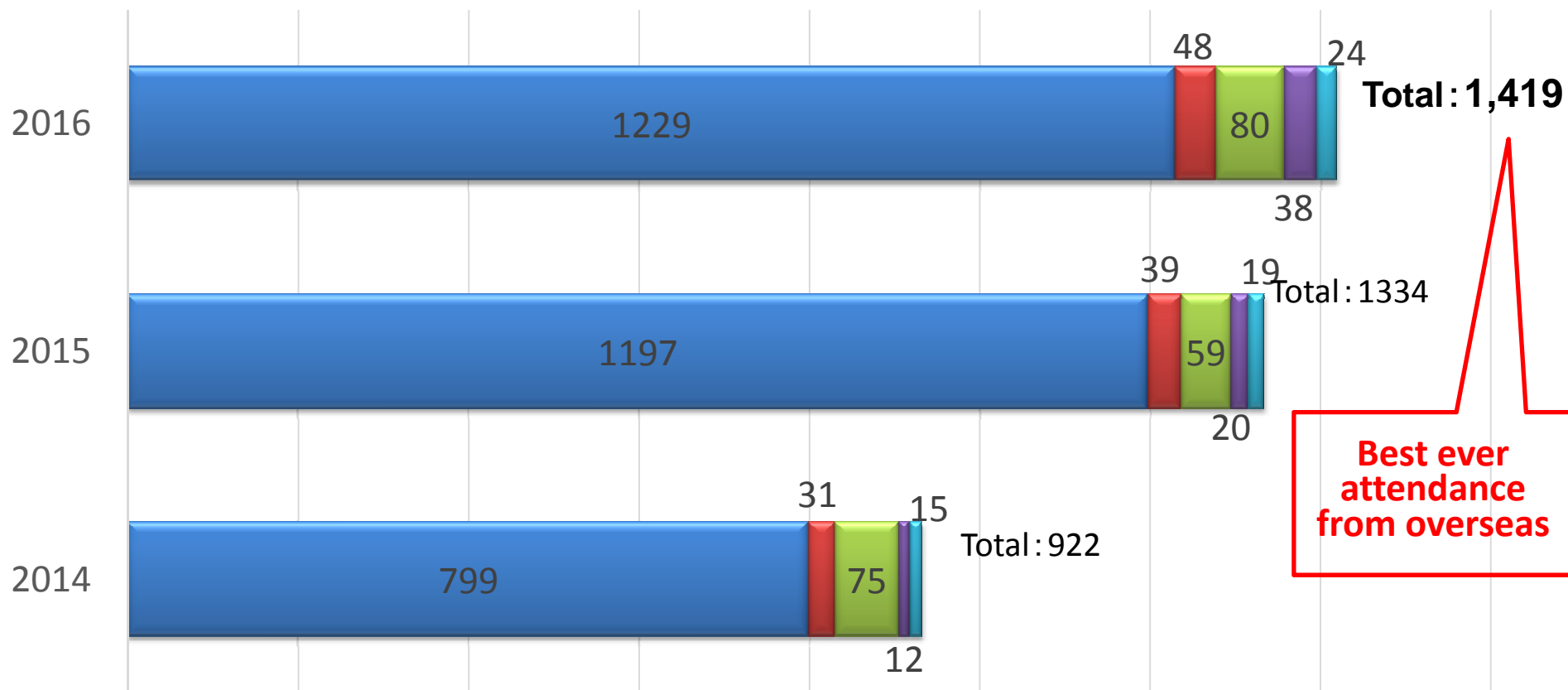
● CCT2016: 5,272 Participants



● CCT2016 International Participants

Comparison between 2014, 2015 and 2016

■ Asia ■ America ■ Europe ■ Middle East ■ Oceania



Best ever attendance from overseas

● CCT History

CCT was started in early 1990', as "Osaka intervention meeting".

1992	Osaka Intervention Meeting
1993-1994	Nakagawa Intervention Meeting
1995-2000	CCIC (Complex Cardiovascular Interventional Conference)
2001-present	CCT (Complex Cardiovascular Therapeutics)

1. CTO

2. LMT bifurcation by DCA

1992

1995

2001

2015

Complex Cardiovascular Therapeutics



Japanese CTO-PCI Registry

Currently,

‘Retrograde Summit General Registry’

and

‘Japanese CTO PCI Expert Registry’

are being conducted in Japan.

Registry Overview

	Retrograde Summit		Japanese CTO PCI Expert Registry
	Registry	General Registry	
Pts. Enrollment	Jan. 2009~ Dec. 2013	Jan. 2014~	Jan. 2014~
Participants As of Jun. 2015	56 of Japanese Centers	40 of	42 of Japanese Expert physicians
Criteria for Participants	<ul style="list-style-type: none"> Centers approved by Retrograde Summit Cases treated by Expert are excluded 		<ul style="list-style-type: none"> More than 300 cases of experience of CTO-PCI More than 50 cases of CTO-PCI per year Recommendation from two or more steering committee member
Core lab	None		Adjudication of Indication and Procedure Success
Organization	Retrograde Summit		Japanese Board of CTO interventional specialist
Chairman	Habara (initiated by Tsuchikane)		Tsuchikane (initiated by Katoh, late Mitsudo)

The First Report on the Japanese CTO PCI Expert Registry

Etsuo Tsuchikane, MD, PhD

*on behalf of
Japanese Board of CTO Interventional Specialist*

Japanese CTO PCI Expert Registry

- The Japanese Board of CTO Interventional Specialists was established in 2013 to accumulate quantitative data to identify issues such as stagnation in the development of CTO-PCI techniques.
- Starting from 2014, Japanese CTO PCI Expert Registry began establishing a database of CTO-PCI performed by certified expert physicians who have a certain level of CTO-PCI skills.
- Patients are enrolled by certified expert operators.
- Procedure success is adjudicated by an independent Corelab.

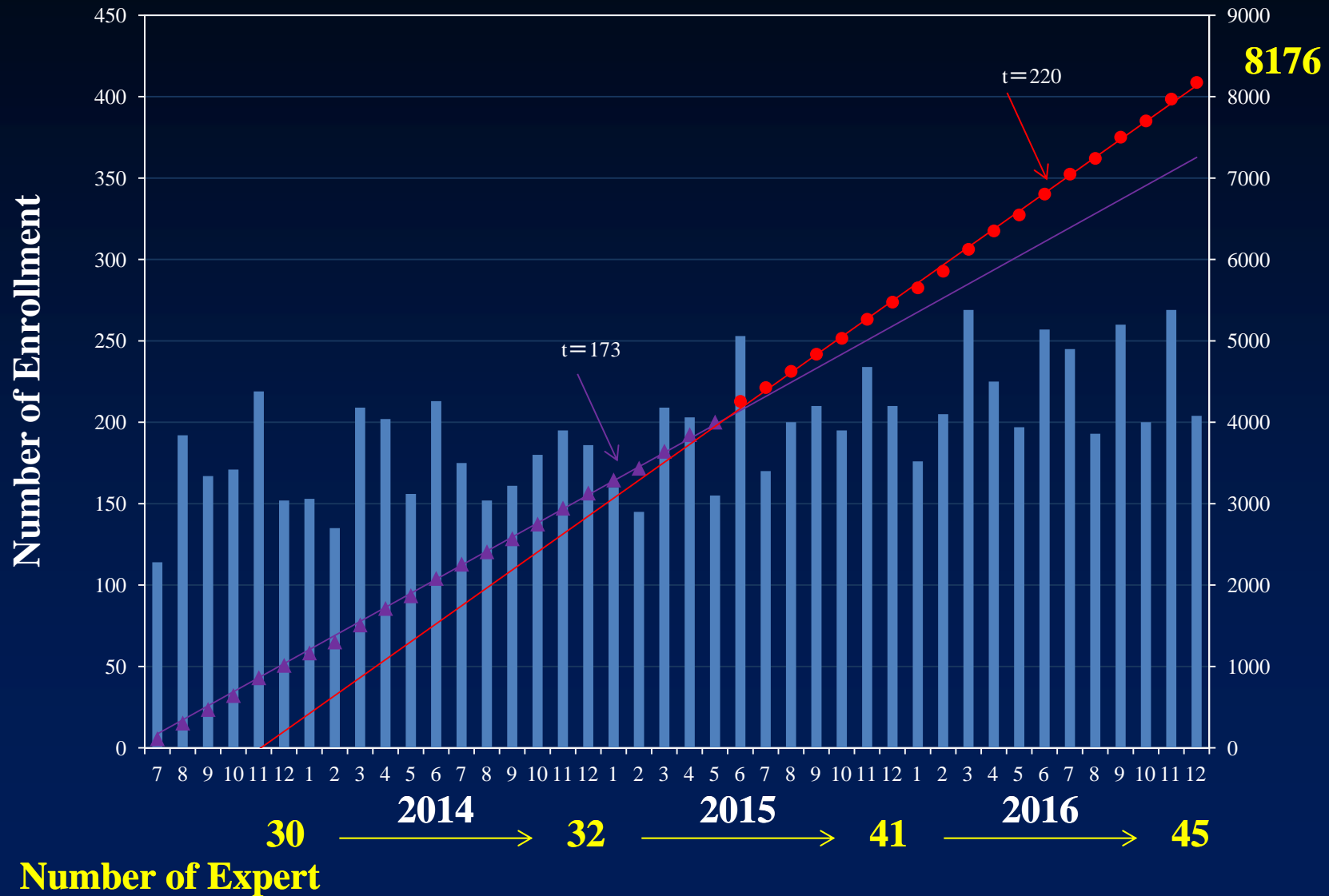
Data Unification

- The database for Retrograde Summit general registry has already been modified to collect same dataset as Japanese CTO PCI Expert Registry.
- The outcome from both Retrograde Summit General Registry and Japanese CTO PCI Expert Registry will be compared and reported in the near future.

Features of Expert Registry

- Officially it started from January 2014, will end in December 2022.
- All clinical data including patient background data and details of the procedures are input via an electronic capture system.
- Pre-procedural CAG and CTA (optional), and procedural angiograms and IVUS images are sent as DICOM data to an independent core laboratory.
- Annual clinical follow-up data are collected for 5 years (only in domestic pts).

Patient Enrollment



**The Initial Outcomes from
Japanese CTO PCI Expert Registry
2014-2015**

Patient Enrollment

The enrolled CTO-PCI procedure; **n=4205** procedures
the number of target CTO lesion in each procedure
(1 lesion : n=4148, 2 lesions : n=57)

CTO-PCI **outside** Japan
n=1359

CTO-PCI in Japan
n=2846

2 CTO lesions in one procedure: n=30

N= 2816

Inadequate anatomical indication: n=62
sub-total lesion: n=104 ,
non-CTO lesion: n=1, unanalyzable n=4

N=2645

Inappropriate data of pt. /lesion
background: n=49

N=2596

Definitions

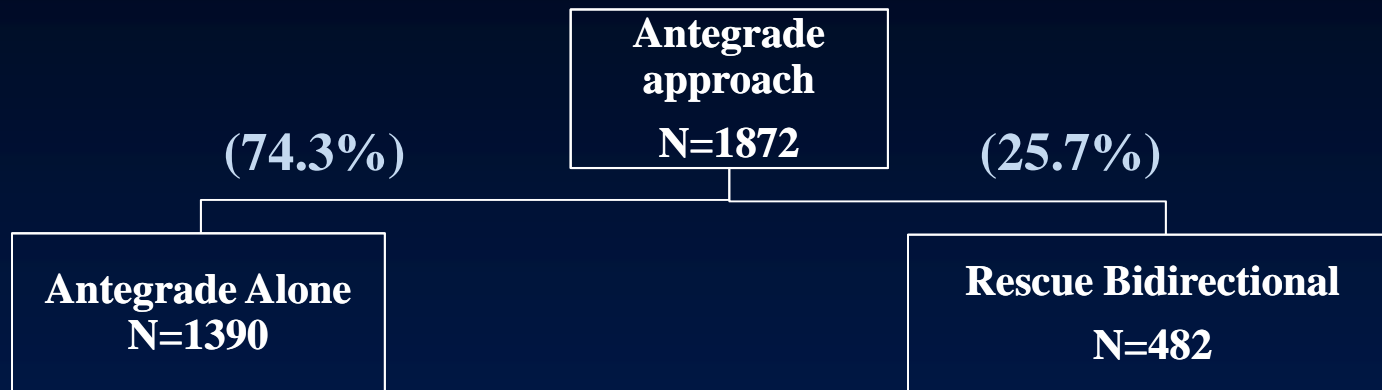
- The procedure was defined here as **bidirectional approach (BA)** where an attempt was made to cross the collateral channel for retrograde revascularization techniques.
- Cases were divided into 3 groups based on **ITT** principle; primary antegrade approach (**PAA**), primary BA (**PBA**), and rescue BA (**RBA**).
- PAA included rescue BA and re-switched antegrade approach.
- No antegrade dissection and reentry device was used.

	Overall	PAA	PBA	PAA vs. PBA
	N=2596	N=1872	N=724	P-value
		72.1%	27.9%	
Age	66.9±10.9	66.8±10.9	66.9±10.7	0.863
BMI	24.7±3.8	24.7±3.8	24.6±3.8	0.413
LVEF	54.8±12.9	54.9±12.9	54.6±12.8	0.458
eGFR	64.9±29.0	65.1±30.2	64.3±25.7	0.458
Male gender, %	86.1	85.1	88.4	0.018
Hypertension, %	78.5	78.0	80.8	0.12
Dyslipidemia, %	77.5	76.1	82.1	0.001
Diabetes, %	44.9	44.9	45.8	0.35
Current smoking, %	54.4	58.0	62.3	0.057
OMI, %	51.0	51.7	51.3	0.895
Prior CABG, %	7.9	7.4	9.4	0.105
Prior PCI, %	63.2	61.8	67.5	0.007
Reattempt, %	20.6	15.1	34.8	<0.0001
Syntax score	15.9±8.6	16.0±8.4	15.6±8.9	0.062
J-CTO score	2.0±1.1	1.9±1.1	2.4±1.1	<0.0001
Target vessel, %				<0.0001
LAD	30.9	32.9	25.7	
LCX	17.1	20.4	8.6	
LMT	0.6	0.6	0.6	
RCA	51.5	46.2	65.2	

	Overall	PAA	PBA	PAA vs. PBA
	N=2596	N=1872	N=724	P-value
In-stent occlusion, %	13.6	16.9	5.1	<0.0001
Distal run off (<3.0mm), %	65.0	64.9	67.2	0.274
CTO length (≥20mm), %	60.5	57.0	69.6	<0.0001
Side branch at proximal cap, %	34.1	34.8	32.0	0.181
Collateral filling, %				<0.0001
Contralateral	50.7	47.6	58.8	
Ipsilateral	13.3	15.9	6.6	
Both	35.2	35.5	34.4	
None	0.7	1.0	0.1	
Lesion calcification, %	52.3	50.5	56.9	0.003
Proximal tortuosity, %	50.7	49.1	49.3	0.108
Tortuosity of CTO lesion, %	24.6	21.6	32.5	<0.0001
Morphology of proximal cap, %				0.002
Blunt	23.7	23.6	23.9	
No stump	19.1	17.7	22.7	
Tapered/tunnel	56.7	58.3	52.3	

	Overall	PAA	PBA	PAA vs. PBA
	N=2596	N=1872	N=724	P-value
GW success, %	92.0	92.9	90.1	0.016
Technical success, %	89.9	91.0	87.3	0.006
Procedural success, %	88.8	90.3	85.0	<0.0001
Procedure time	160.4±89.6	143.8±81.9	201.5±94.4	<0.0001
Contrast volume	230.8±105.9	224.7±104.5	245.8±108.0	<0.0001
In hospital death, %	0.2	0.2	0.4	0.362
MI, %	1.2	0.8	2.0	0.018
Acute stent thrombosis, %	0.2	0.2	0.1	1.000
Stroke, %	0.2	0.2	0.3	0.628
Emergent CABG, %	0	0	0	
Emergent PCI	0.2	0.2	0.1	1.000
Coronary embolism, %	0.2	0.1	0.6	0.06
Coronary perforation (tamponade), %	0.4	0.2	0.9	<0.0001
Complications of puncture site, %	1.3	1.2	1.4	0.844
CIN, %	1.7	1.2	3.1	0.031

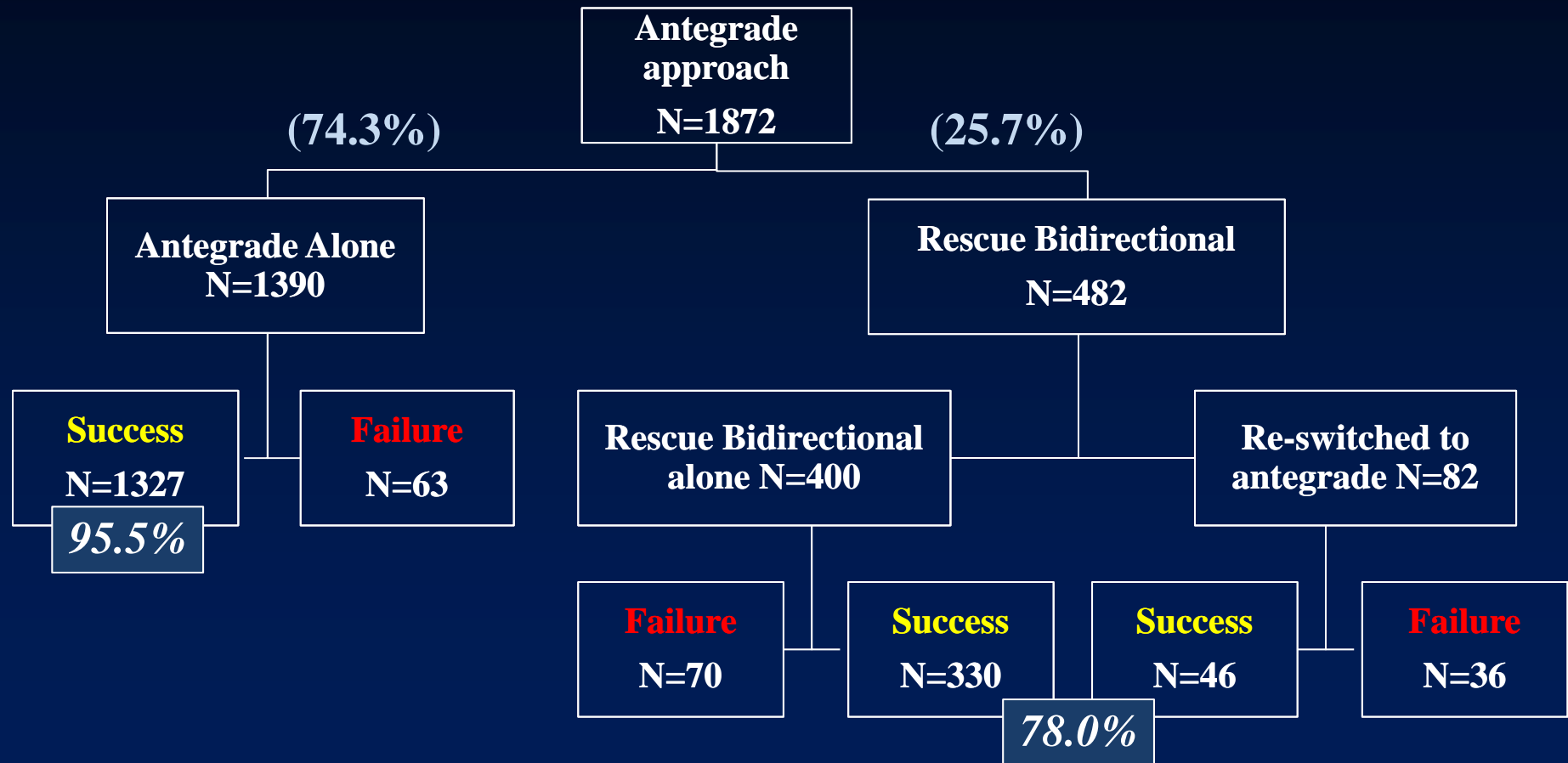
Primary Antegrade



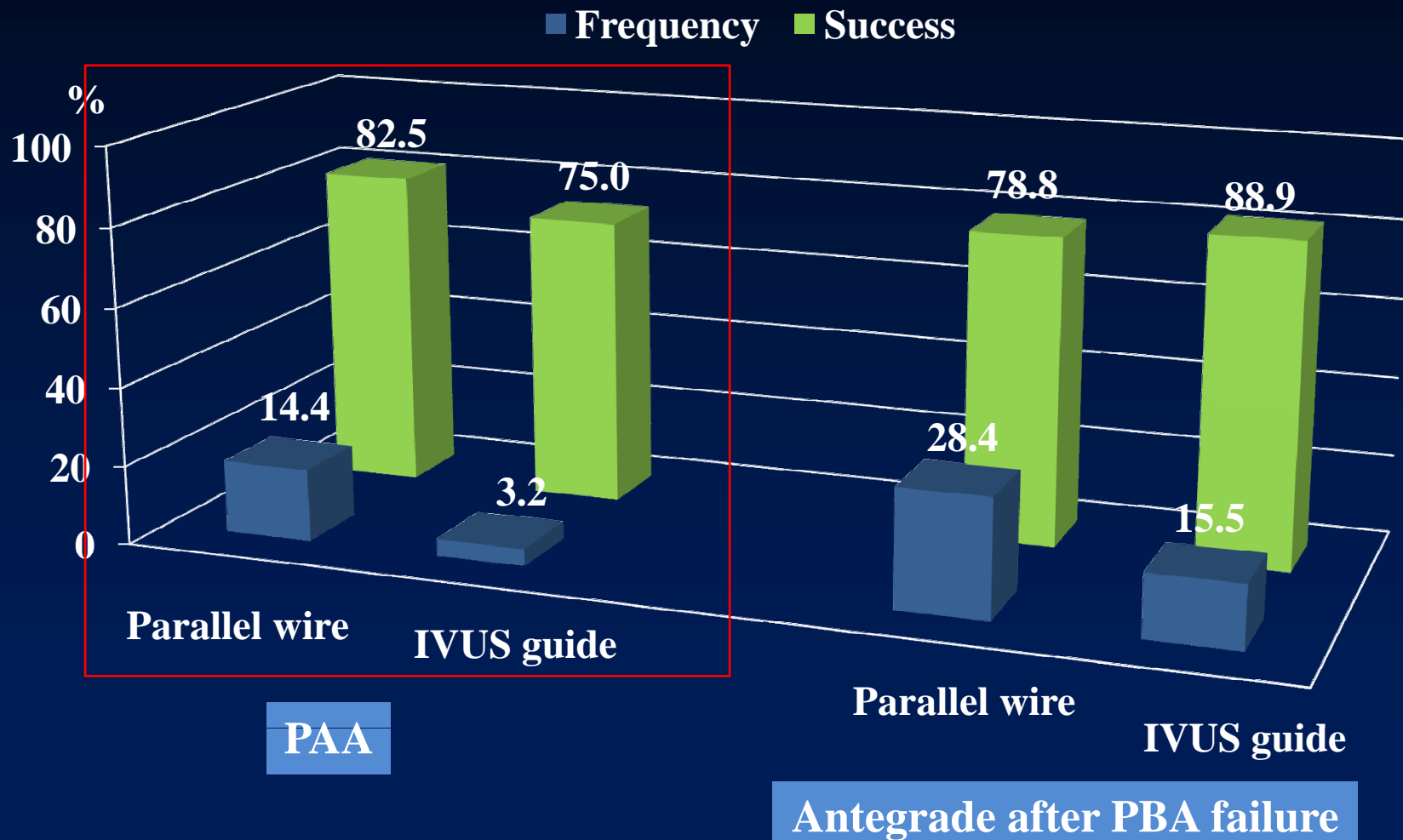
	Antegrade alone	RBA	Ant vs. RBA
	N=1390	N=482	P-value
Age	67.1±11.0	66.2±10.8	0.171
BMI	24.6±3.7	24.8±3.9	0.370
LVEF	55.0±13.0	54.6±12.8	0.434
eGFR	64.5±30.8	66.6±28.4	0.277
Male gender, %	84.1	88.2	0.031
Hypertension, %	77.6	78.0	0.784
Dyslipidemia, %	75.2	77.8	0.166
Diabetes, %	44.7	44.5	0.434
Current smoking, %	51.9	57.1	0.137
OMI, %	49.7	55.0	0.120
Prior CABG, %	6.6	9.6	0.096
Prior PCI, %	59.9	65.5	0.025
Syntax score	16.1±8.5	15.8±8.1	0.797
J-CTO score	1.7±1.1	2.2±1.1	<0.0001
Target vessel, %			<0.0001
LAD	33.9	29.9	
LCX	22.9	13.3	
LMT	0.6	0.4	
RCA	42.6	56.4	

	Antegrade alone	RBA	Ant vs. RBA
	N=1390	N=482	P-value
Reattempt, %	12.7	22.2	<0.0001
In-stent occlusion, %	20.2	7.3	<0.0001
Distal run off (<3.0mm), %	64.2	65.1	0.762
CTO length (≥20mm), %	53.5	67.2	<0.0001
Side branch at proximal cap, %	35.5	33.0	0.325
Collateral filling, %			<0.0001
 Contralateral	46.6	50.4	
 Ipsilateral	18.4	8.9	
 Both	33.8	40.5	
 None	1.2	0.2	
Lesion calcification, %	48.8	55.4	0.013
Proximal tortuosity, %	49.2	49.0	0.836
Tortuosity of CTO lesion, %	18.7	29.9	<0.0001
Morphology of proximal cap, %			0.008
 Blunt	24.6	20.7	
 No stump	16.0	22.6	
 Tapered/tunnel	59.1	56.2	

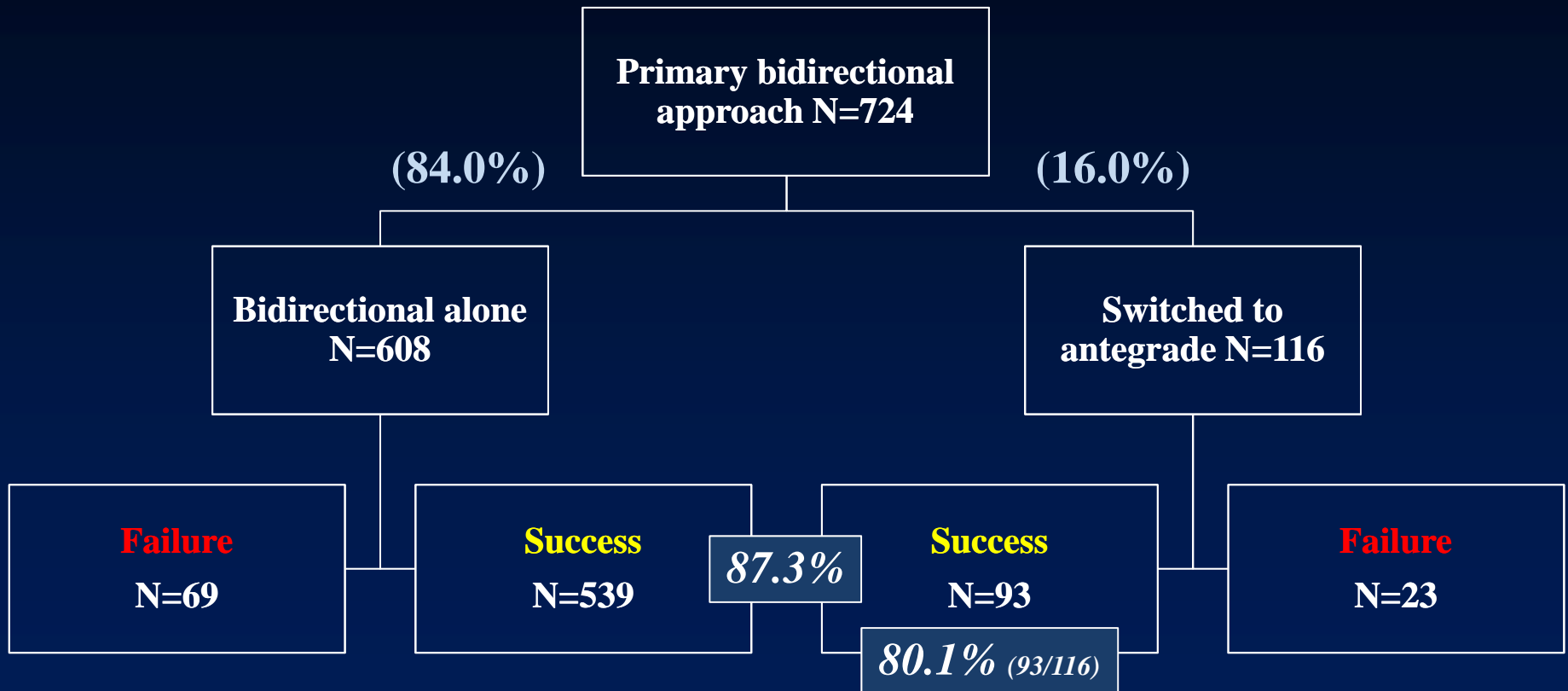
Primary Antegrade



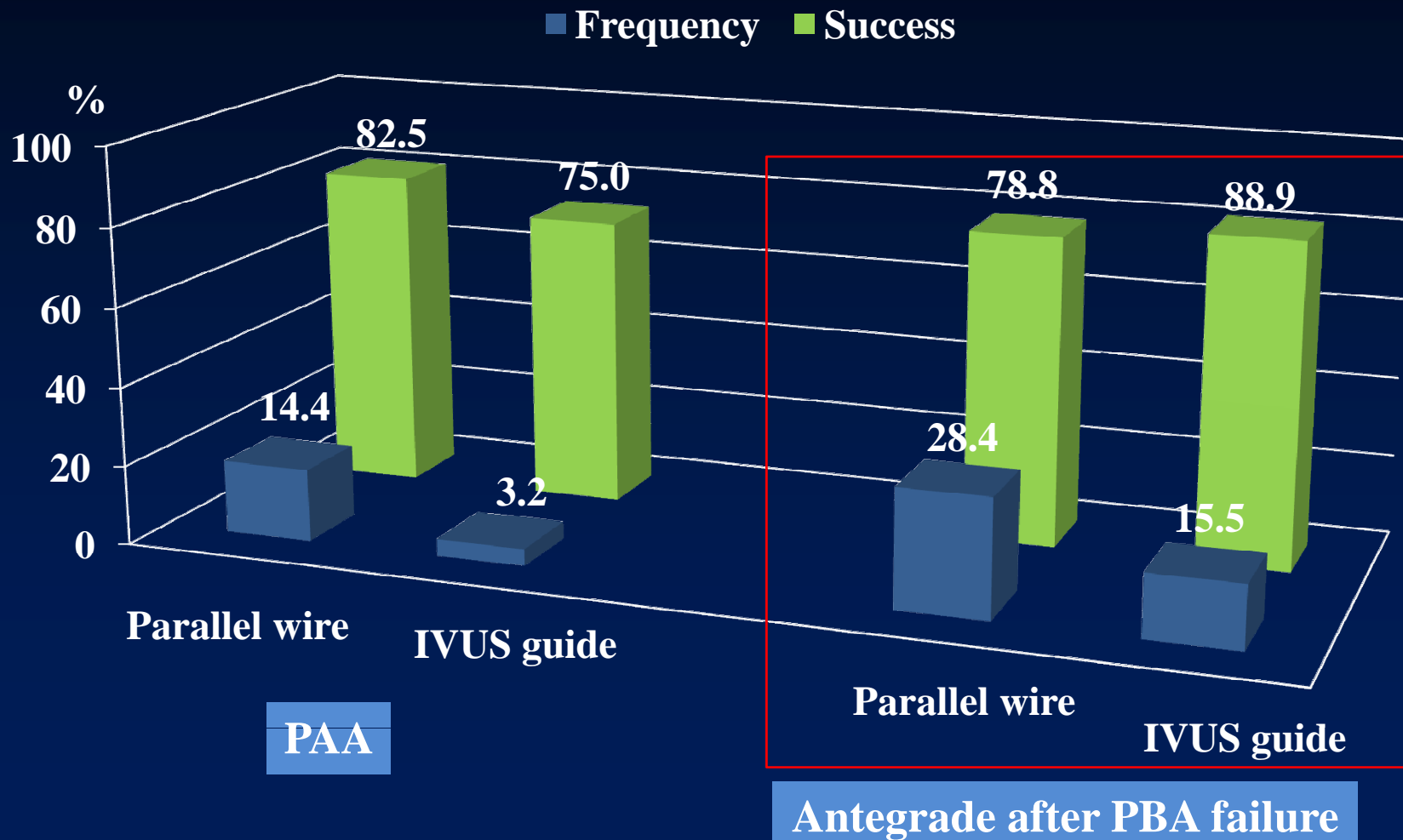
Parallel Wiring and IVUS Guidance



Primary Bidirectional



Parallel Wiring and IVUS Guidance



	RBA	PBA	RBA vs. PBA
	N=482	N=724	P-value
Age	66.2±10.8	66.9±10.7	0.289
BMI	24.8±3.9	24.6±3.8	0.227
LVEF	54.6±12.8	54.6±12.9	0.982
eGFR	66.6±28.4	64.3±25.7	0.286
Male gender, %	88.2	88.4	0.927
Hypertension, %	78.0	80.5	0.449
Dyslipidemia, %	77.8	81.9	0.175
Diabetes, %	44.5	45.5	0.906
Current smoking, %	57.1	57.4	0.915
OMI, %	55.0	50.8	0.320
Prior CABG, %	9.6	9.4	0.972
Prior PCI, %	66.5	67.2	0.948
Syntax score	15.8±8.1	15.6±8.9	0.182
J-CTO score	2.2±1.1	2.4±1.1	0.001
Target vessel, %			0.007
LAD	29.9	25.7	
LCX	13.3	8.6	
LMT	0.4	0.5	
RCA	56.4	65.2	

	RBA	PBA	RBA vs. PBA
	N=482	N=724	P-value
Reattempt, %	22.2	34.8	<0.0001
In-stent occlusion, %	7.3	5.1	0.137
Distal run off (<3.0mm), %	65.1	66.4	0.793
CTO length (≥20mm), %	67.2	69.6	0.729
Side branch at proximal cap, %	33.0	32.0	0.754
Lesion calcification, %	55.4	56.9	0.635
Proximal tortuosity, %	49.0	49.3	0.401
Tortuosity of CTO lesion, %	29.9	32.5	0.644
Morphology of proximal cap, %			0.303
Blunt	20.7	23.9	
No stump	22.6	22.7	
Tapered/tunnel	56.2	52.3	
Collateral used, %			0.801
Sepal	66.3	69.0	
Epicardial	24.7	23.4	
Arterial	6.4	5.2	
Graft	2.7	2.4	

	RBA	PBA	RBA vs. PBA
	N=482	N=724	P-value
Failed collateral crossing, %	20.2	16.0	0.062
GW success, %	80.3	90.1	<0.0001
Technical success, %	78.0	87.3	<0.0001
Procedural success, %	76.5	85.0	<0.0001
Procedure time	218.0±79.8	201.5±94.4	<0.0001
Contrast volume	279.5±123.9	245.8±108.0	<0.0001
In hospital death, %	0	0.4	0.296
MI, %	1.4	2.0	0.688
Acute stent thrombosis, %	0	0.1	1.000
Stroke, %	0.7	0.3	0.370
Emergent CABG, %	0	0	
Emergent PCI	0.2	0.1	1.000
Coronary embolism, %	0	0.6	0.171
Coronary perforation (tamponade), %	0.4	0.9	0.295
Complications of puncture site, %	1.2	1.4	0.796
CIN, %	2.4	3.1	0.72

Predictors of Failure in PBA

PBA			
Univariate analysis			
	OR	CI	P-value
Prior CABG	1.87	1.024-3.416	0.042
Dyslipidemia	0.565	0.349-0.915	0.02
Side branch at proximal cap	2.086	1.373-3.167	0.001
Tortuosity of CTO	1.813	1.191-2.760	0.006
Severe lesion calcification	2.876	1.622-5.101	<0.0001
multivariate analysis			
	OR	CI	p-value
Severe lesion calcification	3.264	1.739-6.125	<0.0001
Tortuosity of CTO	1.699	1.075-2.686	0.023
Side branch at proximal cap	2.399	1.524-3.776	<0.0001
Dyslipidemia	0.535	0.322-0.889	0.016

Predictors of Failure in RBA

RBA			
Univariate analysis			
	OR	CI	P-value
Sex	0.328	0.180-0.598	<0.001
BMI	1.604	1.024-2.511	0.039
Diabetes	1.720	1.097-2.698	0.018
eGFR<60	0.630	0.401-0.988	0.044
In-stent occlusion	2.780	1.329-5.814	0.007
Lesion>20mm	1.722	1.039-2.855	0.035
Tortuosity of CTO	1.734	1.087-2.765	0.021
Severe lesion calcification	4.242	2.074-8.677	<0.0001
multivariate analysis			
	OR	CI	p-value
Severe lesion calcification	2.711	1.188-6.185	0.018
Sex	0.302	0.155-0.590	<0.0001
BMI	1.807	1.084-3.012	0.023

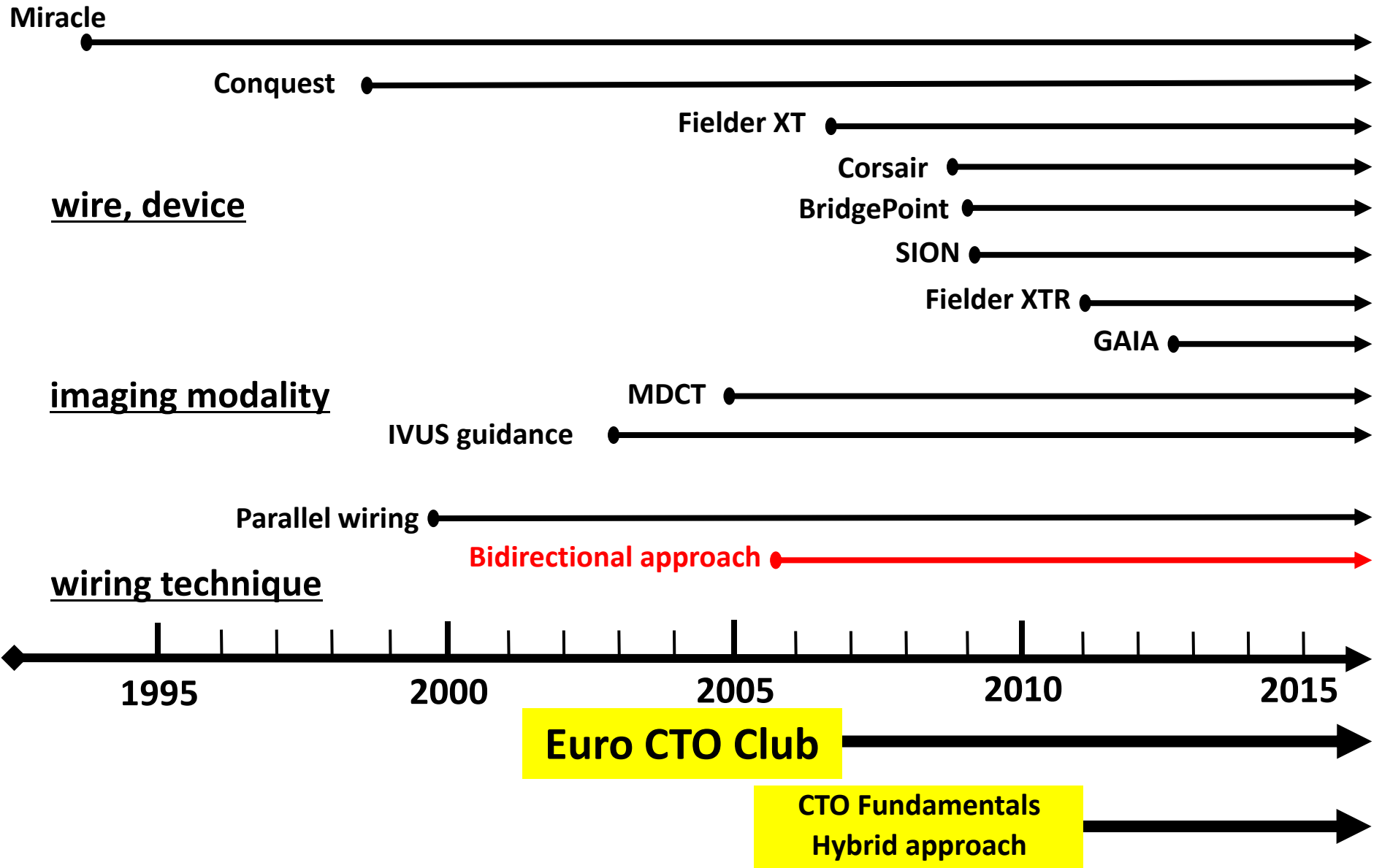
Summary

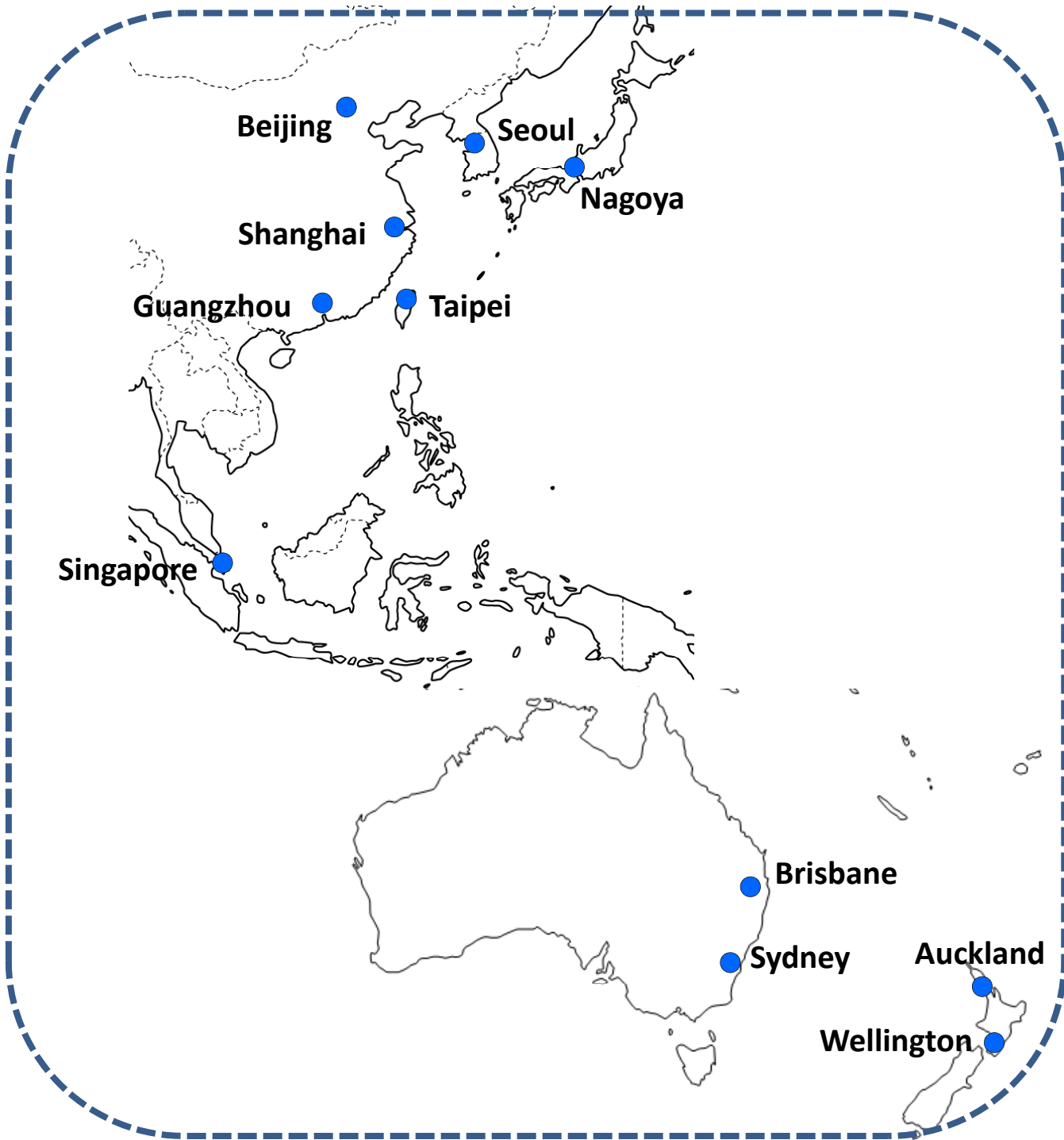
- Japanese experts frequently chose the bidirectional approach as the primary strategy (27.9%), especially for more complex CTO lesions, with a technical success rate of about 90%.
- For intermediate CTO lesions (J-CTO score < 2), experts mainly performed the antegrade approach alone, with a very high success rate (more than 95%).
- However, for RBA, the success rate decreased to less than 80%.
- The experts frequently used the parallel wiring and IVUS-guided penetration in antegrade approach, with high technical success (75.0%–88.9%).
- Severe lesion calcification was a strong predictor of failure.

Conclusion

CTO-PCI performed by highly experienced experts achieved a high technical success rate and a low rate of major complications.

Development of CTO-PCI procedure





Beijing

Seoul

Nagoya

Shanghai

Guangzhou

Taipei

Singapore

Brisbane

Sydney

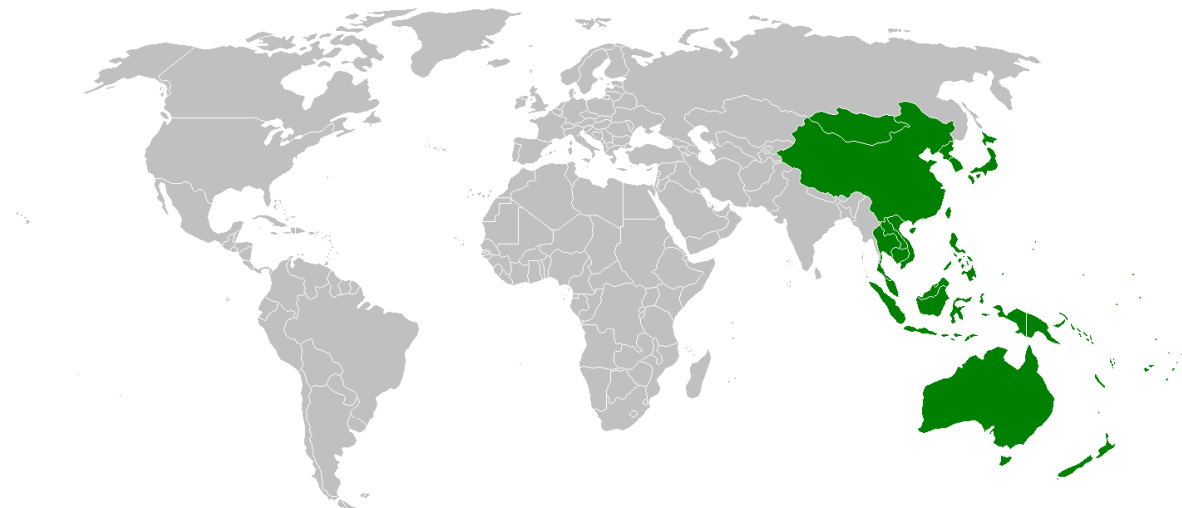
Auckland

Wellington



Asian-Pacific CTO CLUB

Kick-off Meeting@CIT2015, Beijing
March 19th, 2015





Objective

To promote CTO-PCI based on the well developed technology (devices, techniques) for more than 20 years in Asian-Pacific region.

To educate the next generation of Asian-Pacific CTO operators for the patients living in this region.

Directors



Ji Yan Chen	Guangdong General Hospital	China
Lei Ge	Zhongshan Hospital Fudan University	China
Scott Harding	Wellington Hospital	New Zealand
Paul Hsien-Li Kao	National Taiwan University Hospital	Taiwan
Seung-Whan Lee	Asan Medical Center	Korea
Soo Teik Lim	National Heart Centre Singapore	Singapore
Sidney Tsz Ho Lo	Liverpool Hospital	Australia
Jie Qian	Fu Wai Hospital	China
Etsuo Tsuchikane	Toyohashi Heart Center	Japan
Eugene B. Wu	Prince of Wales Hospital	Hong Kong



Qian

Lee

Tsuchikane

Ge

Chen

Kao

Wu

Lim

Lo

Harding

Supervisors

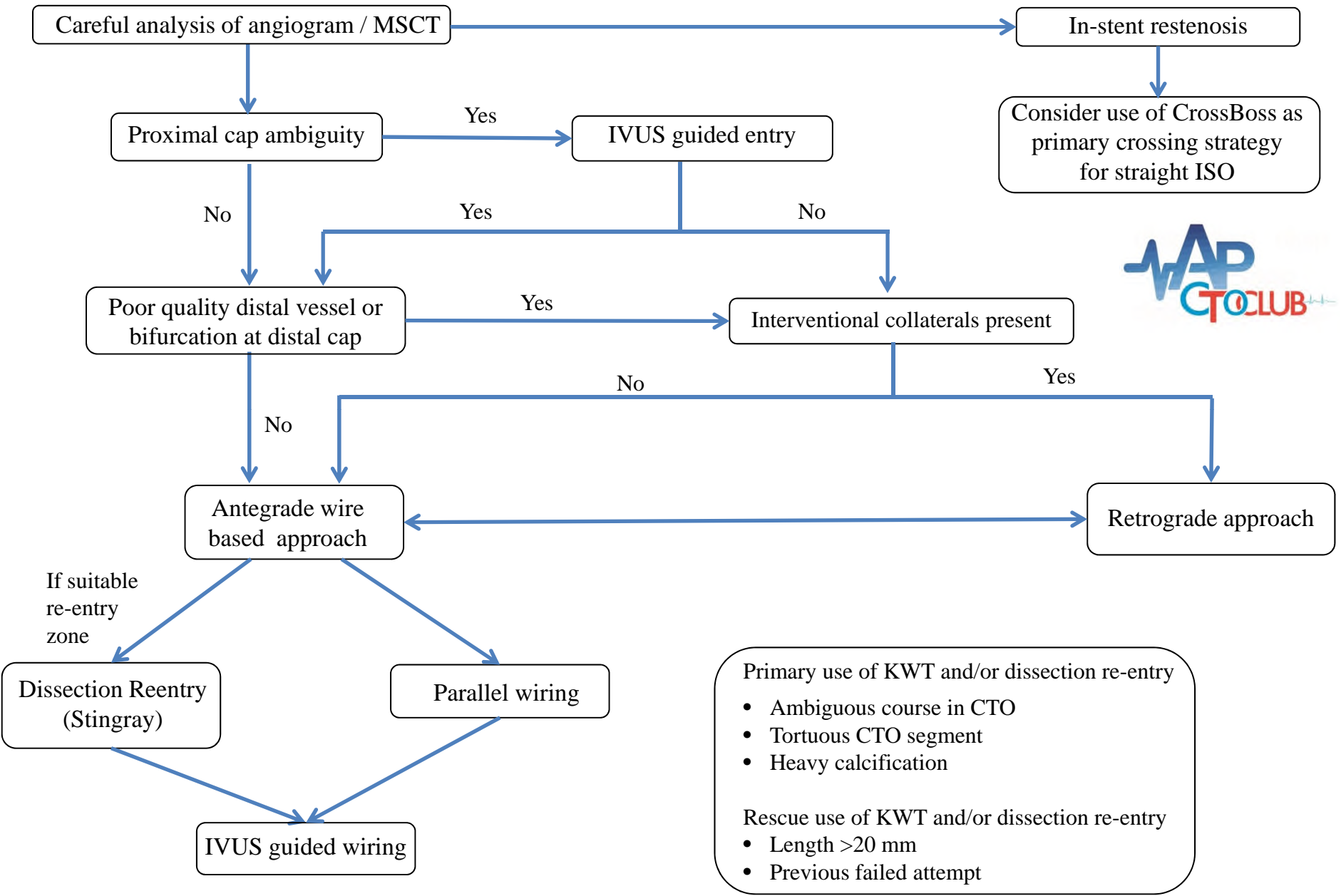


Jumbo Ge	Zhongshan Hospital Fudan University	China
Yang-Soo Jang	Severance Hospital, Yonsei University Hospital	Korea
Osamu Katoh		Japan
Tian Hai Koh	National Heart Centre Singapore	Singapore
Sum Kin Leung	Keen Heart Medical Practice	HongKong
Jim Stewart	Auckland City Hospital	New Zealand
Yeujin Yang	Beijing Fuwai Hospital	China
Chiung-Jen Wu	Kaohsiung Chang Gung Memorial Hospital	Taiwan

What's AP CTO Club role and activity in AP region?

1. Development of AP CTO-PCI Algorithm





Consider stopping if >3 hours, 3.7 x eGFR ml contrast, Air Kerma > 5 Gy unless procedure well advanced

What's AP CTO Club activities



What's AP CTO Club activities

- “Umbrella” covering CTO workshops and major meetings in AP region

- Jun. 19-20 CTO Club in Nagoya
- Aug. 21-22 Guangzhou CTO Workshop in China
- Sep. 11-12 CTO Interventions Live course in Singapore
- Oct. 23-24 CTOCC in Shanghai
- Oct. 29-31 **CCT** in Kobe
- Nov. 18-20 ANZCCT in Brisbane

2015

-
- Jan. 8-9 TTT in Taipei
 - Jan. 21-23 **Asia PCR** in Singapore
 - Mar. 17-20 **CIT** in Beijing
 - Apr. 26 CTO Live@**TCT AP** in Seoul
 - Jun. 9-10 ANZCTO Club in Perth
 - Jun. 17-18 CTO Club in Nagoya
 - Aug. 18-19 Guangzhou CTO Workshop in China
 - Sep. 9-10 CTO Interventions Live course in Singapore
 - Oct. 20-22 **CCT** in Kobe

2016

-
- Jan. 7-8 TTT in Taipei

2017



What's AP CTO Club role and activity

1. Developn
2. Web Site



What's AP CTO Club role and activity in AP region?

1. Development of AP CTO-PCI Algorithm
2. Web Site Open www.apcto.club
3. APCTO Registry by course directors from 2016 by using same database as Japanese Expert Registry
4. Educational Training Program
 - Workshop with live cases for young physician's CTO training w/wo proctorship



Organized by :



Hong Kong Public Hospital Cardiologists Association Ltd
香港公立醫院心臟醫生協會有限公司

Co-organized by :



APCTO Club



Hong Kong Society of Transcatheter
ENdo-cardiovascular Therapeutics



Department of Medicine
Pamela Youde Siewersole Eastern Hospital

Sponsor :

ASAHI INTECC

4th HKCTO live 2017 by HKPHCA - with Proctorship Live

Sponsors:

ConMed Limited

BIOTRONIK

Boston Scientific

Time : 18th Feb 2017 (13:45 - 18:00) Sat "Lunch and Registration start at 12:30"
19th Feb 2017 (09:30 - 16:00) Sun "Breakfast starts at 09:30"
Venue : G/F Learning Centre, Block B Pamela Youde Siewersole Eastern Hospital
Live demonstration cases transemphal with PIVOTAL Cardiac Cath Lab

Dr. Eugene B Wu



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1. Development of AP CTO-PCI Algorithm
2. Web Site Open www.apcto.club
3. APCTO Registry from course directors from 2016 by using same database as Japanese Expert Registry
4. Educational Training Program
 - Workshop in each regional meeting for young physician's CTO training w/wo proctorship

