

14th

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Registry data of CTO from Japan

Maoto Habara, MD (Toyohashi Heart Center, Japan)

on behalf of Retrograde Summit



Conflicts of Interest

Speaker's name : Maoto Habara

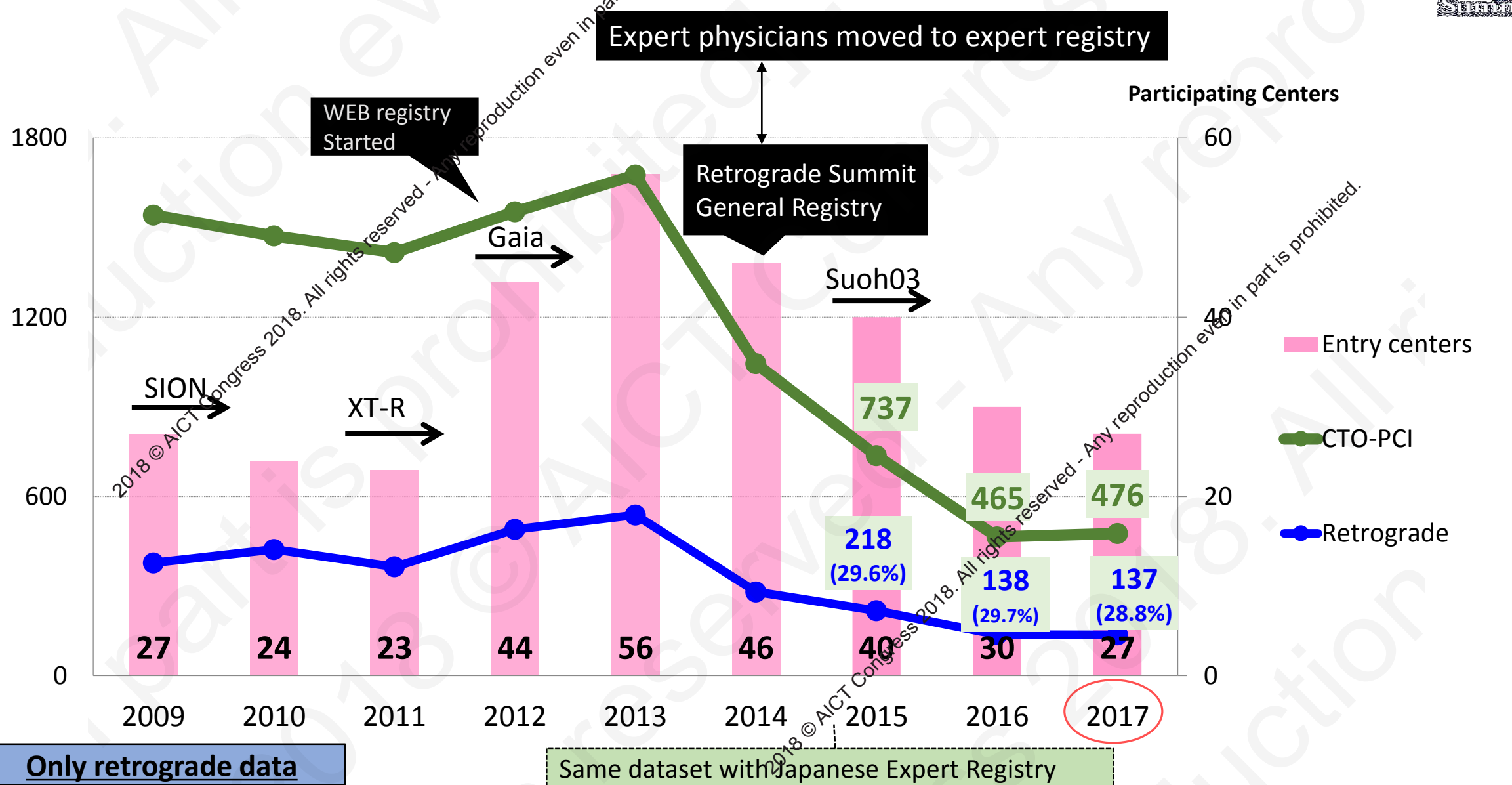
We have no disclosure

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- **Retrograde Summit Registry** was initiated by Retrograde Summit in 2009 and collected only data of retrograde approach cases.
- A web based registry was started from **2012** to collect all CTO-PCI data, including antegrade approach cases.
- Since 2014, the registry name was changed to **Retrograde Summit General Registry** to differentiate from **Expert Registry**. Also, database was integrated with Expert registry since 2015.
- Patients are enrolled by participating centers.
- There was no centralized event adjudication and core laboratory assessment. Procedural success is adjudicated at each center based on the definition on the protocol.

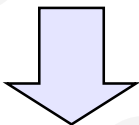
Annual Change of Enrollment



Registry Data 2017



Case enrollment : 504 CTO-PCIs



28 cases were excluded due to insufficient case card information

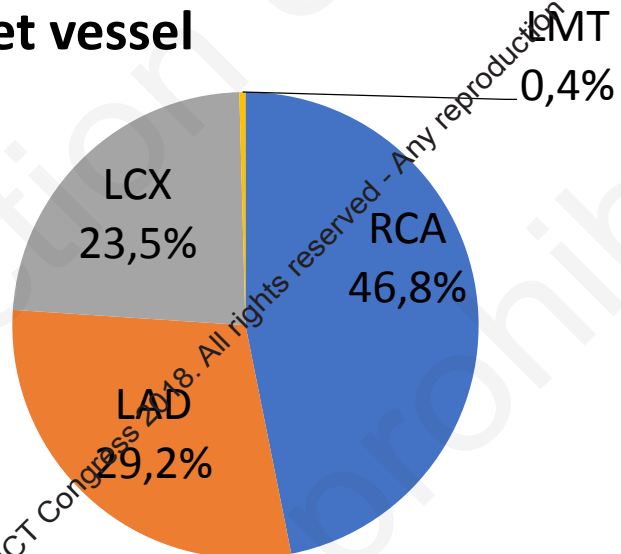
Final subject for analysis:
476 CTO-PCIs

	Retrograde Summit Registry		Retrograde Summit General Registry			
	2012	2013	2014	2015	2016	2017
Participating centers	44	57	46	40	30	27
CTO-PCIs	1,553	1,676	1,045	737	465	476
- Retro	490 (32%)	538 (32%)	281 (27%)	218 (30%)	138 (30%)	137 (29%)

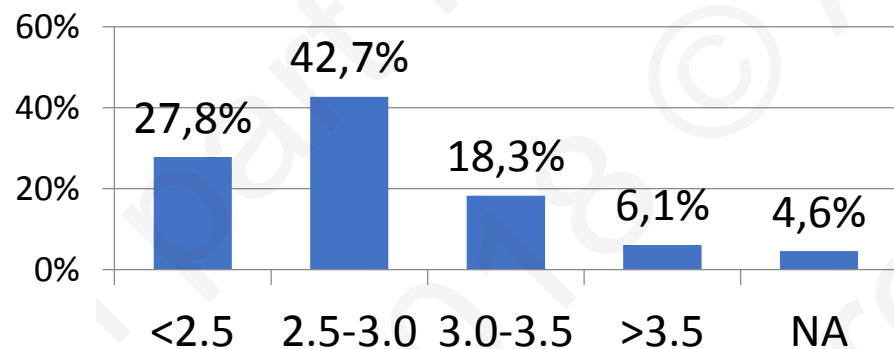
Lesion characteristics

(Overall; 465cases)

Target vessel

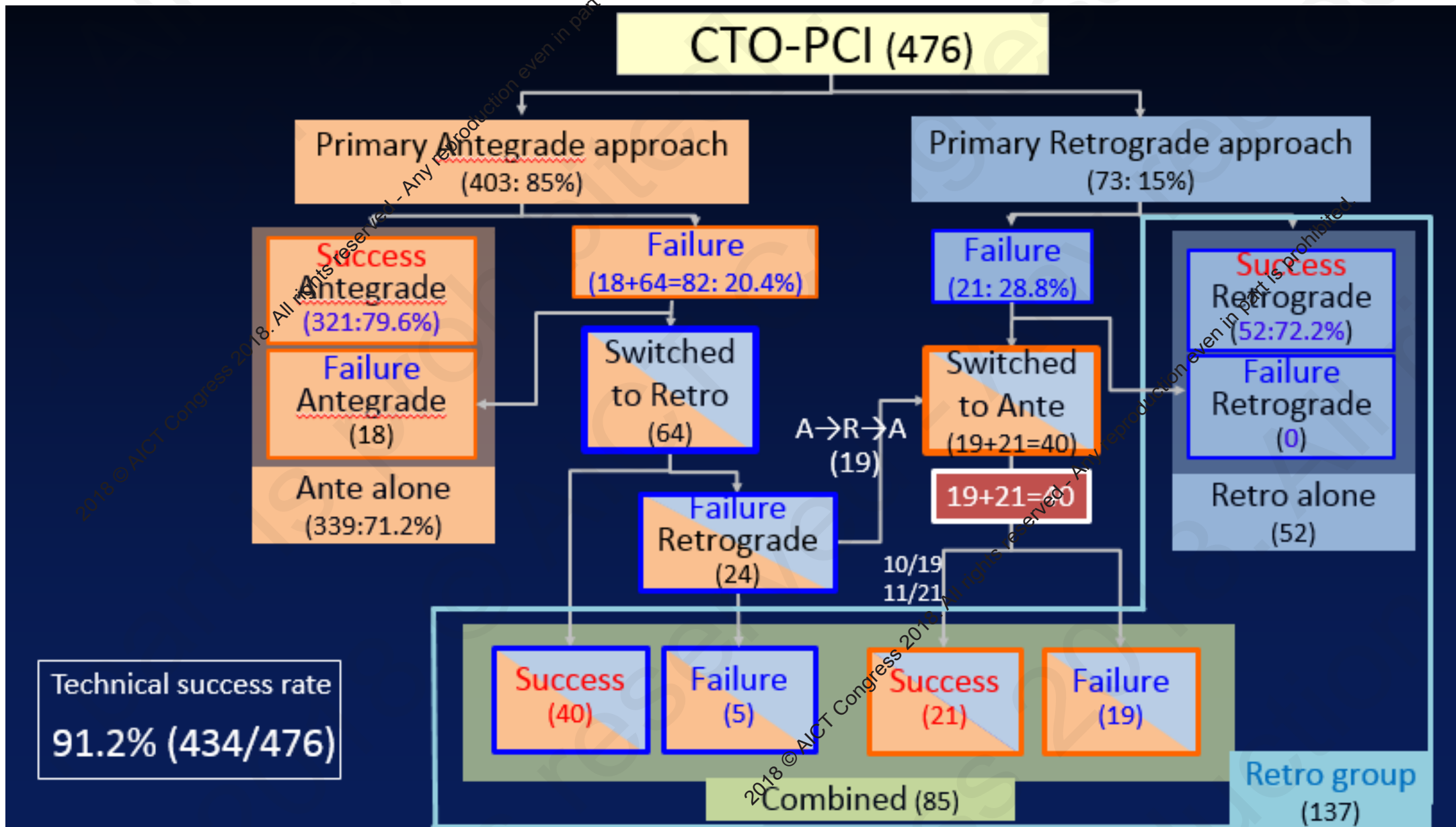


Reference diameter



In-stent occlusion	14.9%
Occlusion length (≥ 20mm)	40.9%
Prior failed PCI	7.6%
Lesion calcification (Presence/absence)	65.1%
Lesion tortuosity (≥45°)	14.5%
Proximal vessel tortuosity (>moderate)	20.4%
CTO at bifurcation	33.8%
Collateral channel	
- CC 0	11.6%
- CC 1	48.1%
- CC 2	39.9%

Procedure summary (technical success; GW Cross)

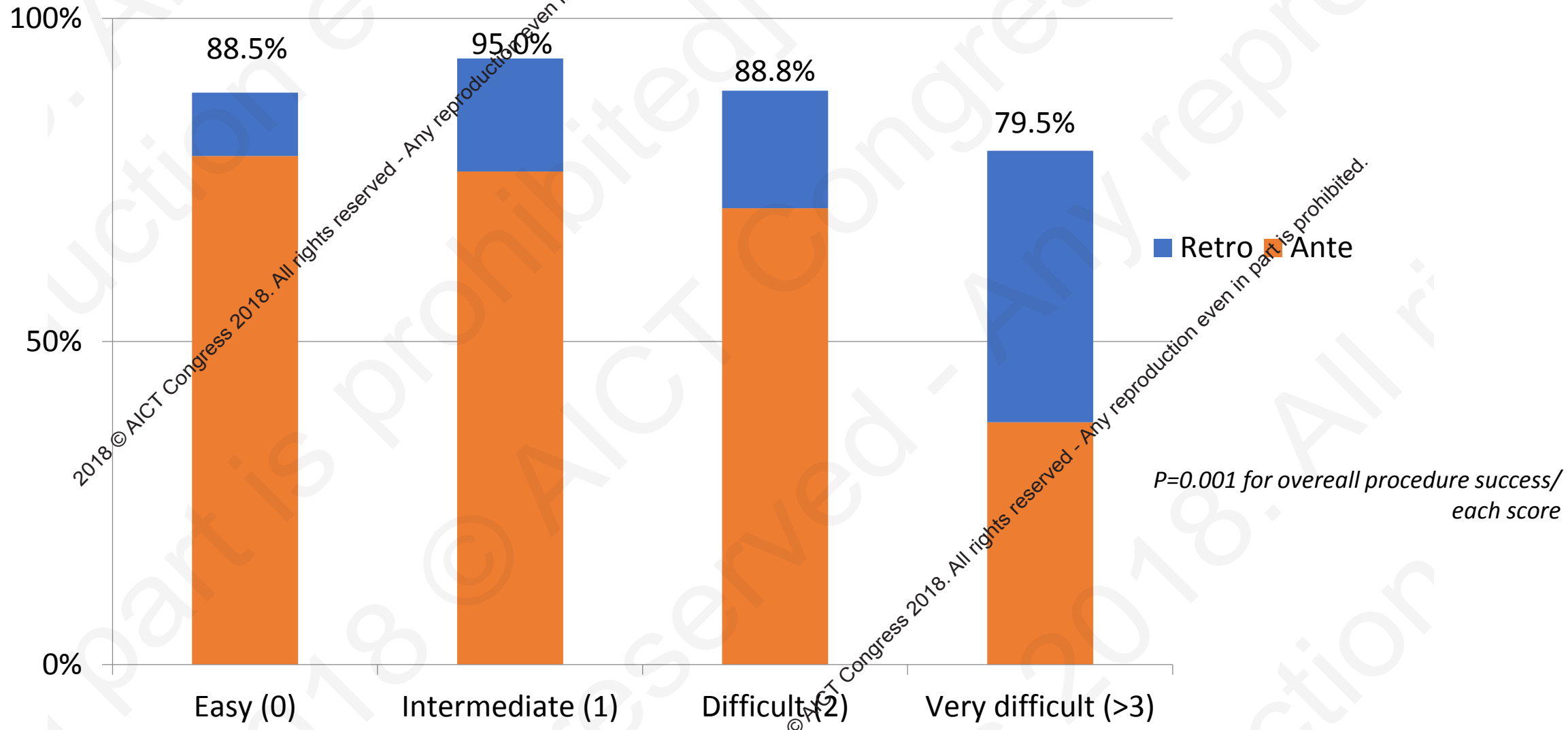


Procedure success (Overall)

	2012 (1553)	2013 (1676)	2014 (1045)	2015 (737)	2016 (465)	2017 (476)
Over all	88.4% (1372)	88.4% (1482)	88.2% (922)	88.9% (655)	90.5% (421)	88.7% (422)

	2012	2013	2014	2015(737)	2016(465)	2017 (476)
Ante alone group	90.8% (965/1063)	92.4% (1051/1138)	90.7% (693/764)	91.3% (474/519)	93.9% (307/327)	92.3% (313/339)
Retro group	83.1% (407/490)	80.1% (431/538)	81.5% (229/281)	83.0% (181/218)	82.6% (114/138)	75.9% (104/137)

Procedure success by J-CTO



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P=0.001 for overall procedure success/
each score

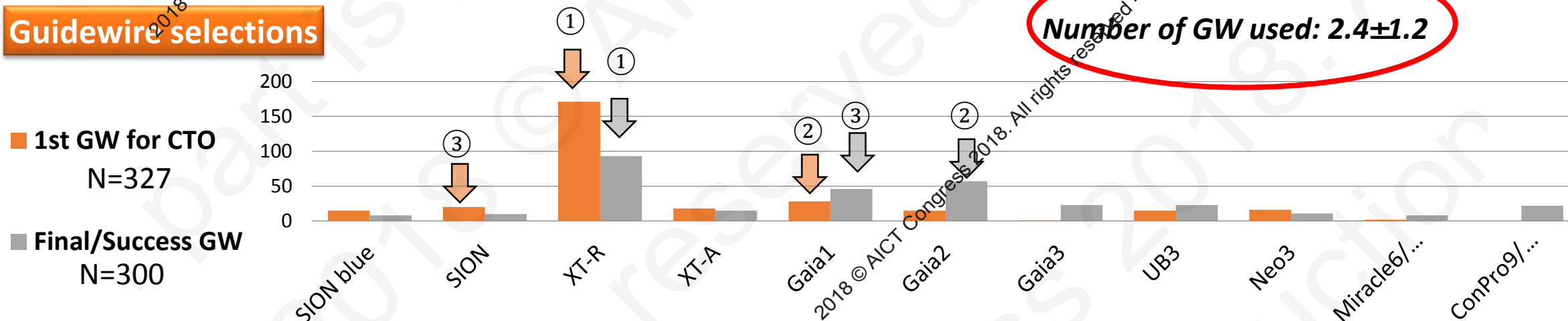
Procedure outcome (Overall)

Successful GW crossing for lesion	91.2%
Procedure success rate	88.7%
Retrograde access/approach	28.8%
Number of stent	1.74±0.8
Total stent length (mm)	51.9±25.7
Procedure time (min)	156.3±92.2
Contrast volume (ml)	180.0±90.2
Fluoroscopy time (min)	78.2±74.6
Air kerma (mGy)	2908.4±3140.9

Antegrade alone procedure

- Access site: **Femoral(62.5%)**, Radial(34.5%), Brachial(3.0%)
- Guiding catheter: **8Fr.(41.9%)**, 7Fr.(41.0%), 6Fr.(16.8%)
- Guidewire success for CTO: **94.7%** (321/339)
- Special technique/device used: **Single wire(78%; 251/321)**
- Use of catheter: **Corsair(45.1%)**, Caravel(41.3%),

Guidewire selections

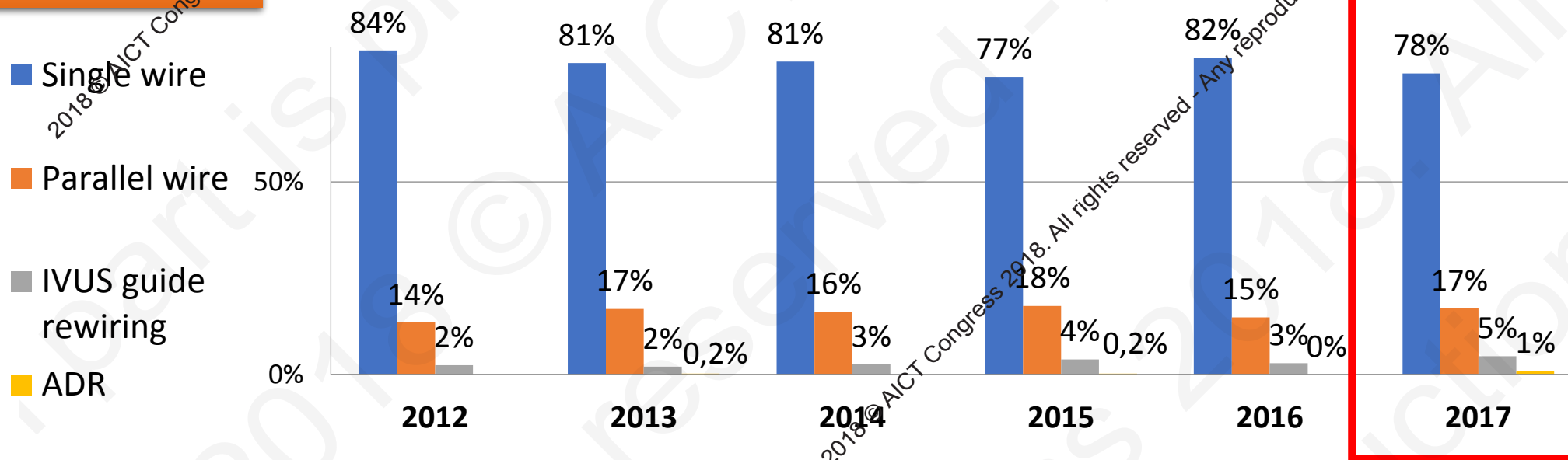


Annual change

Antegrade alone CTO crossing

	2012 (1063)	2013 (1138)	2014 (764)	2015 (519)	2016 (327)	2017(339)
Guidewire success	91.8% (976)	93.5% (1064)	92.2% (704)	91.9% (477)	95.4% (312)	94.7% (321)

Crossing technique

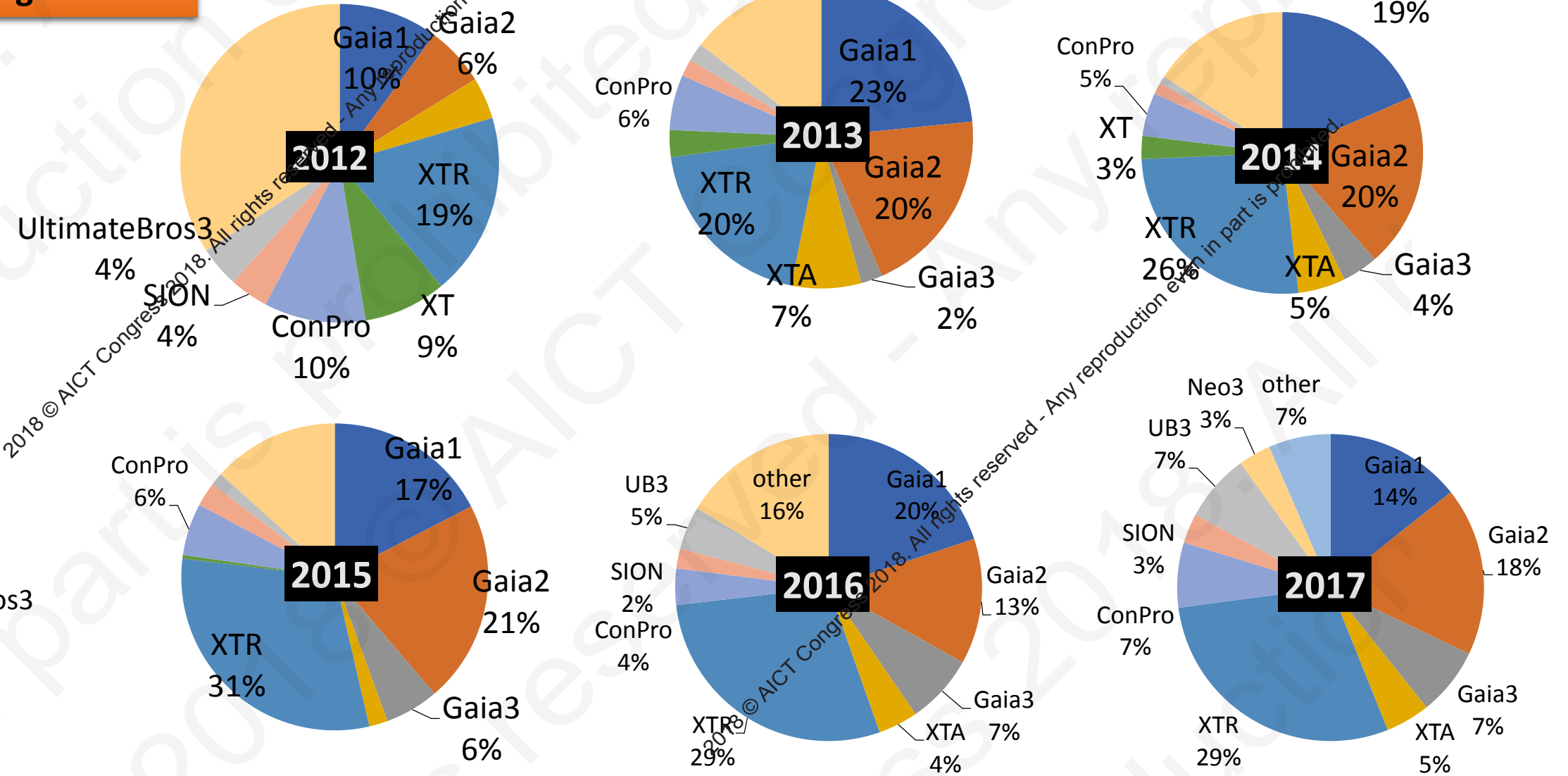


Annual change Antegrade alone CTO crossing



Successful guidewire

- Gaia1
- Gaia2
- Gaia3
- XTA
- XTR
- XT
- ConPro
- SION
- UltimateBros3
- other



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ASAHI Gaia Next

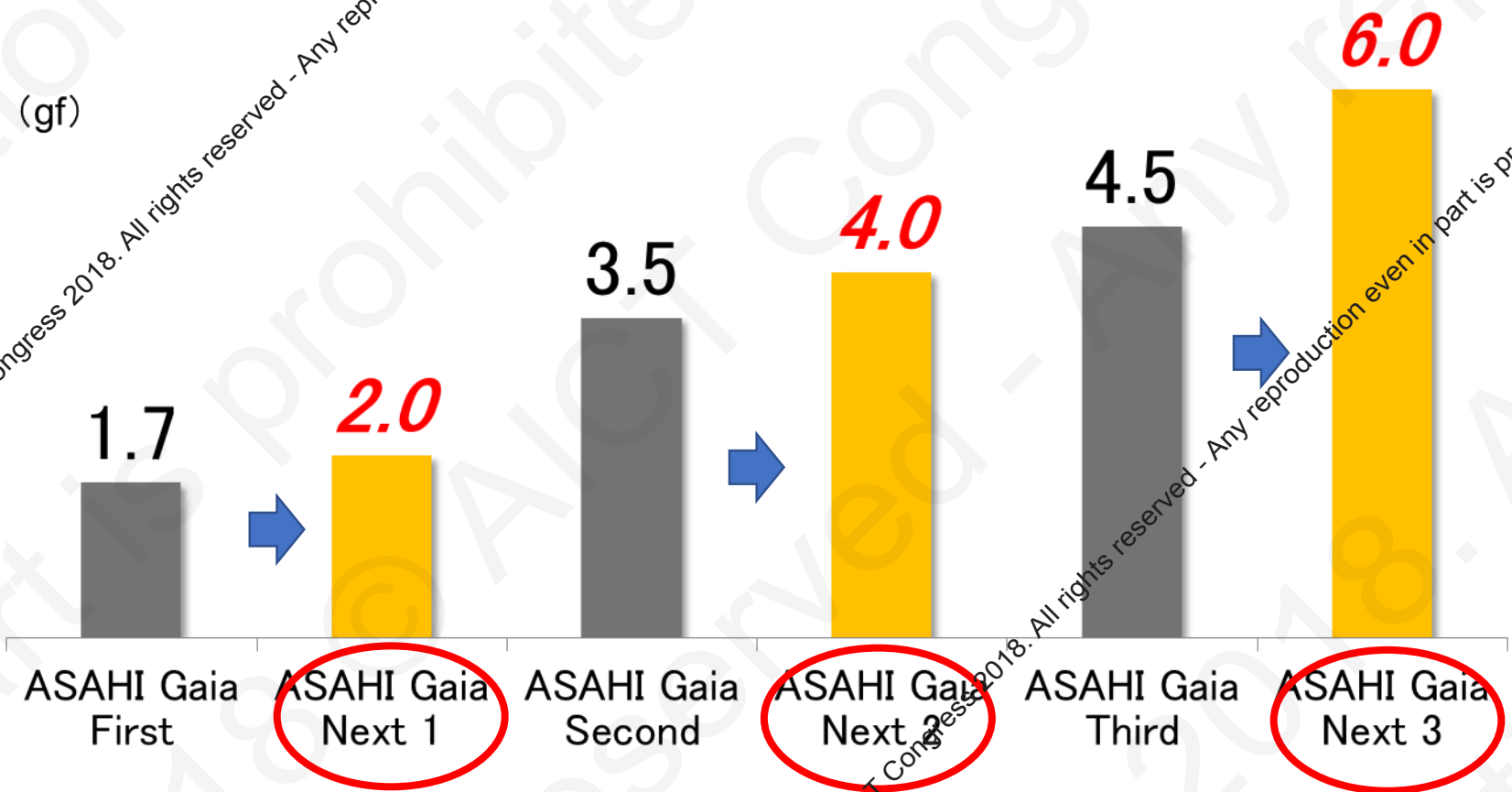
P T A G U I D E W I R E

Tip force

Line-up

(gf)

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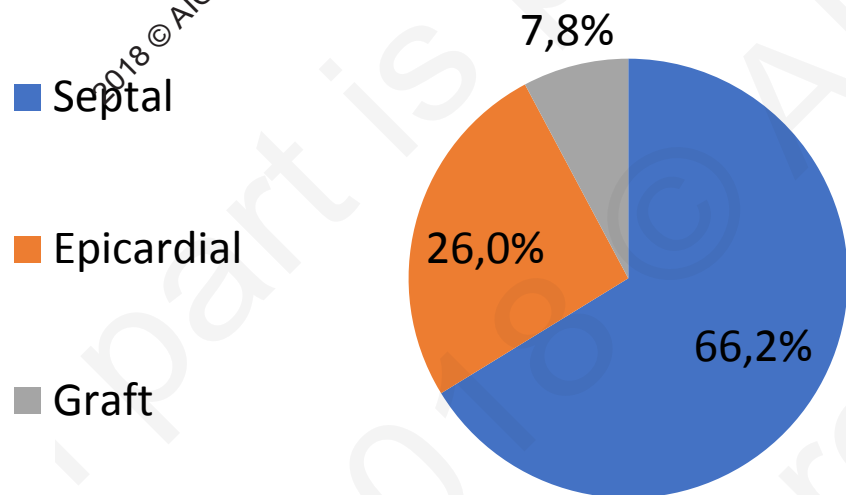


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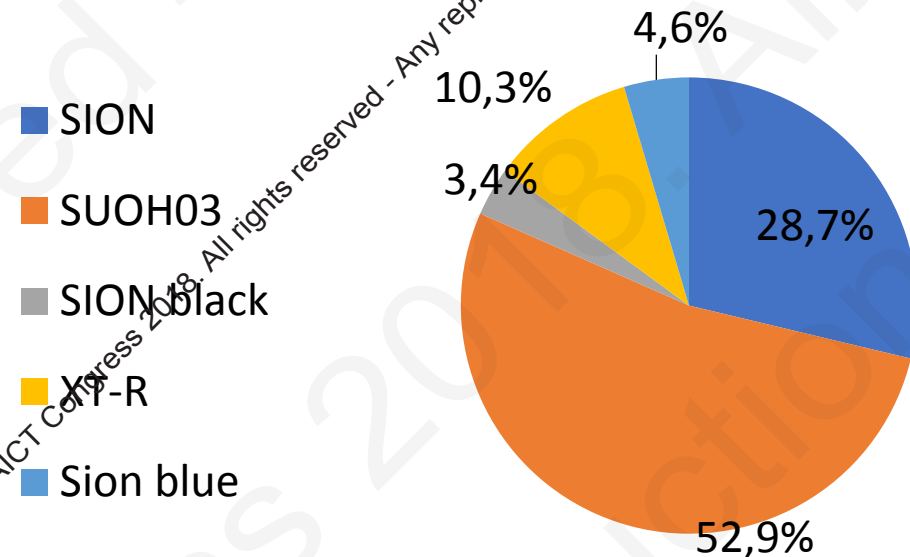
Collateral channel crossing

- Primary retrograde/ all retrograde: **53.3%** (73/137)
- Access site: **Femoral(74.4%)**, Radial(20.4%),
- Guiding catheter size: **7Fr.(67.9%)**, 8Fr.(18.3%)
- Successful collateral crossing by GW: **74.5% (102/137)**
- Guidewire# used for collateral crossing: **1.9±1.2**

Successful collateral channel



Successful guidewire for collateral crossing



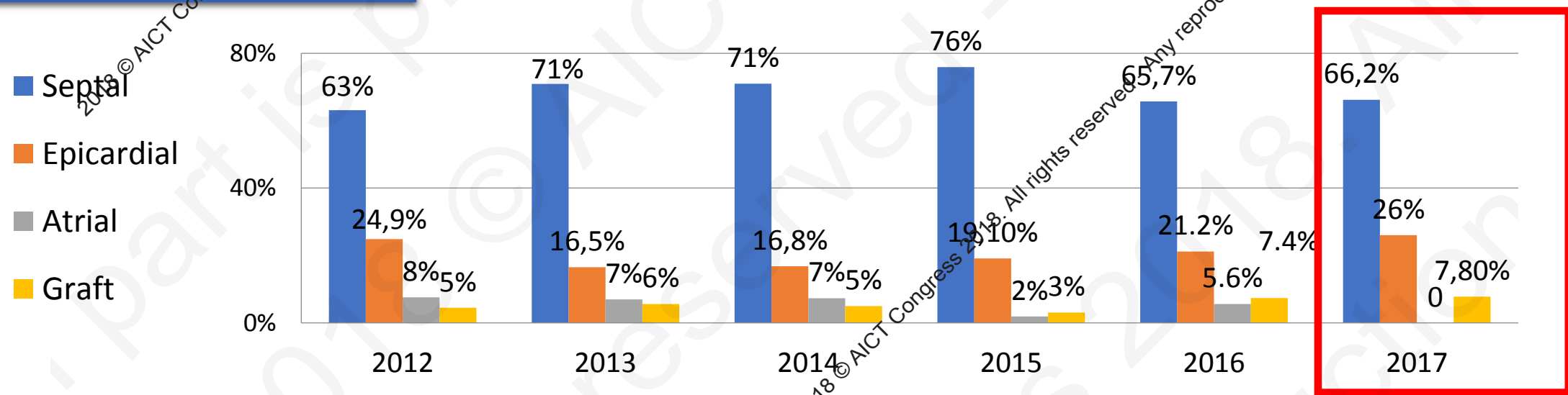
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Annual change

Collateral channel crossing

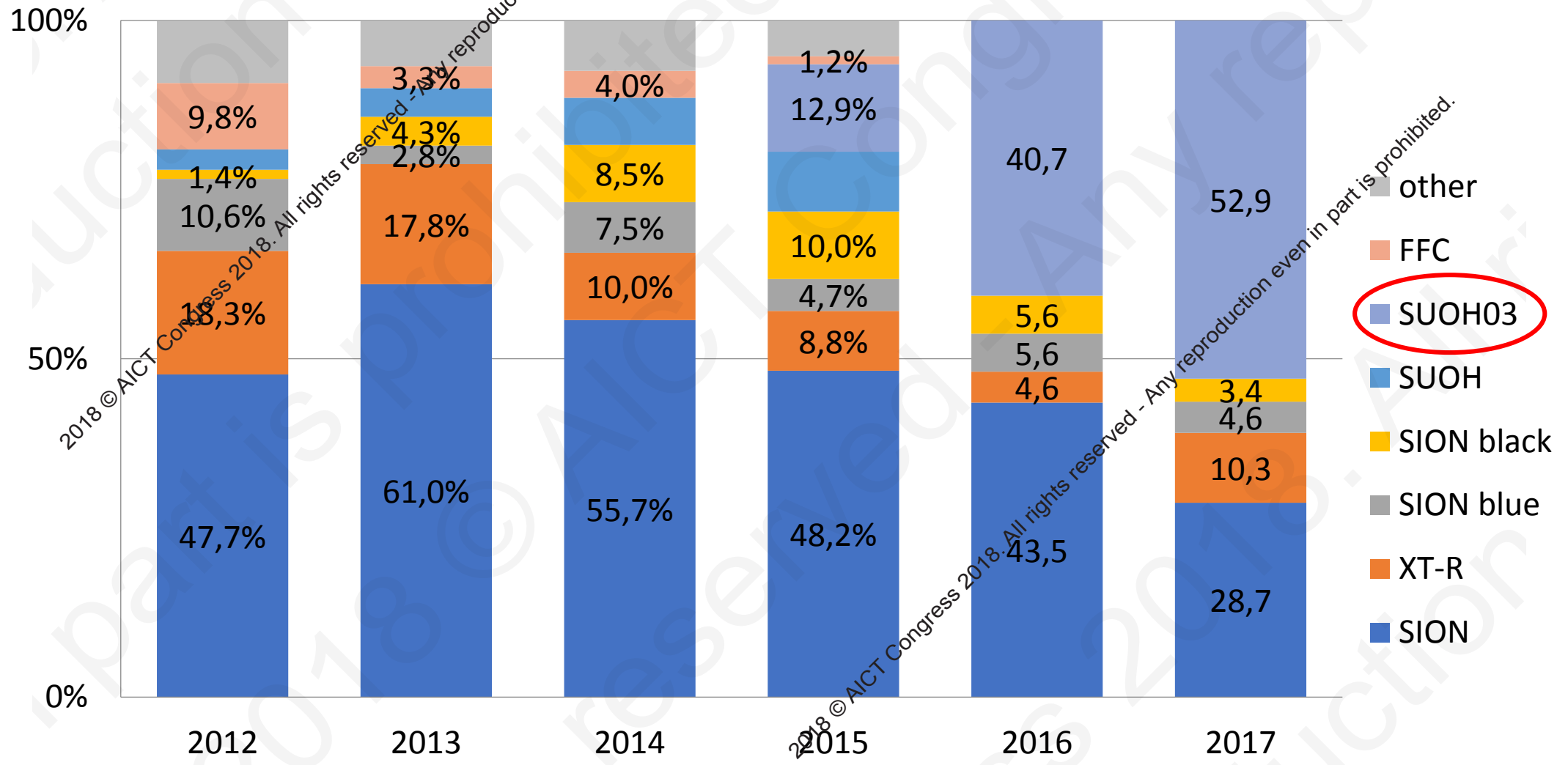
	2012 (490)	2013 (538)	2014 (281)	2015 (218)	2016 (138)	2017 (137)
Guidewire cross success	77.6% (380)	76.4% (411)	76.5% (215)	78.9% (172)	78.7% (108)	74.5% (102)

Successful collateral route



Annual change

Successful GW for collateral channel

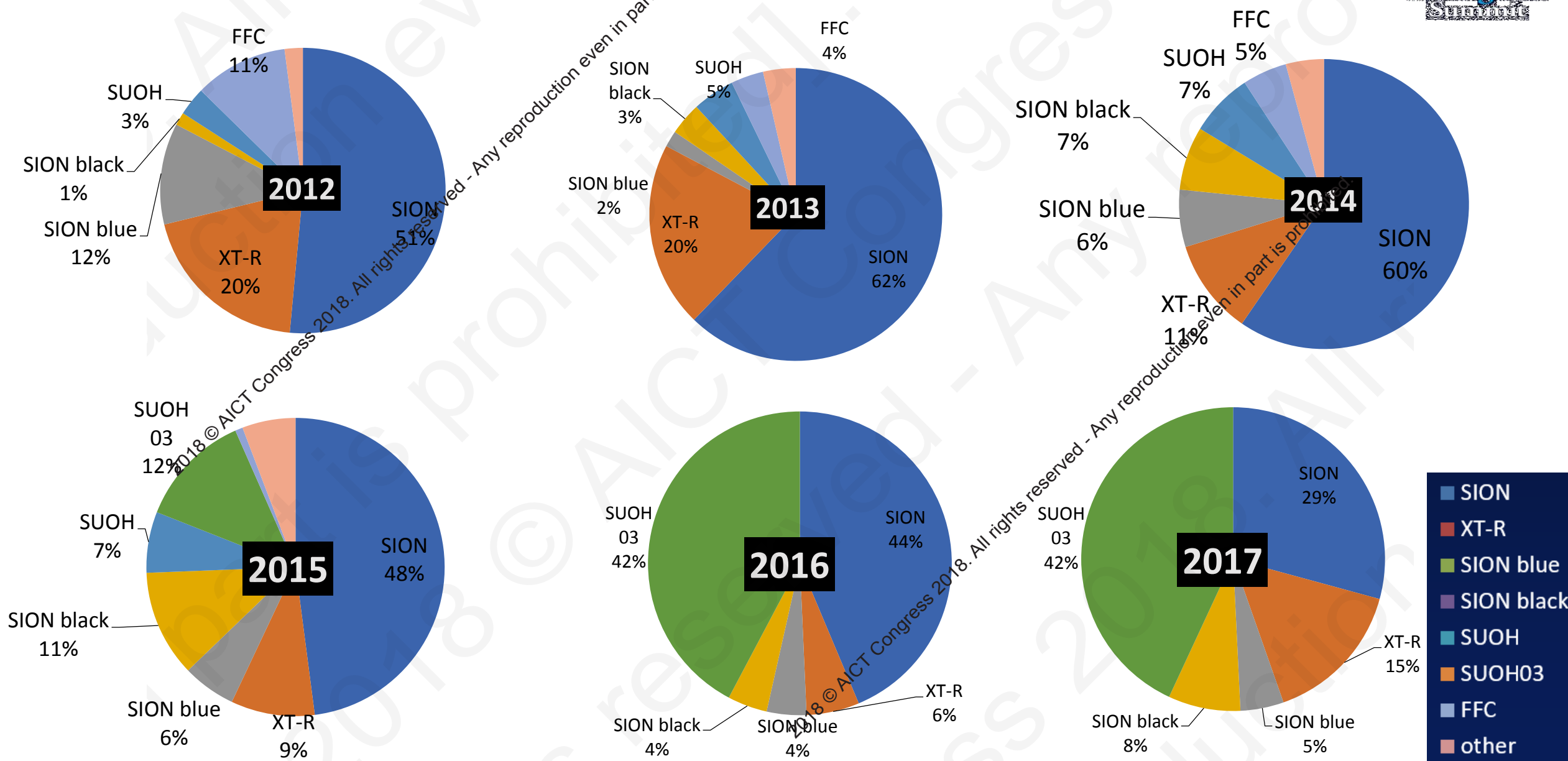


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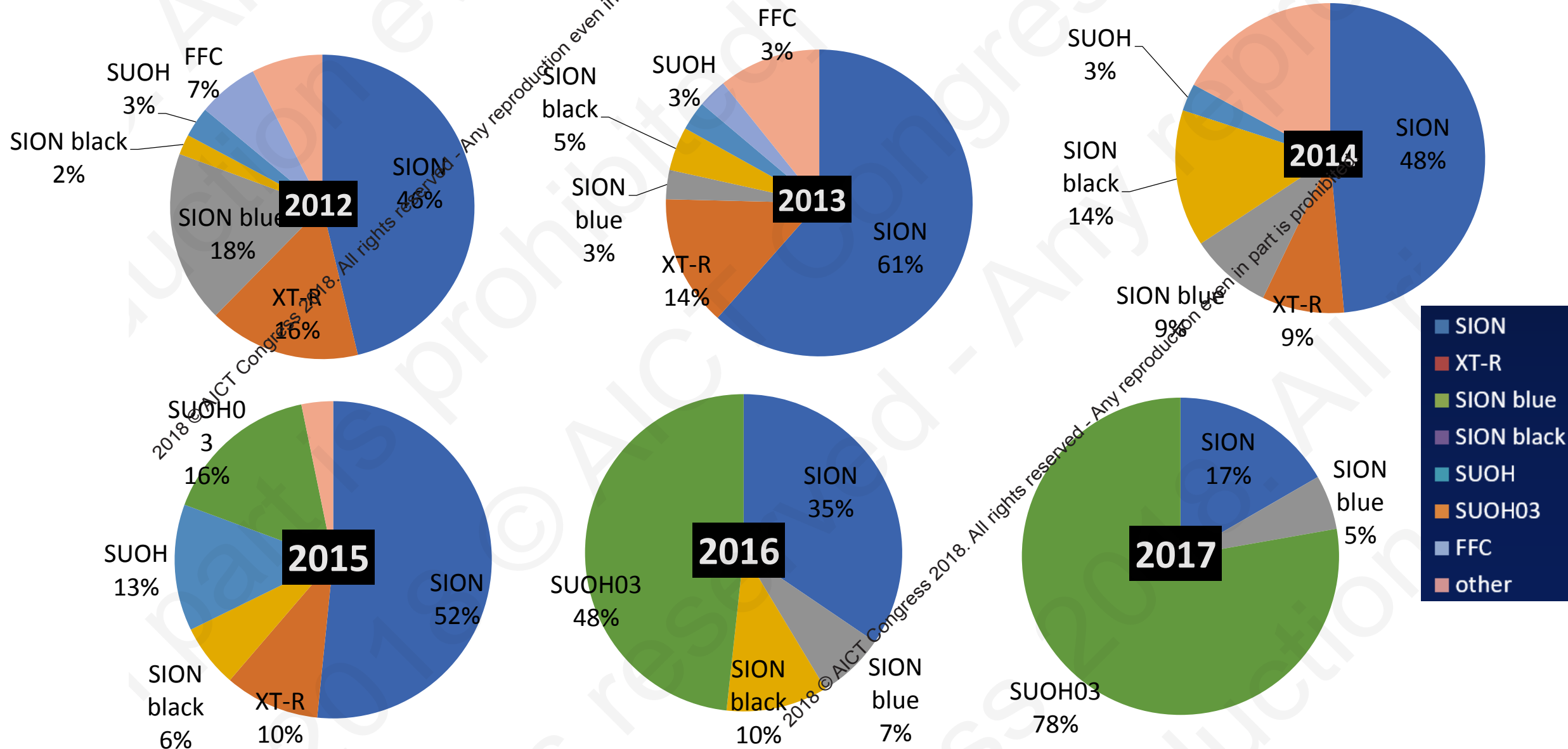
Annual change

Successful GW for *septa* channel

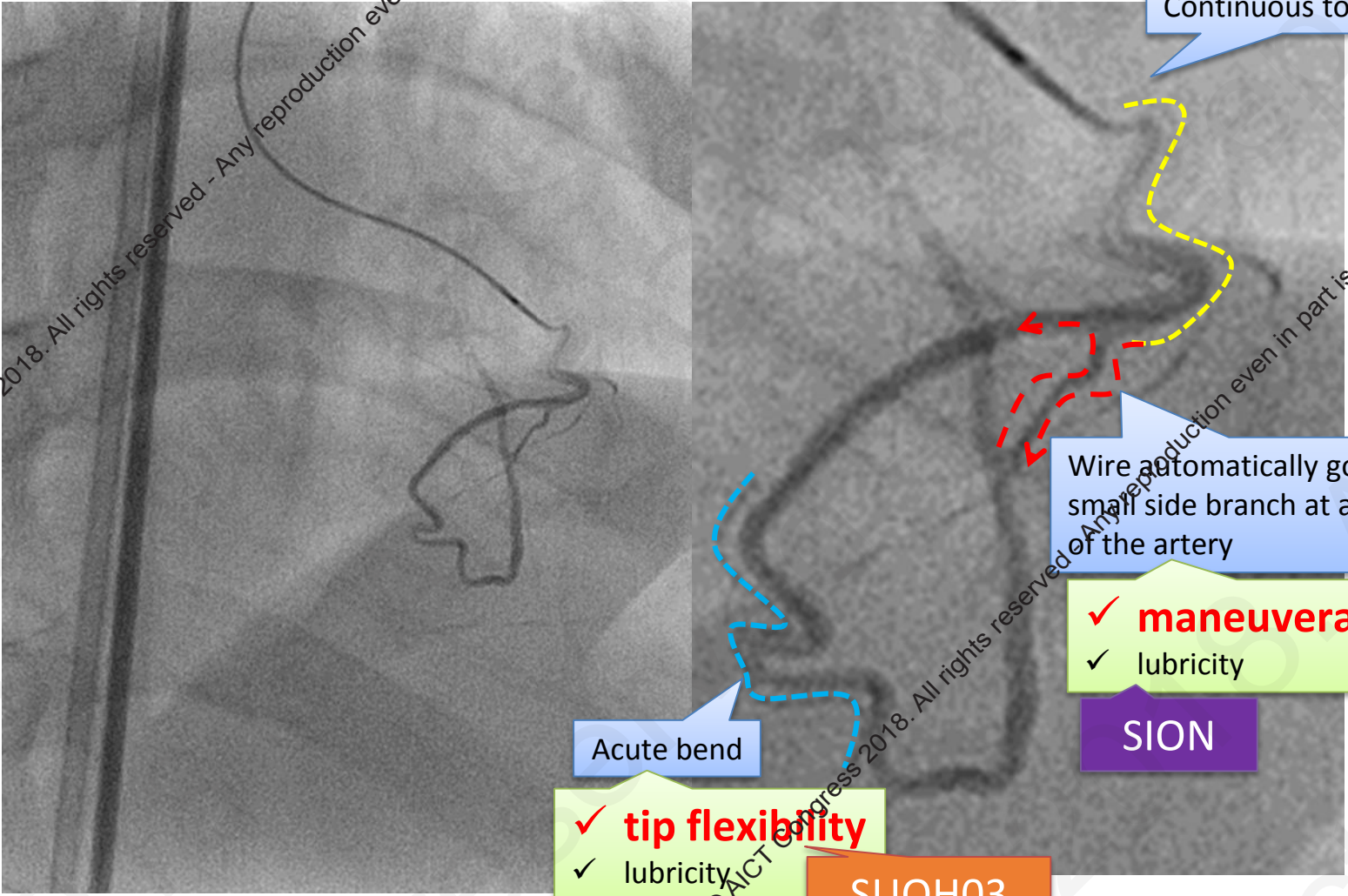


Annual change

Successful GW for *epicardial* channel



Epicardial channel



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SION

- ✓ maneuverability
- ✓ lubricity

Continuous tortuosity

Wire automatically go into small side branch at a bend of the artery

- ✓ **maneuverability**
- ✓ lubricity

SION

Acute bend

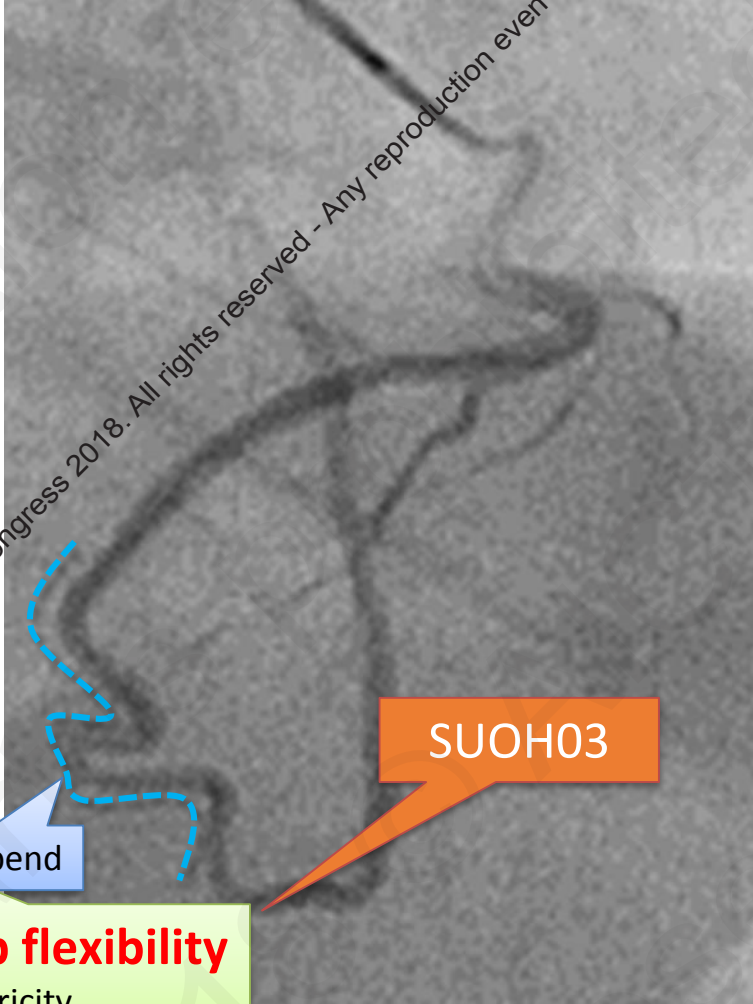
- ✓ **tip flexibility**
- ✓ lubricity

SUOH03

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Epicardial channel

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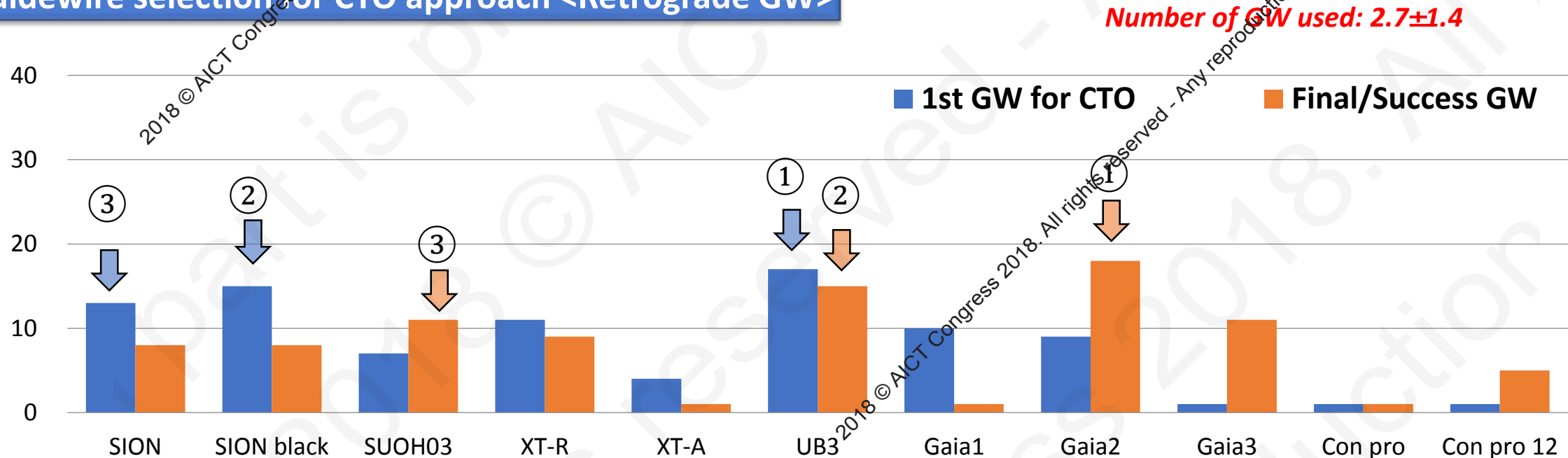
Retrograde approach



- Retrograde group (N=137) -

- Use of catheter for retrograde: **Caravel(53.3%)**, Corsair(42.3%)
- Retrograde success after GW channel cross: 92.8%
- Attempted CTO crossing technique(n=89): **Reverse CART(60.0%)**, Retrograde wire cross(20.2%), Kissing Wire Cross(18.0%), CART (2.3%)

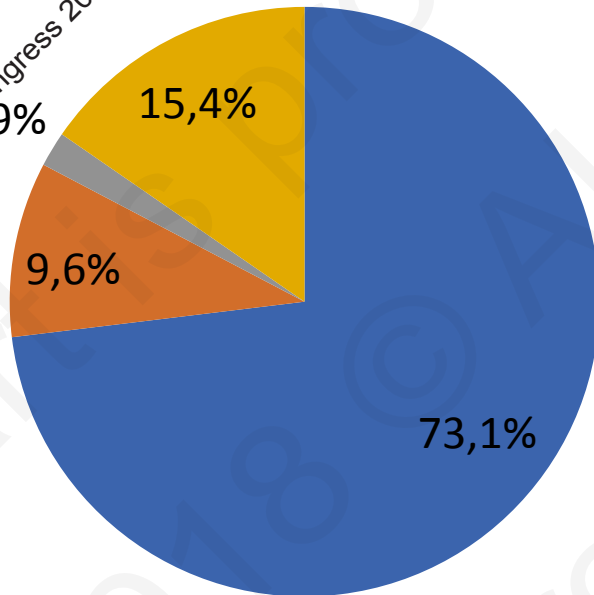
Guidewire selection for CTO approach <Retrograde GW>



Procedure failure reason (Overall)

● Procedure success : **88.7% (422/476)**

Failure reason



- Guidewire unpass
- Device unpass
- Insufficient dilatation or run-off of artery
- Compilcation during procedure
- Main branch occlusion due to false lumen created by guidewire
- Other

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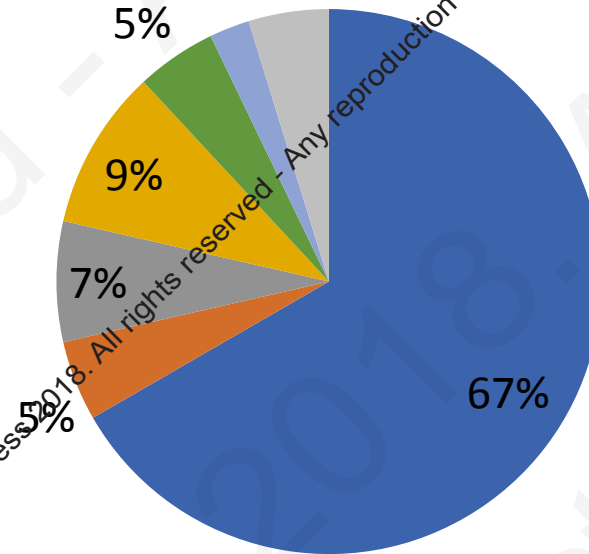
Procedure failure reason

- Retrograde approach (N=137) -

- Procedure success by retrograde: **67.2%(92/137)** ← 82.6% (114/138);2016

Failure reason of retrograde approach

- Retrograde channel GW unpass
- Channel unpassed by catheter
- Couldn't approach CTO by GW
- Unsuccessful CTO crossing
- Couldn't access CTO distal by GW/catheter
- Procedure discontinuation due to complication
- Fail to build up antegrade system
- Fail to cross antegrade device
- CTO unpassed by retrograde catheter



Complications

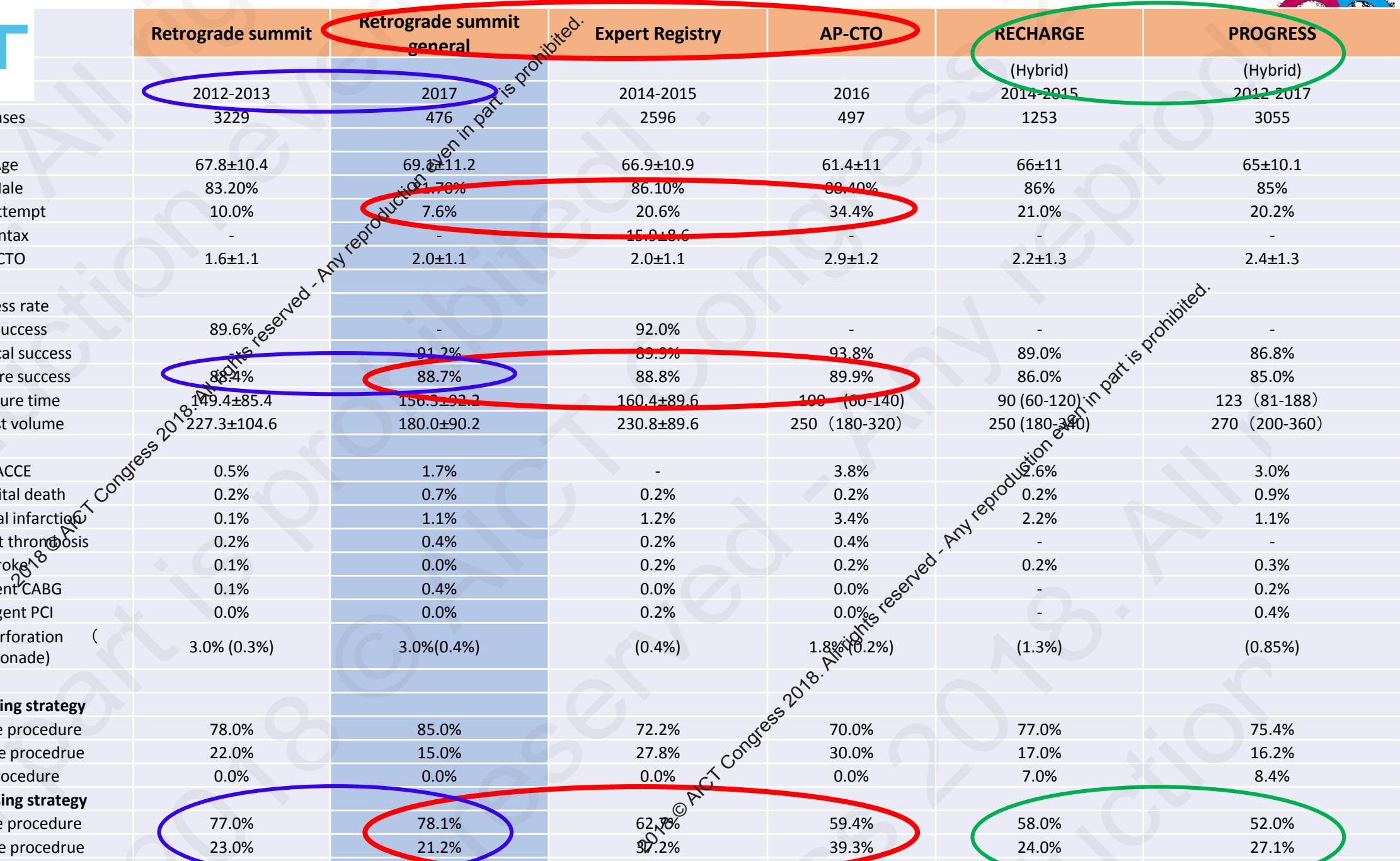
(overall:467cases)

In-hospital MACCE	1.7% (8)
Death	0.7% (3)
<i>PCI related death</i>	0.2%(1)
Stroke	0 % (0)
MI	1.1% (5)
<i>Non-Q MI</i>	0.9%(4)
Emergent CABG	0.4% (2)
Other complication	
Coronary perforation	3.0% (14)
<i>Tamponade</i>	0.4% (2)
Contrast induced-nephropathy	9.0% (42)
Stent thrombosis	0.4% (2)
Access site complication requiring treatment	1.7% (8)

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	Retrograde summit	Retrograde summit general	Expert Registry	AP-CTO	RECHARGE	PROGRESS
	2012-2013	2017	2014-2015	2016	(Hybrid) 2014-2015	(Hybrid) 2012-2017
Cases	3229	476	2596	497	1253	3055
Age	67.8±10.4	69.2±11.2	66.9±10.9	61.4±11	66±11	65±10.1
Male	83.20%	81.70%	86.10%	88.40%	86%	85%
Re-attempt	10.0%	7.6%	20.6%	34.4%	21.0%	20.2%
Syntax	-	-	15.0±8.6	-	-	-
J-CTO	1.6±1.1	2.0±1.1	2.0±1.1	2.9±1.2	2.2±1.3	2.4±1.3
Success rate						
GW success	89.6%	-	92.0%	-	-	-
Technical success	88.4%	91.2%	89.9%	93.8%	89.0%	86.8%
Procedure success	88.4%	88.7%	88.8%	89.9%	86.0%	85.0%
Procedure time	149.4±85.4	156.3±92.2	160.4±89.6	100 (60-140)	90 (60-120)	123 (81-188)
Contrast volume	227.3±104.6	180.0±90.2	230.8±89.6	250 (180-320)	250 (180-340)	270 (200-360)
MACCE	0.5%	1.7%	-	3.8%	2.6%	3.0%
In-hospital death	0.2%	0.7%	0.2%	0.2%	0.2%	0.9%
Myocardial infarction	0.1%	1.1%	1.2%	3.4%	2.2%	1.1%
Acute stent thrombosis	0.2%	0.4%	0.2%	0.4%	-	-
Stroke	0.1%	0.0%	0.2%	0.2%	0.2%	0.3%
Emergent CABG	0.1%	0.4%	0.0%	0.0%	-	0.2%
Emergent PCI	0.0%	0.0%	0.2%	0.0%	-	0.4%
Coronary perforation (Tamponade)	3.0% (0.3%)	3.0% (0.4%)	(0.4%)	1.8% (0.2%)	(1.3%)	(0.85%)
First Crossing strategy						
Antegrade procedure	78.0%	85.0%	72.2%	70.0%	77.0%	75.4%
Retrograde procedrue	22.0%	15.0%	27.8%	30.0%	17.0%	16.2%
ADR procedure	0.0%	0.0%	0.0%	0.0%	7.0%	8.4%
Final Crossing strategy						
Antegrade procedure	77.0%	78.1%	62.7%	59.4%	58.0%	52.0%
Retrograde procedrue	23.0%	21.2%	37.2%	39.3%	24.0%	27.1%
ADR procedure	0.0%	0.6%	0.0%	1.0%	18.0%	20.9%



Conclusion

- In our Retrograde Summit General Registry cases in 2017, overall procedure success was 88.7%.
- Also, the MACCE rate (1.7%) showed safety and feasibility of CTO-PCI in our registry.

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