ACURATE *neo* TF for Transcatheter Aortic Valve Implant (TAVI)

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Conflict of interest

Speaker's name: Yaron Almagor

☑ I have the following potential conflicts of interest to report:

Speaker fees, Proctor,

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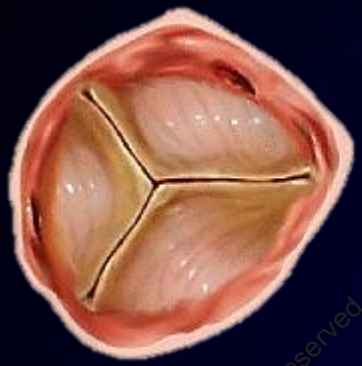
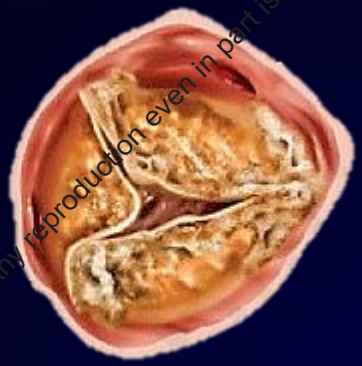
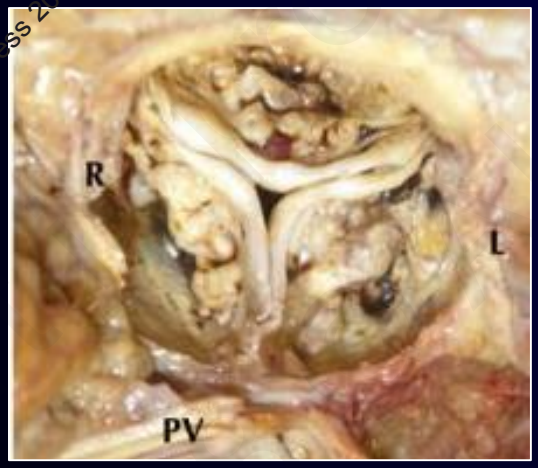
Aortic Valve Stenosis



Normal Aortic Valve



Stenotic Aortic Valve



Calcified Aortic Valve

What is Aortic Stenosis (AS)?

- Narrowing of the aortic valve[1]
  - Primarily due to calcium deposits
    - ~2% of adults over 65 have AS
  - May be congenital
- Bicuspid AV present in 2% of population[2]
- AS May lead to[1]:
  - AFib and atrial flutter
  - Stroke
  - Syncope
  - Heart failure
  - Pulmonary hypertension

Treatment options[3]:

- Medical treatment (diuretics, nitrates, beta-blockers)
- Surgical valve repair/replacement
- Valvuloplasty
- Transcatheter valve replacement

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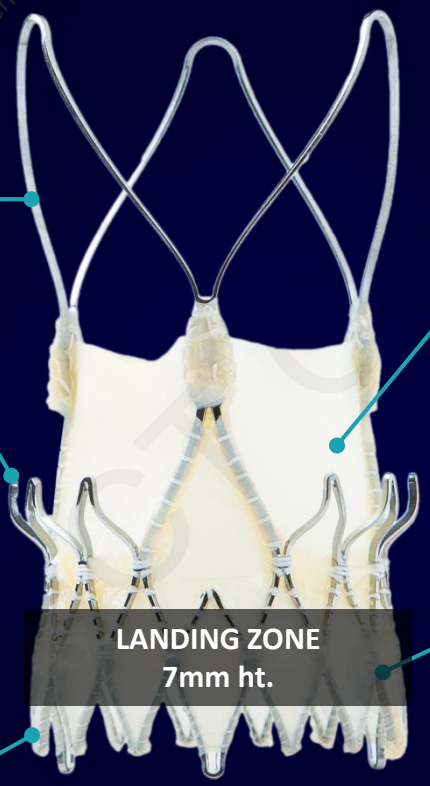
[1]Otto, et al. *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine*. 9th Ed. 2011:chap 66. [2]Siu SC. *J Am Coll Cardiol* 2010;55:2789–800. [3]Nishimura, et al. *J Thorac Cardiovasc Surgery*. 2014; 148(1):e1-e132 Top image adapted from Nath and Kumar, *J Vasc Med Surg* 2015, 3:2 *http://dx.doi.org/10.4172/2329-6925.1000195*. Lower image adapted from *http://www.heart-valve-surgery.com/heart-surgery-blog/2010/04/05/calcium-supplements-heart-valve-leaflets-disease/*.

ACURATE *neo*™ Valve



Stabilization Arches

- Axial self-aligning

Upper Crown

- Minimal supra-annular anchoring
- Captures native leaflets and provides coronary clearance

Lower Crown

- Minimal protrusion into LVOT
- Low risk of conduction system interference

Supra-annular Valve

- Porcine pericardium leaflets
- BioFix™ anti-calcification process
- Low gradients

Pericardial Skirt

- Inner and outer anti-leak skirts

Self-expanding Nitinol Frame

- Treats annulus from 21mm to 27mm

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ACURATE Transfemoral Delivery System

Flexible Delivery Catheter*
- Designed for trackability

Safety Button
- Prevents premature implantation

Top-Down Deployment Mechanism
- Stable & predictable valve release

Two Rotation Knobs
- Allows for an uncomplicated 3-step implantation

*18F introducer sheath compatible, e.g. REGULUS™, LOTUS™ Introducer Set Small (LIS-S), TRANSGLIDE®, Cook XL Check-Flo® 20F, Gore® DrySeal 20F

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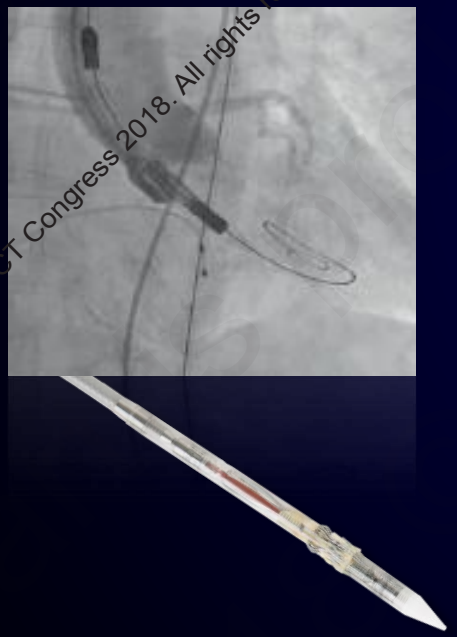
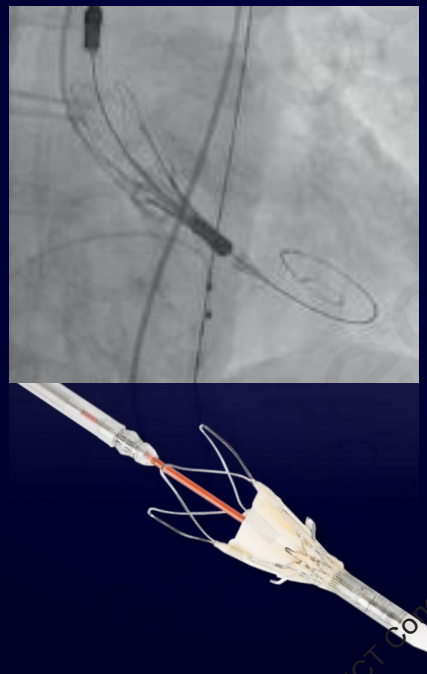
ACURATE *neo* TF Deployment

Unique two-step, top-down deployment for stable positioning and predictable valve release

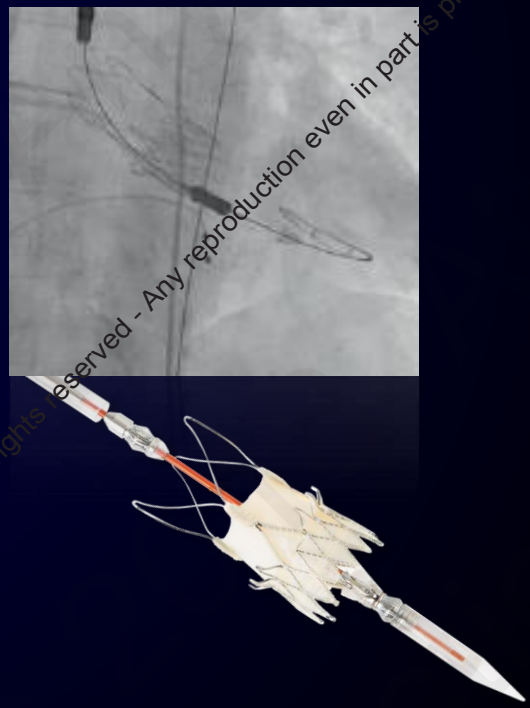
Valve positioning pre-deployment



Release of stabilization arches



Full valve release



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ACURATE *neo* Clinical Program

TF20 FIM

TF89

SAVI TF Registry

PROGRESS

Post-Market Registry
High Risk Patients with Severe AS
N=1000; single arm; 25 EU centers
3 valve sizes (21mm-27mm)

1º Endpoint: All-cause mortality at 30d
2º Endpoints: Procedure success post-implant, device performance at 7d and 12m, VARC-2 safety and NYHA class at 30d and 12m

1-yr Results PCR 2017

SAVI = **S**ymetis **A**CURATE **V**alve **I**mplantation

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Möllmann, EuroPCR 2016

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SAVI TF Registry

Baseline Patient Characteristics (N=1000)

Mean Age (years, mean ± SD)	81.1 ± 5.2
Female (%)	61.2
Log. EuroSCORE (%, mean ± SD) (n=872)	18.1 ± 12.5
STS Score (%, mean ± SD) (n=630)	6.0 ± 5.6
NYHA Class III/IV (%) (n=963)	81.2
Mean Aortic Gradient (mmHg, mean ± SD) (n=872)	42.7 ± 15.2
Mean EOA (cm^2, mean ± SD) (n=865)	0.72 ± 0.2

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Möllmann, EuroPCR 2016

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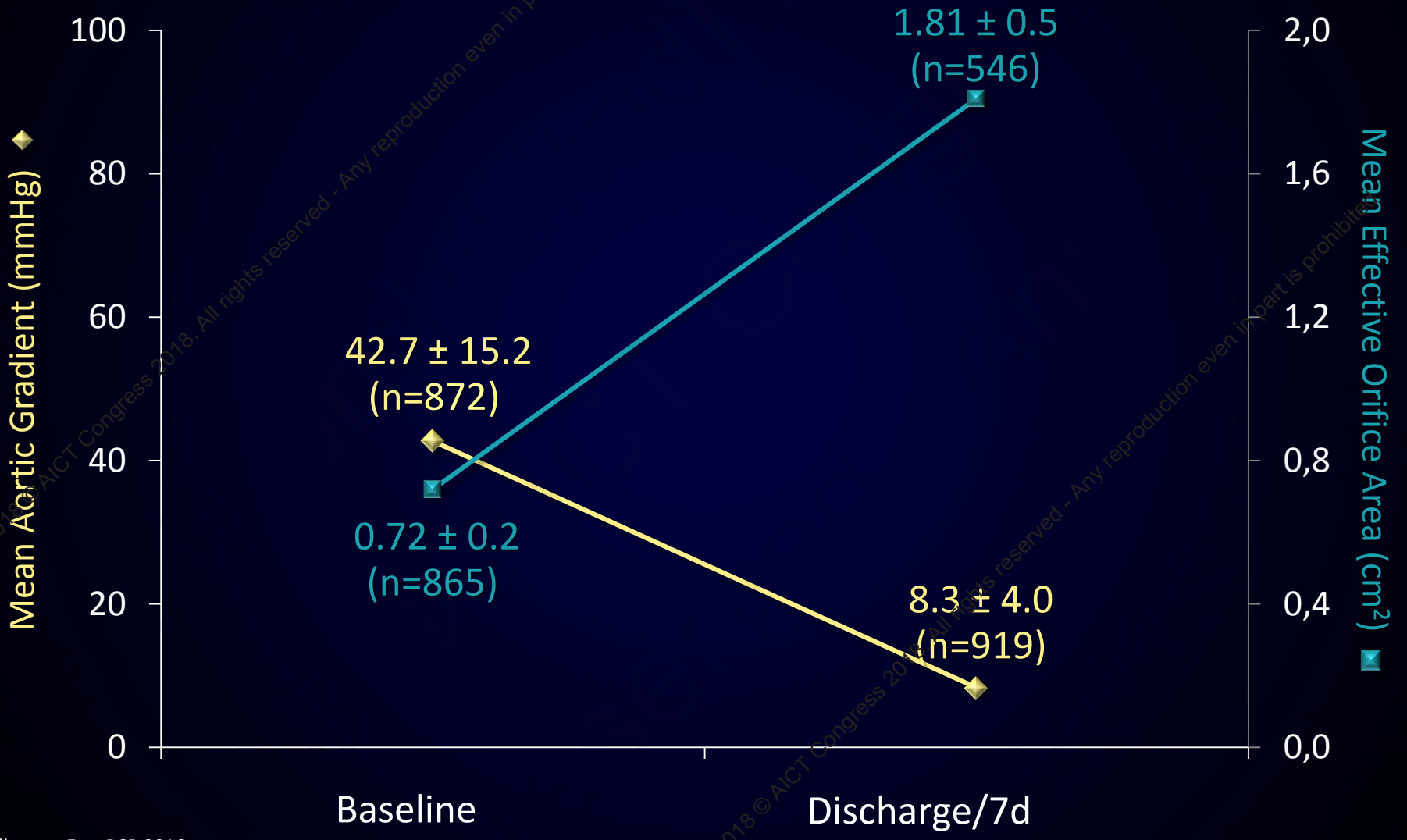
SAVI TF Registry
Mean Aortic Gradient and EOA



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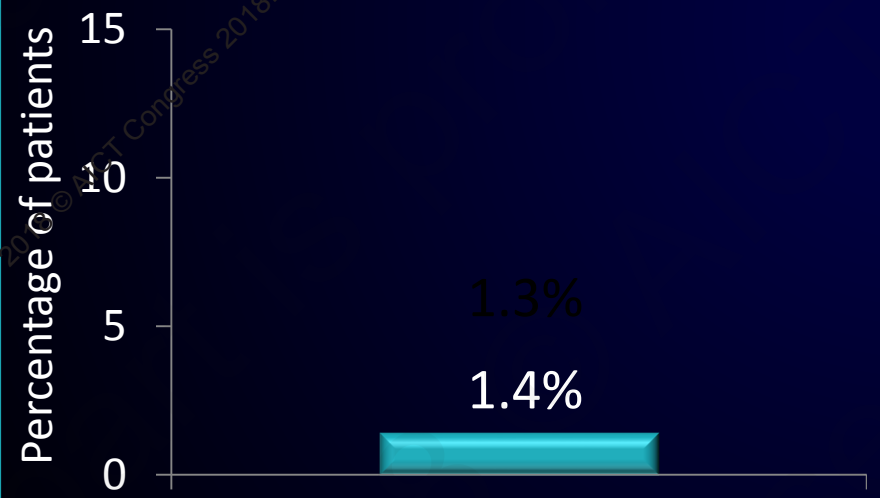
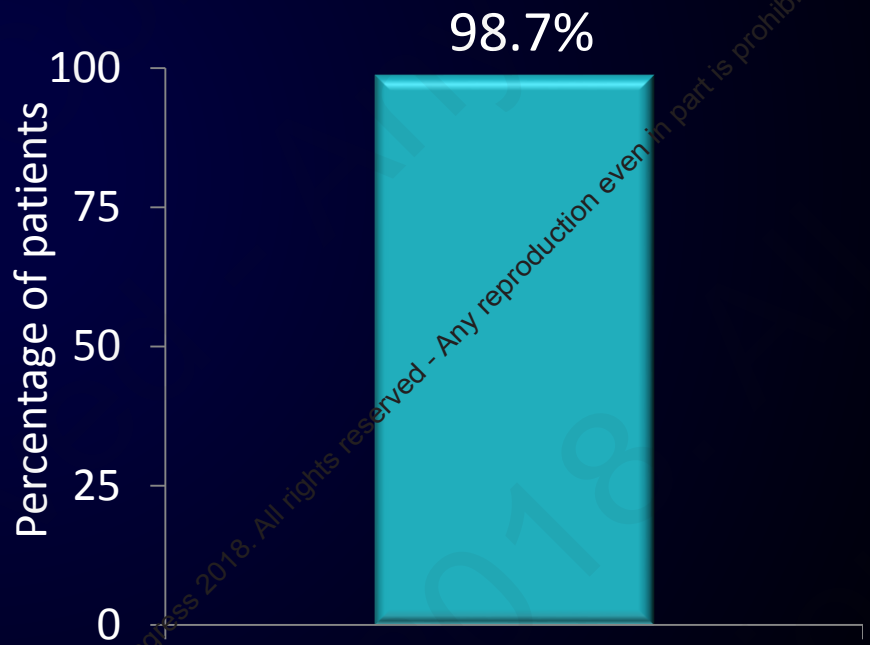
SAVI TF Registry
Primary and Key Secondary Endpoints

All-Cause Mortality at 30 Days
(N=994)



Procedural Success Post-Implant*
(N=1000)



48.7% deployed with rapid pacing

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Möllmann, EuroPCR 2016. *Non-successful procedures included: 0.9% (9/1000) V-in-V, 0.3% (3/1000) conversion to surgery, and 0.1% (1/1000) aborted procedure.
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SAVI TF Registry
Safety Endpoints at 30 Days and 1 Year

Safety Endpoints	% at 30d (n/N)	% at 1Yr (n/N)
All-cause mortality	1.4 (14/994)	8.0 (78/983)
Stroke	1.9 (19/994)	3.6 (35/983)
MI	0.3 (3/994)	1.3 (13/983)
Life-threatening bleed	1.5 (15/994)	2.1 (21/983)
Major vascular complication	**3.8 (38/994)**	**4.2 (41/983)**
Coronary obstruction requiring reintervention	**0 (0/994)**	**0.1 (1/983)**
Repeat procedure for valve-related dysfunction*	1.2 (12/994)	1.7 (17/983)
AKI Stage 2 or 3**	1.5 (15/994)	3.3 (32/983)
PPMI	**8.2 (82/994)**	**10.0 (98/983)**
Freedom from MACCE	96.5 (959/994)	87.8 (863/983)

Möllmann, EuroPCR 2017.

*9 V-in-V and 3 SAVR at procedure; no further reintervention post-discharge to 30 days. **AKI stage unknown for one patient.

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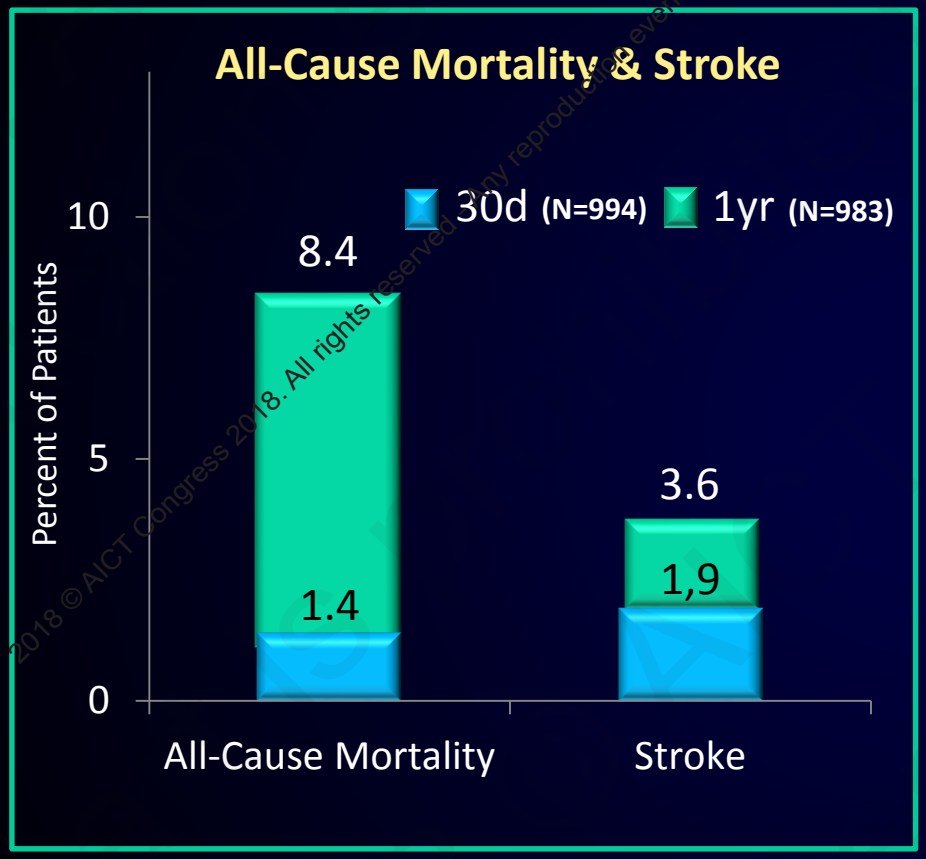
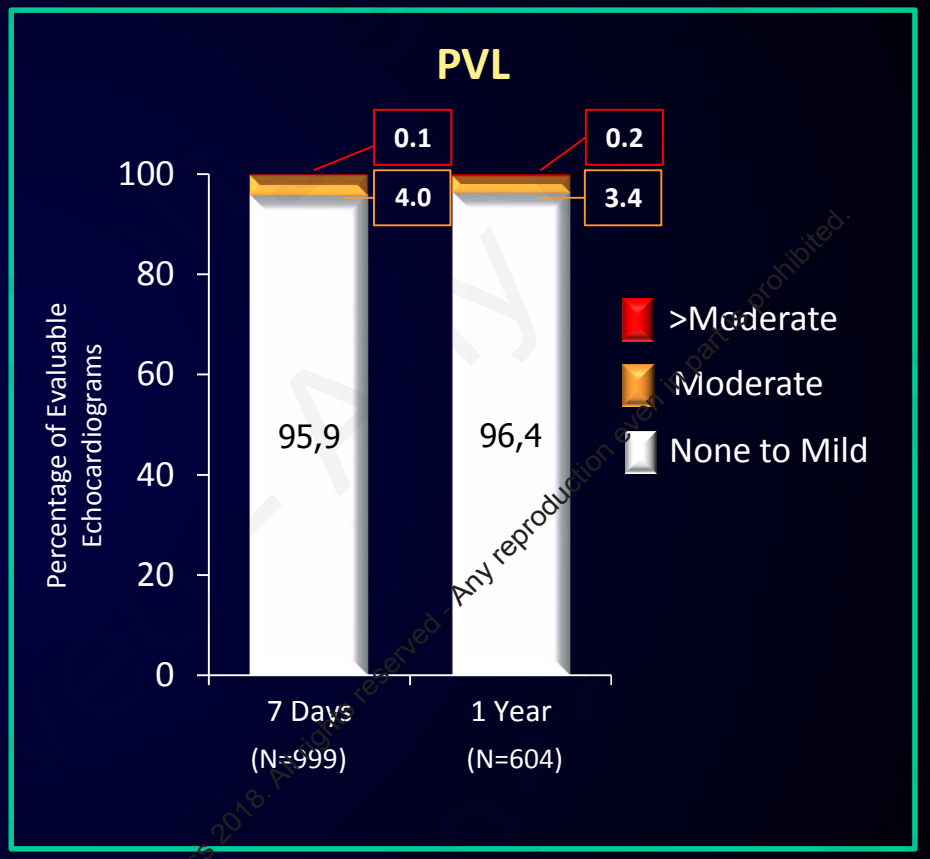
SAVI TF Registry
30-Day and 1-Year Results Summary





Permanent pacemaker implanted	30 Day (N=994)	1 Year (N=983)
Among all patients	**8.2%**	**10.0%**

Möllmann, EuroPCR 2017.

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Urgent TAVI with self-expandable valve for acute aortic regurgitation post Mitral valve replacement

המרכז הרפואי
שערי צדק
SHAARE ZEDEK
MEDICAL CENTER

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Patient Characteristics

- 62 y/o F
- Rheumatic heart disease – Mitral valve replacement + Tricuspid repair : 1997
- Redo Mitral valve replacement (2016) – Bio-prosthetic (MOSAIC 27mm)
- Post surgery: severe aortic regurgitation- suspected aortic leaflet injury
- Chronic heart failure

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Case Challenges

- No aortic annulus/leaflet calcifications
- Depth of implantation- close proximity between biological mitral valve struts to the left ventricular outflow tract
- Dilemma between different valve frames' radial forces - which valve to use?

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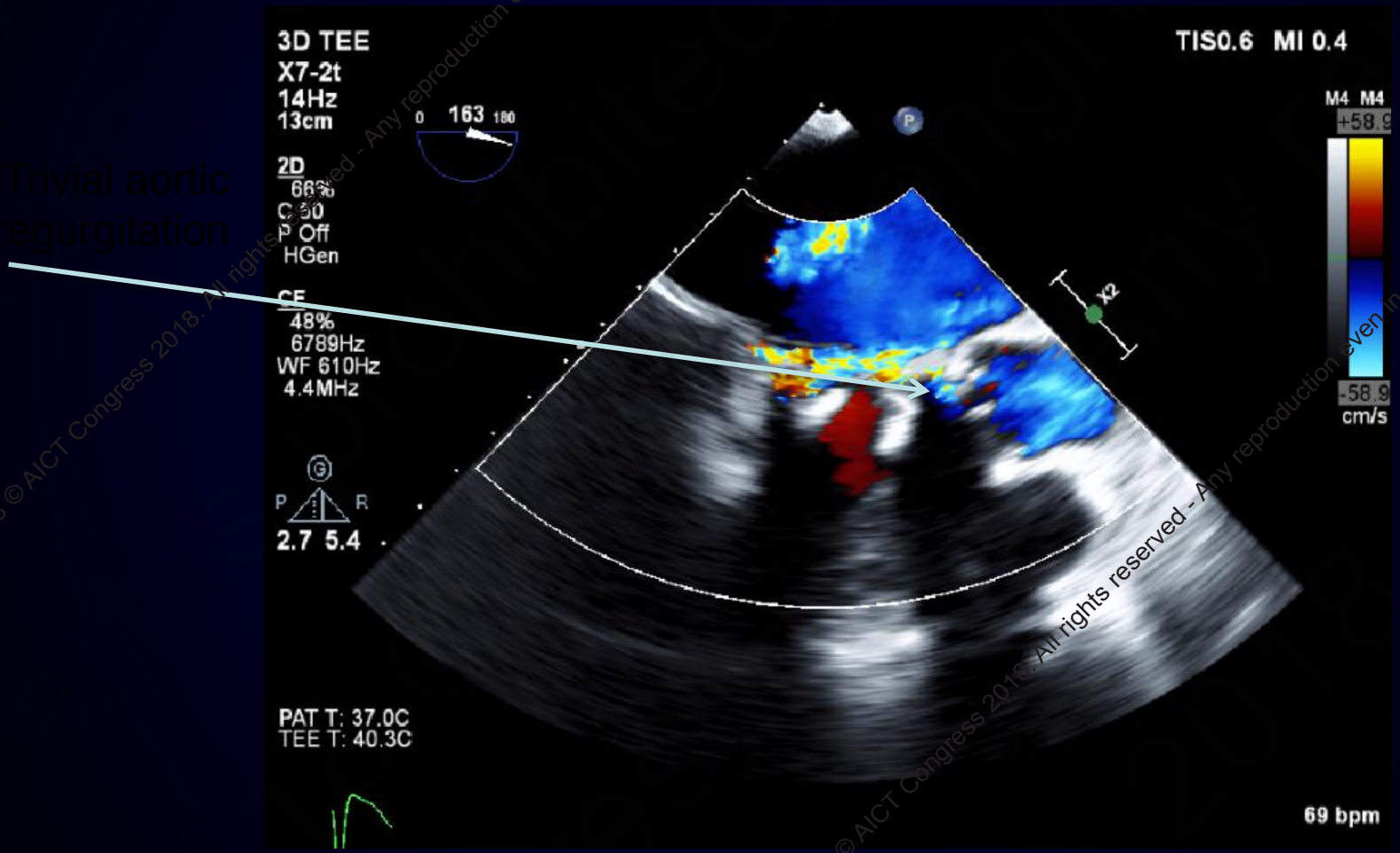
Trans-esophageal echocardiogram pre-mitral valve replacement: trivial aortic regurgitation



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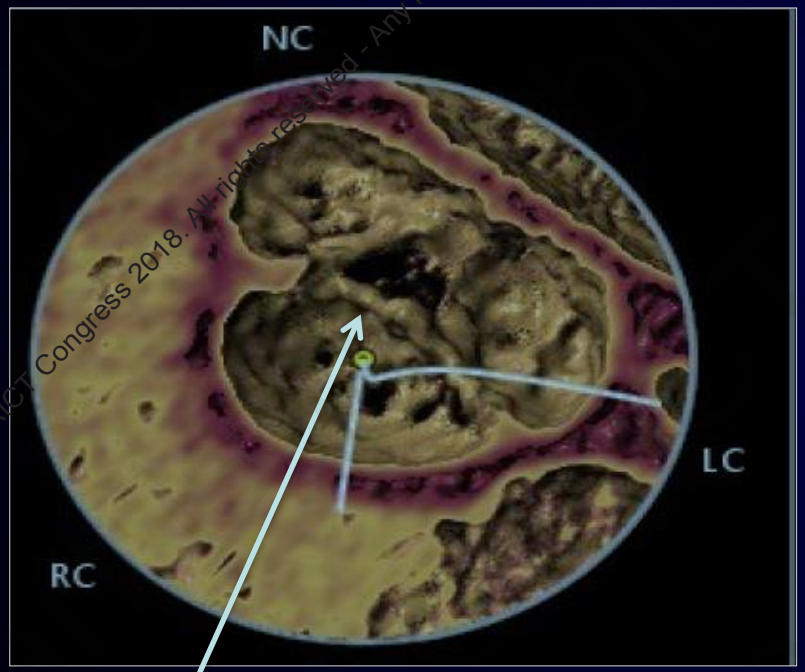
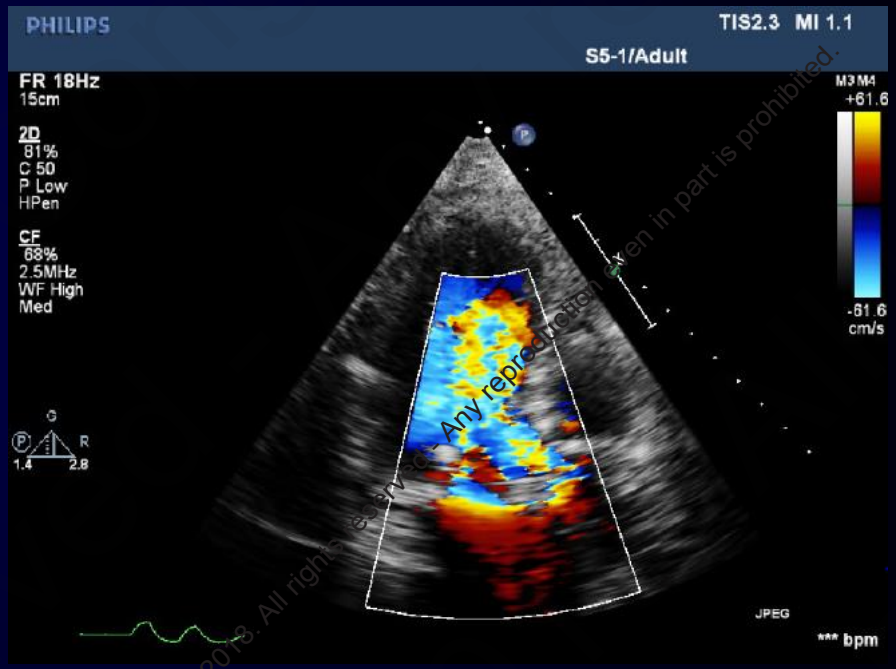
Post-mitral valve replacement: acute severe aortic regurgitation



No calcifications



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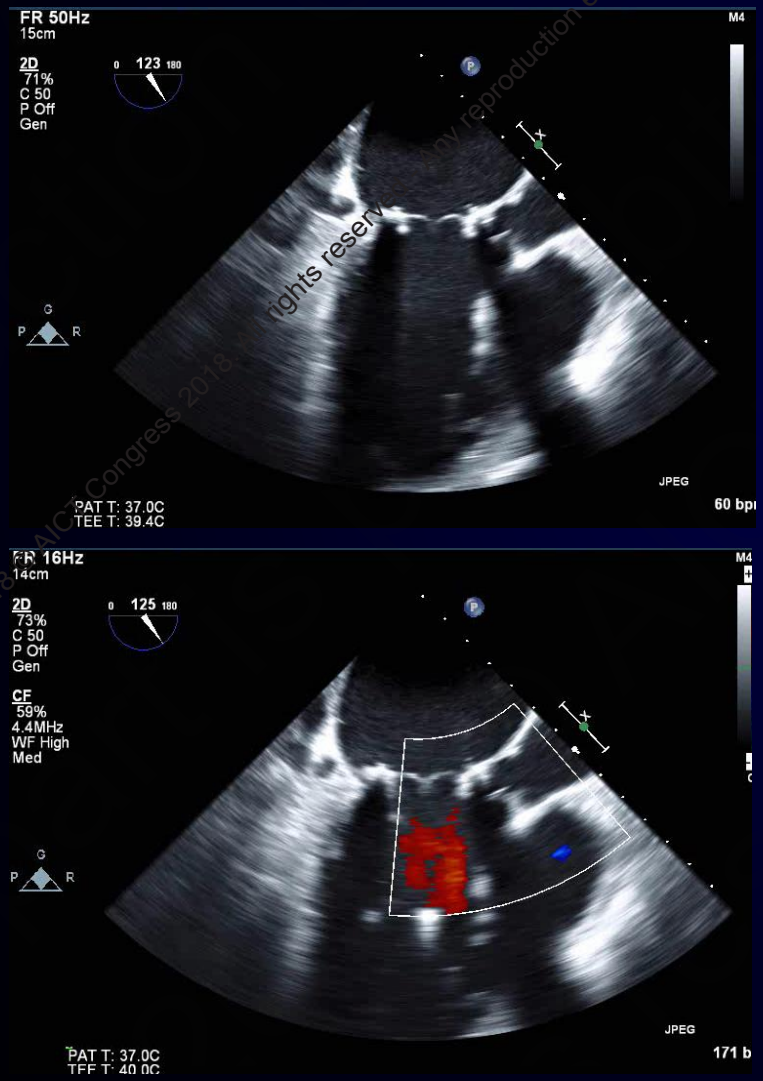
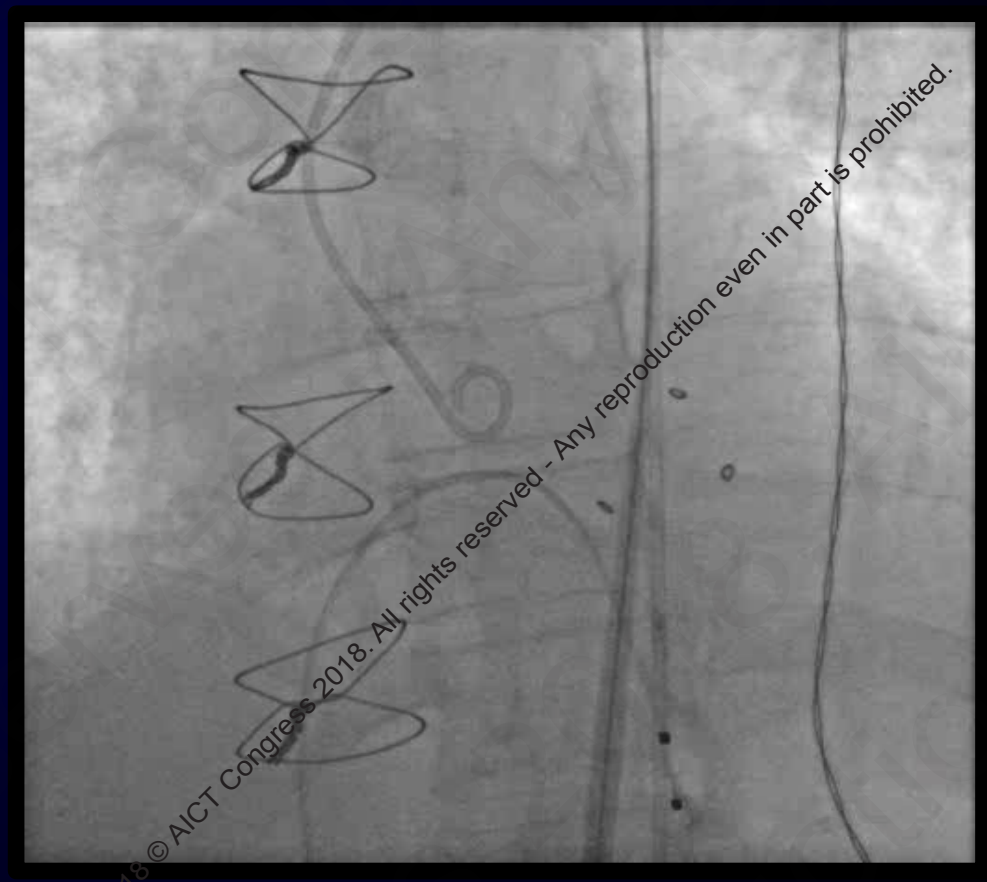
Symetis in Isolated AR





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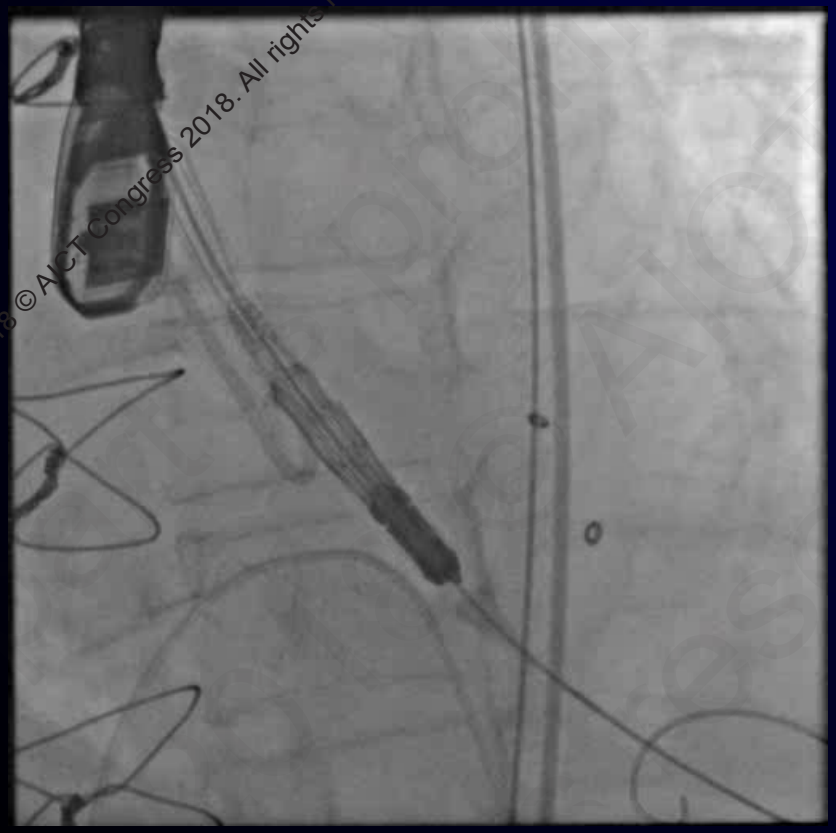
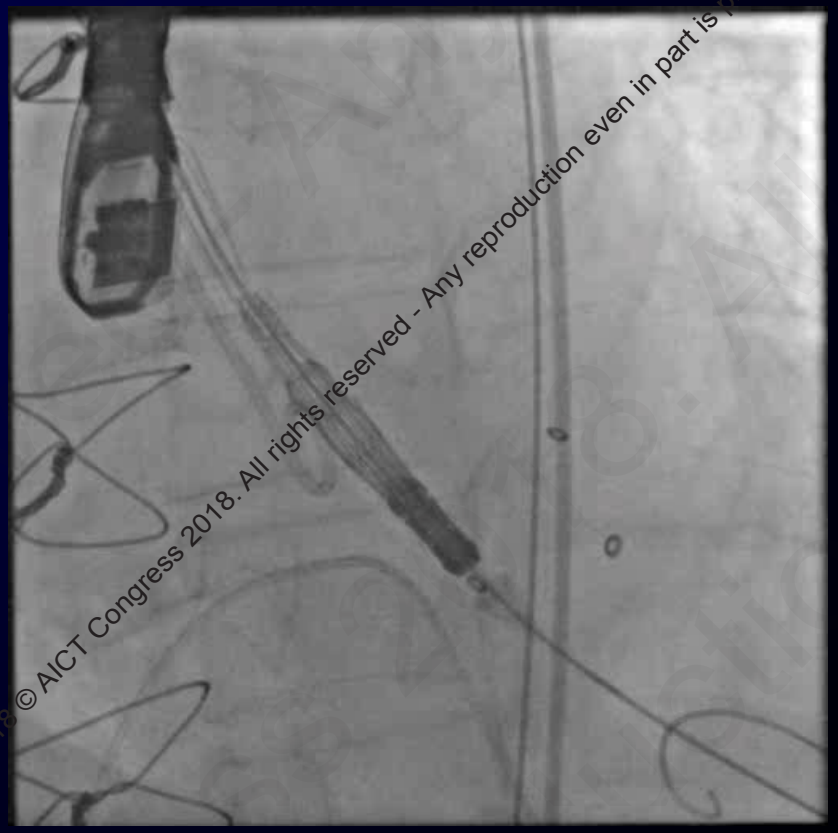
Symetis in Isolated AR

Aortogram



Upper Crown



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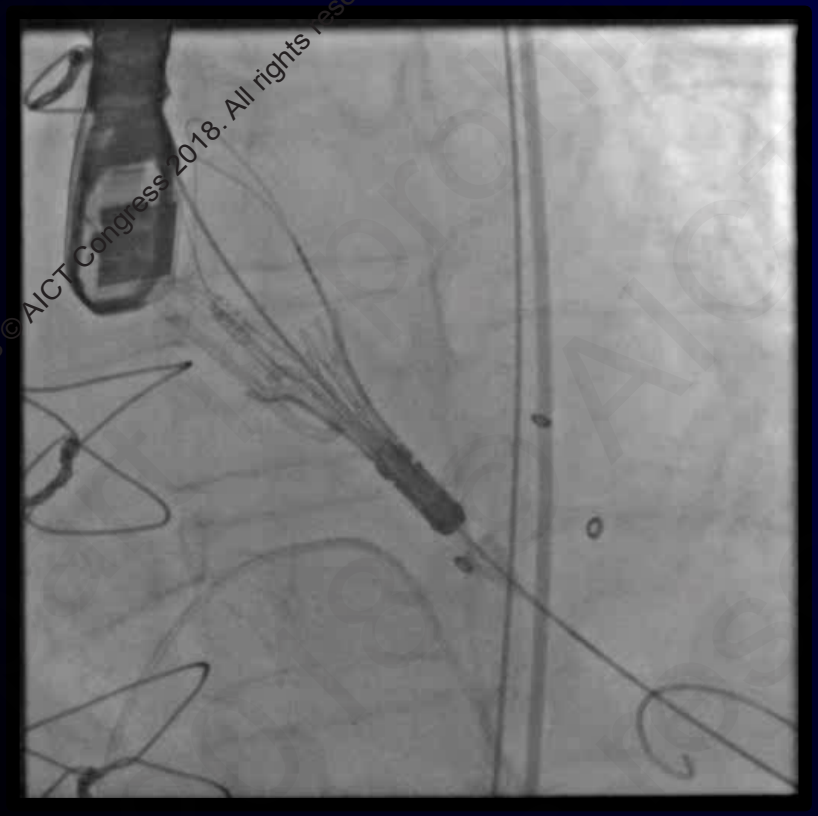
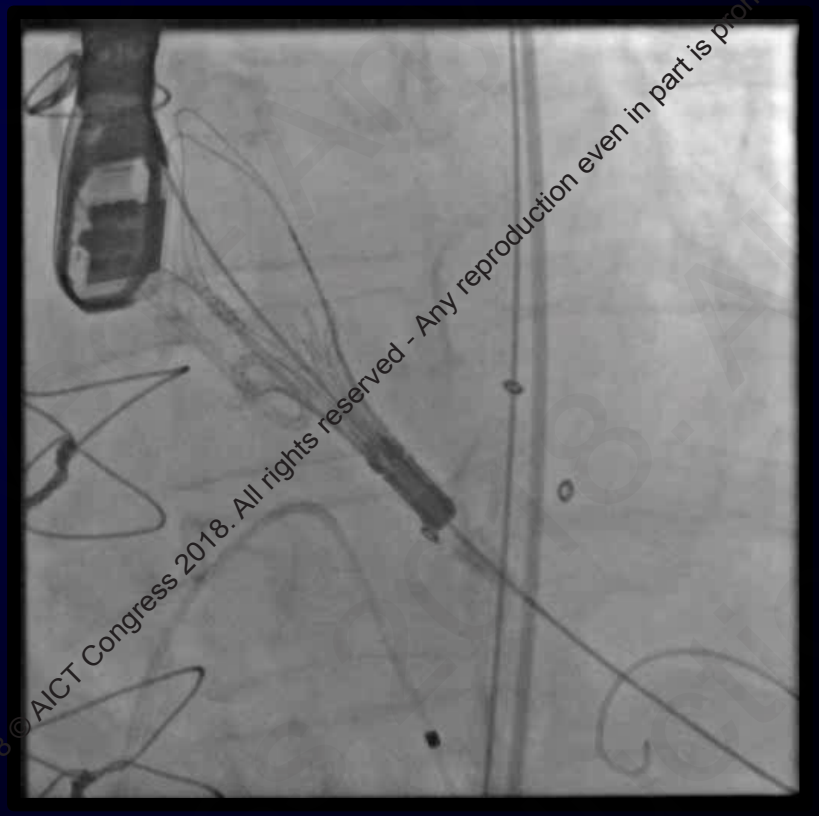
Symetis in Isolated AR

"Predictable" position



No need for Rapid pacing



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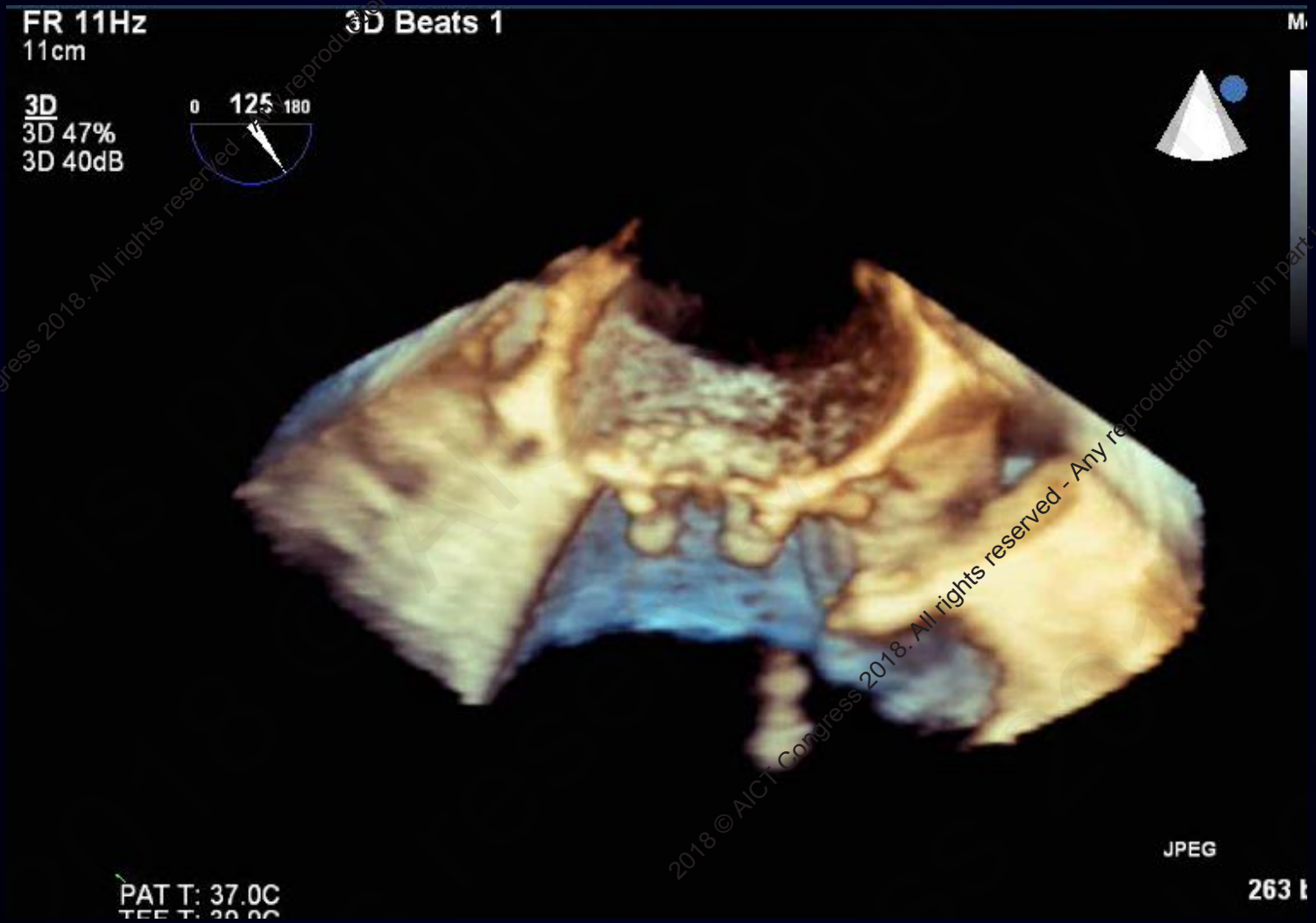
Symetis in Isolated AR
3D TEE



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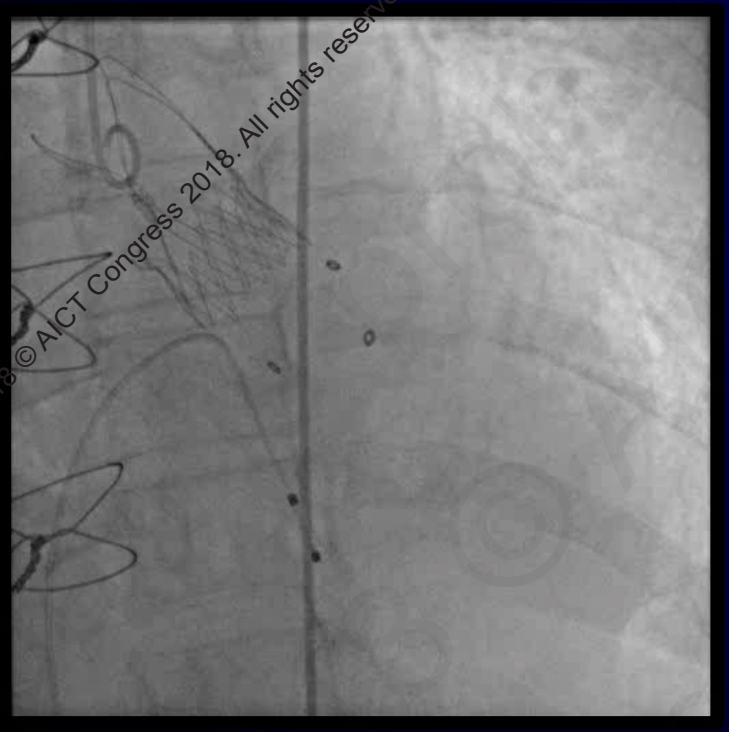
Final Result

Trivial PVL



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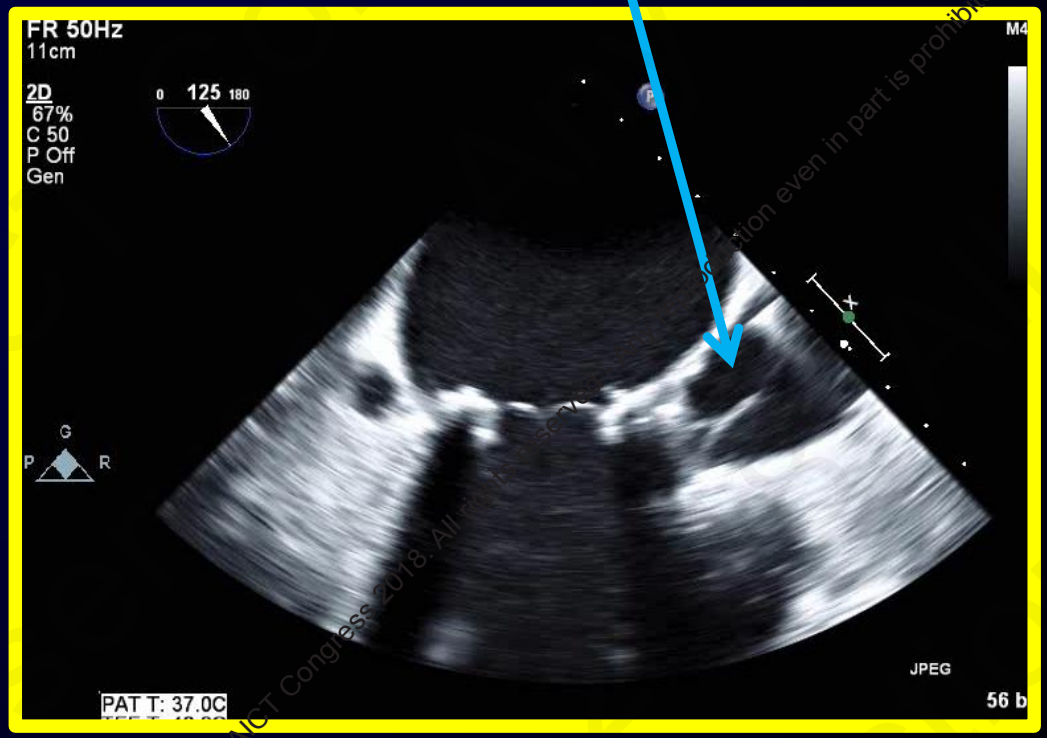
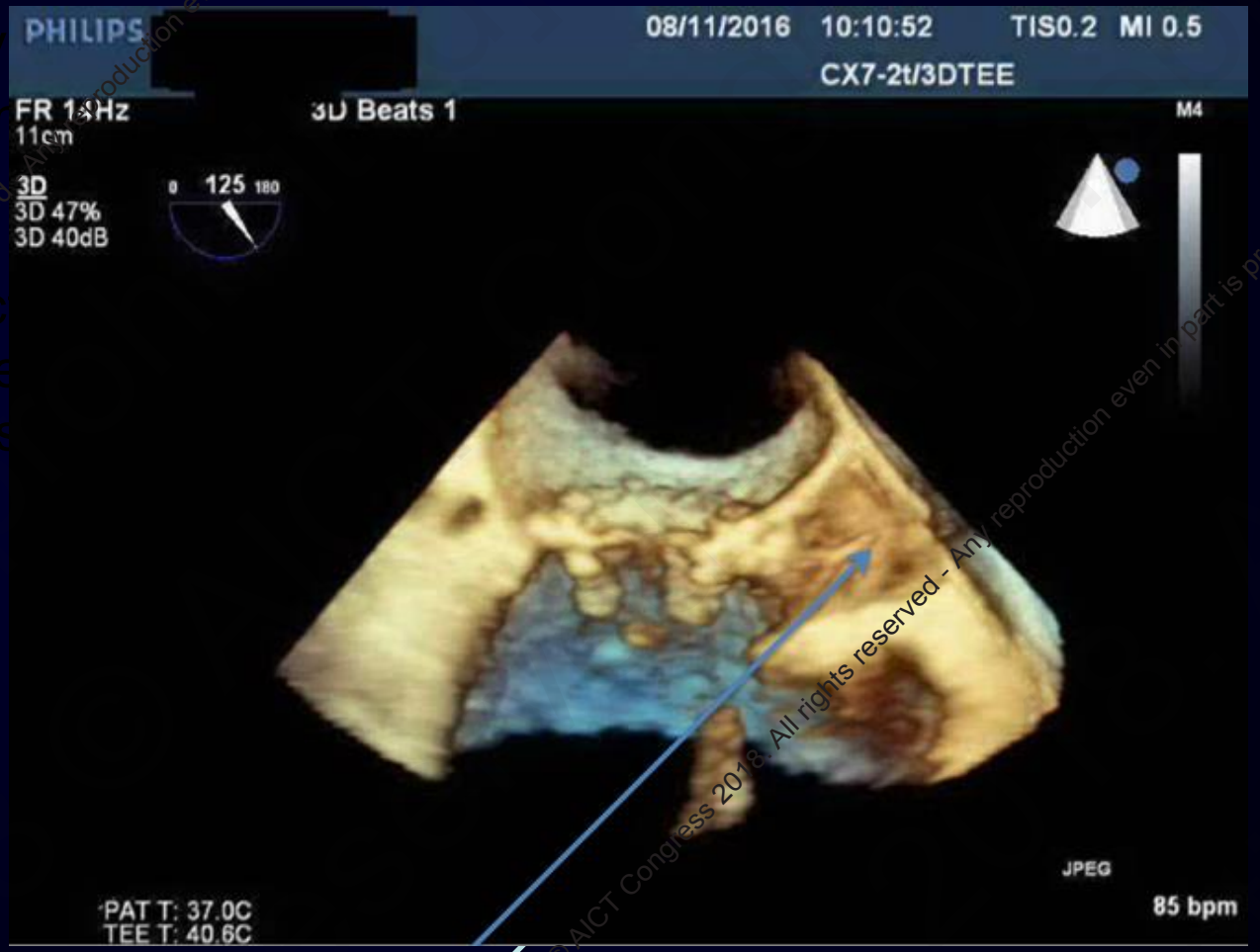
Supra Annular Position



Post-TAVI 3-dimensional echocardiogram

1. High TAV
implantation

2. No contac
between the
valves



Supra-annular position

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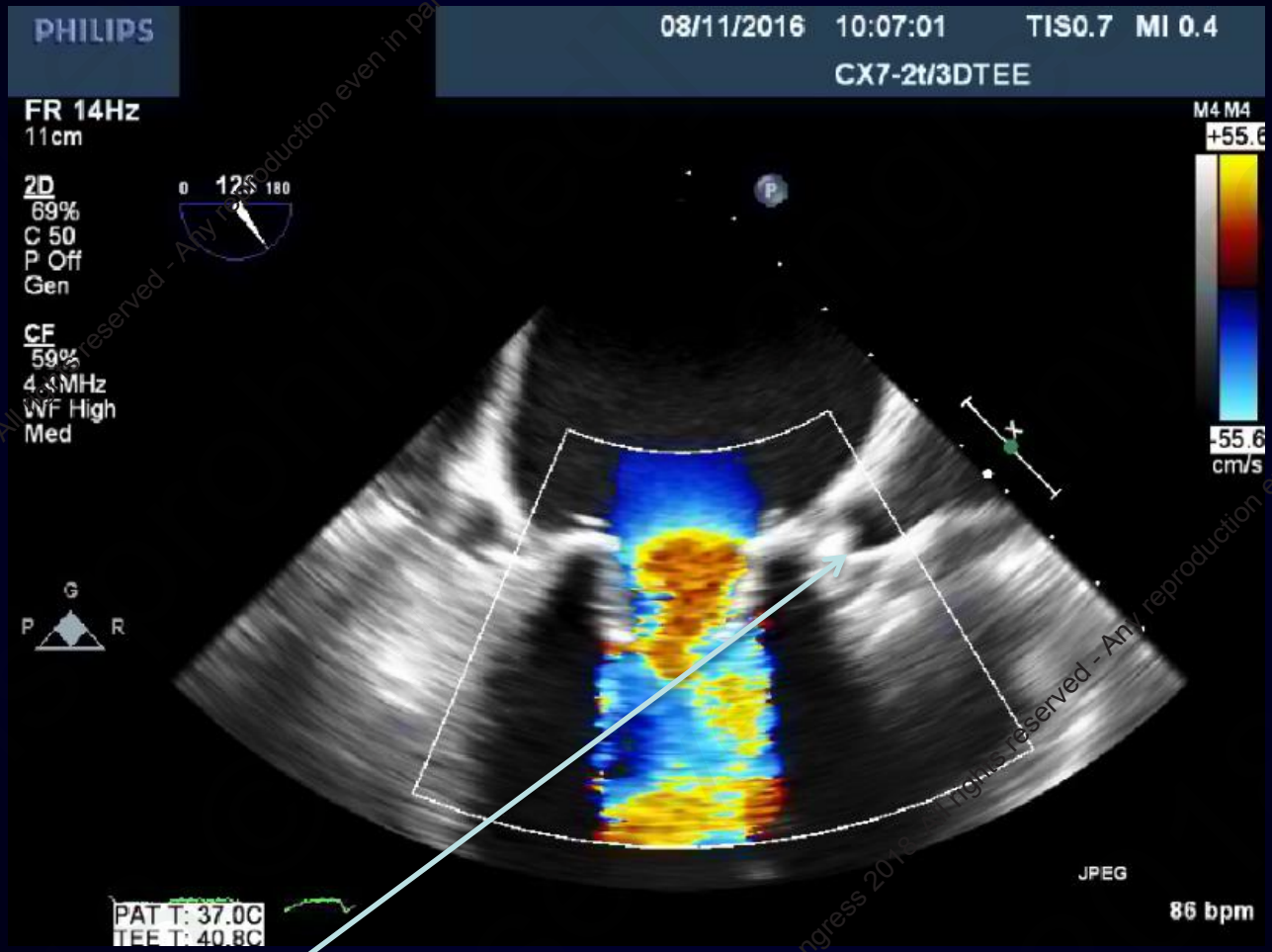
Final results



No aortic regurgitation

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JIC JOURNAL OF INVASIVE CARDIOLOGY

Transfemoral Implantation of the Acurate *neo* for the Treatment of Aortic Regurgitation

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ABSTRACT: Objectives. We report an international experience of transfemoral transcatheter aortic valve replacement (TAVR) using the self-expanding Acurate *neo* valve (Boston Scientific) in aortic regurgitation. **Methods.** This series comprises 20 patients with pure aortic regurgitation undergoing transfemoral TAVR with the Acurate *neo* prosthesis at nine centers in Europe and Israel. **Results.** Mean age was 79 ± 8 years and mean STS score was 8.3 ± 9.3%. Leaflet calcification was none/minimal in 19 patients (95%). Prosthesis size selection was based on perimeter-derived annular diameter, with a tendency to over-size in cases of borderline annuli. One patient required implantation of a second valve. Device success rate was 18/20 (90%). At discharge, aortic regurgitation was none in 14 patients (70%), mild in 5 patients (25%), and moderate in 1 patient (5%). Left ventricular end-diastolic diameter decreased from 58 ± 7 mm at baseline to 53 ± 7 mm before discharge (P<.001). At 30-day follow-up, there was no mortality, no stroke, and 3 patients (15%) had received a permanent pacemaker. New York Heart Association class had improved significantly compared to baseline (85% in class I/II compared to 15% at baseline; P<.001). **Conclusions.** In a selected patient population, transfemoral TAVR using the Acurate *neo* transcatheter heart valve was successful in treating aortic regurgitation, significantly reduced left ventricular dimensions, and improved clinical symptoms.

J INVASIVE CARDIOL 2018 July 15 (Epub Ahead of Print).

KEY WORDS: aortic regurgitation, degenerative valve, femoral, transcatheter aortic valve implantation, transcatheter aortic valve replacement

Transcatheter aortic valve replacement (TAVR) is an established therapy for intermediate and high-risk patients with severe aortic stenosis.[1,2] In addition, TAVR has been performed off-label to treat patients with pure aortic regurgitation.[3-8] While open-heart surgery clearly remains the gold standard for the treatment of aortic regurgitation, some high-risk patients may benefit from a less invasive, percutaneous procedure.

The self-expanding Acurate *neo* transfemoral system (Boston Scientific) received the CE mark in 2014 and has design features that may help to anchor the valve even in the absence of calcification.[9-11] In particular, the lower part of the transcatheter heart valve (THV) has an x-shaped design with an upper crown 5 mm larger than the nominal THV diameter, which may help to anchor the prosthesis and prevent it from embolization into the left ventricle once released (Figure 1).

We report an international experience with transfemoral TAVR using the Acurate *neo* THV for the treatment of pure aortic regurgitation.

Methods

Study population and design. This is an independent, multicenter registry retrospectively including patients with severe aortic regurgitation treated with the Acurate [illegible] in the database by the respective centers and comprised data throughout the initial hospital stay and 30-day data including echocardiographic follow-up. All patients provided written informed consent for prospective data acquisition and follow-up examinations.

TAVR work-up and procedure. The Acurate *neo* THV device and its implantation have been described previously.[9,10,12] In our series, potential TAVR candidates were discussed by an interdisciplinary heart team consisting of non-invasive cardiologists, interventional cardiologists, and cardiac surgeons. The decision of whether or not a patient would be suitable for percutaneous treatment with the Acurate *neo* THV was made by the local heart teams. All patients underwent electrocardiography-gated multidetector computed tomography for annular measurements. The valve size was chosen according to the annulus perimeter (a small "S" valve for annular perimeters <72 mm, a medium "M" valve for annular perimeters between 72 and 78 mm, or a large "L" valve if the perimeter was between 79 and 84 mm). In borderline cases, the larger valve was preferred. The patient with the largest annulus included in this series had a perimeter of 82 mm. Due to the absence of calcification, there was no predilation or postdilation required. Following TAVR, patients were monitored for 1-3 days, depending on

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Baseline Patient Characteristics (N=20)	
Mean Age (years)	79 ± 8
Female (%)	15 (75%)
STS predicted risk of mortality score (%)	8.3 ± 9.3
Aortic regurgitation	
Moderate (grade 2)	1 (5%)
Moderate-severe (grade 3)	10 (50%(
Severe (grade 4)	9 (45%(
NYHA Class III/IV (%)	17 (85%)
Mean Aortic Gradient (mmHg)	11 ± 8
Mean EOA (cm^2)	1.9 ± 0.8
Calcification of the native valve	
None or mild	19 (95%(
Moderate	1 (5%(

Procedural Outcomes	%(n/N)
Procedural Success*	90.0 (18/20)

30- day Outcomes	
Death	0 (0/20)
Stroke*	0 (0/20)
MI	0 (0/20)
Reintervention**	5.0 (1/20)
Aortic regurdutation	
none	14 (70%)
mild	5 (25%)
moderate	1 (5%)
New Pacemaker	3 (15%)
NYHA Class I/II(%)	17 (85%)
Mean EOA (cm^2)	2.2 ± 0.6

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Conclusions

In a selected patient population, transfemoral TAVR using the Acurate neo transcatheter heart valve was successful in treating aortic regurgitation, significantly reduced left ventricular dimensions, and improved clinical symptoms.

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Summary

- ACURATE *neo* TF Valve Design Goals:
  - Supra-annular valve for low gradients
  - Sealing skirt for PVL prevention
  - Upper and lower crown design to capture native leaflets and minimize interaction with the LVOT
  - Top-down deployment for predictable valve release
  - Axial self-alignment with stabilization arches

- Positive clinical performance of the ACURATE *neo* TF Valve supported by:
  - **SAVI TF1000 Real-World Registry Data (N=1000):**
    - » Excellent procedural success (98.7%)
    - » Low mortality (8.4%) and low stroke (3.6%) at 1 year
    - » Low PPM (10%) and minimal mod/severe PVL (3.6%) at 1 year

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Back up slides

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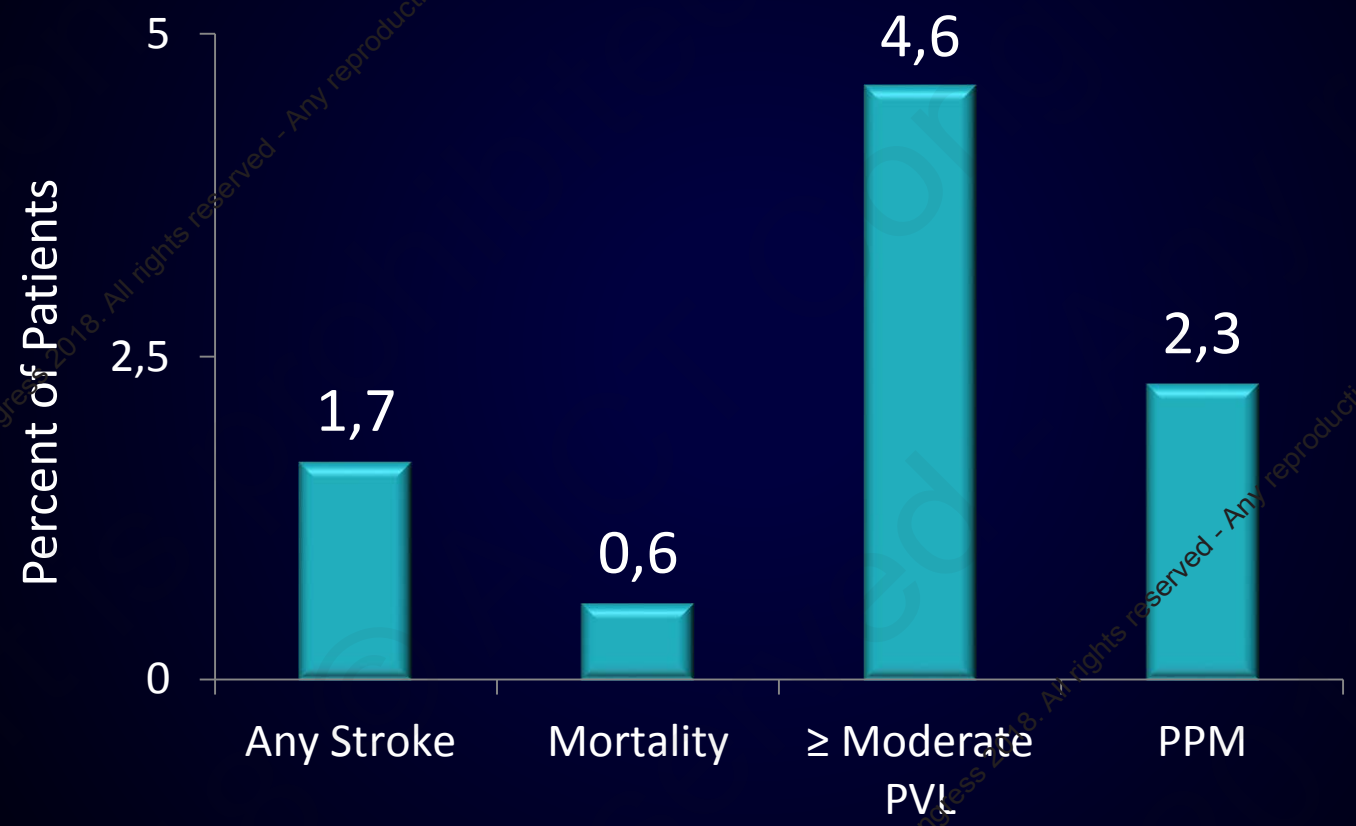
ACURATE *neo* TF: Prospective, Single Arm, Impact of Pre- & Post-Dil Balloon Selection Study at 3 Centers (N=175)

30d Outcomes (N=175)



- Pre-dil required in all patients using a balloon 1-3mm smaller than the annular diameter
- 26.3% of patients received post-dil for PVL with balloon 1-2mm smaller than annular diameter

Toggweiler, EuroIntervention 2017.

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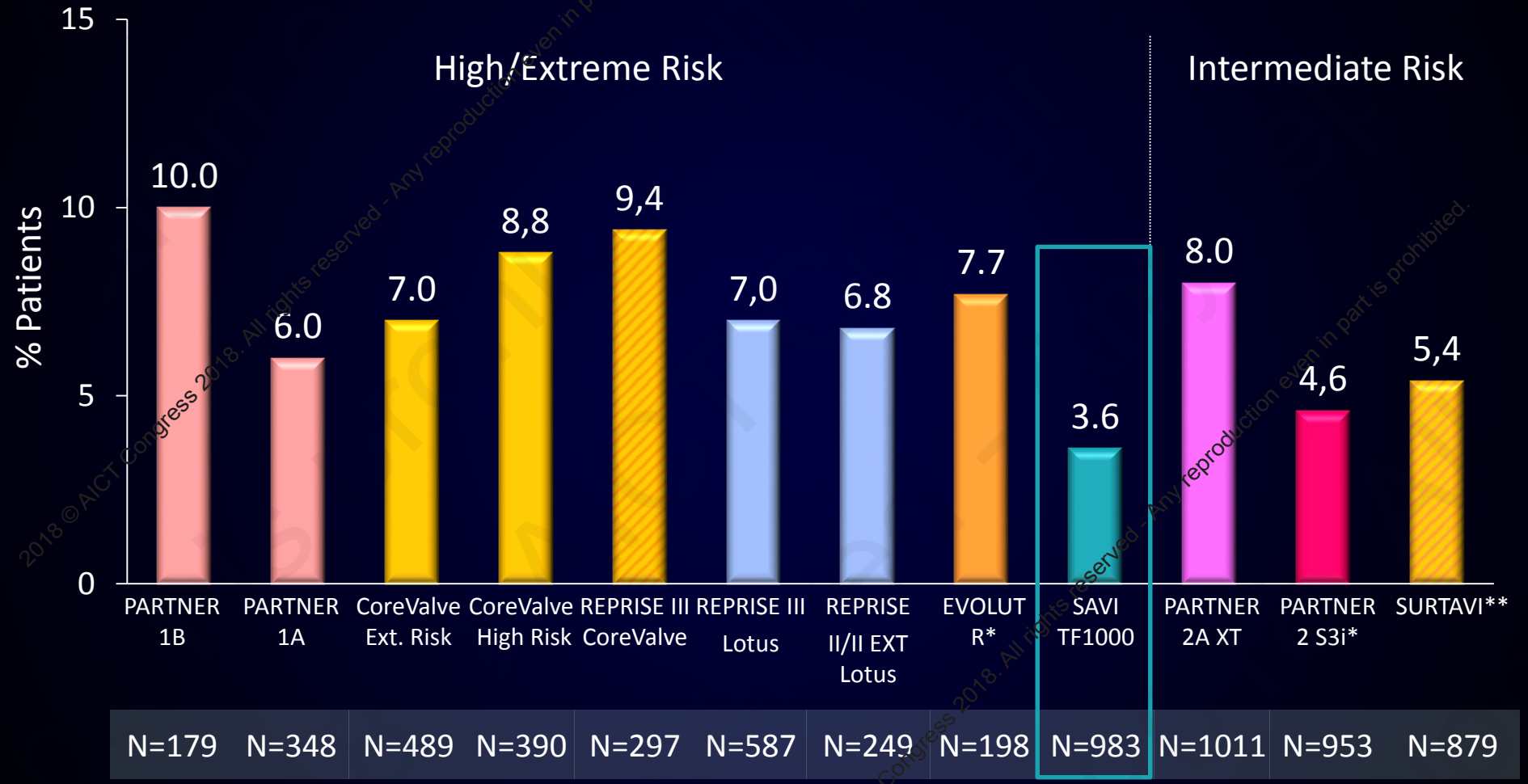
All Stroke to 1 Year
TAVI Clinical Trials



*KM estimate. **Bayesian rate. PARTNER 1B: Leon, NEJM 2010. PARTNER 1A: Smith, NEJM 2011. CoreValve Ext. Risk: Popma, JACC 2014. REPRISE III: Feldman, PCR 2017. REPRISE II/II EXT: Meredith, PCR LV 2014. CoreValve High Risk: Adams, NEJM 2014. EVOLUT R: Popma, TCT 2016. SAVI TF1000: Möllmann, EuroPCR 2017. PARTNER 2A XT: Leon, NEJM 2016. PARTNER 2 S3i: Thourani, Lancet 2016. SURTAVI: Reardon, NEJM 2017. Results from different studies are not directly comparable. Information provided for educational purpose only. Information not intended for use in France. CE mark received 2014. Information for the ACURATE Valve System is for use in countries with applicable product registrations. Indications, contraindications, warnings and instructions for use can be found in the product labeling supplied with each device.

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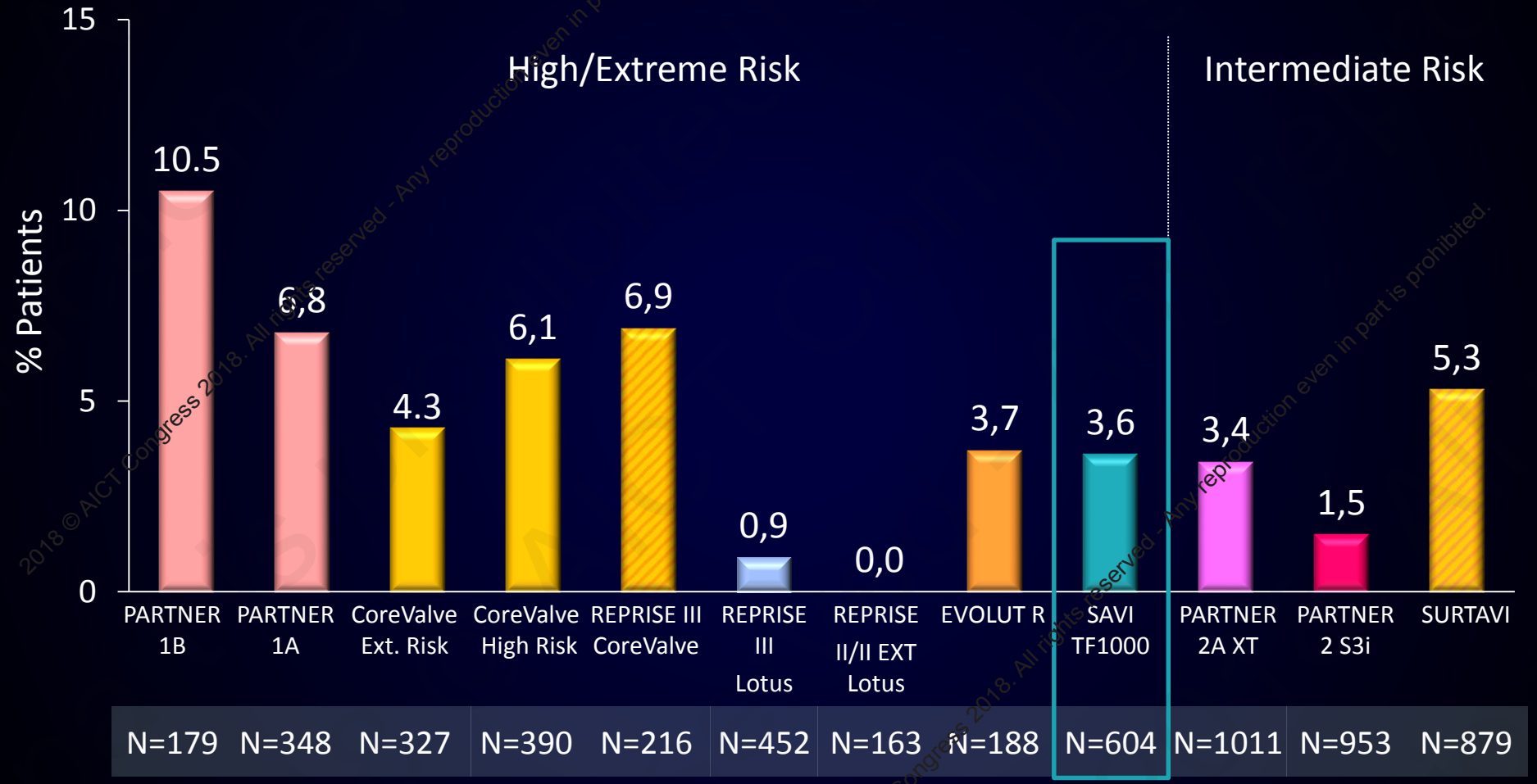
Moderate/Severe PVL to 1 Year
TAVI Clinical Studies



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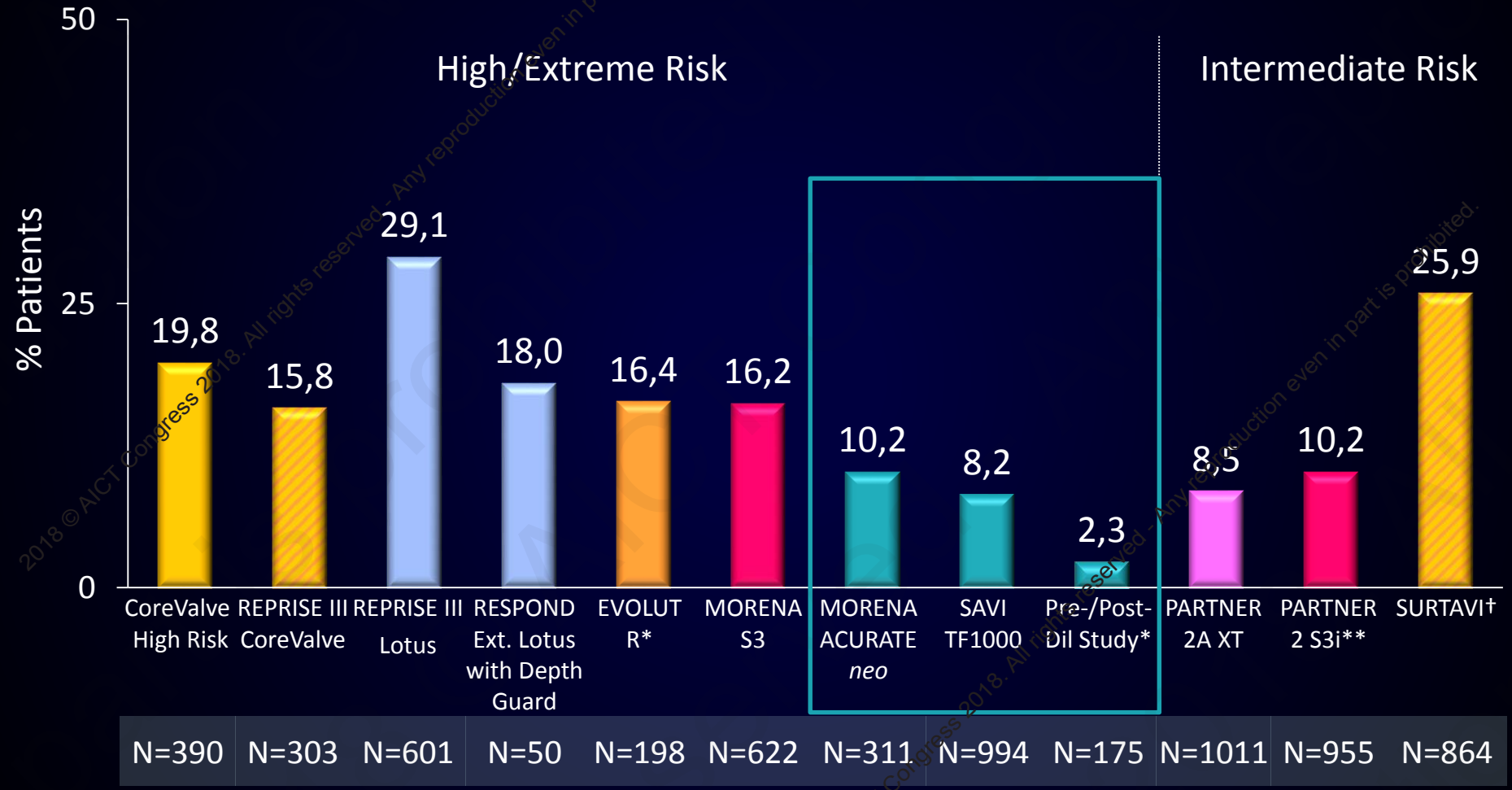
PARTNER 1B: Leon, NEJM 2010. PARTNER 1A: Smith, NEJM 2011. CoreValve Ext. Risk: Popma, JACC 2014. REPRISE III: Feldman, PCR 2017 . REPRISE II/II EXT: Meredith, PCR LV 2016. CoreValve High Risk: Adams, NEJM 2014. EVOLUT R: Popma, TCT 2016. SAVI TF1000: Möllmann, EuroPCR 2017. PARTNER 2A XT: Leon, NEJM 2016. PARTNER 2 S3i: Thourani, Lancet 2016. SURTAVI: Reardon, NEJM 2017. For educational purposes only. Results from different studies are not directly comparable. Information provided for educational purpose only. Information not intended for use in France. CE mark received 2014. Information for the ACURATE Valve System is for use in countries with applicable product registrations. Indications, contraindications, warnings and instructions for use can be found in the product labeling supplied with each device.

New Permanent Pacemaker to 30 Days
TAVI Clinical Studies



*Pre-dil with balloon 1-3mm smaller than annulus required in every case; post-dil in 26.3% of cases with balloon 1-2mm smaller than the annulus. **KM estimate. †Bayesian rate. CoreValve High Risk: Adams, NEJM 2014. REPRISE III: Feldman, PCR 2017. RESPOND Ext.: Blackman, PCR 2017. EVOLUT R: Popma, TCT 2016. MORENA: Husser, DGK 2017. SAVI TF1000: Möllmann, EuroPCR 2017. Pre-/Post-/ Dil Study: Toggweiler, EuroIntervention 2017. PARTNER 2A XT: Leon, NEJM 2016. PARTNER 2 S3i: Thourani, Lancet 2016. SURTAVI: Reardon, NEJM 2017. Results from different studies are not directly comparable. Information provided for educational purpose only. Information not intended for use in France. CE mark received 2014. Information for the ACURATE Valve System is for use in countries with applicable product registrations. Indications, contraindications, warnings and instructions for use can be found in the product labeling supplied with each device.

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14th

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ASIAN INTERVENTIONAL CARDIOVASCULAR THERAPEUTICS

THE OFFICIAL CONGRESS OF APSIC

7 - 9th September 2018

Hong Kong

Convention and Exhibition Centre (HKCEC)

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