14th AICT
ASIAN INTERVENTIONAL CARDIOVASCULAR THERAPEUTICS
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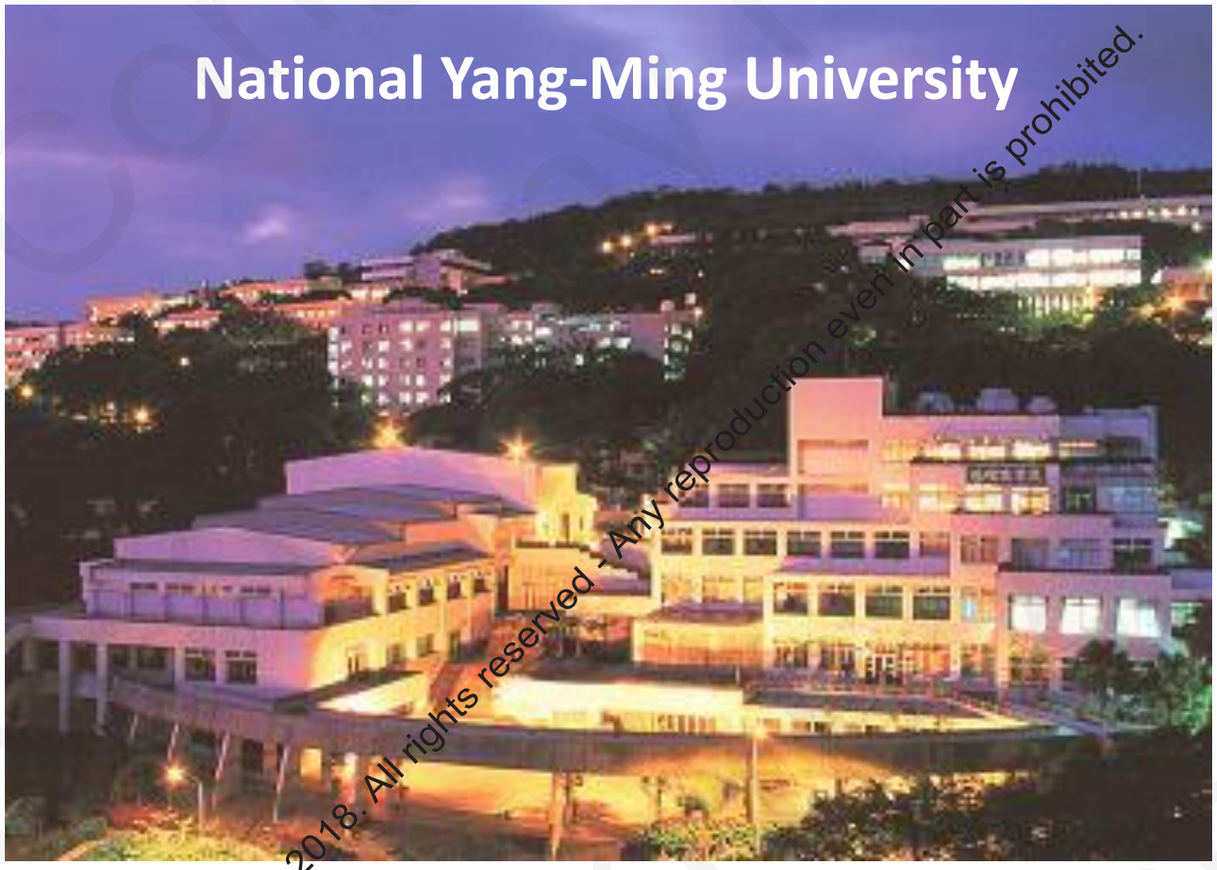
Performing coronary procedures after TAVR: tips and tricks



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Professor, School of Medicine, National Yang Ming University, Taipei, Taiwan

Coronary artery disease in patients undergoing TAVI: why, what, when and how to treat

Significant CAD has been reported in more than 60% of octogenarians undergoing SAVR; and in 40 to 75% of high-risk patients undergoing TAVR.

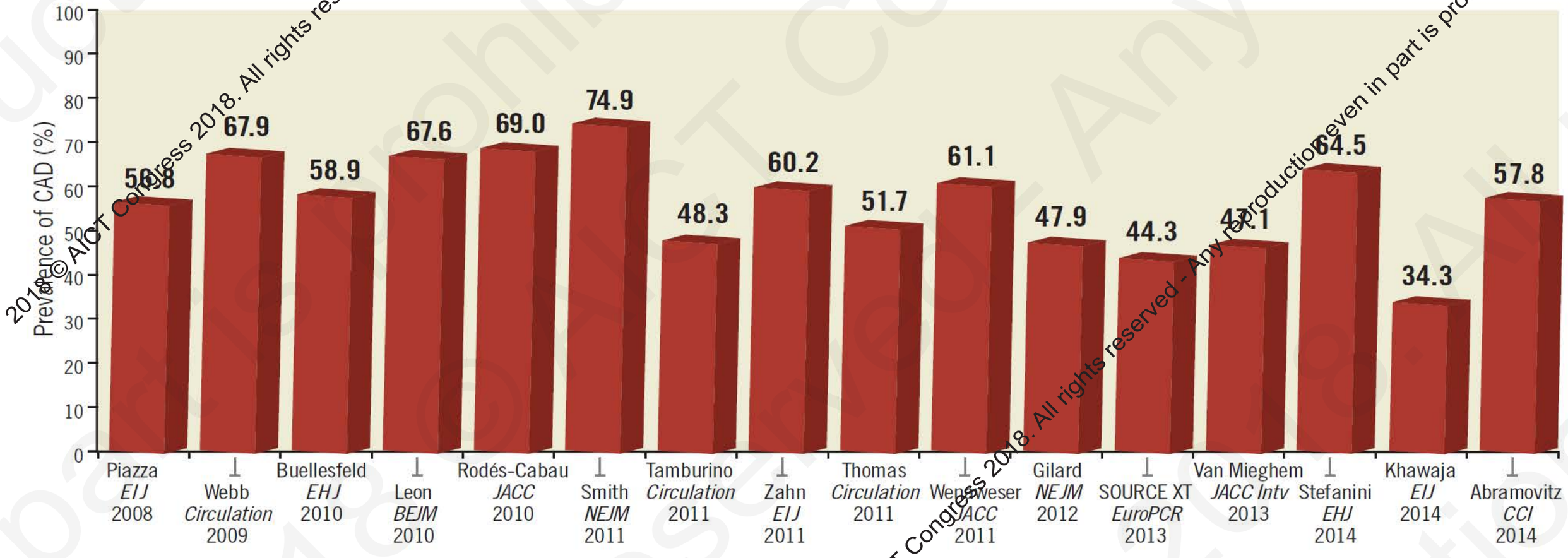

Figure 1. *Prevalence of coronary artery disease in patients with aortic stenosis undergoing TAVI.*

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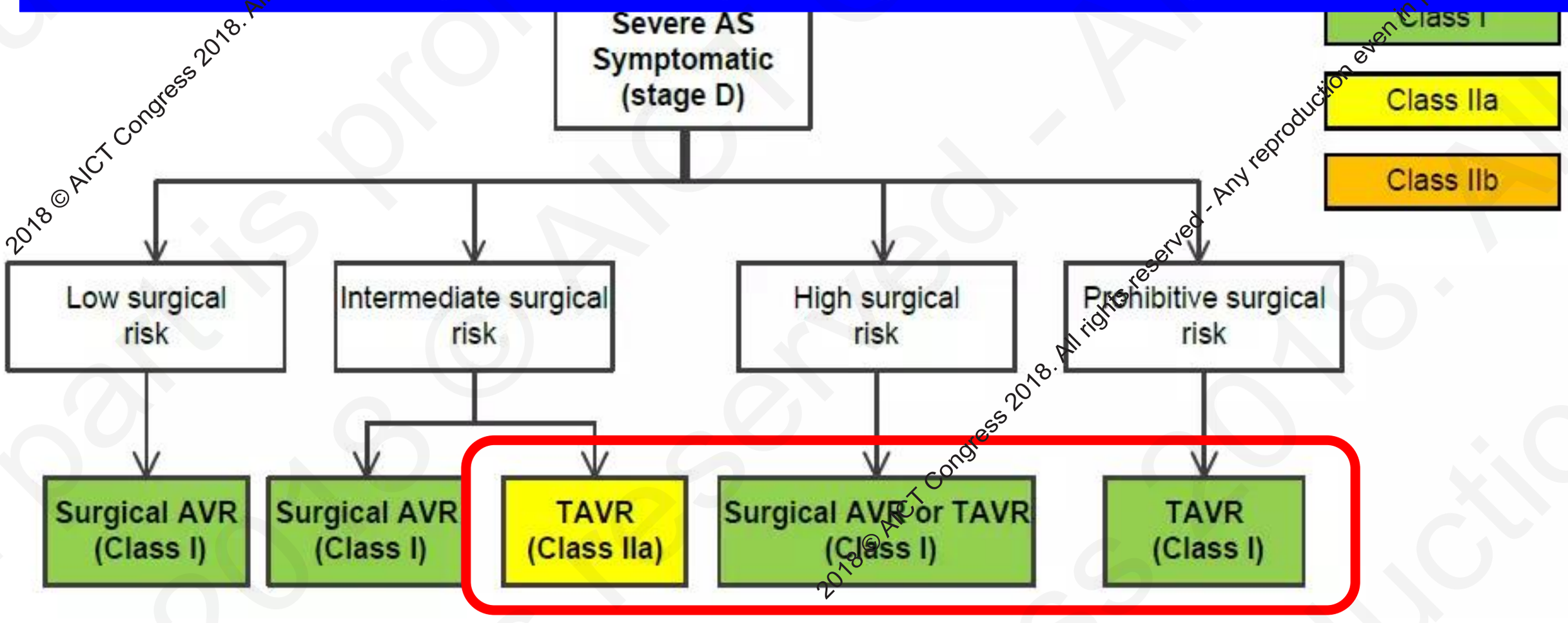
2017 American College of Cardiology Expert Consensus Decision Pathway for TAVR in the Management of Adults with Aortic Stenosis

For older people, long-term risk may not be an issue.

However, as we move to lower-risk, younger patients, the CAD is going to be a bigger issue.

About *5%* of patients end up coming back for an unplanned PCI.



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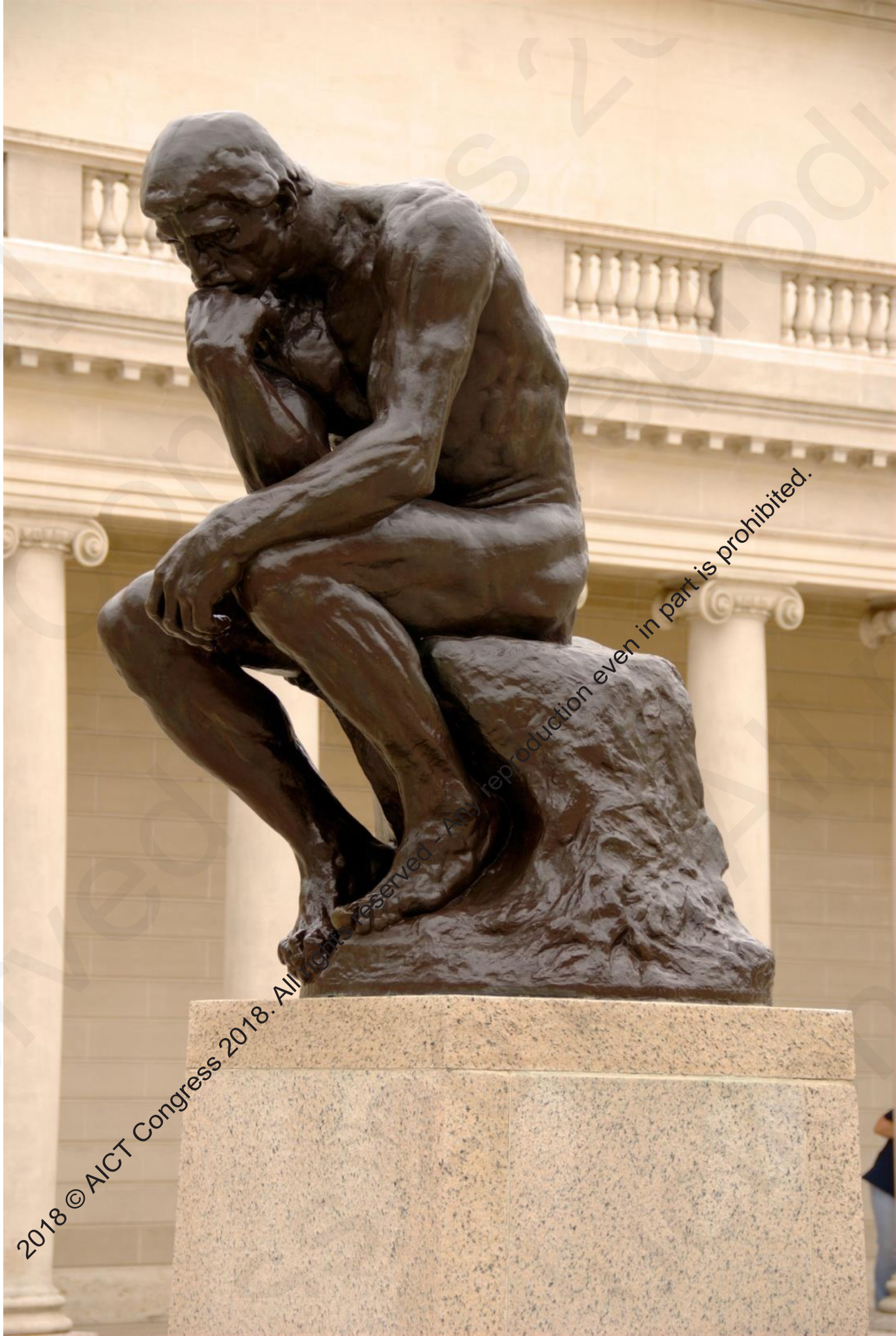
PCI after TAVR

PCI after TAVR poses certain, unique procedural risks, including the possibility that

- **the prosthetic valve struts may interfere with cannulation of the coronary arteries**

- **catheter manipulation may potentially dislodge the prosthetic valve.**



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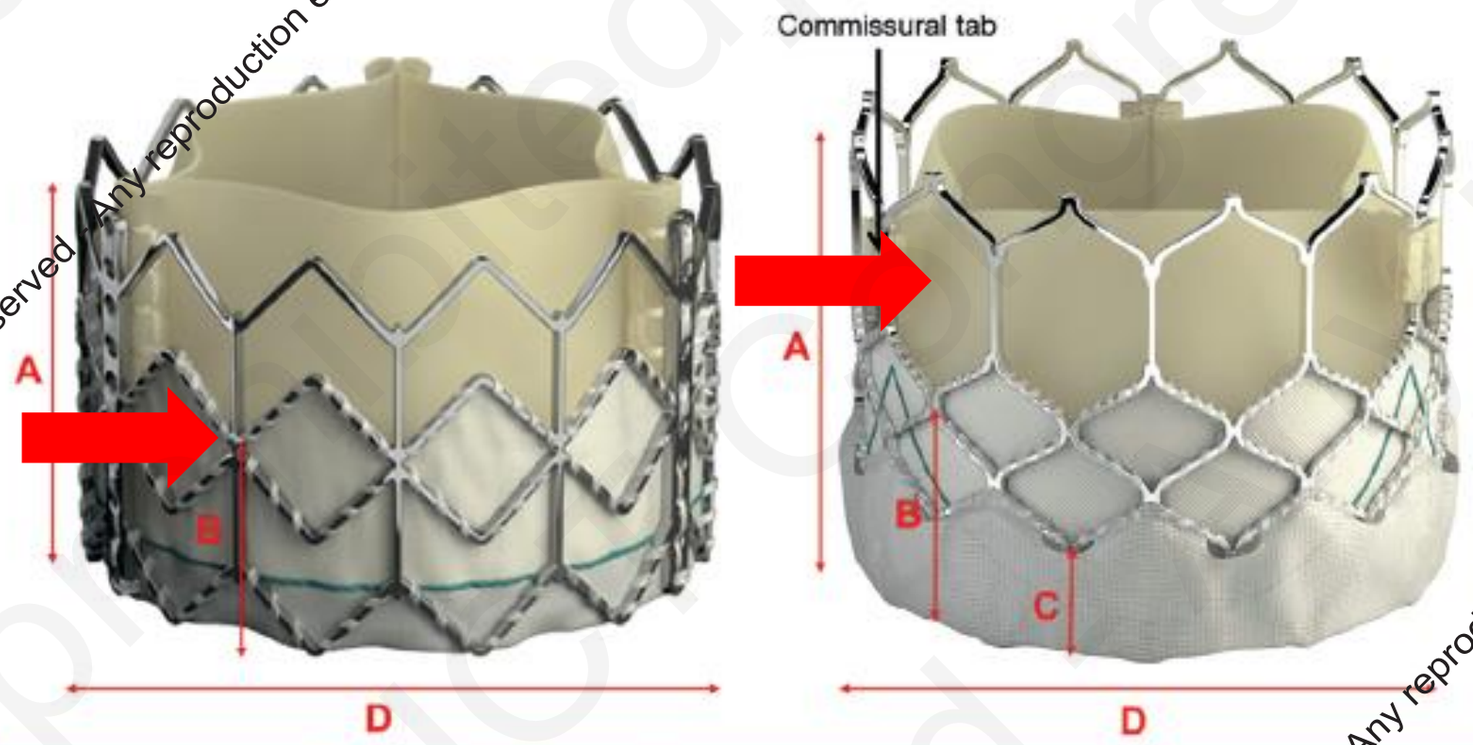
Balloon-expandable valves with shorter skirt height or larger cells may be better !

FIGURE 5 Balloon-Expandable Valves: Features and Dimensions (J Am Coll Cardiol 2018;71:1360-78)



	23 mm Sapien XT	26 mm Sapien XT	29 mm Sapien XT	20 mm Sapien 3	23 mm Sapien 3	26 mm Sapien 3	29 mm Sapien 3
A. Frame Height	14 mm	17 mm	19 mm	15.5 mm	18 mm	20 mm	22.5 mm
B. Inner Skirt Height	6.7 mm	8.7mm	11.6 mm	7.9 mm	9.8 mm	10.2 mm	11.6 mm
C. Outer Skirt Height	N/A	N/A	N/A	5.2 mm	6.6 mm	7.0 mm	8.1 mm
D. Valve Diameter	23 mm	26 mm	29 mm	20 mm	23 mm	26 mm	29 mm

Various dimensions of the Sapien XT and Sapien 3 valves (Edwards Lifesciences, Irvine, California) are listed for comparison.

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Higher implant will be problematic in patients with low coronary take-off !

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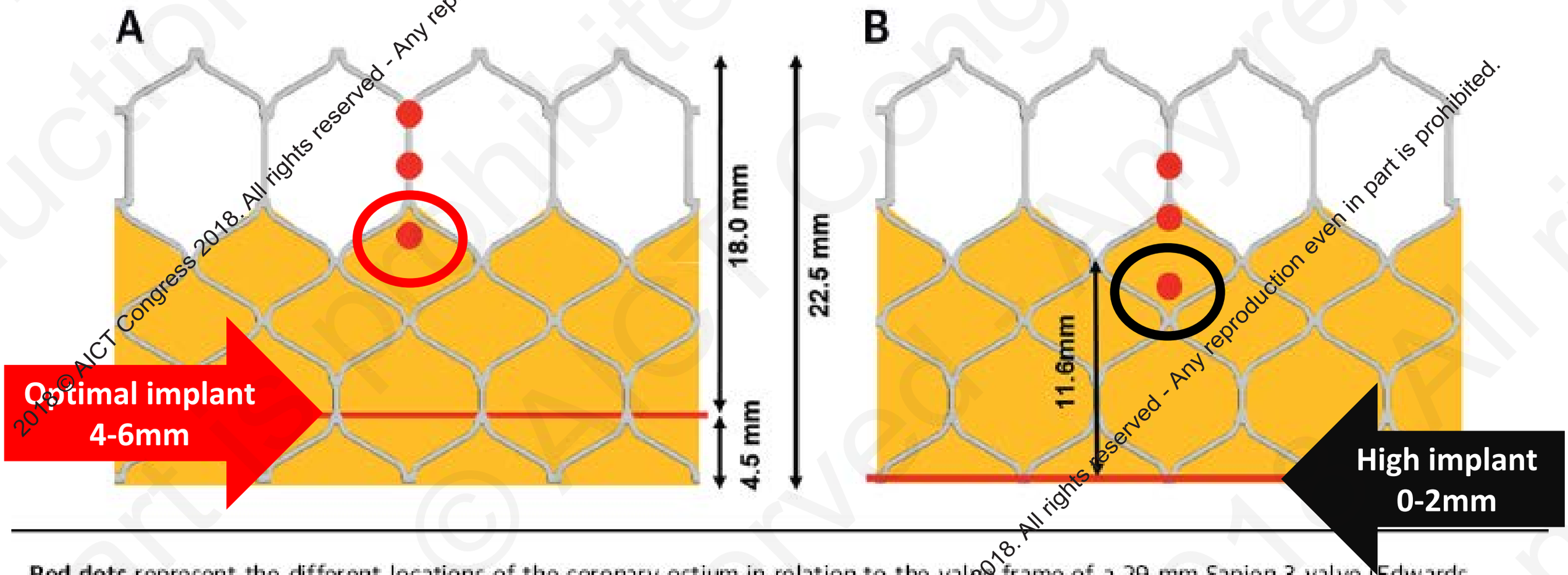
FIGURE 6 Balloon-Expandable Valve and Coronary Ostia Based on Depth of Implant

(J Am Coll Cardiol 2018;71:1360-78)

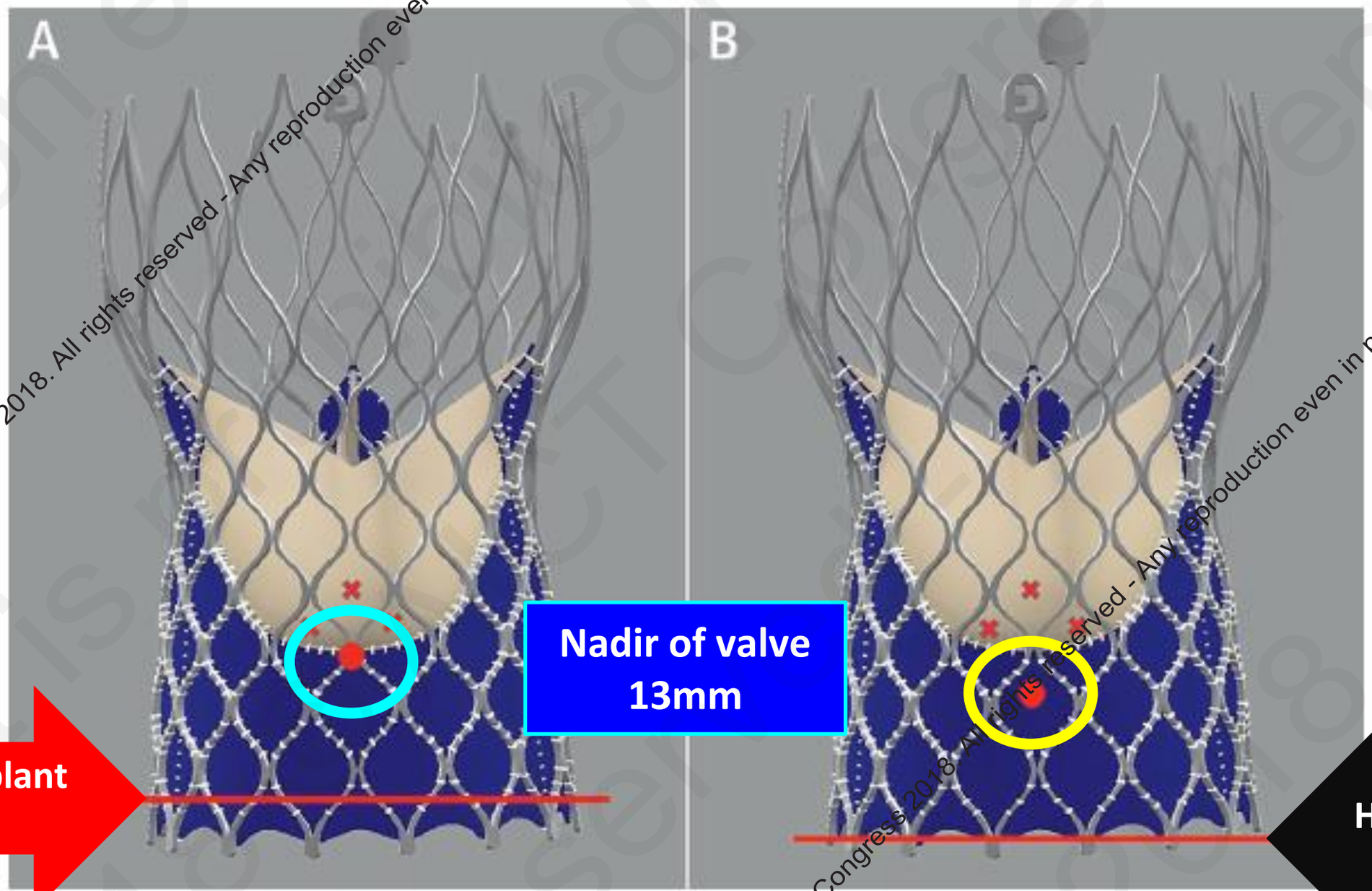


Red dots represent the different locations of the coronary ostium in relation to the valve frame of a 29 mm Sapien 3 valve (Edwards Lifesciences, Irvine, California), and the **red line** represents the annular plane. An optimally positioned Sapien 3 valve (Edwards Lifesciences, Irvine, California) **(A)** would make coronary access potentially easier than one with a higher implant **(B)**, where the coronary ostium will be located below the seal skirt. Tall native leaflet or bulky calcium at the leaflet tip may further increase difficulty of coronary access in a high valve implant.

Higher implant will be problematic !

(J Am Coll Cardiol 2018;71:1360-78)

FIGURE 2 Self-Expanding Valve and Coronary Access Depending on Level of Implantation Across the Annulus



Red dot represents the location of the coronary ostium in relation to the valve frame, and the **red line** represents the annular plane. The **red x's** depict the closest diamonds that can be used to access the coronary ostium. An optimally positioned Evolut-R (Medtronic, Galway, Ireland) **(A)** would make coronary access potentially easier than one with a higher implant **(B)**.

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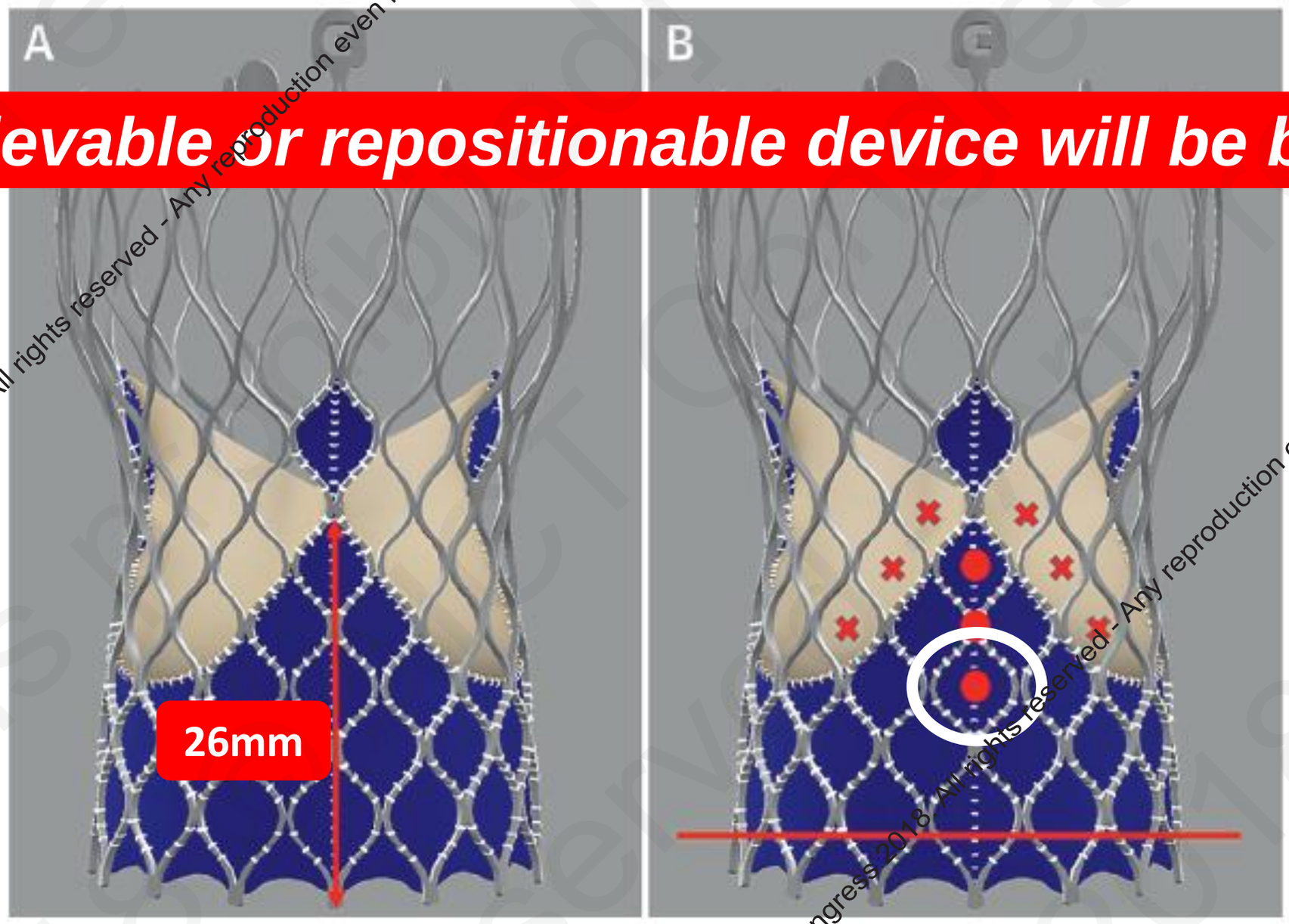
It will be even more difficult to access coronary ostia if they face the side of the commissural post !

FIGURE 3 Self-Expanding Valve and Coronary Access If Ostia Lines Up With Commissural Post (J Am Coll Cardiol 2018;71:1360-78)



Red line represents the annular plane. The 3 **red dots** depict coronary ostia heights of approximately 10, 14, and 18 mm above the annular plane, respectively. The **red x's** depict the closest diamonds that can be used to access the coronaries. The commissural post of an Evolut-R (Medtronic, Galway, Ireland) is 26 mm in height **(A)**. Depending on the height of coronary ostia, a different catheter and approach is necessary for coronary reaccess, when the ostium faces the side of the commissural post **(B)**.

A retrievable or repositionable device will be better!

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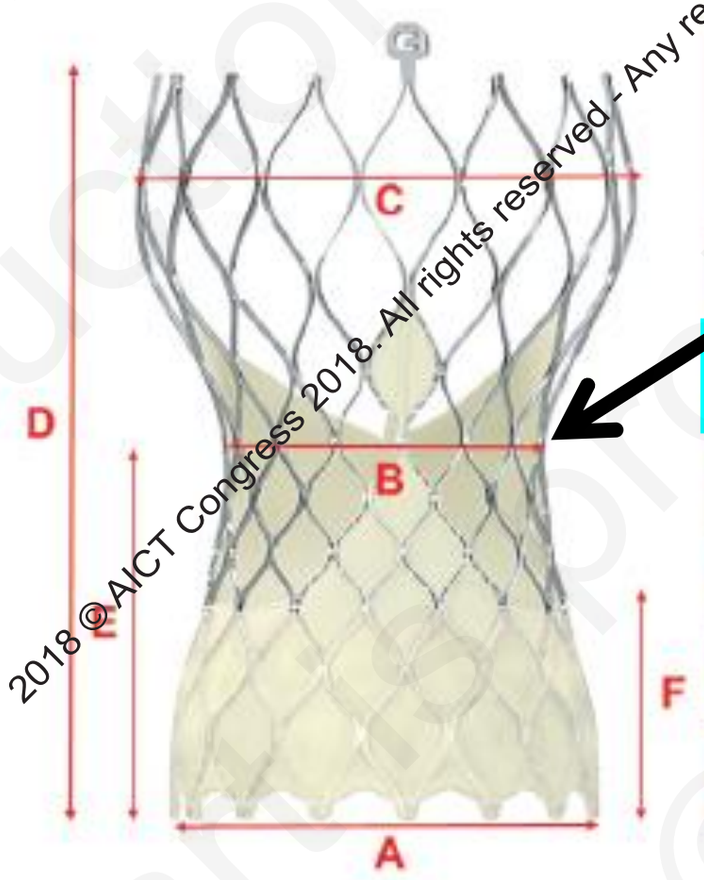
Evolut R and Evolut R Pro may be better.

The concave central portion ("waist") of the self-expanding valve is narrower than native aortic root dimensions, which will limit the manipulation of catheters.



	23mm Evolut R / PRO	26 mm Evolut R / PRO	29mm Evolut R / PRO	34mm Evolut R
A. Inflow Diameter	23 mm	26 mm	29 mm	34 mm
B. Waist Diameter	20 mm	22 mm	23 mm	24 mm
C. Outflow Diameter	34 mm	32 mm	34 mm	38 mm
D. Frame height	45 mm	45 mm	45 mm	46 mm
E. Commissure Height	26 mm	26 mm	26 mm	26 mm
F. Skirt Height	13 mm	13 mm	13 mm	14 mm

Smaller catheters, such as a Judkins left or right catheter should be chosen.

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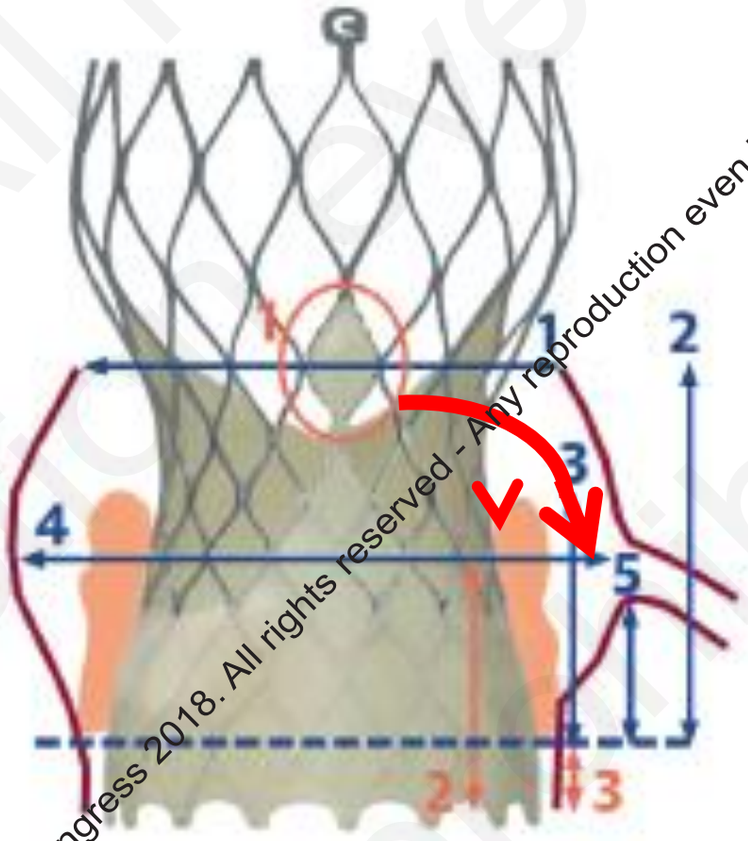
Factors Impacting Coronary Access

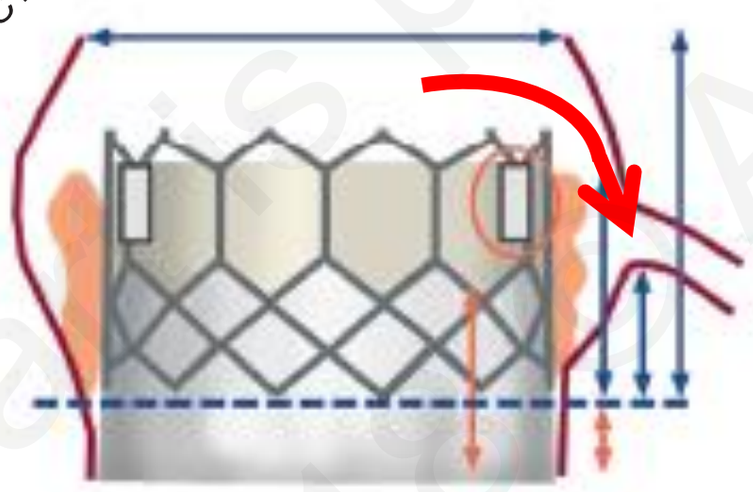
Imaging Evaluation

(J Am Coll Cardiol 2018;71:1360-78)



Anatomical

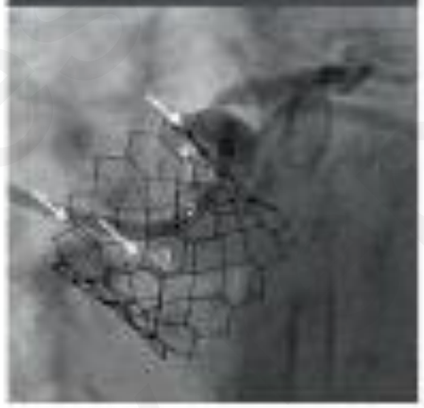
1. Sinotubular junction dimensions
2. Sinus height
3. Leaflet length and bulkiness
4. Sinus of Valsalva width
5. Coronary height



Device and Procedural

1. Commissural tab orientation
2. Sealing skirt height
3. Valve implant depth

Fluoroscopy



MDCT

Feasible but sometimes technically challenging!!

replacement.

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Coronary Angiography and Percutaneous Coronary Intervention After Transcatheter Aortic Valve Replacement

(J Am Coll Cardiol 2018;71:1360–78)

Matias B. Yudi, MBBS,[a] Samin K. Sharma, MD,[a] Gilbert H.L. Tang, MD, MSc, MBA,[b] Annapoorna Kini, MD[a]

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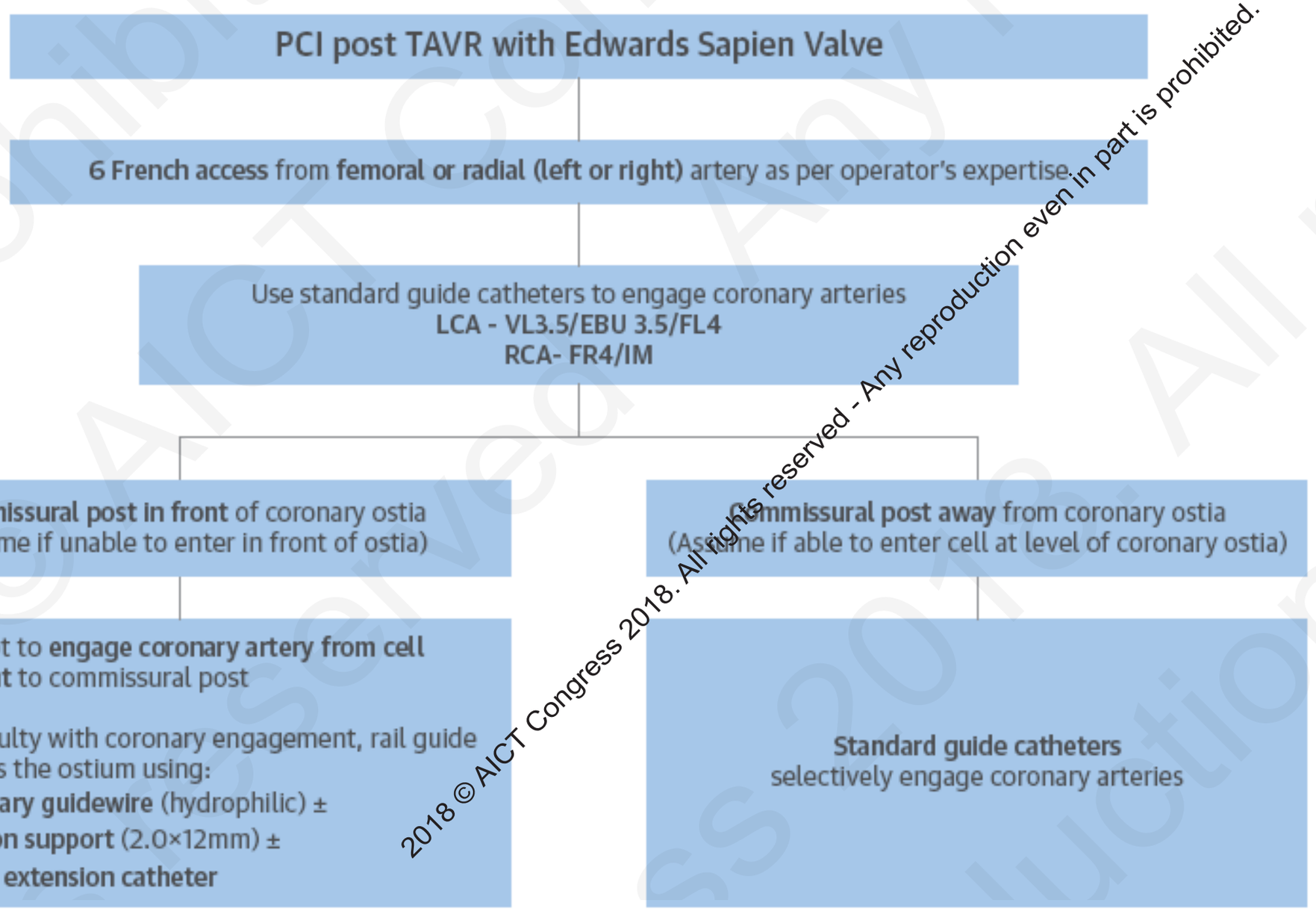
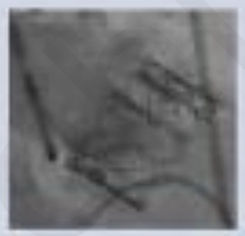
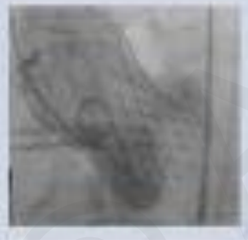
FIGURE 11 FIGURE 12 FIGURE 1

FIGURE 14 Algorithm on PCI Post-TAVR With a Balloon-Expandable Valve



Recommended catheters for CA or PCI after TAVR

Name	Prosthesis	Correct position	Characteristics	Tipps for CA or PCI
Subcoronary aortic valve prostheses				
JenaValve			- Self expandable nitinol stent - Three nitinol feelers - Self orientating - TA and TF approach - Total height: 30-32mm	Standard Catheters
SAPIEN XT			- Balloon expandable - TF and TA approach - Total height: 14-19mm	Standard Catheters
Partially supracoronary aortic valve prostheses				
CoreValve			- Self expandable nitinol stent - TF approach only - Total height: 53-55mm	LCA: Smaller catheter size (JL 3.5) RCA: - Amplatz right 1.0
Portico			- Self expandable nitinol stent - TF and TA approach - Total height: 47mm	LCA: Smaller catheter size (JL 3.5) RCA: - Amplatz right 1.0
Acurate			- Self expandable nitinol stent - Three stabilization arches - TA and TF approach - Total height: 44-46mm	LCA: - Amplatz left 2.0 RCA: - Amplatz right 1.0

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Tips and techniques for CAG or PCI after CoreValve/Evolute R

- Use aortography to confirm ostia takeoff points.
- Engage the coronary ostium coaxially through the middle of the frame cell: JL4 → JL3.5/4.5
- If there is difficulty with the frame cell that is directly coaxial to the ostium, use the frame cell to the left or right, or above the ostium.
- Attempt a partial selection, then engage with the wire.
- Use an extension when extra support is needed or when the distance between the frame and the coronary ostia is large — commonly with RCA.
- After PCI, disengage the guide catheter from the ostium over the guidewire prior to removing through the frame cell.

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Case presentation

Brief History

- Mrs. Chen, 76 y/o
- C.C: progressive exertional dyspnea for 6 months.
- Past hx.: CAD TVD s/p POBAS for LAD & RCA (2015.11)
  VHD with critical AS s/p TAVR and
  pacer for slow atrial fib. (2016.1.12)
  At that time, the RCA was patent.

- Stress test: TL-201 scan (ischemia in RCA territory)

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Tl-201 scan (2017/03/07)

(76Y/F)

11:09:23

Img:1
Ser:593968
Exercise Tl-201 myocardial perfusion SPECT
Acq Time:

SAX-AST-STR
SAX Apex< - >Base
[6 / 28] [7 / 28] [8 / 28] [9 / 28] [10 / 28] [11 / 28] [12 / 28] [13 / 28] [14 / 28] [15 / 28] [16 / 28] [17 / 28]

SAX-AST-RST
SAX Apex< - >Base
[6 / 29] [7 / 29] [8 / 29] [9 / 29] [10 / 29] [11 / 29] [12 / 29] [13 / 29] [14 / 29] [15 / 29] [16 / 29] [17 / 29]

SAX-AST-STR
VLA Septal< - >Lateral
[27 / 64] [28 / 64] [29 / 64] [30 / 64] [31 / 64] [32 / 64] [33 / 64] [34 / 64] [35 / 64]

SAX-AST-RST
VLA Septal< - >Lateral
[26 / 64] [27 / 64] [28 / 64] [29 / 64] [30 / 64] [31 / 64] [32 / 64] [33 / 64] [34 / 64]

SAX-AST-STR
HLA Inferior< - >Anterior
[28 / 64] [29 / 64] [30 / 64] [31 / 64] [32 / 64] [33 / 64] [34 / 64] [35 / 64] [36 / 64]

SAX-AST-RST
HLA Inferior< - >Anterior
[27 / 64] [28 / 64] [29 / 64] [30 / 64] [31 / 64] [32 / 64] [33 / 64] [34 / 64] [35 / 64]

NM

300Pix
Fit 77%

BV

EBW NM
Philips Nuclear Medicine

W:256 L:128

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CAG (2017/03/10)

Engagement of diagnostic catheter to LCA


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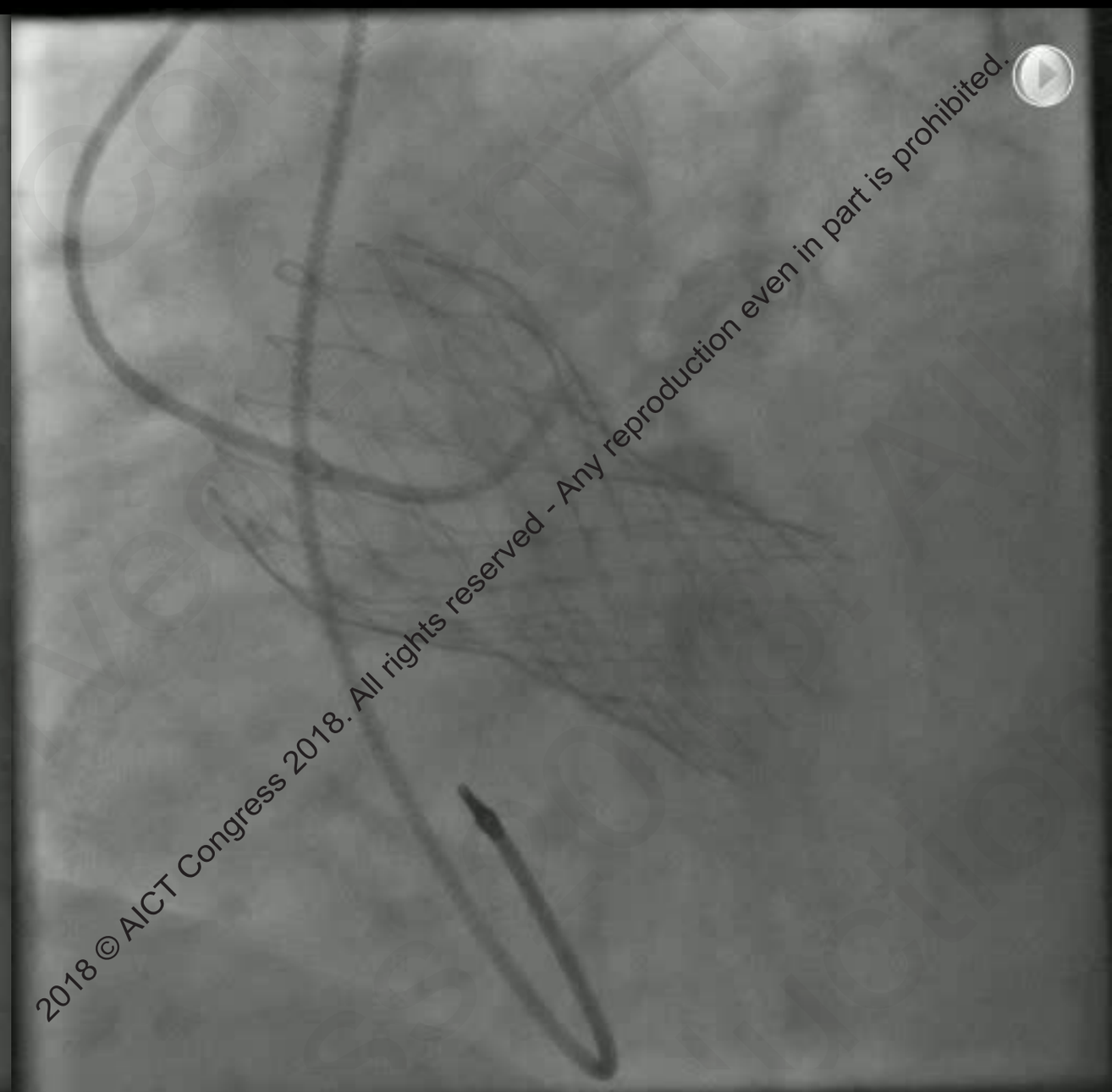
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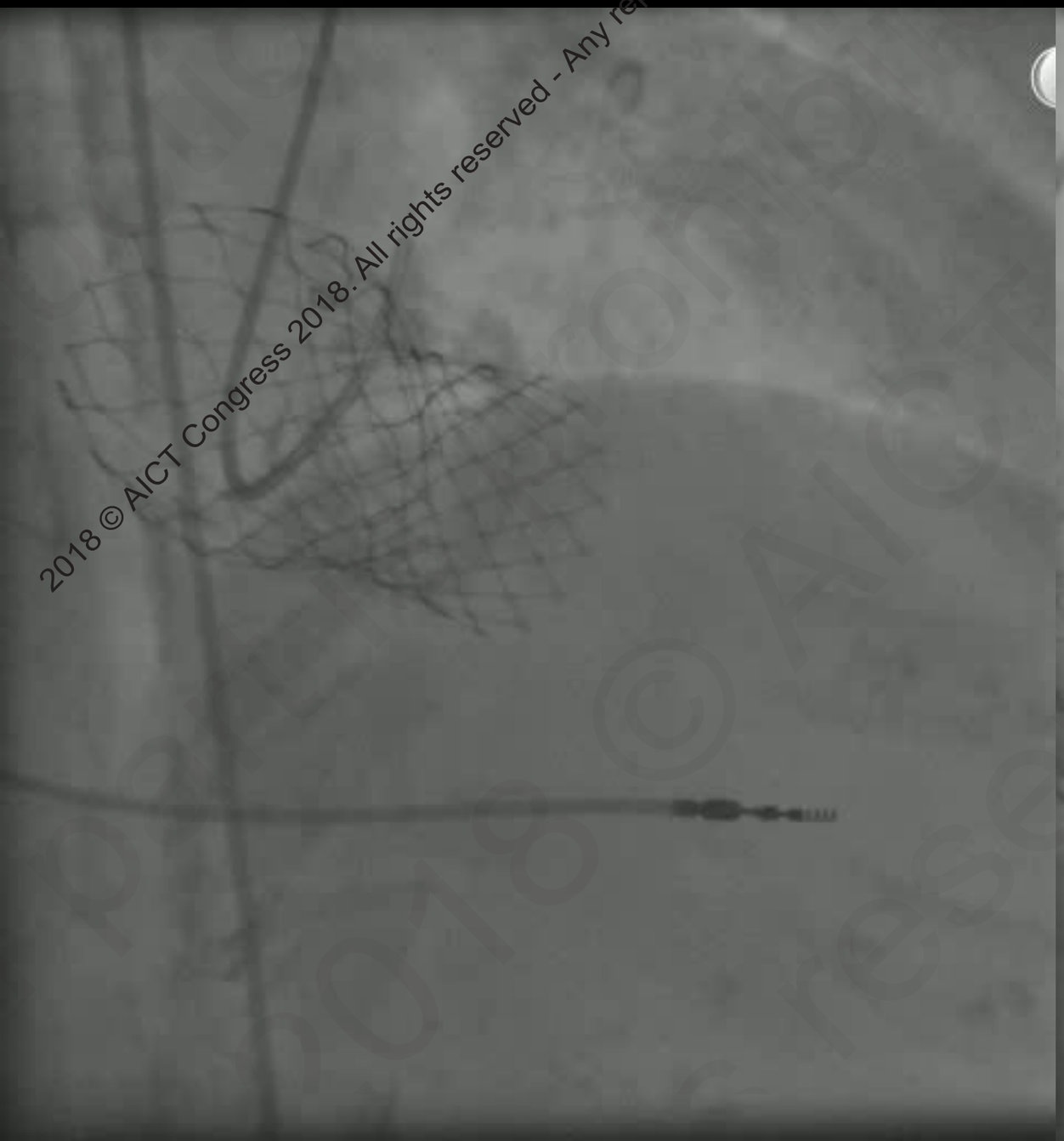
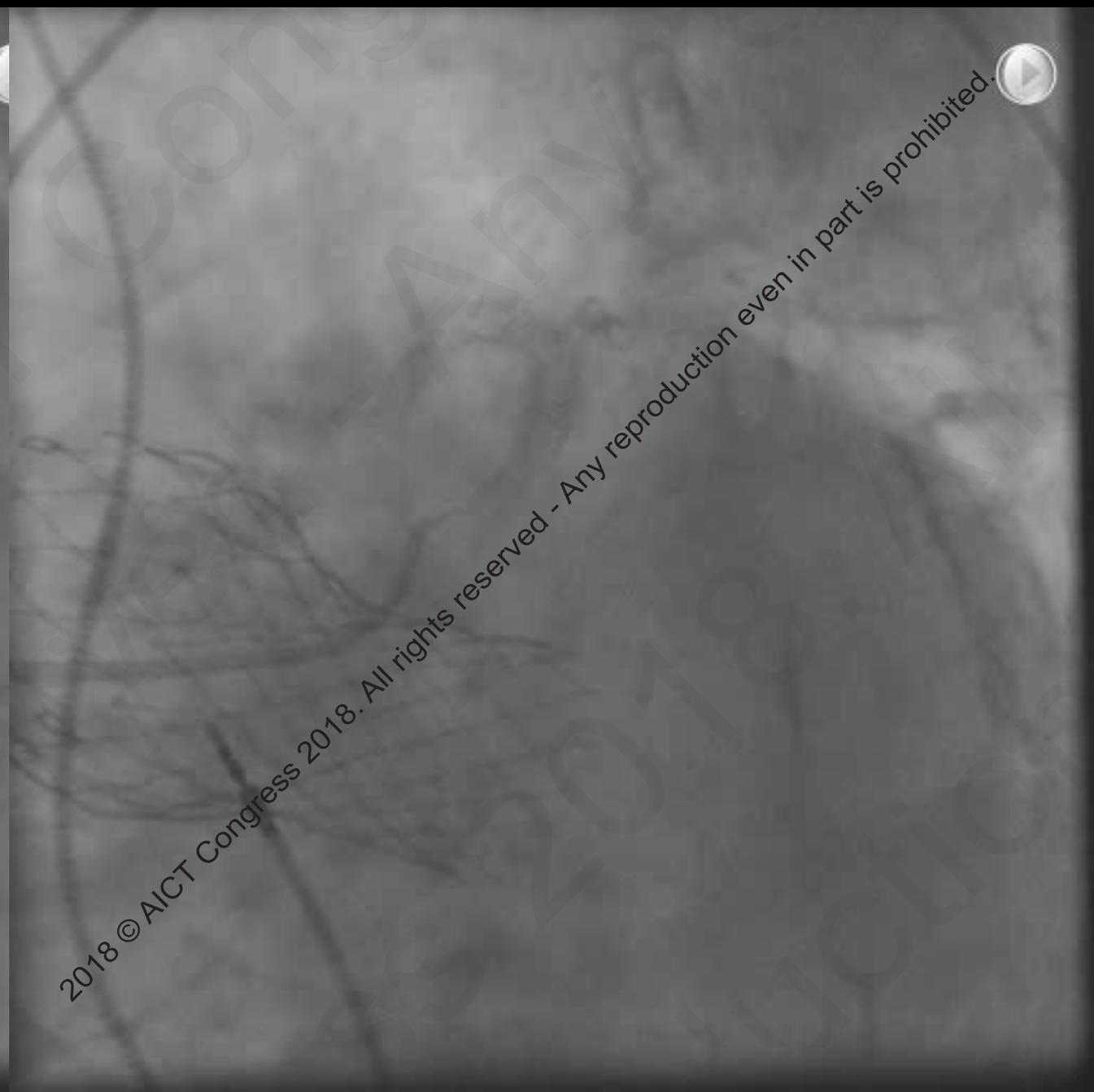
CAG (2017/03/10)

Coronary arteriogram of LCA





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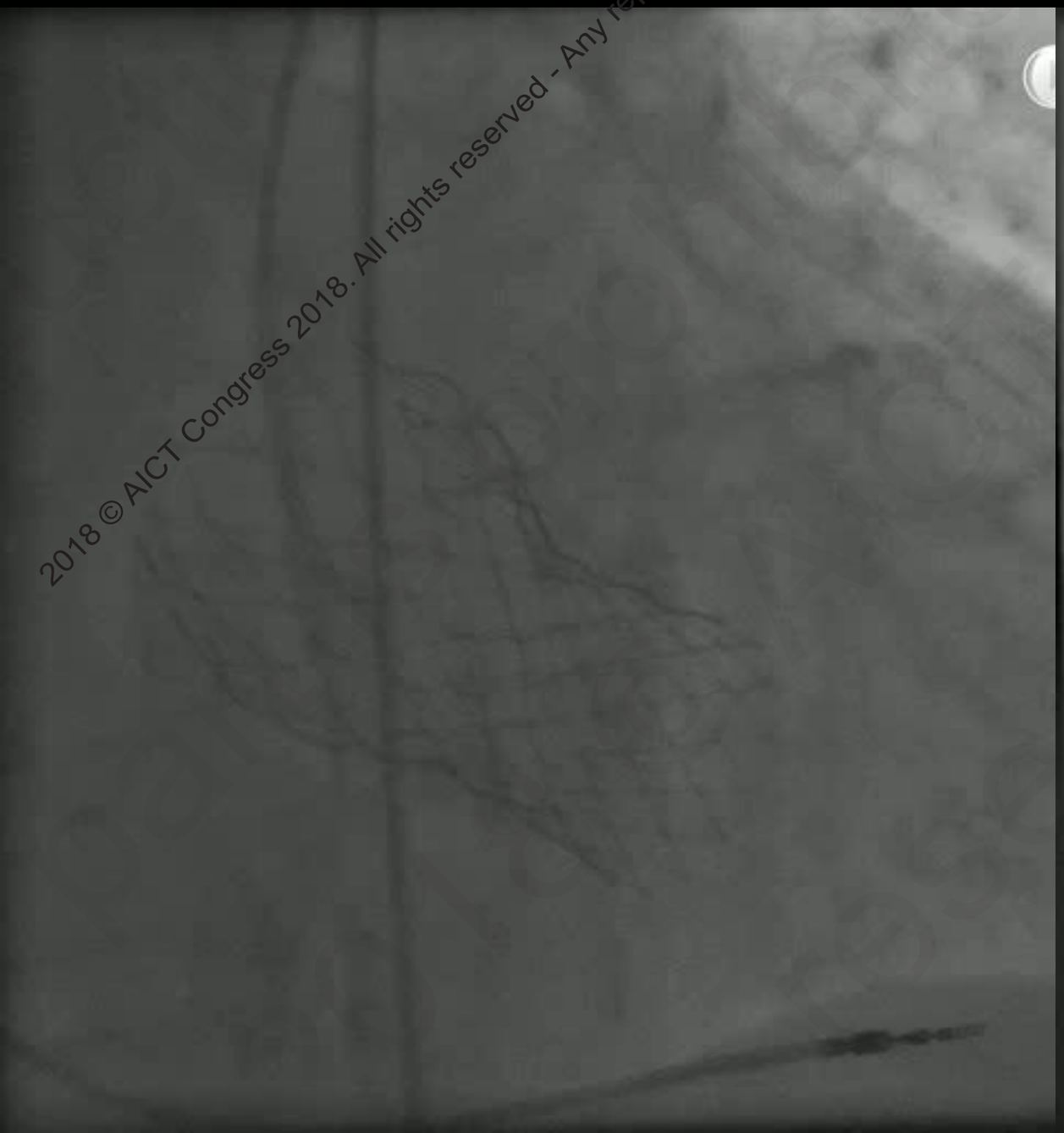
CAG (2017/03/10)

Engagement of diagnostic catheter to RCA



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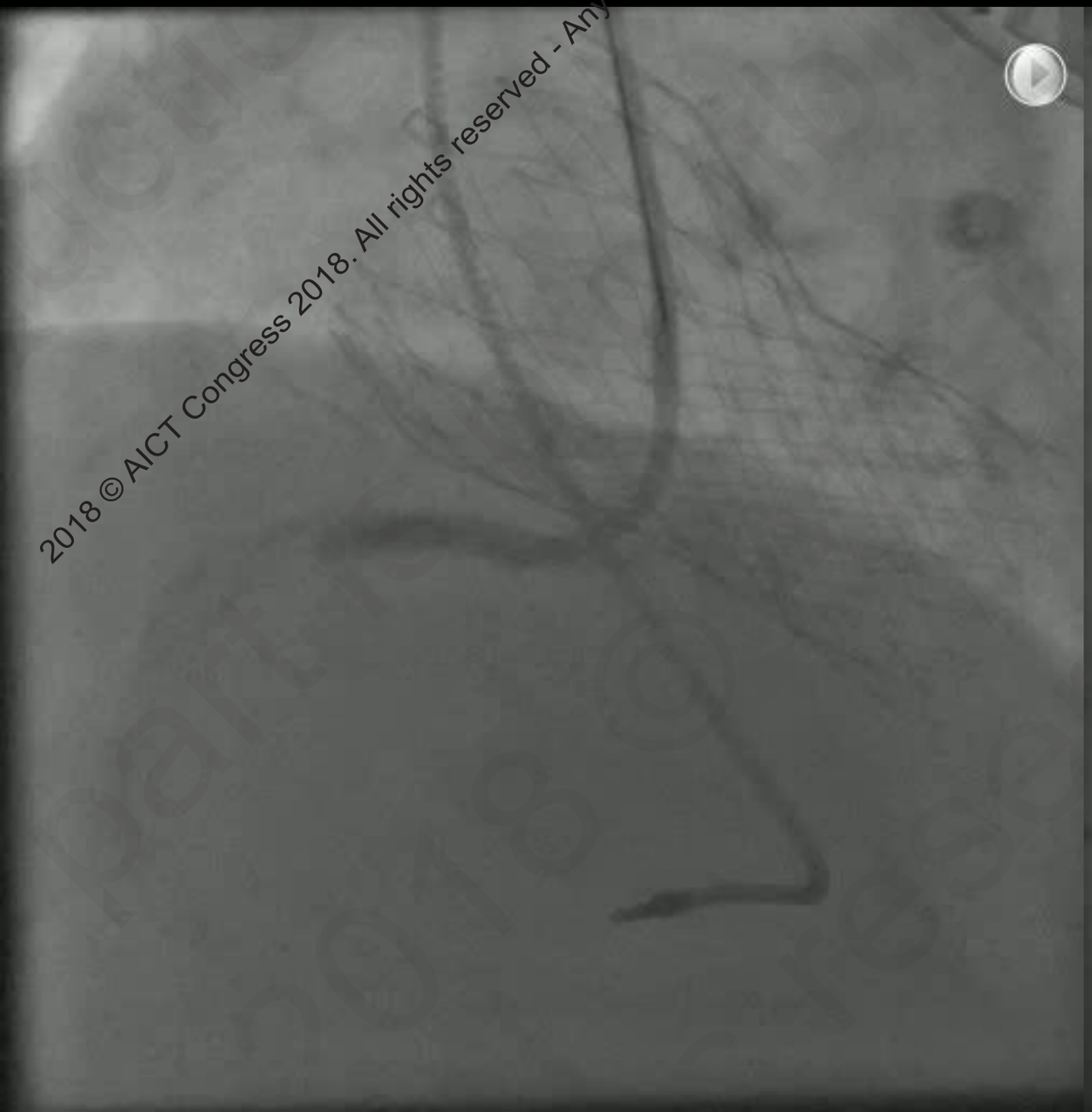
CAG and LVG (2017/03/10)

Coronary arteriogram of RCA and LVG



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RCA-PCI

Guiding Cath.: JR 3.5/6F, AR1 (x)
GW: Sion Blue → Gaia Frist, w/ Corsair (135cm)

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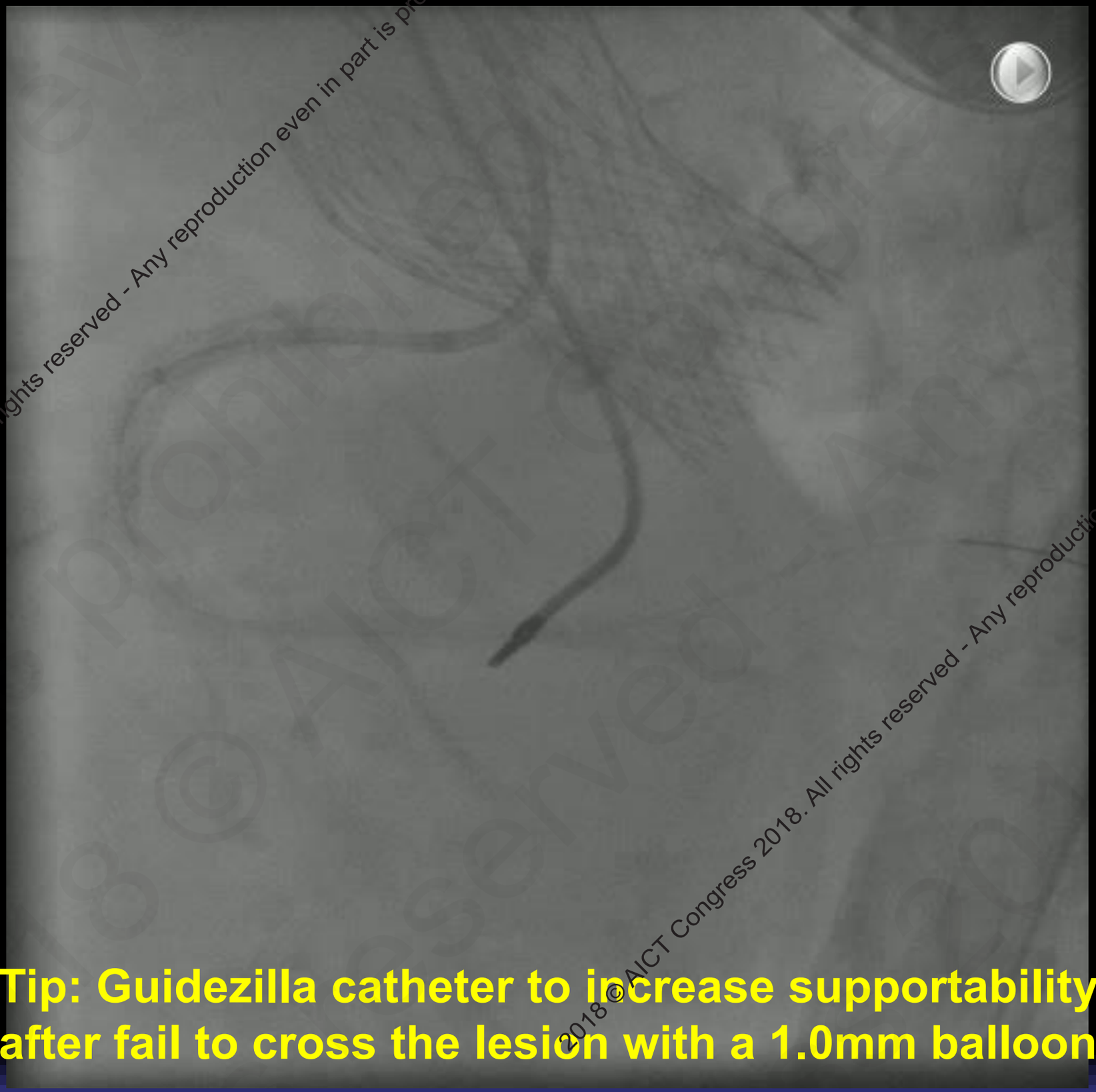
RCA-PCI



Tip: Guidezilla catheter to increase supportability after fail to cross the lesion with a 1.0mm balloon

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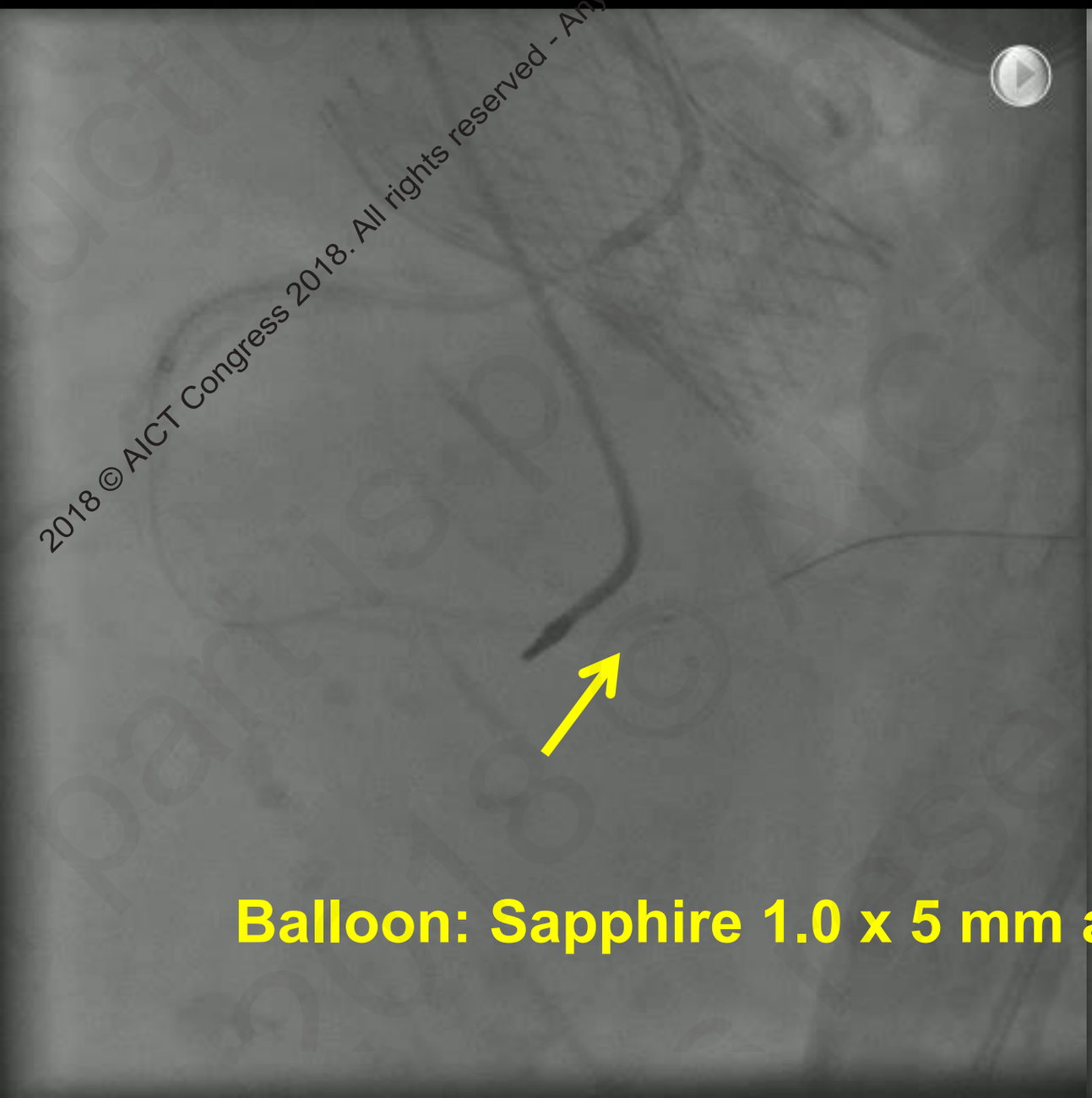
Pre-dilatation

Pre-dilatation with a 1.0 x 5 mm balloon



Balloon: Sapphire 1.0 x 5 mm and then a MiniTrek 1.2 x 6mm

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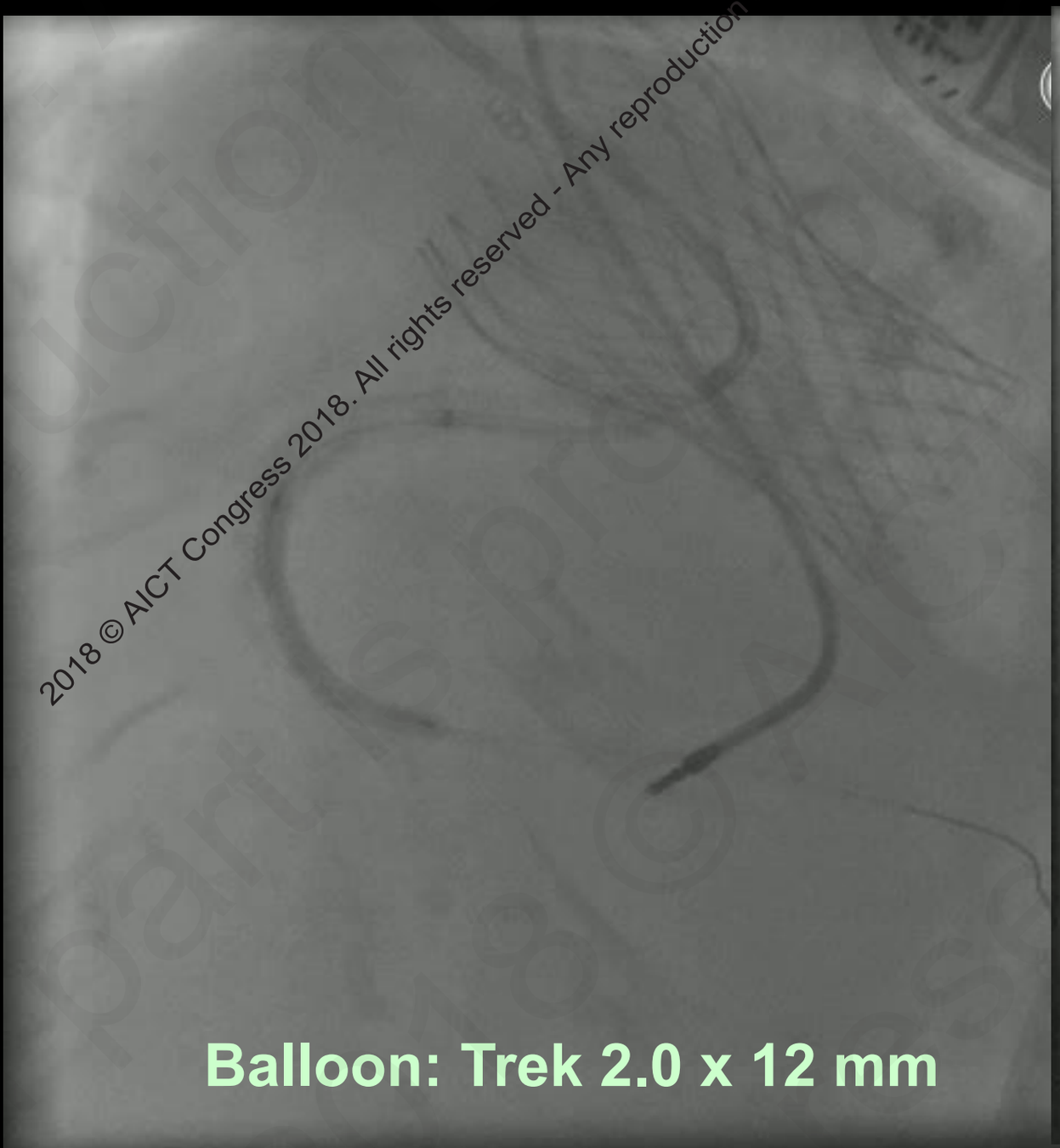
1st stent deployment



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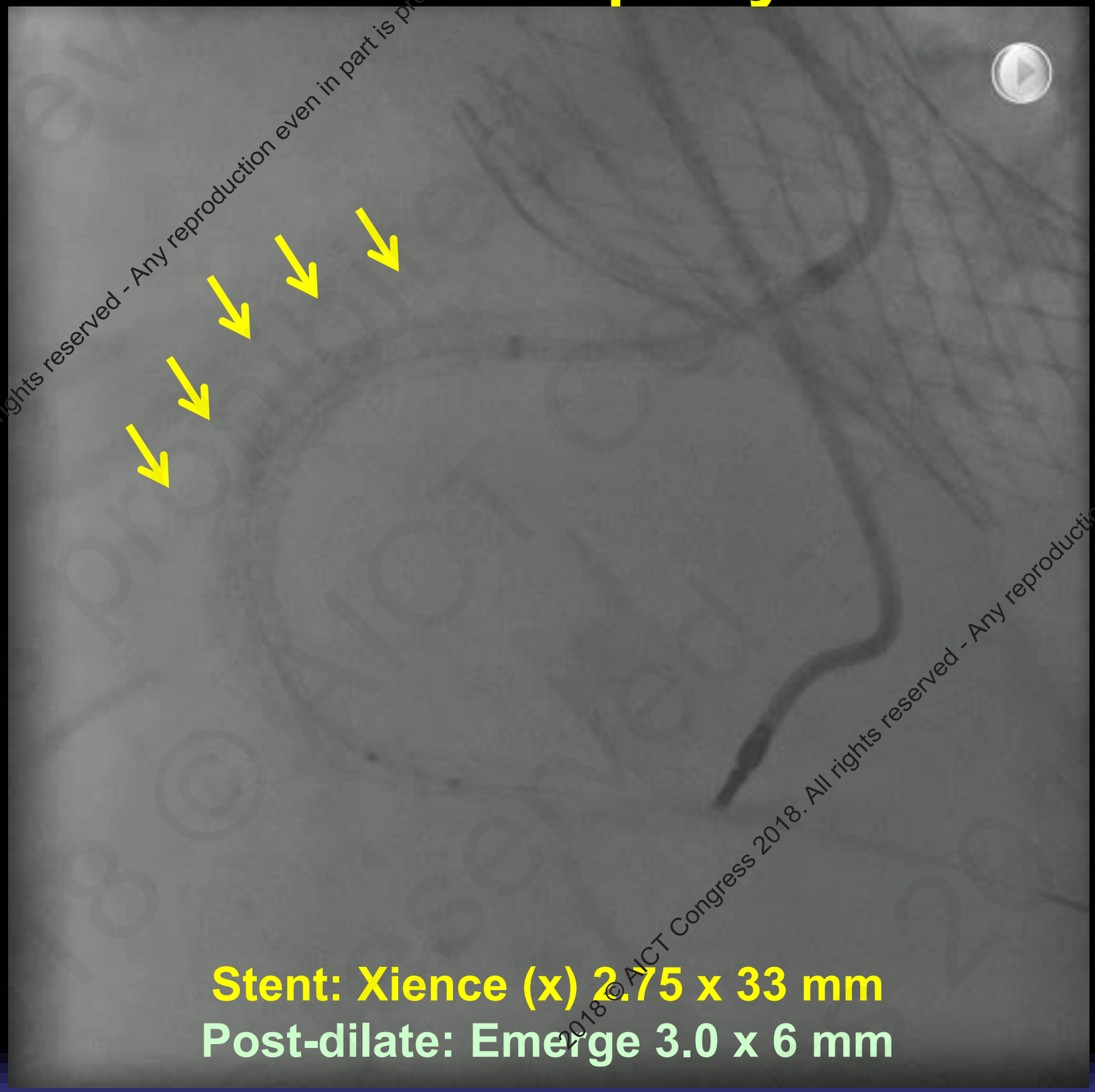
2nd stent deployment



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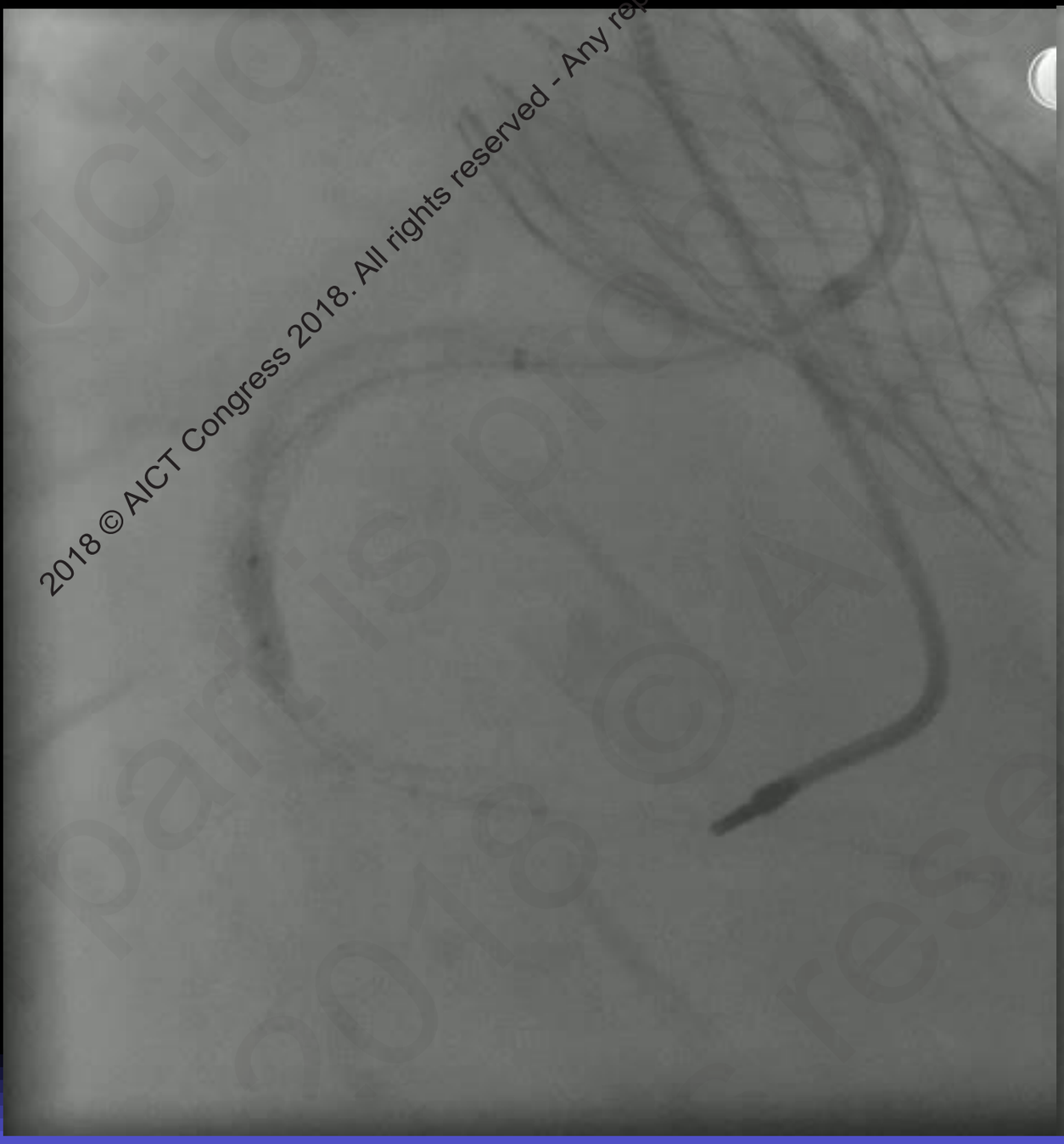
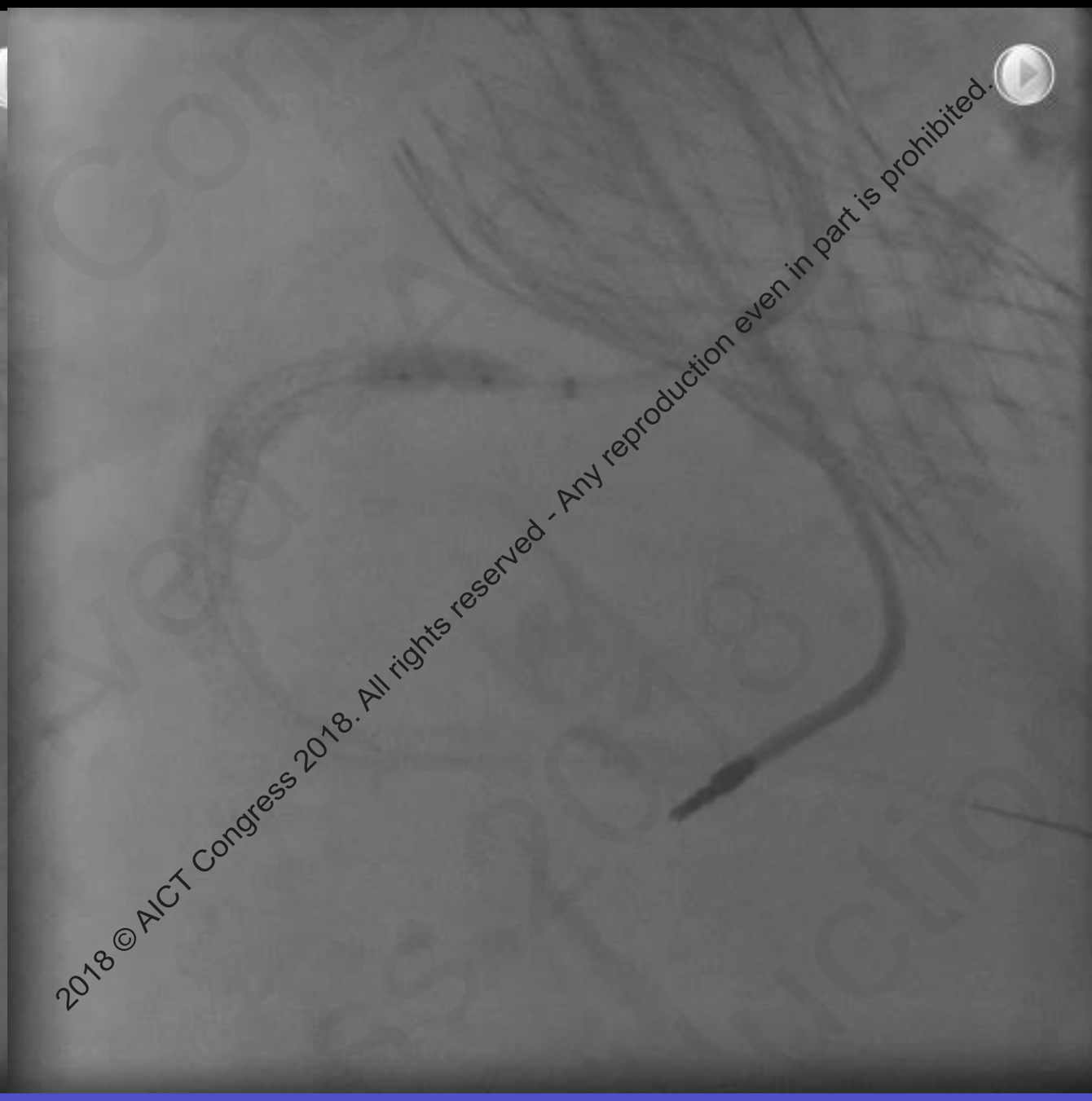
Post-dilatation

Post-dilate: Emerge 3.0 x 6 mm (middle to distal) and 3.5 x 6 mm (proximal)





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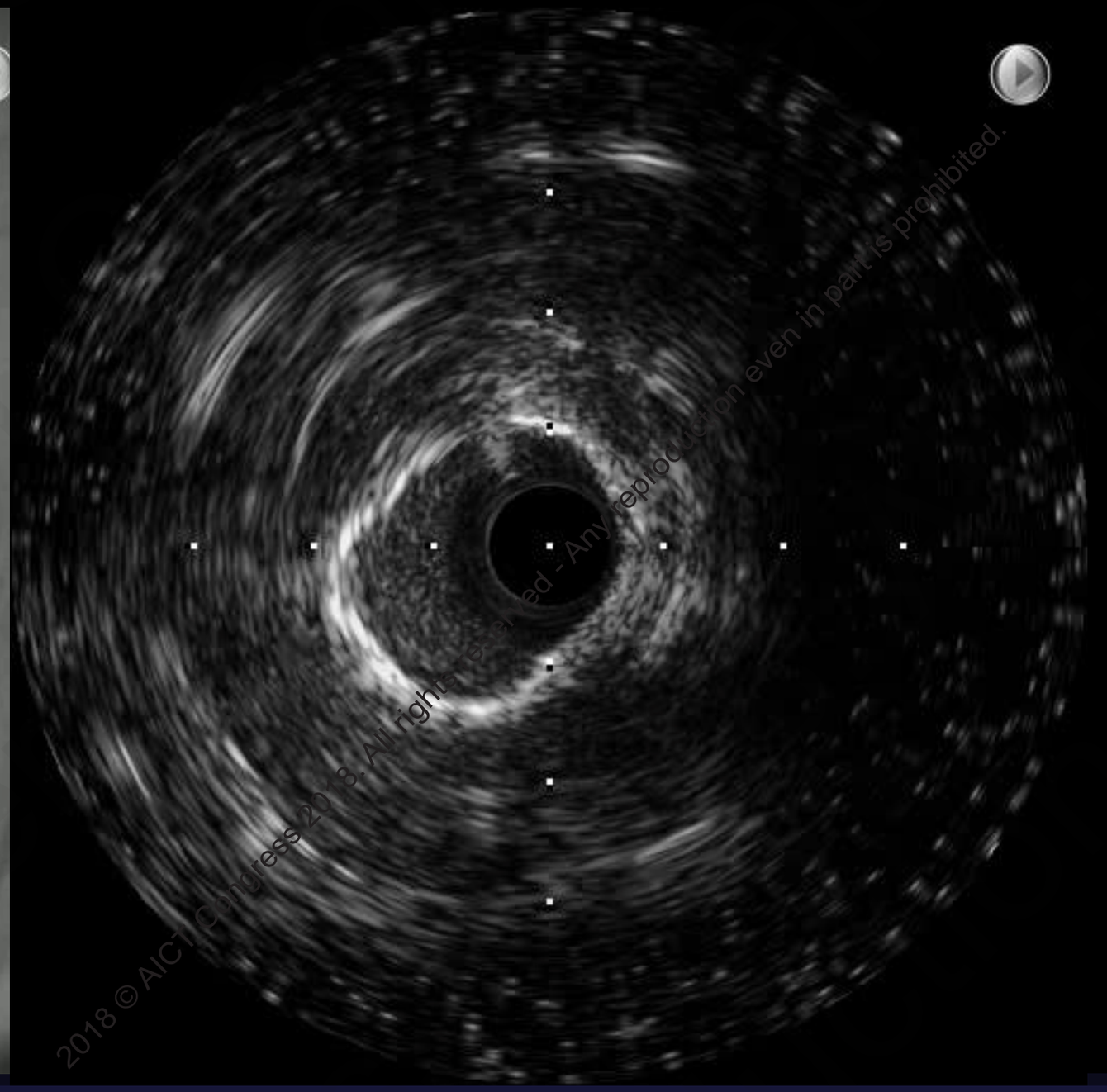
Final angiogram and IVUS



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Coronary engagement scoring system

	Score
Fully engaged	1
Fully engaged with Guideliner support	1.5
Partially engaged	2
Partially engaged with wire/Guideliner	2.5
Failed engagement	3

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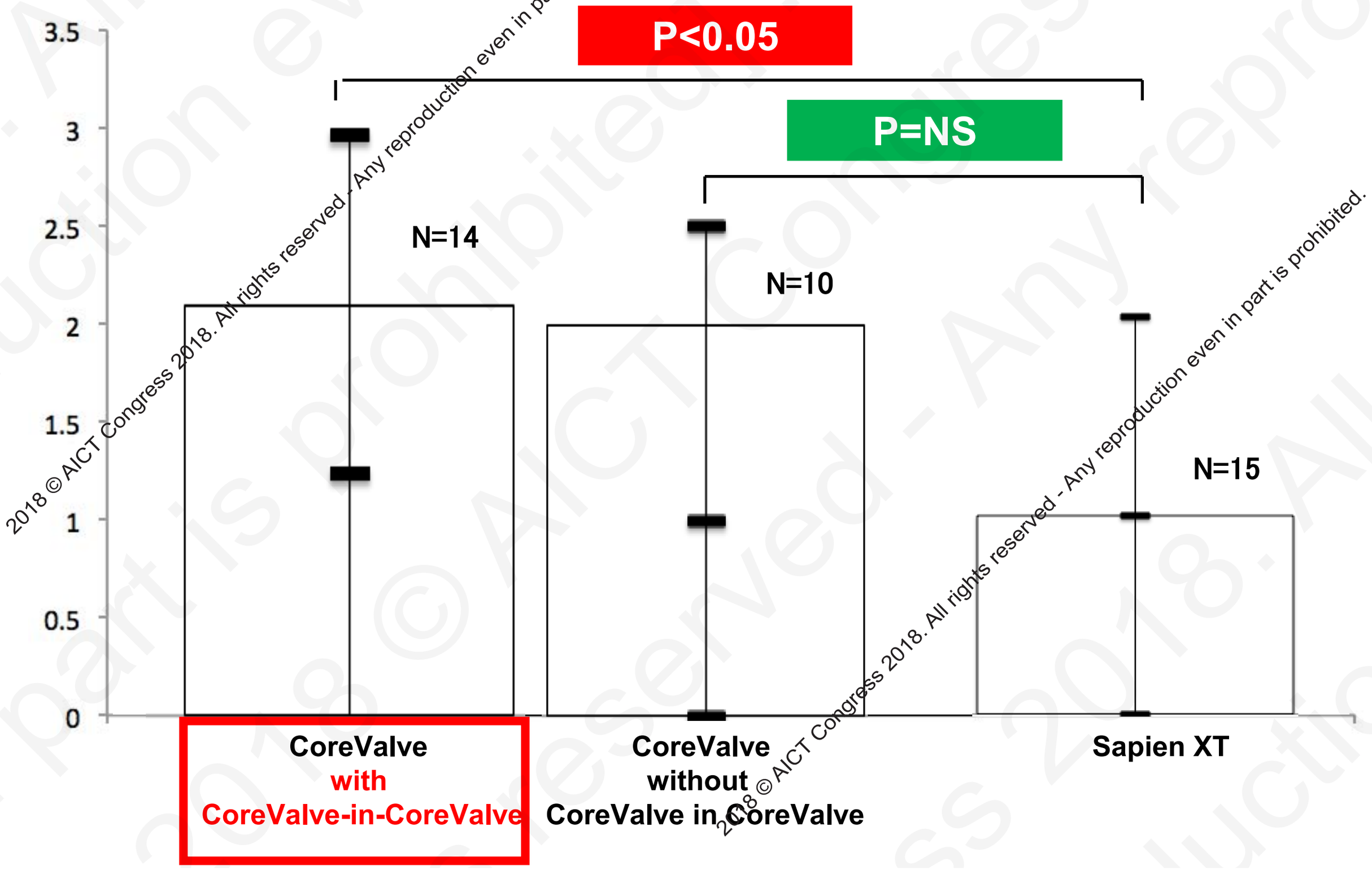
Coronary engagement scoring system



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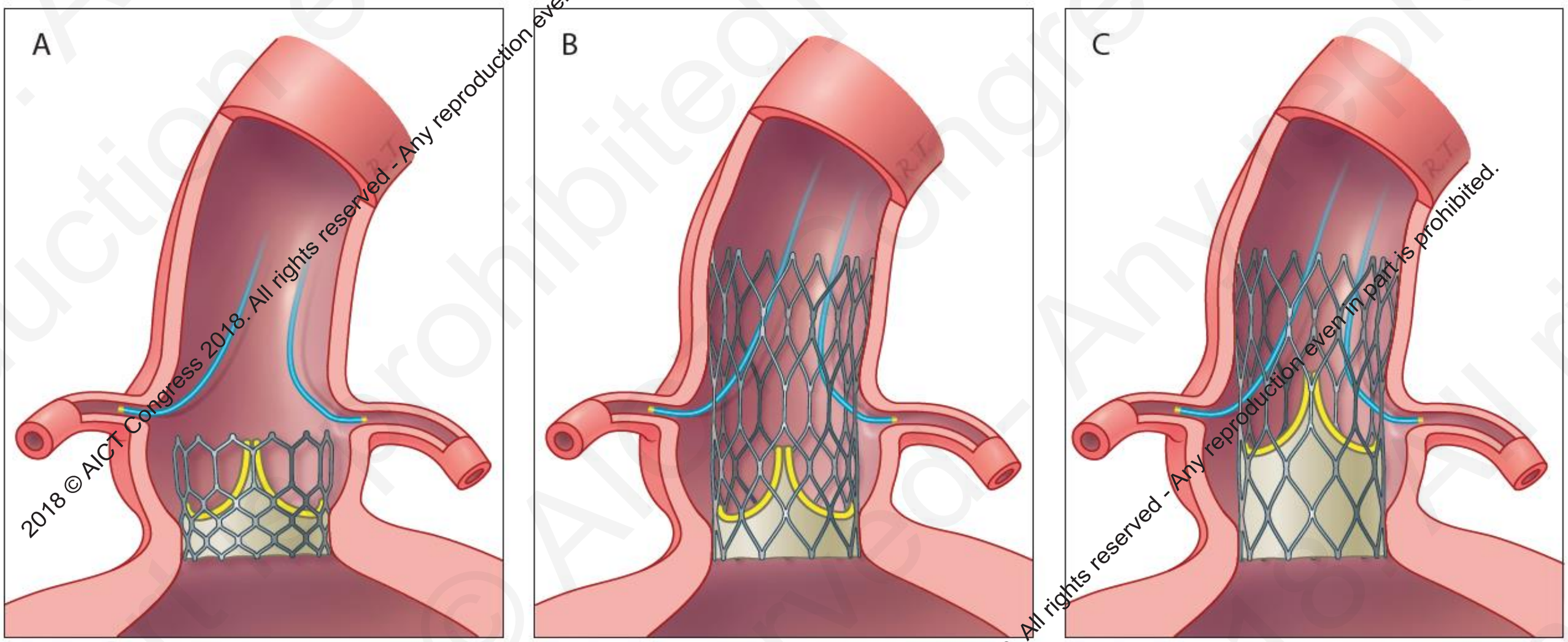
Coronary access after TAVR



Low-frame
Intra-annular leaflets

High-frame
Intra-annular leaflets

High-frame
supra-annular leaflets

Curtesy of Dr. Lars Sondergaard

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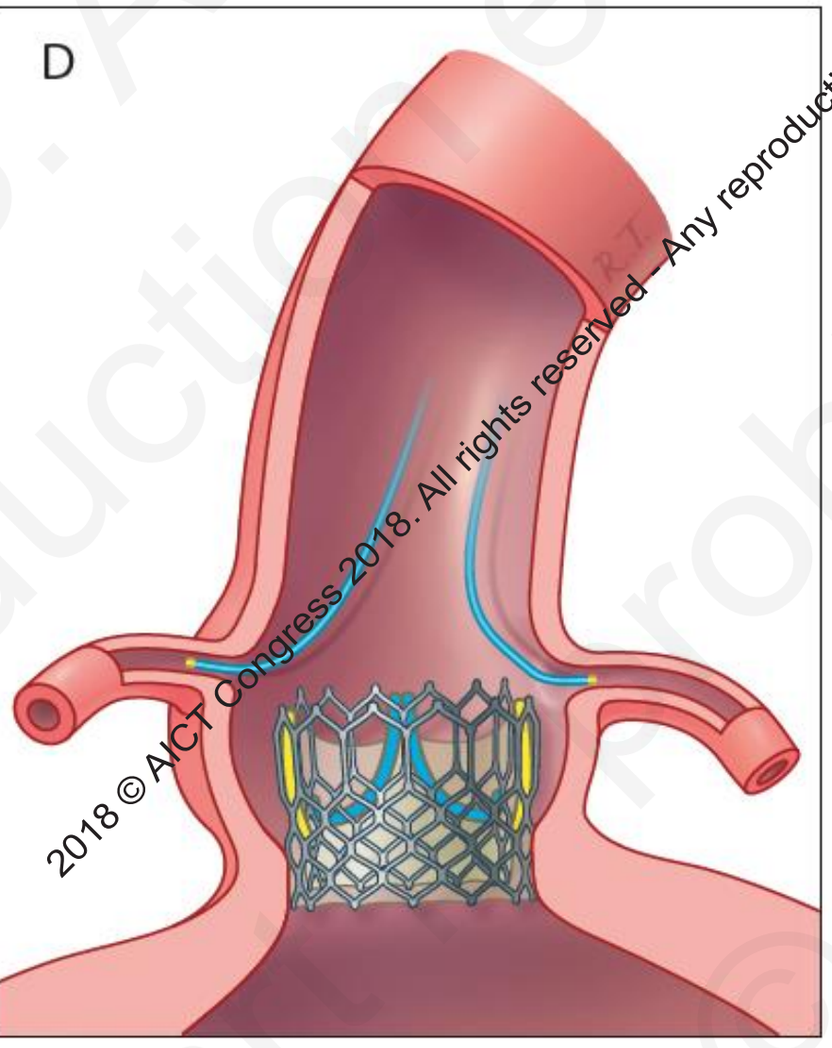
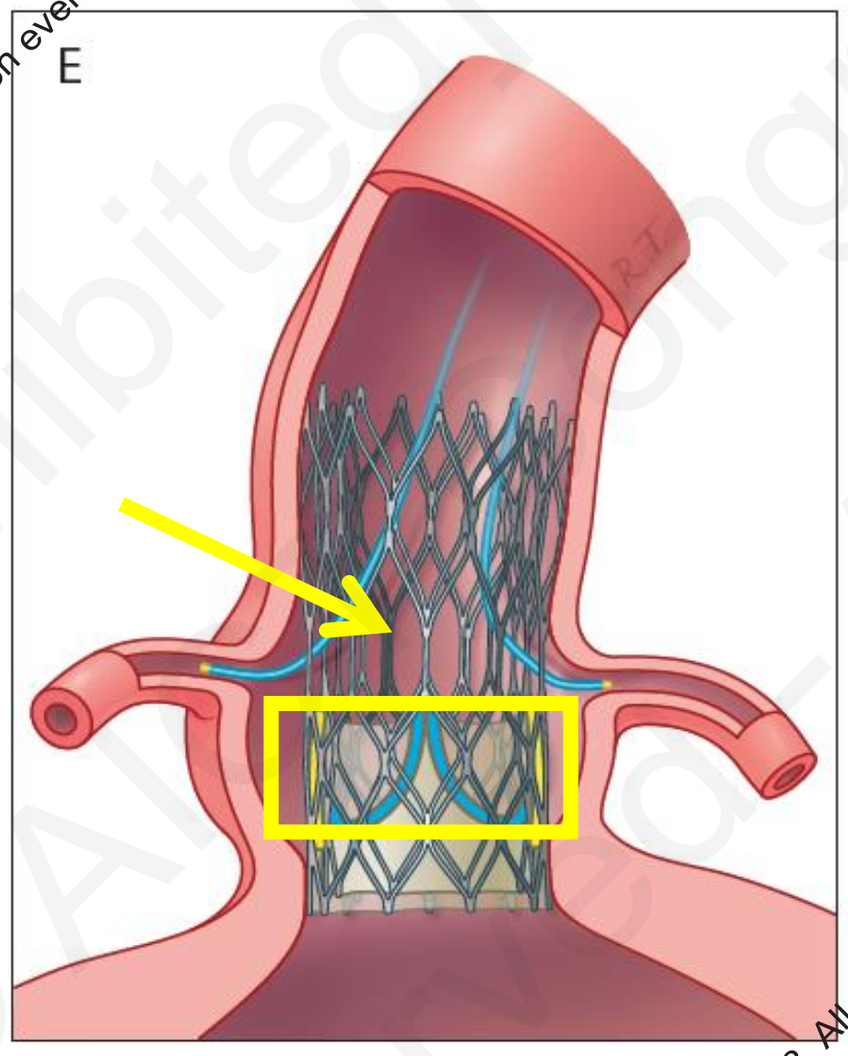
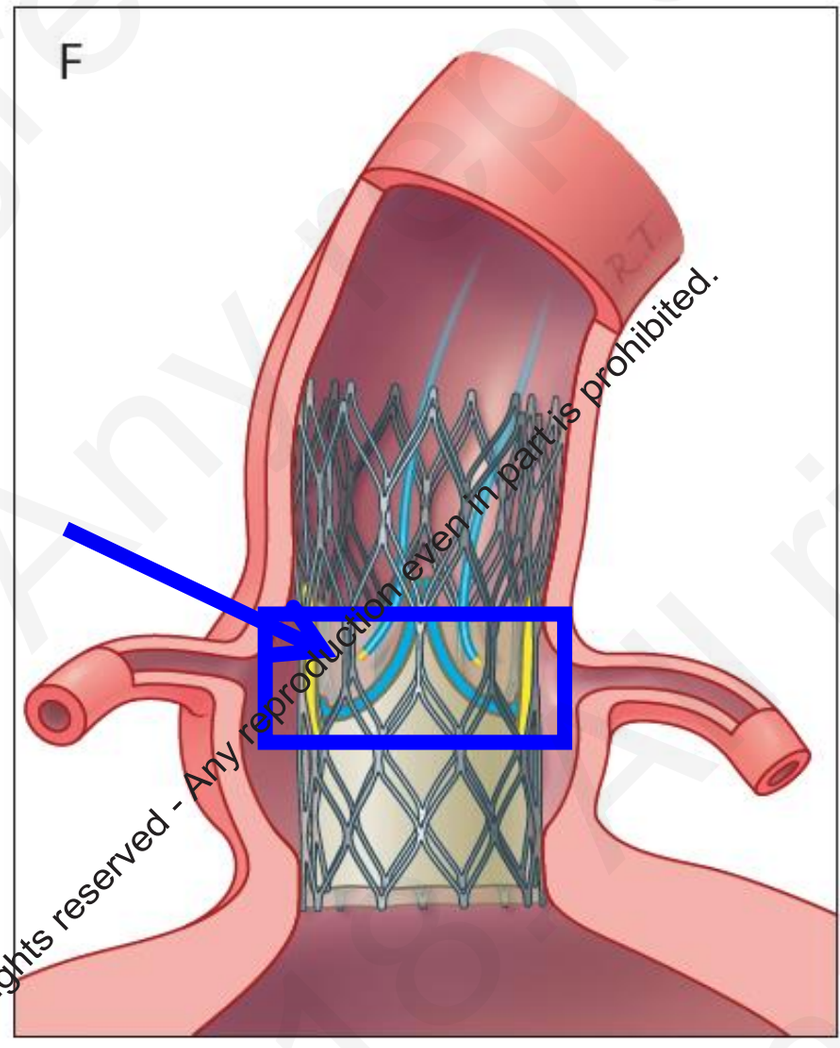
Coronary access after TAVR-in-TAVR







Low-frame
Intra-annular leaflets

High-frame
Intra-annular leaflets

High-frame
supra-annular leaflets

Curtesy of Dr. Lars Sondergaard

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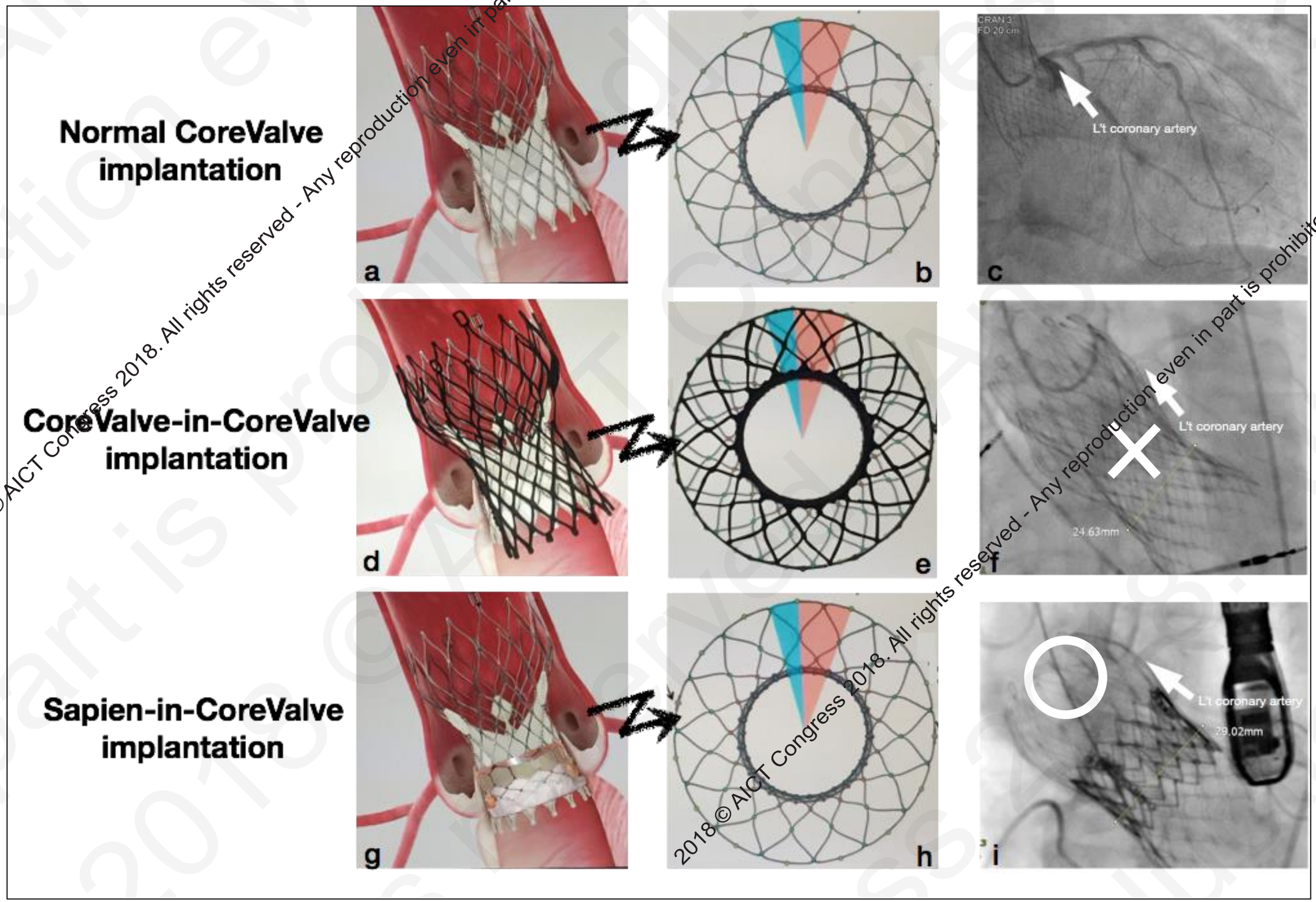
Coronary access after TAVR-in-TAVR



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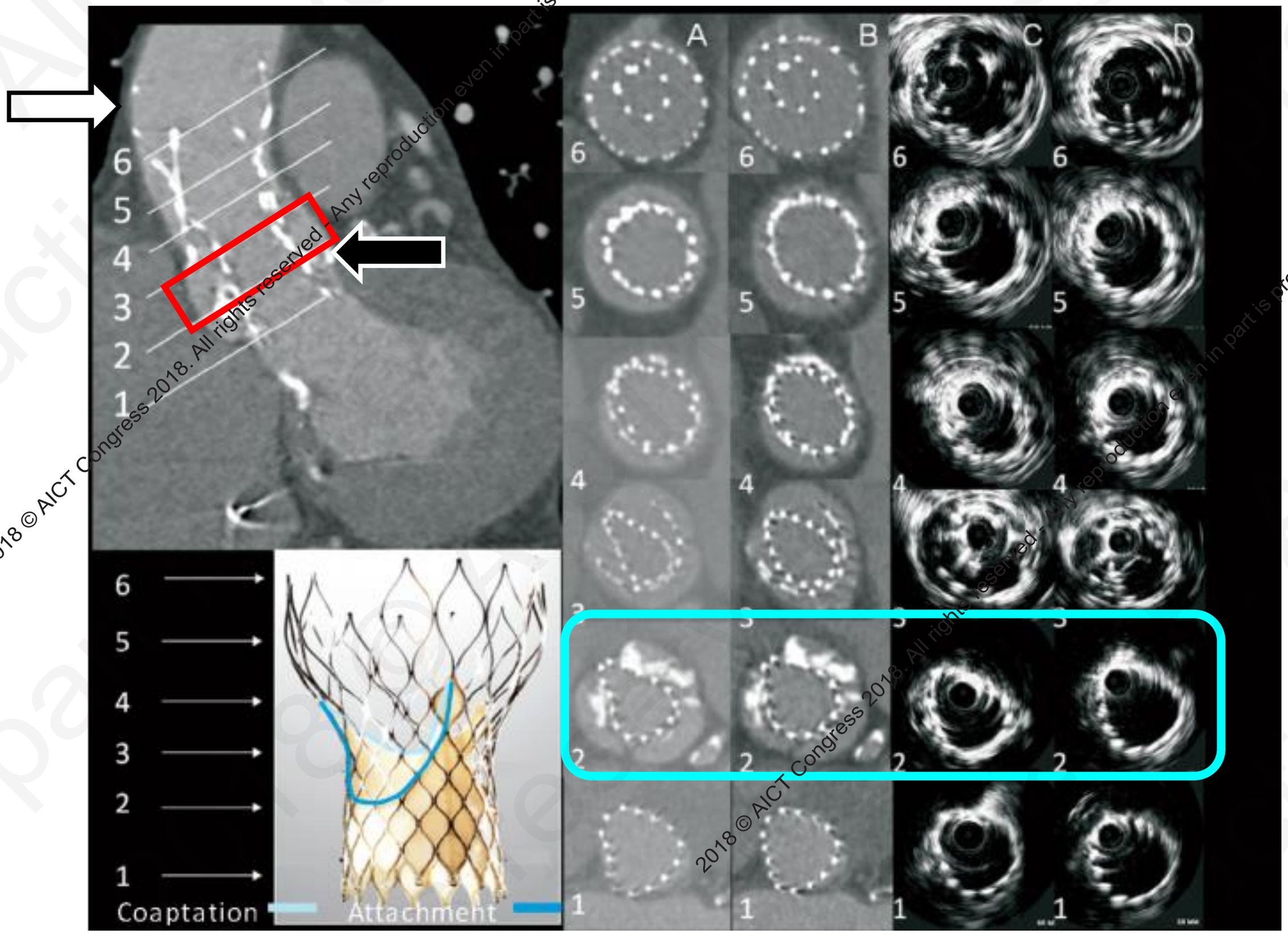
Snare the first CoreValve to ascending aorta ("Lasso technique") and then deploy the second valve.



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PCI after TAVR

- As we move the indication of TAVR to **lower-risk, younger patients**, the CAD is going to be a bigger issue. Since about **5%** of patients end up coming back for an **unplanned PCI**.

- PCI after TAVR poses certain, unique procedural risks, including the possibility that **the prosthetic valve struts may interfere with cannulation of the coronary arteries** and that **catheter manipulation may potentially dislodge the prosthetic valve**.

- PCI procedure is **more technically challenging after self-expanding valves with longer frames** than that performed in the presence of a shorter TAVR prosthesis.

- **Avoid THV-in-THV using self-expanding valves** is of paramount importance regarding future coronary recanalization !

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Thank You and Have a Nice Day!

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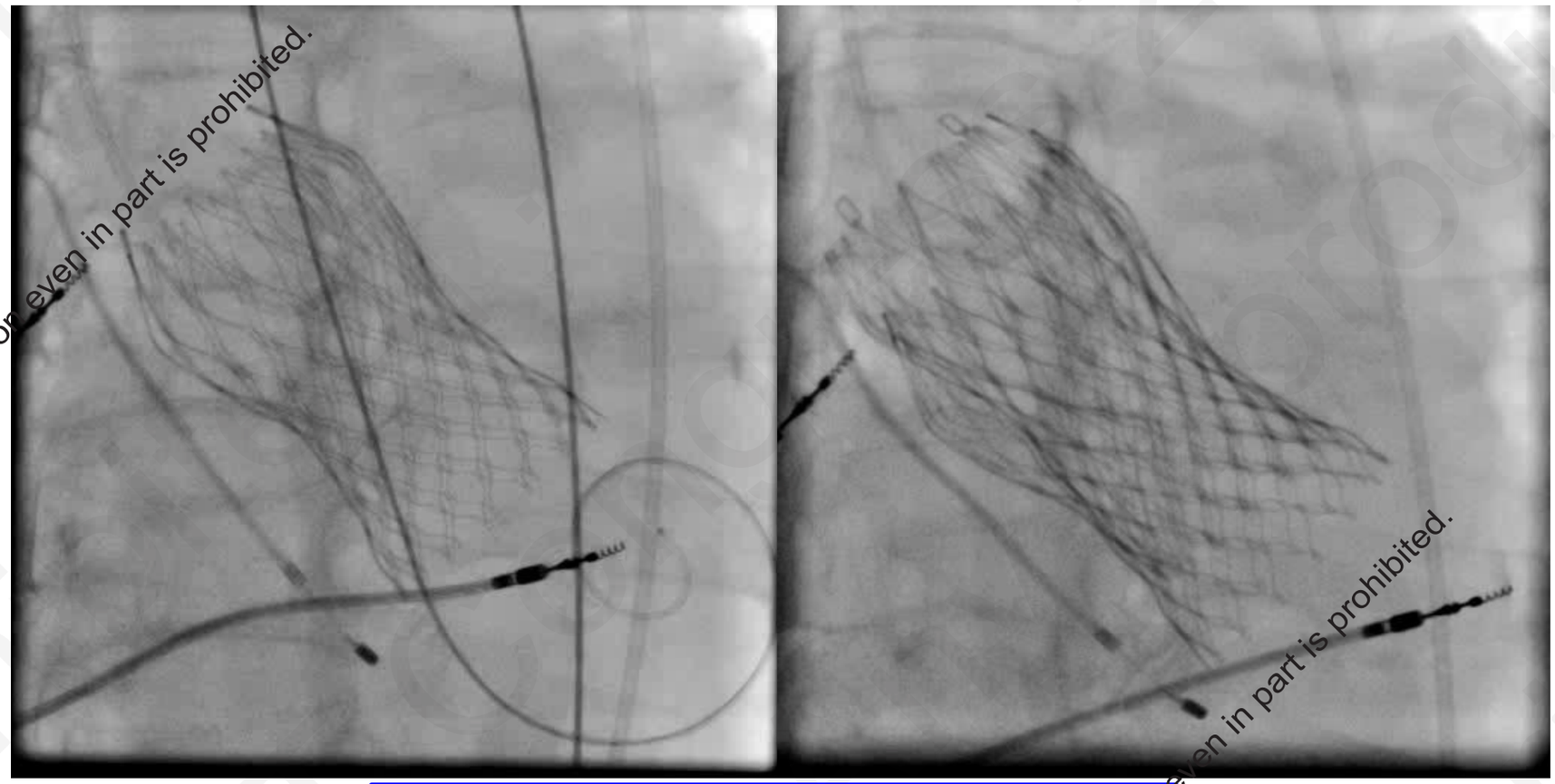
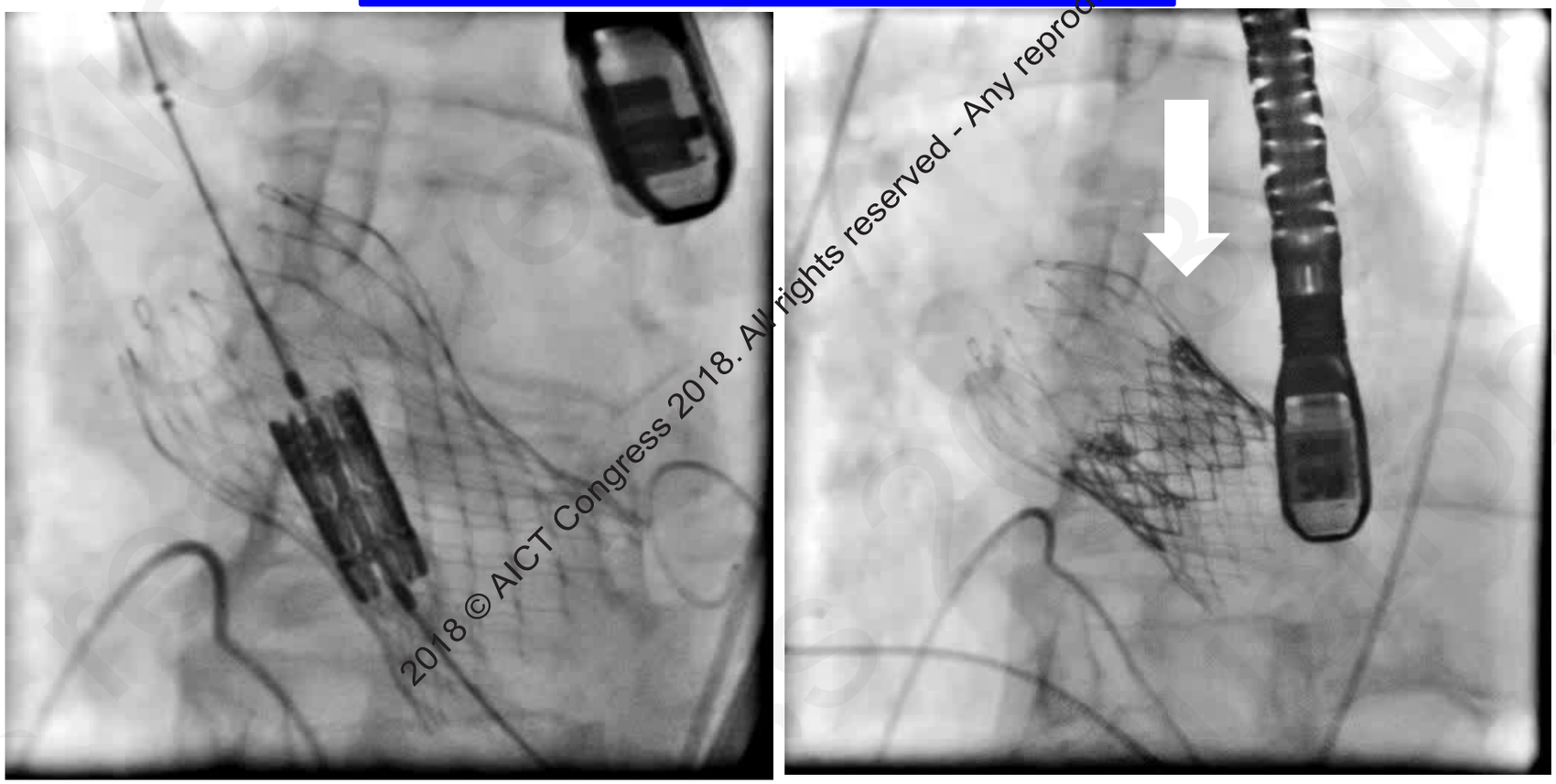
If a THV-in-THV has to be done,

Sapien-in-CoreValve can provide better fixation, PVL sealing, and coronary accesses than CoreValve-in-CoreValve!

CoreValve-in-CoreValve



Sapien-in-CoreValve



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14th AICT

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