

15 Years History of TAVR in Asan Medical Center: Minimalist Intuitive Simple Approaches

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2002

Rouen, France on 16th, April 2002



Cribier A, et al. *Circulation*. 2002;106:3006-3008

The Evolution of TAVR

Pre-Historic



High risk

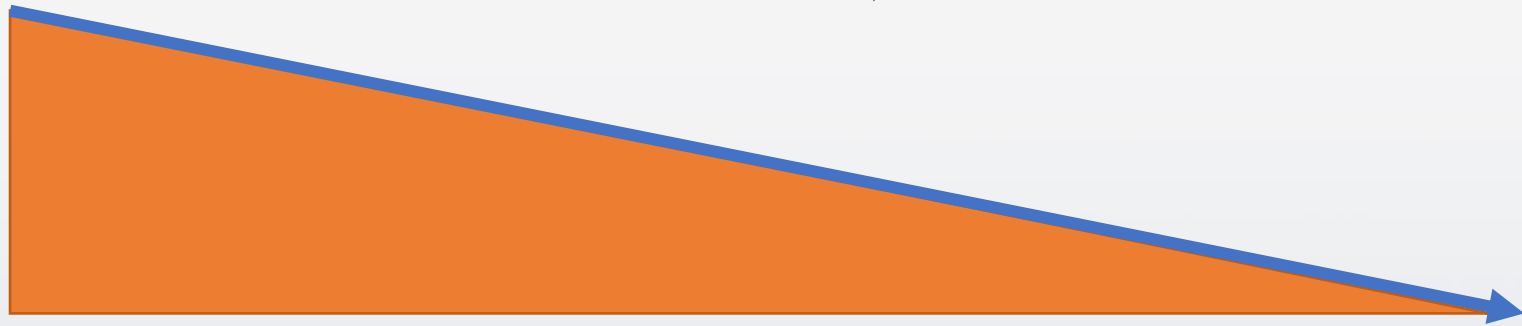
intermediate risk

low risk

Next Round



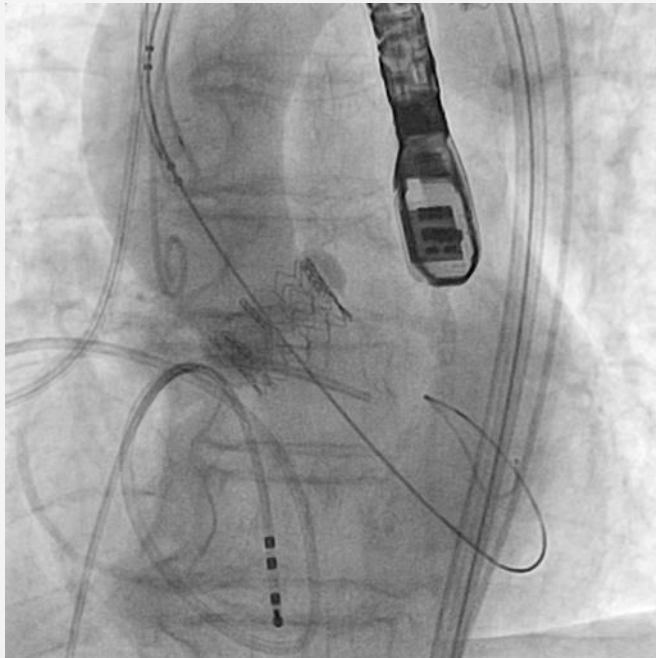
Inoperable High Risk
83-84 YO



Low Risk
73-74 YO

First AMC Case

2010.03.29. 1st case in AMC



Edwards Valve 23mm

#1 case in Korea Date 2010.3.29 Cath No. _____

Severe AS → PAVR using Edward 23 mm
embolization (+) at descending aorta

Second trial (+) → successful deployment

Access site (Rt. iliac a. rupture)
→ emergent operation (+)

Conclusion) Successful PAVR
using Edward 23 mm valve

Dotted lines indicate proximal, mid and distal segments.
Dominant posterior wall blood supply — Rt. Lt. Balanced.

M026301 서울아산병원 Asan Medical Center 심혈관조영 및 중재적시술결과지시

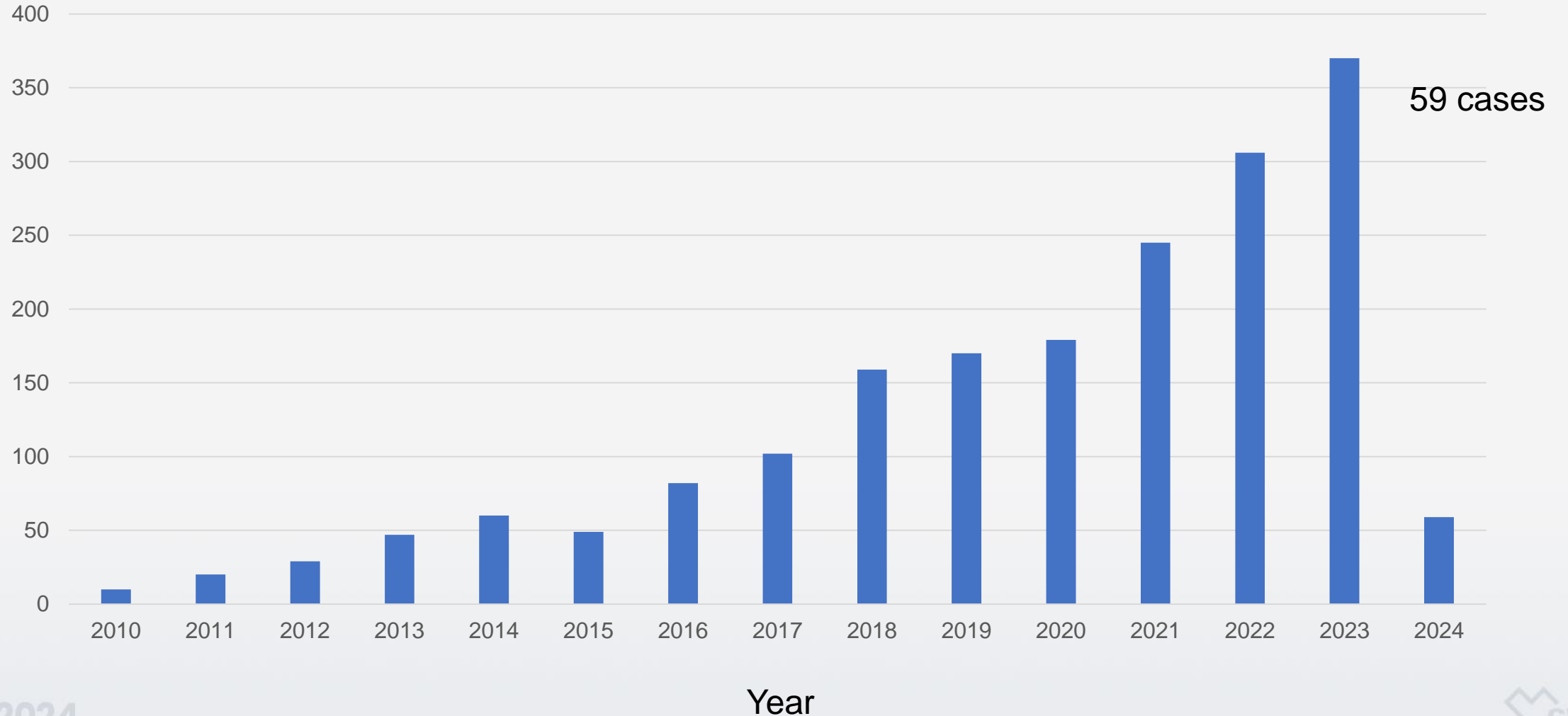
AS로 percutaneous AVR 시행 후 sheath stuck으로 external iliac artery rupture되어 VAS와 협의 repair수술시행함.

op. findings and procedure
sheath in the abdominal cavity(+)
bifurcation 2-3cm하방에서 external iliac artery rupture
intimal atheroma(+)
proximal external iliac artery- suture ligation
distal iliac artery는 sheath와 분리되지 않아 femoral a. bifurcation상방에서 iliac artery를 자르고 sheath와 함께 뽑아냄
Fem-Fem bypass with 8mm graft
Rt-end to end pattern, Lt-end to side pattern
flow good

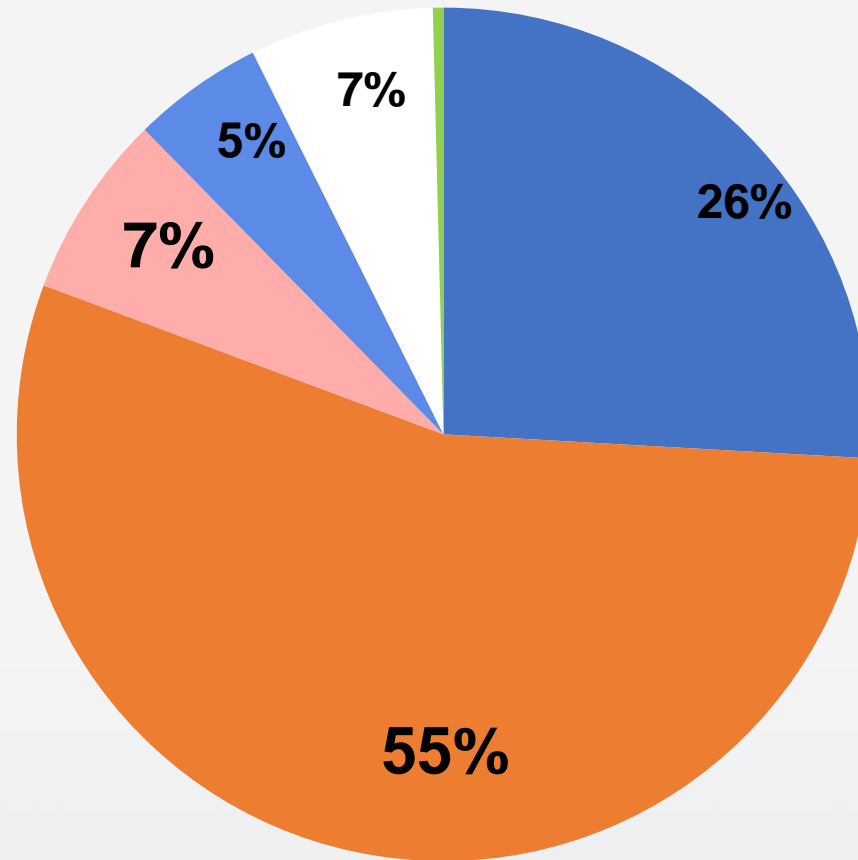
JP insertion in retroperitoneal space and wound closure

Preop. Diagnosis :	Rupture of iliac artery Rt.
Postop. Diagnosis :	Rupture of iliac artery Rt.:
Operation Name :	CIA ligation Femoral-femoral bypass (graft):

TAVR Volume in AMC (Total no=1887)



TAVR Devices in AMC (N=1800)



- S3 Ultra
- Sapien 3
- Sapien XT
- CoreValve
- Evolut R/PRO
- Lotus

Selection of Evolut R – Life Saving Situation

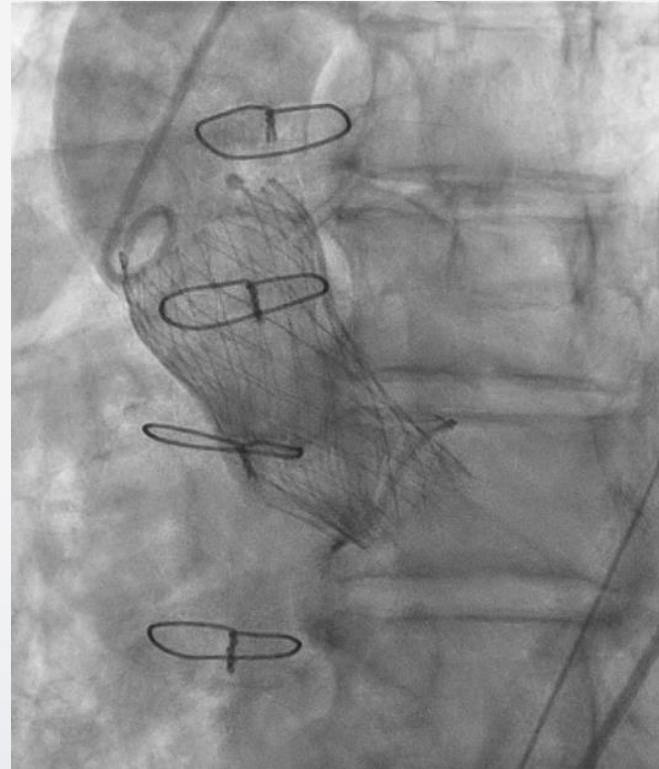
Poor Peripheral Access

Valve-in-valve case(SJ trifacta 23mm)

TAVR Planning

- Device
 - SAPIEN 3U
 - Evolut Pro
- Size
 - 23 mm (nominal)
- Access site
 - Rt femoral
 - Lt. femoral
- Predilation
 - Yes
 - No
- CAG (2VD on CCTA, 2023.08.02)
 - Already done
 - Not yet
- Coronary protection
 - Yes
 - No
- Sentinel
 - Yes
 - No

→ Change the plan to Evolute pro



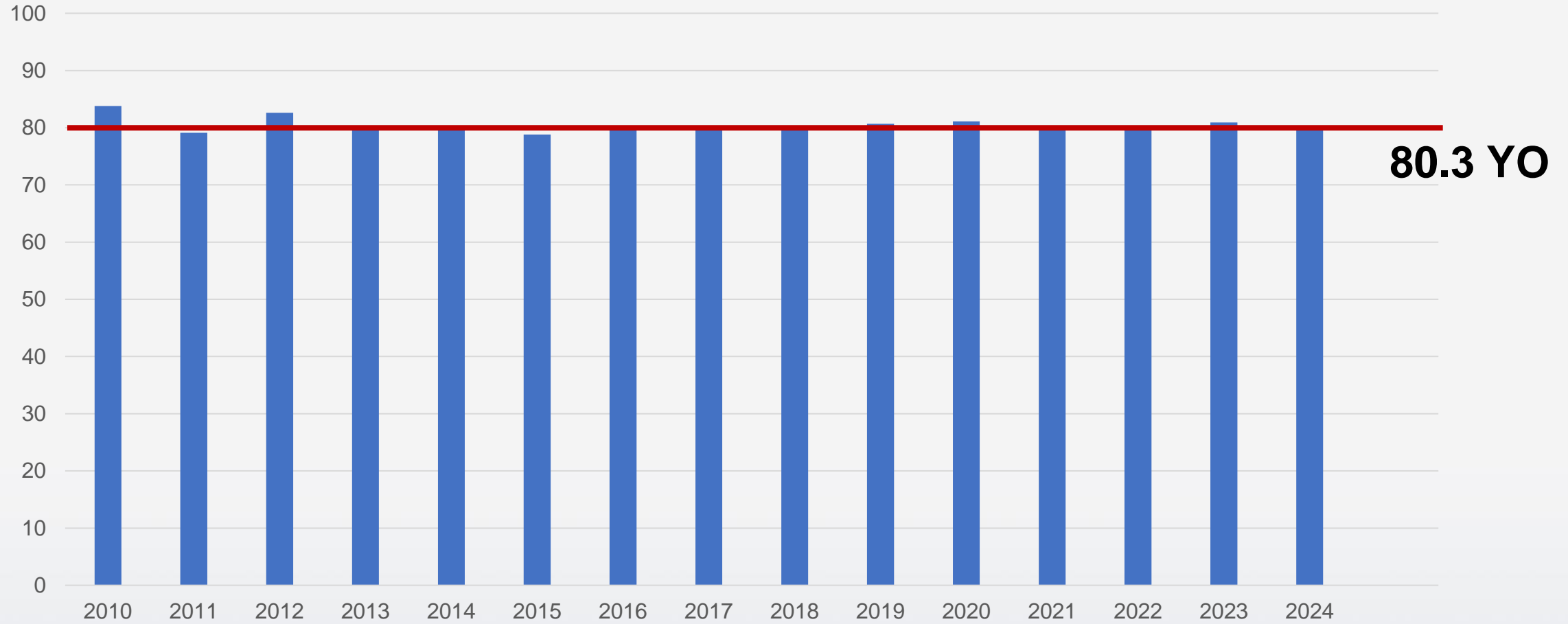
Very High Risk – Low EF

64-year-old male

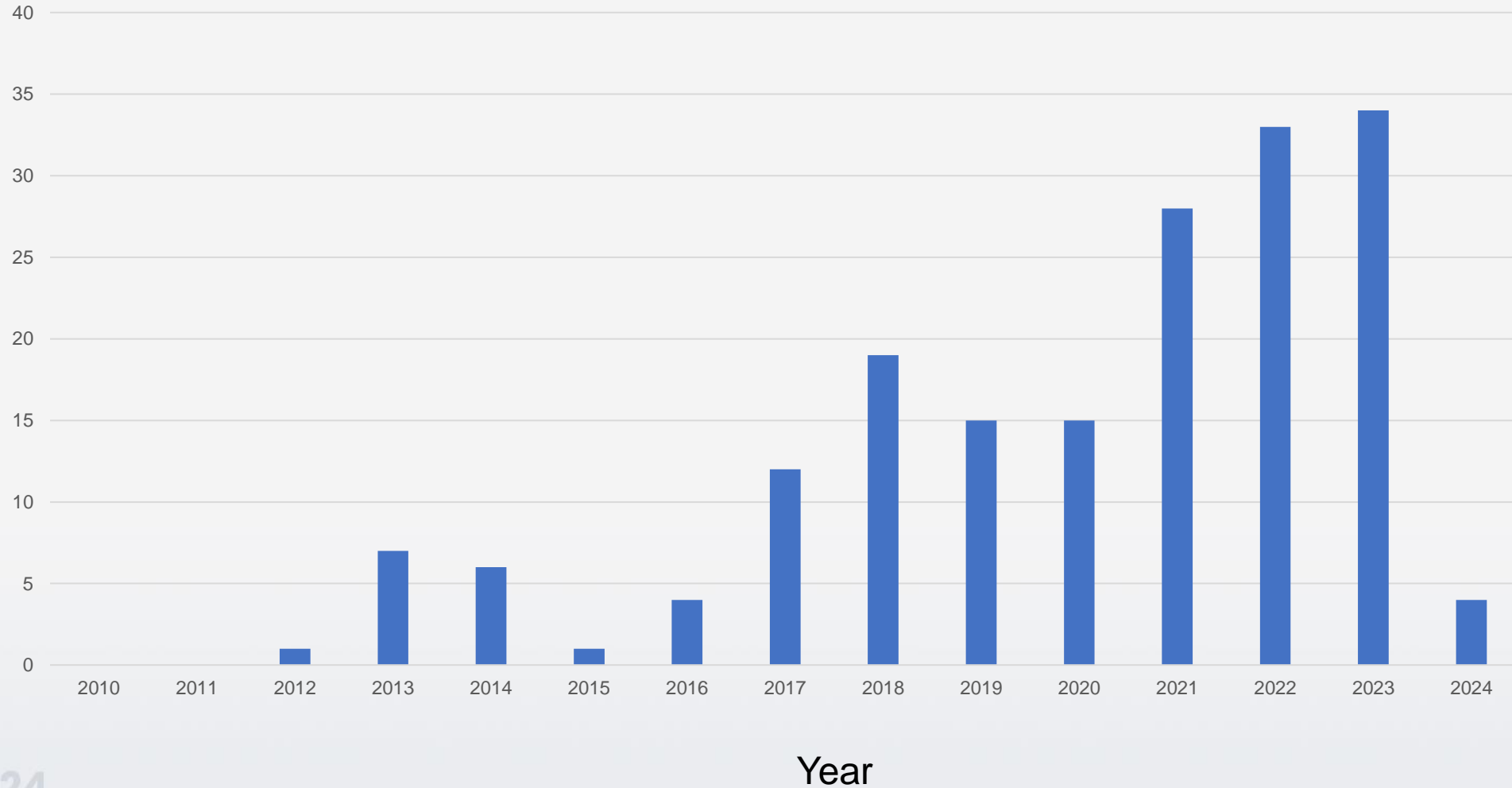
LVEF 21 %; AVA 0.64 cm²



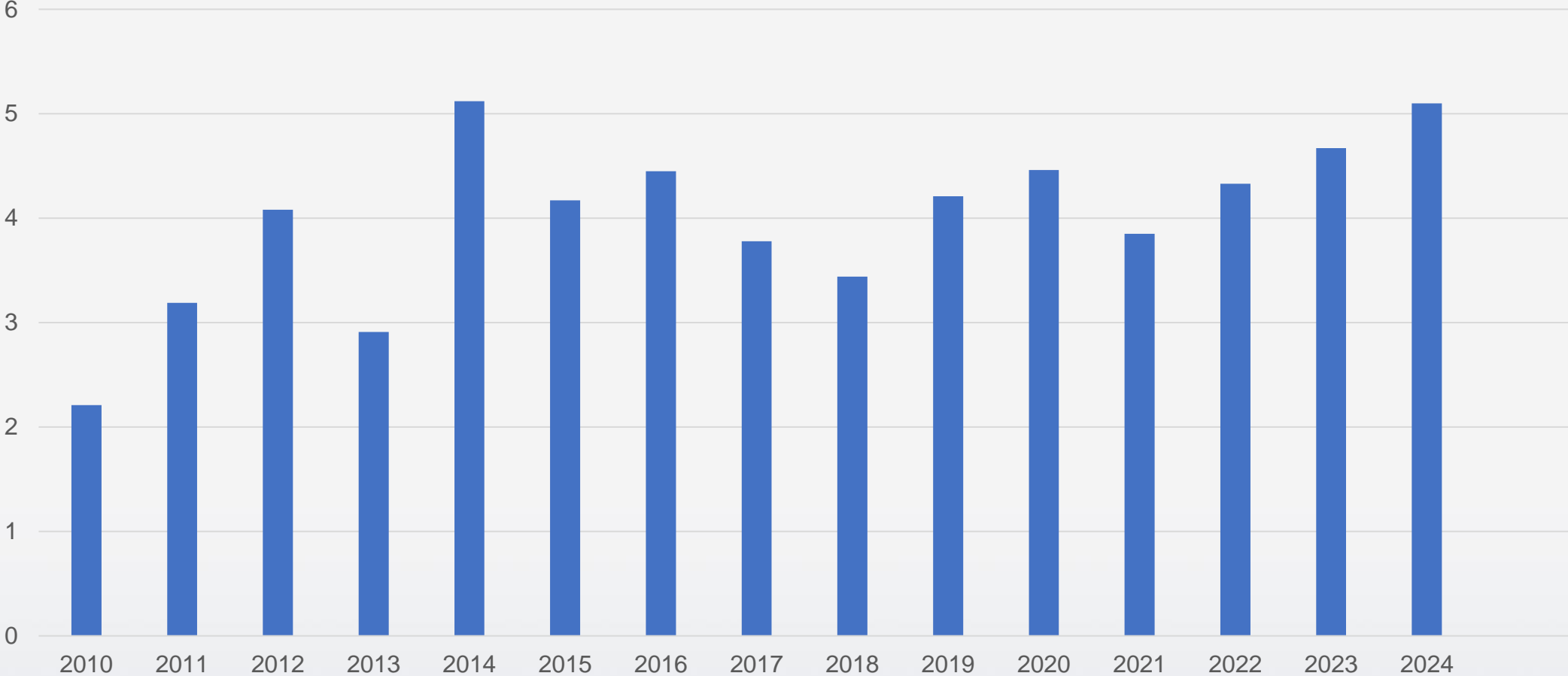
Age



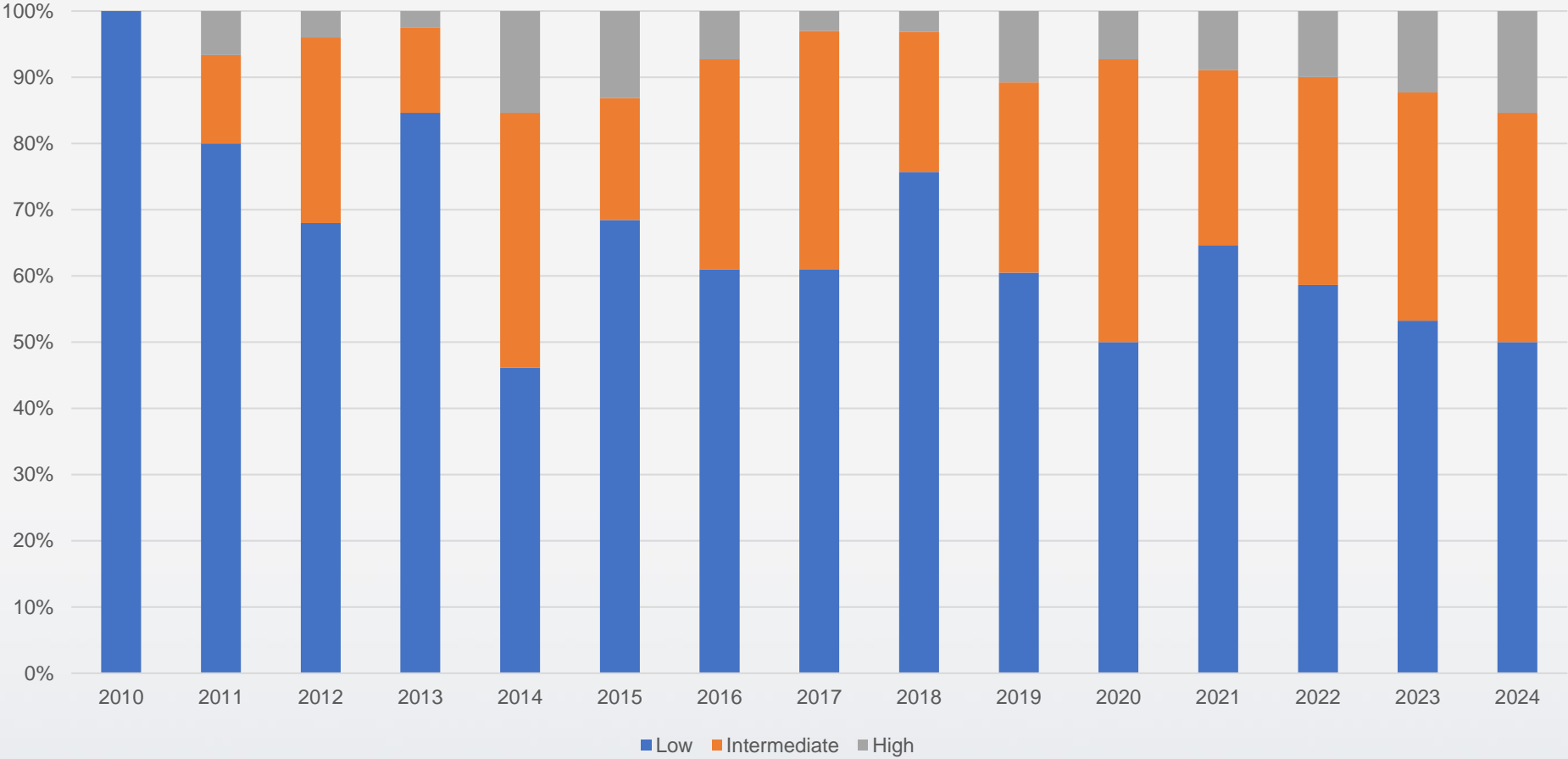
TAVR for Bicuspid AS (Total no=179, 10.6%)



STS Score



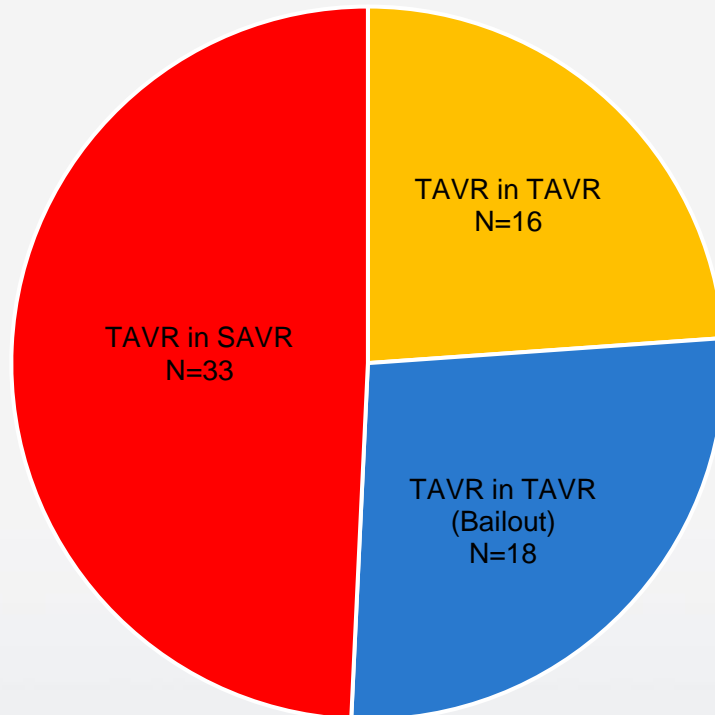
STS Score



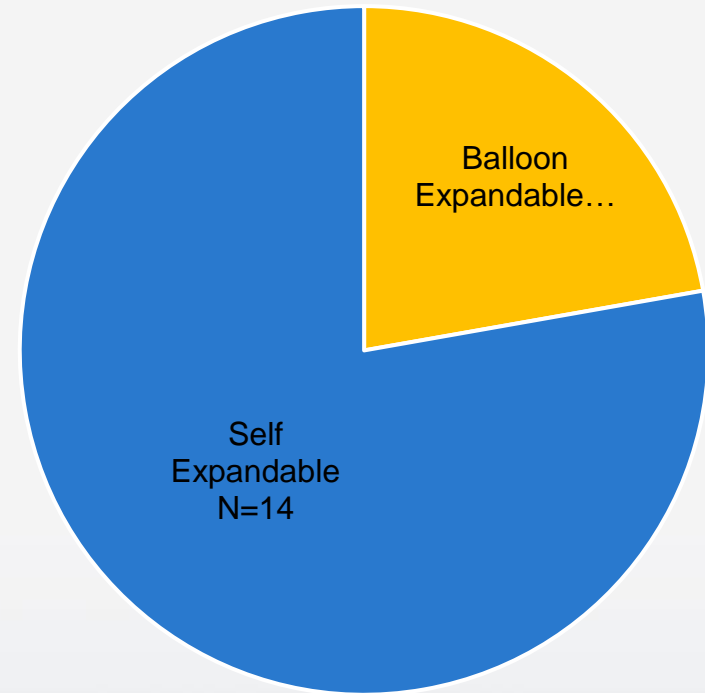
Valve-in-Valve in Asan Medical Center

Overall TAVR: 1837 cases (SEV 224, BEV 1608, MEV 5) between 2010 and 2024

Total Proportion: 67 (3.6%)



Bailout Valve-in-Valve: 18 (1.0%)



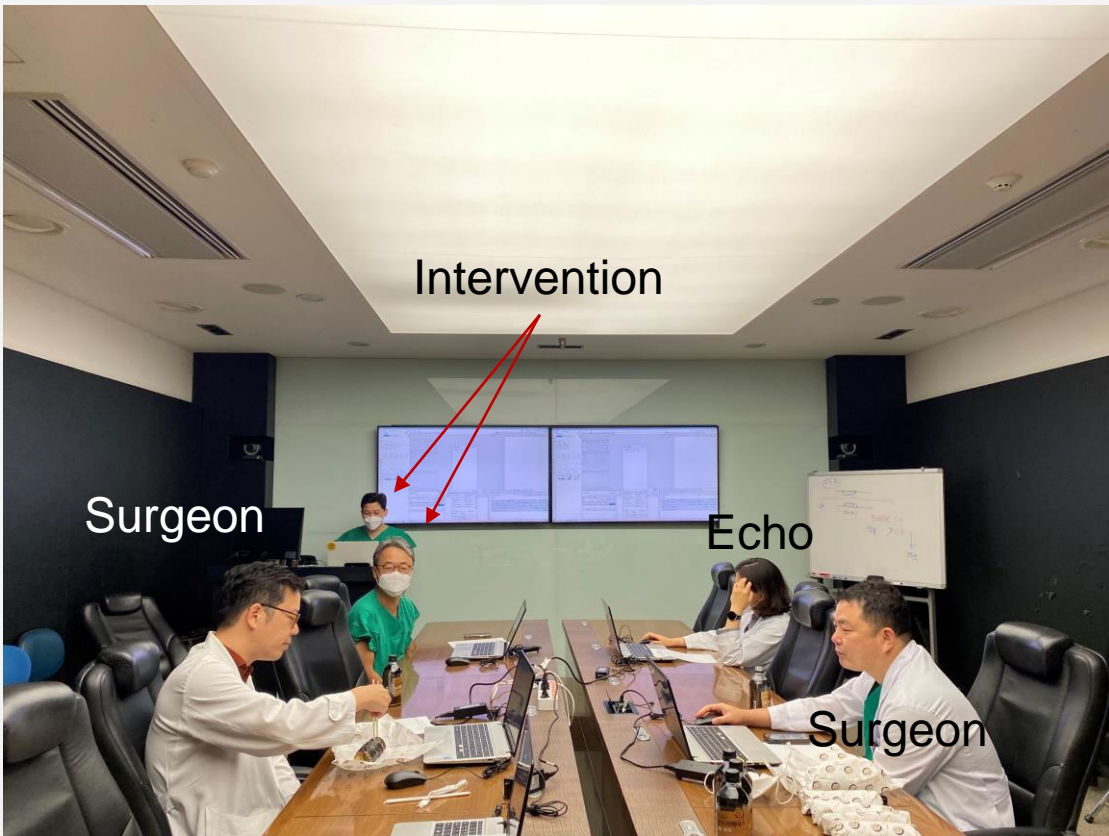
TAVR in AMC

What is the Difference ?

TAVR in AMC

- 1. Perfect “Heart Team” Collaboration**
- 2. “Minimalist Approach” with monitored anesthesia care**
- 3. “AMC CT Algorithm” for Device Selection.**
 - *Pre-TAVR Meticulous CT Measurement*
 - *Straightforward Procedure*

Perfect “Heart Team” Collaboration Every Friday Morning 8 AM

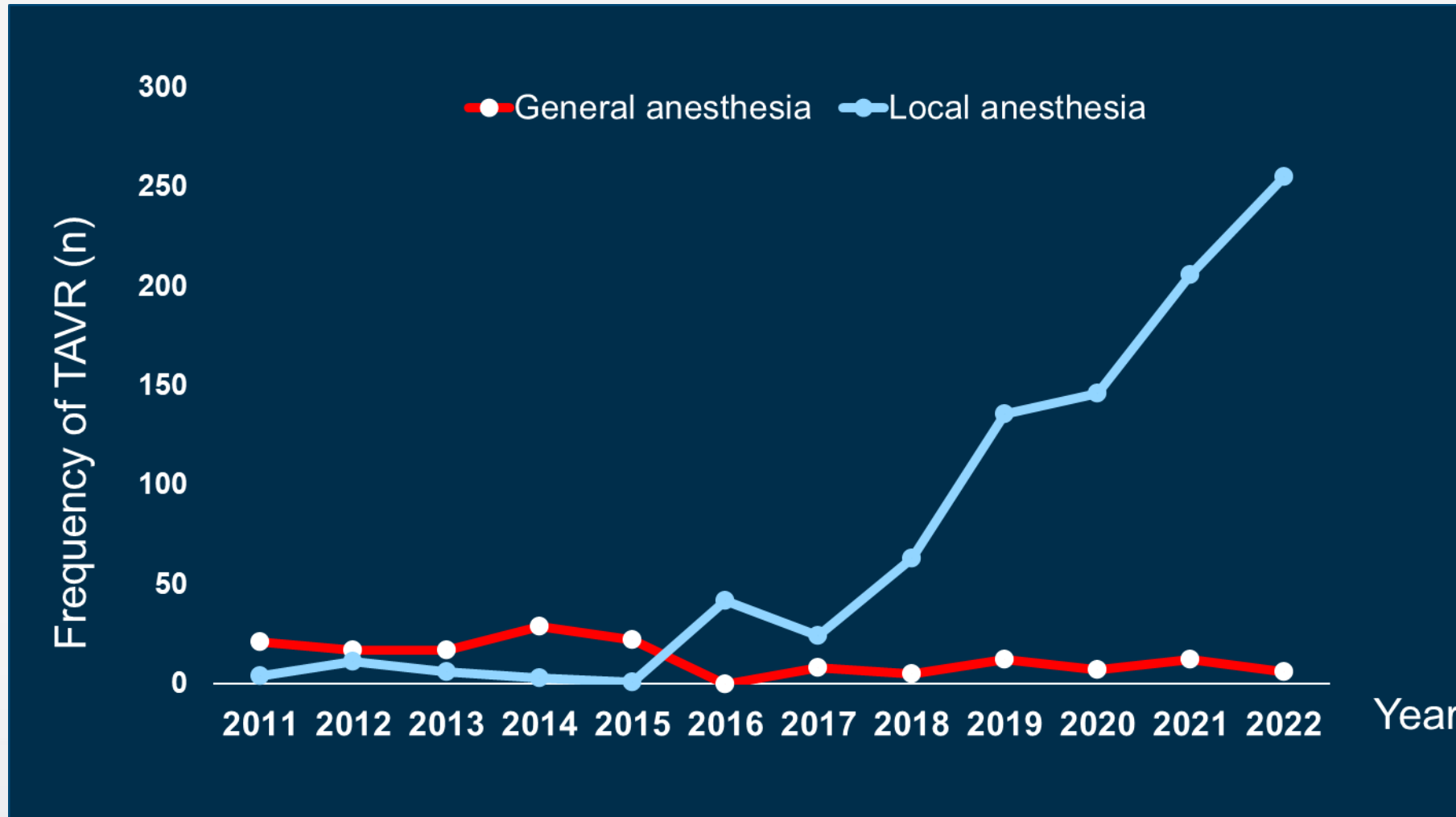


- AMC Smart Cardiac Surgeons Send the Patients to Cardiologists for TAVR.

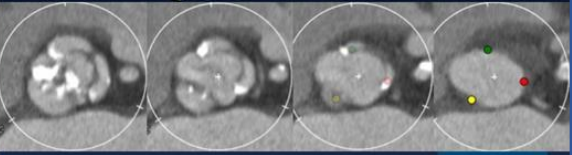
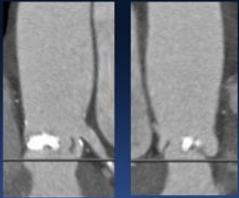
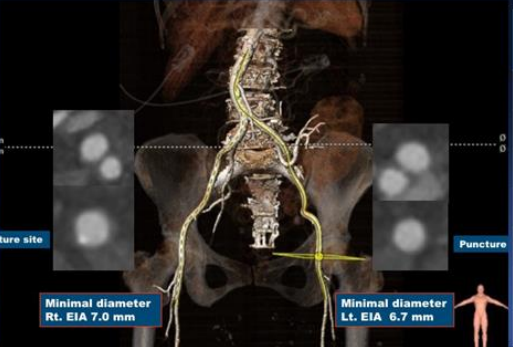
“Minimalist Approach”

1. No General Anesthesia,
2. No TEE
3. 30 min. Procedure
4. No Complications
5. One Day stay in CCU
6. Discharge on Day #3
7. Cardiac Rehabilitation Program

“monitored Anesthesia Care”



“CT Analysis”

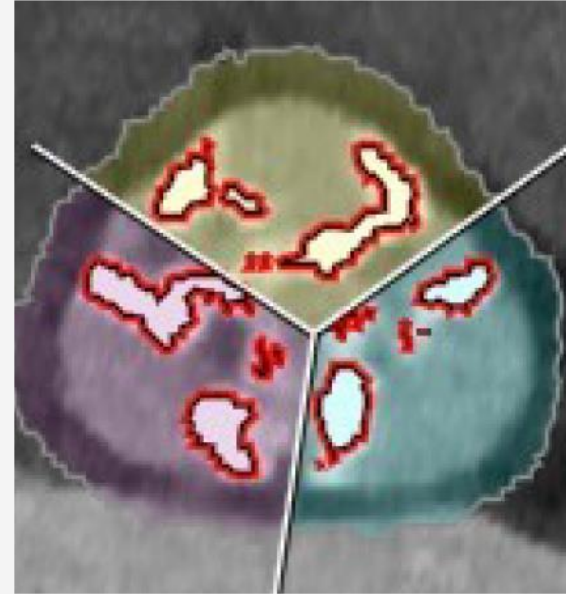
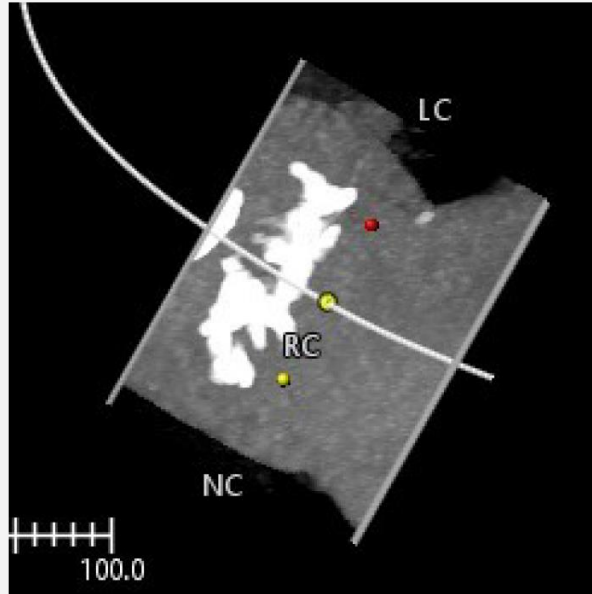
Clinical information	Echo findings	CT findings – Aortic annulus view																														
<ul style="list-style-type: none"> 71/F, 157 cm, 47.5 kg, BMI 19.27, BSA 1.44 Chief complaints <ul style="list-style-type: none"> - Dyspnea (NYHA III) Medical history <ul style="list-style-type: none"> - ESRD s/p KT (1991), spinal stenosis, osteoporosis - Pericardial effusion s/p PCC (2017.3) ECG : paroxysmal AF with RVR Serum Cr : 1.48 PFT : FEV1 0.94 (43%) / FVC 1.15 (40%) = 82% STS score = 3.081 % Euroscore I = 2.68 %, Euroscore II = 2.66 % 	<ul style="list-style-type: none"> Tricuspid valve AVA = 0.55 cm² Peak / Mean PG = 119 / 63 mm Hg V max = 5.5 m/s EF= 71 % LVOT diameter, TTE: 19.4 mm Severe degenerative AS Mild AR Pericardial effusion 	 <p>Annulus plane</p> <table border="1"> <thead> <tr> <th colspan="2">Aortic Annulus parameters</th> </tr> </thead> <tbody> <tr> <td>Annulus short diameter</td> <td>17.7 mm</td> </tr> <tr> <td>Annulus long diameter</td> <td>25.4 mm</td> </tr> <tr> <td>Annulus mean diameter</td> <td>21.5 mm</td> </tr> <tr> <td>Annulus area</td> <td>353.6 mm²</td> </tr> <tr> <td>Annulus area-driven diameter</td> <td>21.2 mm</td> </tr> <tr> <td>Annulus perimeter</td> <td>68.6 mm</td> </tr> <tr> <td>Annulus perimeter-driven diameter</td> <td>21.9 mm</td> </tr> </tbody> </table>	Aortic Annulus parameters		Annulus short diameter	17.7 mm	Annulus long diameter	25.4 mm	Annulus mean diameter	21.5 mm	Annulus area	353.6 mm ²	Annulus area-driven diameter	21.2 mm	Annulus perimeter	68.6 mm	Annulus perimeter-driven diameter	21.9 mm														
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<h3>CT findings – Coronary Height</h3>  <table border="1"> <thead> <tr> <th colspan="2">Coronary Height</th> </tr> </thead> <tbody> <tr> <td>LCA</td> <td>10.5 mm</td> </tr> <tr> <td>RCA</td> <td>13.5 mm</td> </tr> </tbody> </table> <p>Anomalous origin of RCA from LCC</p>	Coronary Height		LCA	10.5 mm	RCA	13.5 mm	<h3>CT findings – Ileofoemoral Angio</h3>  <p>Minimal diameter Rt. EIA 7.0 mm</p> <p>Minimal diameter Lt. EIA 6.7 mm</p>	<h3>Sizing for Sapien 3</h3> <table border="1"> <thead> <tr> <th>Size</th> <th>Area_oversize (%)</th> <th>Perimeter_oversize (%)</th> </tr> </thead> <tbody> <tr> <td>23</td> <td>115.7</td> <td>104.1</td> </tr> <tr> <td>24</td> <td>126.0</td> <td>108.6</td> </tr> <tr> <td>25</td> <td>136.7</td> <td>113.2</td> </tr> <tr> <td>26</td> <td>146.7</td> <td>117.7</td> </tr> <tr> <td>27</td> <td>158.2</td> <td>122.2</td> </tr> <tr> <td>28</td> <td>170.1</td> <td>126.8</td> </tr> <tr> <td>29</td> <td>183.5</td> <td>131.6</td> </tr> </tbody> </table>	Size	Area_oversize (%)	Perimeter_oversize (%)	23	115.7	104.1	24	126.0	108.6	25	136.7	113.2	26	146.7	117.7	27	158.2	122.2	28	170.1	126.8	29	183.5	131.6
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Dedicated Dr.



Quantify “Calcium”

Calcium Amount, Location and Distribution



Calcium volume	
NCC	723 mm ³
RCC	438 mm ³
LCC	472 mm ³
Total	1633 mm ³

Heavy Calcium

Mean Amount of total Calcium **355.4 ± 289.9**

Adjusting S3 Sizing By Balloon Volume (Over or Under filled)

22 mm	- 1cc
23 mm	
24 mm	+ 1cc
25 mm	- 2cc
26 mm	
27mm	+ 2cc
28mm	- 3cc
29 mm	
30 mm	+ 3cc

TAVR in AMC

	N = 1688
Age, years	80.3 ± 9.20
Male sex	775 (46.91%)
BMI, kg/m ²	25.15 ± 4.8
STS risk score (%)	4.2 ± 1.2
DM	611 (36.2%)
Hypertension	1330 (78.8%)
Atrial fibrillation	284 (16.8%)
Coronary artery disease	659 (39.0%)
Previous MI	62 (3.6%)
Previous stroke	202 (11.9%)
Peripheral vascular disease	70 (4.1%)
Chronic Kidney Disease	159 (9.4%)
COPD	176 (10.4%)
LV Ejection fraction, %	59.1 ± 10.12

TAVR in AMC

Procedural Outcomes

	Overall (N = 1688)
Procedural success	1683 (99.7%)
Conversion to surgery	18 (1.06%)
Coronary obstruction	4 (0.2%)
Implantation of two valves	19 (1.12%)
New permanent pacemaker	148 (8.7%)
PVL \geq moderate	43 (2.5%)
Major vascular complication	73 (4.3%)
Length of hospital stay (days)	6.5 \pm 11.5

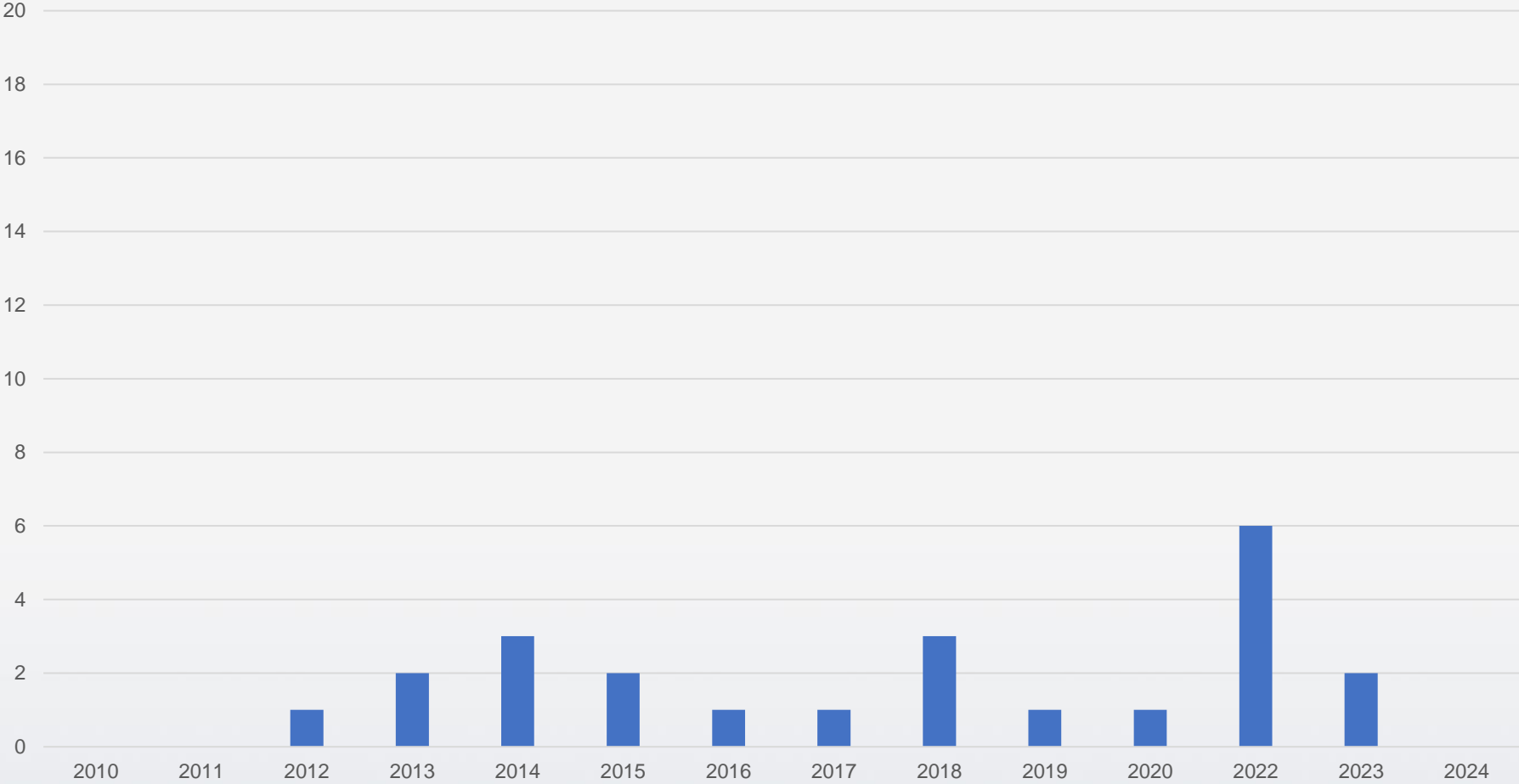
30 Days Outcomes

	Overall (N = 1688)
Death, all	24 (1.4%)
Cardiac death	16 (0.9%)
Non-cardiac death	8 (0.4%)
Stroke, all	51 (3.1%)
Disabling	9 (0.52%)
Non-disabling	42 (2.4%)
Death or disabling stroke	33 (1.9%)
Bleeding	632 (37.4%)
Fatal	54 (3.2%)
Non-fatal	578 (34.2%)

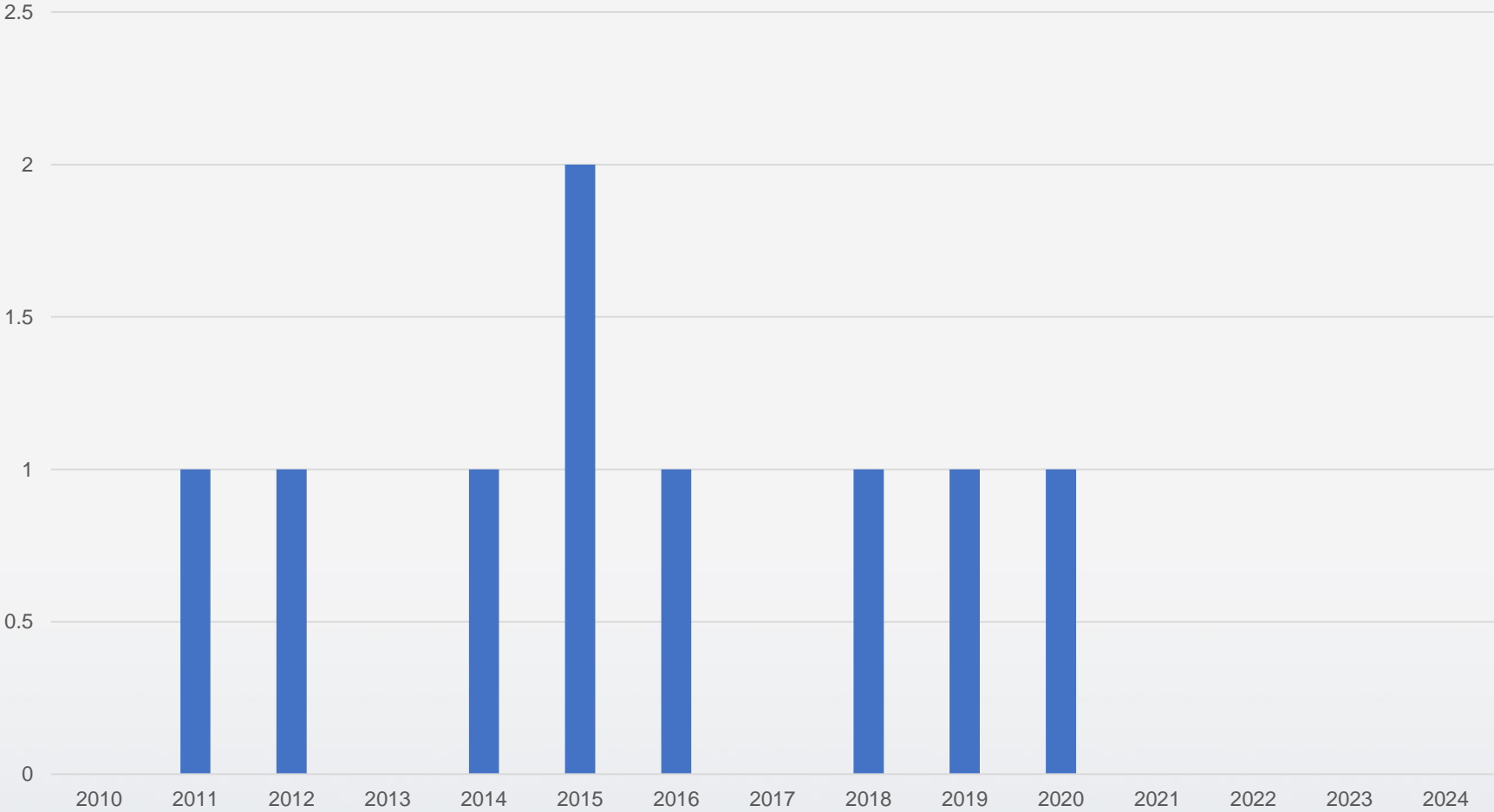
1 Year Outcomes

	Overall (N = 1178)
Death, all	122 (7.2%)
Cardiac death	47 (2.7%)
Non-cardiac death	75 (4.4%)
Stroke, all	76 (4.5%)
Disabling	16 (0.9%)
Non-disabling	60 (3.5%)
Death or disabling stroke	198 (11.7%)
Rehospitalization	95 (5.6%)
Infective endocarditis	24 (1.4%)

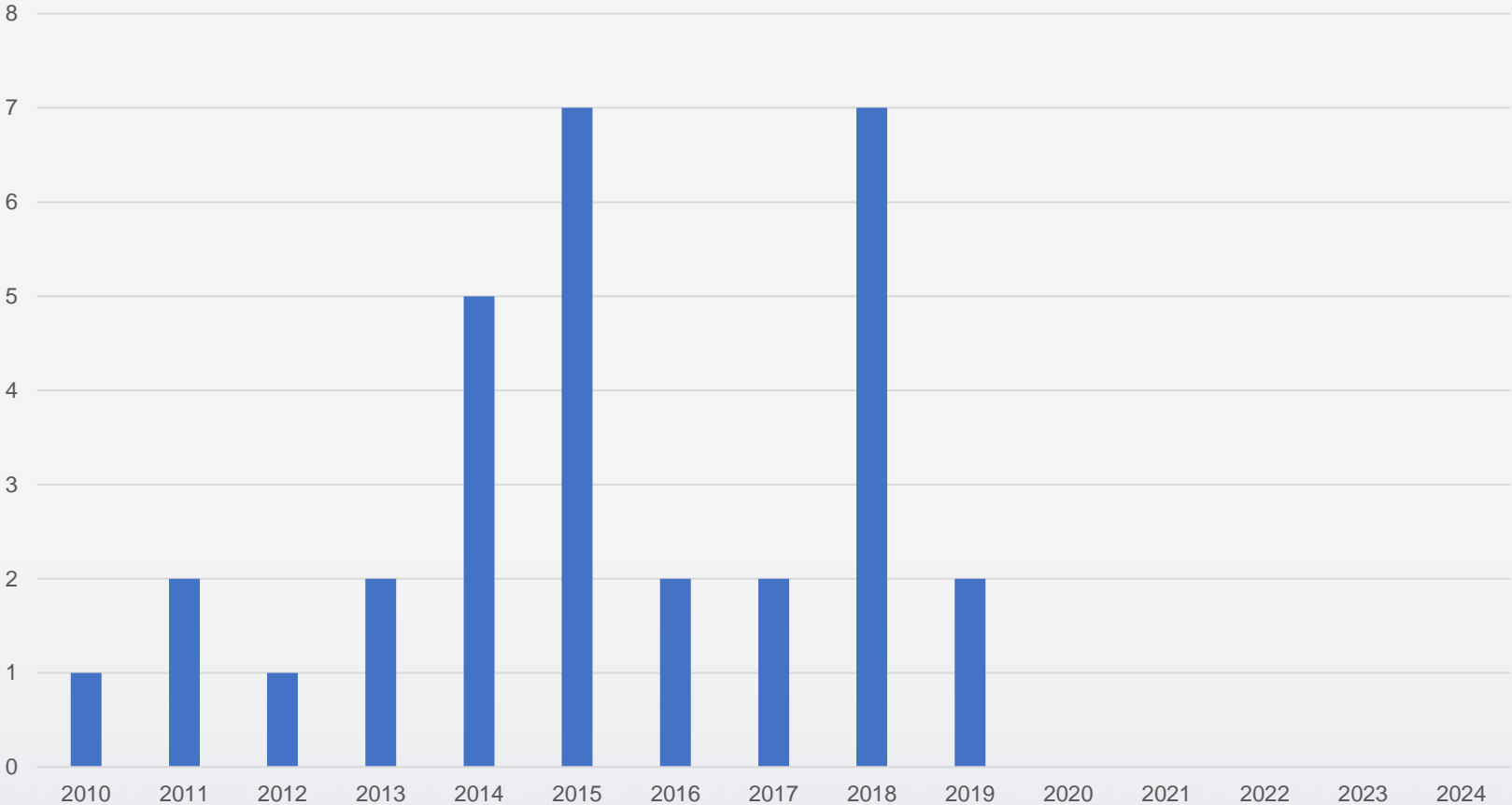
30 Day Mortality from Any Cause



30 Day Major (Disabling) Stroke

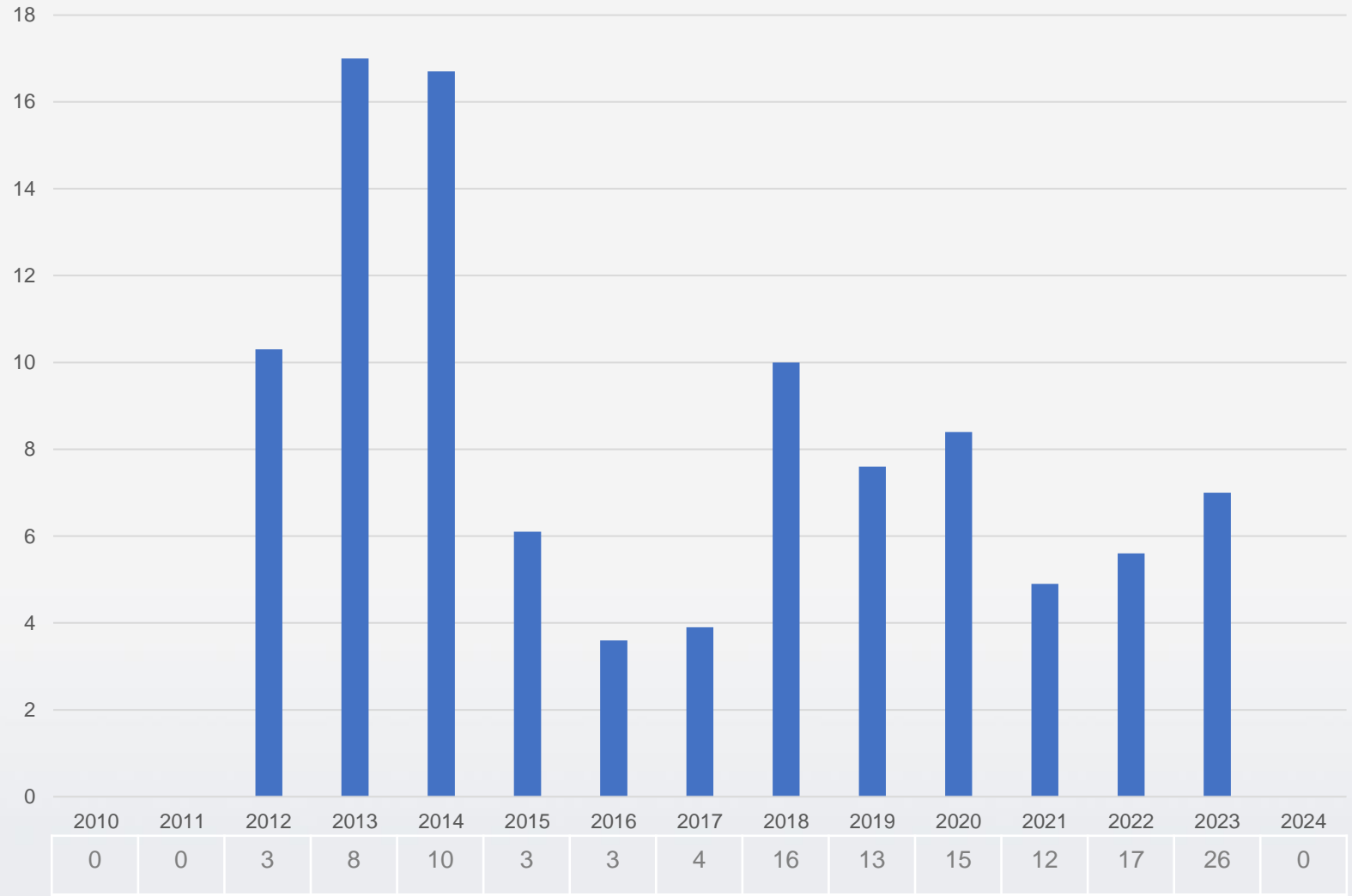


30 Day Major Vascular Complications

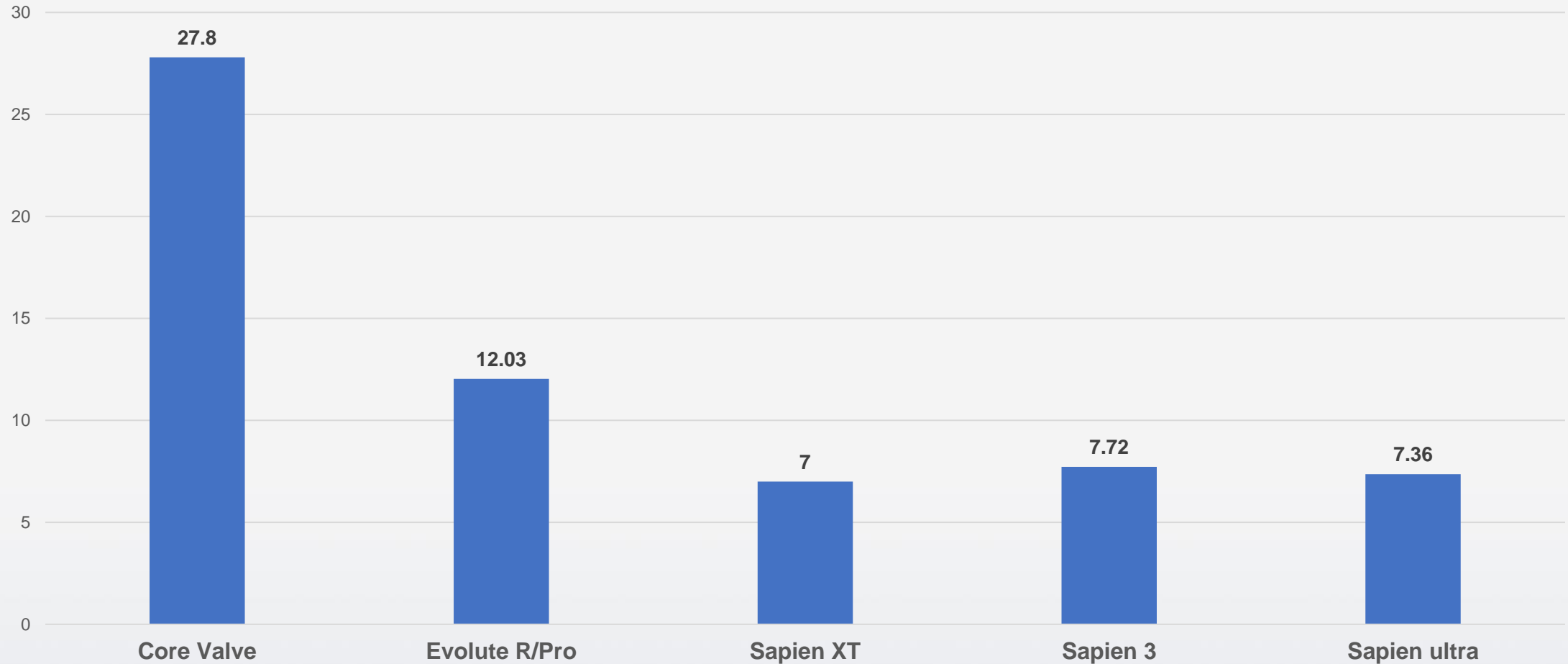


30 Day Permanent Pacemaker Implantation

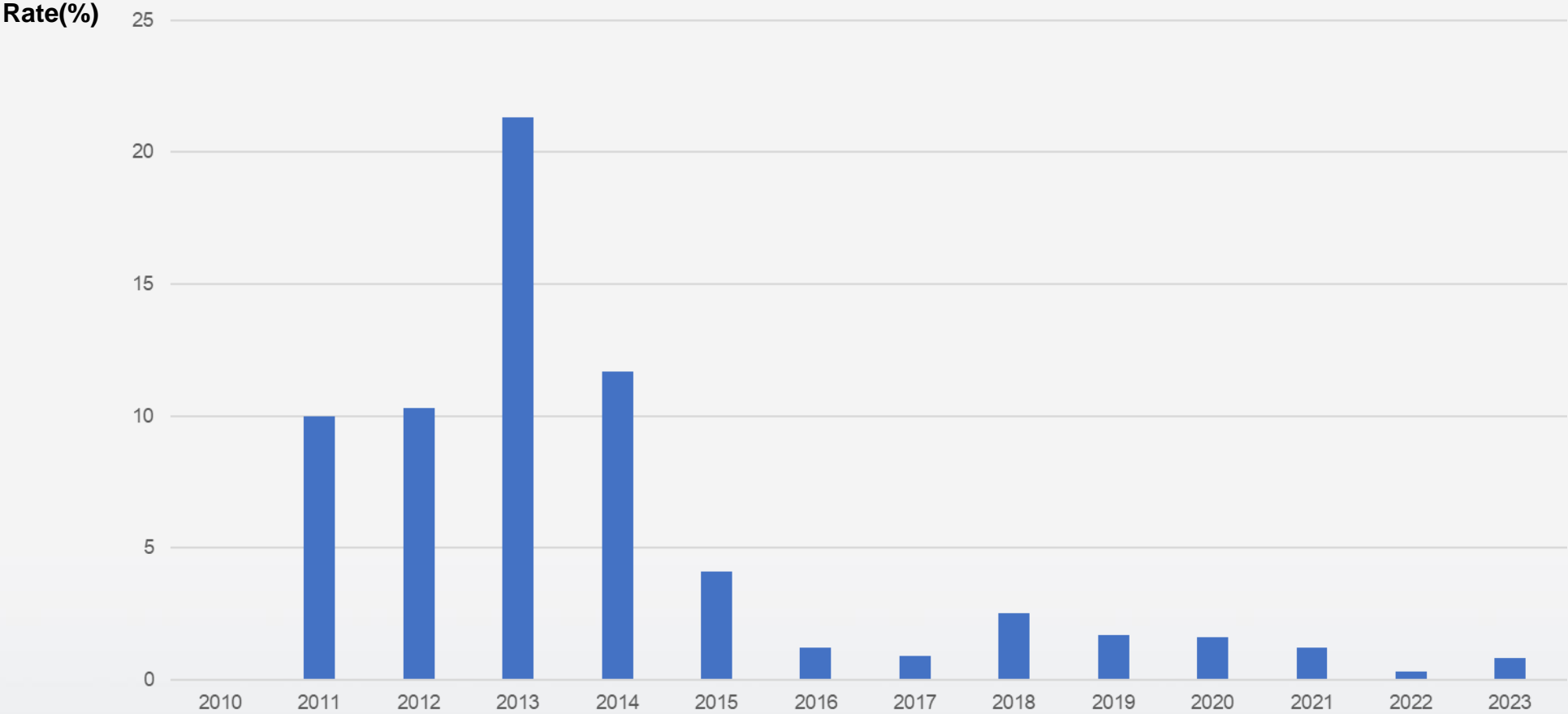
Rate(%)



Permanent Pacemaker Implantation



Significant (\geq Moderate) PVL



Outcomes of TAVR

Standard Performance (VARC-2) for AS patients (@ 30 days)*

All-cause mortality	< 3%
Major (disabling) strokes	< 2%
Major vascular complications	< 5%
New permanent pacemakers	< 10%
Mod-severe PVR	< 5%

AMC All	AMC 2023
1.5%	1.3%
0.6%	0.3%
4.5%	4.2%
7.9%	6.8%
2.7%	0.4%

Dr. Alain Cribier at TCTAP 2016

My prediction on the future of TAVR

2016 TAVI is indicated in patients who are not optimal candidates to surgery



2020 SAVR is indicated in patients who are not optimal candidates to TAVR !

His Dream Come True in AMC and Everywhere



Thank you for your attension