2023.06.24. (Sat)
15:15~16:45 15 min (ENG)

KHRS 2023
June 23(Fri.) - 24(Sat.), 2023
Grand Walkerhill Seoul, Korea
The 15th Annual Scientific Session of the Korean Heart Rhythm Society

Cross Specialty 3: Surgery vs. Catheter for AF Treatment

Recent Update of LA Appendage Closure

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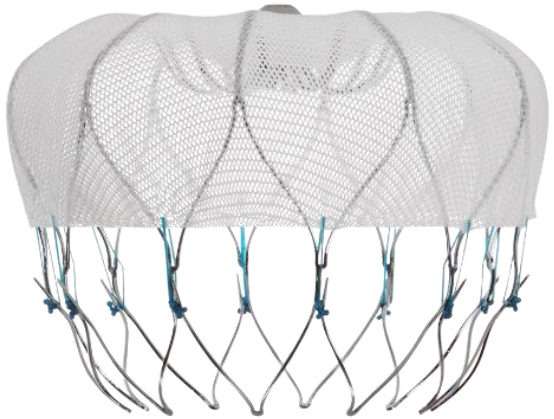
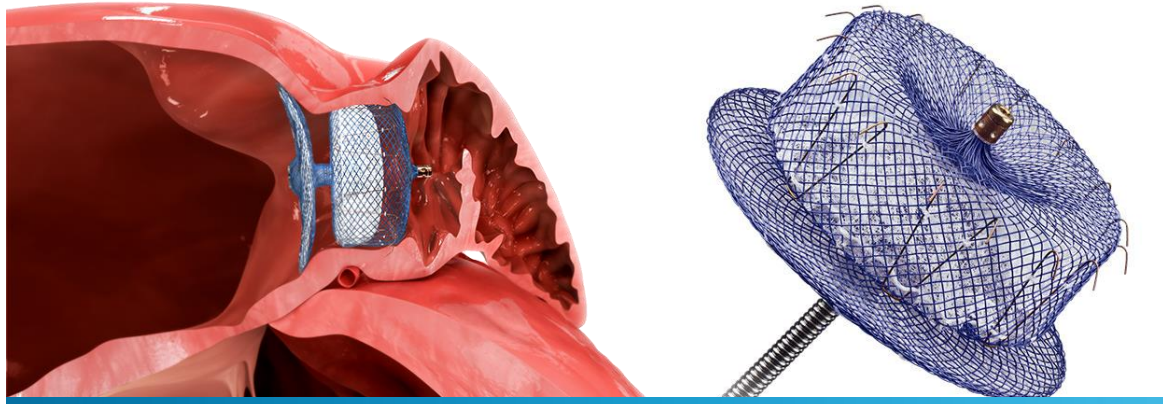
Available LAAO Devices in KOREA



WATCHMAN™

WATCHMANFLX™
LEFT ATRIAL APPENDAGE CLOSURE DEVICE



Amplatzer™ Amulet™

UAmbre™

In 2012

KHRS 2023 June 23(Fri.) - 24(Sat.), 2023 Grand Walkerhill Seoul, Korea
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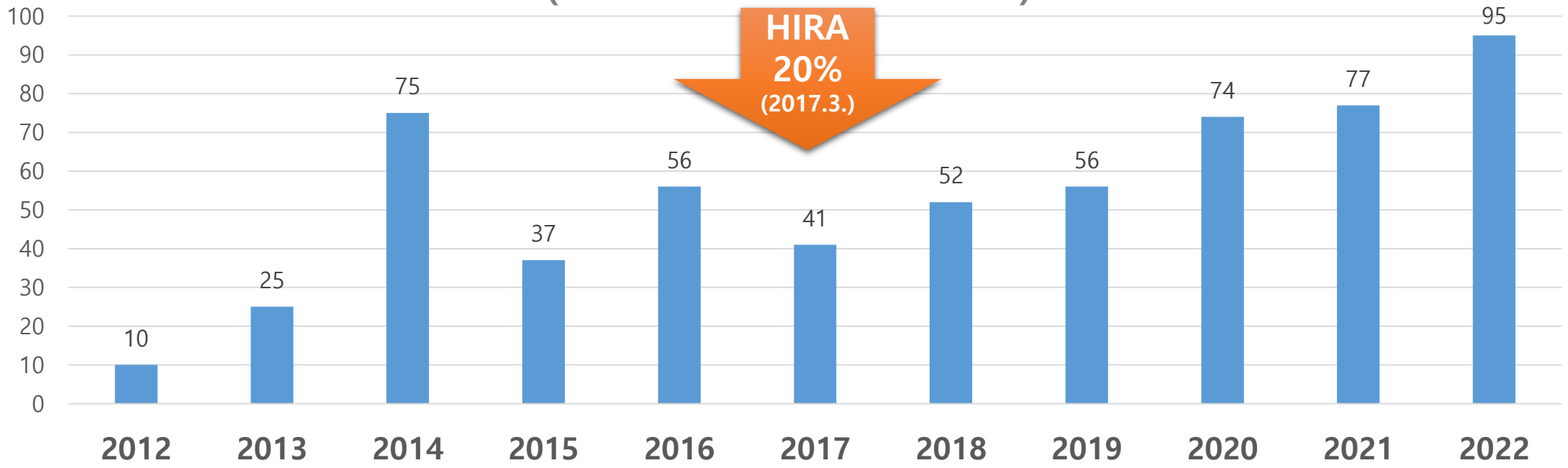
LAAC Devices were Introduced in Korea

Annual CASE Volume

(WM + Amulet + LAmbre)

Total: 583 cases
(204 + 379)



2005
PROTECT AF
N=707
Randomized
Comparison: warfarin

2008
ACP acquired CE

2013
Amulet acquired CE

March 2015
FDA Approval

Total of **204** cases before partial coverage

2019
WM FLX CE

2020
WM FLX FDA

2021
Amulet acquired FDA

Global **Watchman** Procedure Overview

Case Number By Country / 17-22(6yrs)

WM's annual sales became greater than coronary stents' annual sales

국가	2017	2018	2019	2020	2021	2022	Total
U.S.			41,000	40,500	62,600	69,000	**213,100**
E.U.			6,100	6,600	7,500	8,400	28,600
CHN	2,000	4,700	7,700	8,700	11,000	12,000	46,100
JPN			179	500	1,100	1,650	3,429
KOREA	41	52	56	74	77	95 Estimation	395 (WM: 117)

WM + Amulet in KOREA

+ LAmbre (+16) launched in 2022.7.

Data by Boston Scientific

Global 'Amulet' Case by country (2017-2022)

Country	2017	2018	2019	2020	2021	2022	Total
U.S.	*NA*	*NA*	*NA*	*NA*	1,000	1,750	2,750
E.U.	6,000	6,500	7,000	7,500	8,500	9,500	45,000
CHN	*NA*	*NA*	*NA*	*NA*	*NA*	200	200
JPN	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	
HKG	100	105	120	112	100	115	652
KOR	40	27	42	38	39	44	230

- **U.S.:** Amulet launched in 2021
- **CHN:** Amulet launched in 2022
- **JPN:** Not available (Plan: launch in 2027)

Abbott

LAmbre Global Market

LAmbre™

Region	2018	2019	2020	2021	2022	Total
Asia	937	2,302	1,957	2,480	3,407	11,083
EU	912	1,239	827	1,432	2,290	6,700
North America	-	-	4	8	8	20
South America	159	407	411	712	853	2,542
Africa	31	105	147	164	151	598
Korea					16	16
Total	2,039	4,053	3,346	4,796	6,709	41,902

Korean Gov't Covers ONLY 20% for LAAO

Since March 2017…

- Initial adequacy assessment period: 5 years (2017 ~ 2022)
- Re-Assessed in 2022 (Internal claim data analysis supports LAAO's benefit in Korean pts. – unpublished claim data)
- Extended coverage will be re-assessed in 2027
- Main reasons for extended initial adequacy assessment period
  - Guideline recommendation – IIB
  - Insufficient clinical data in KOREA
- Lack of supporting data… Inequality exists…

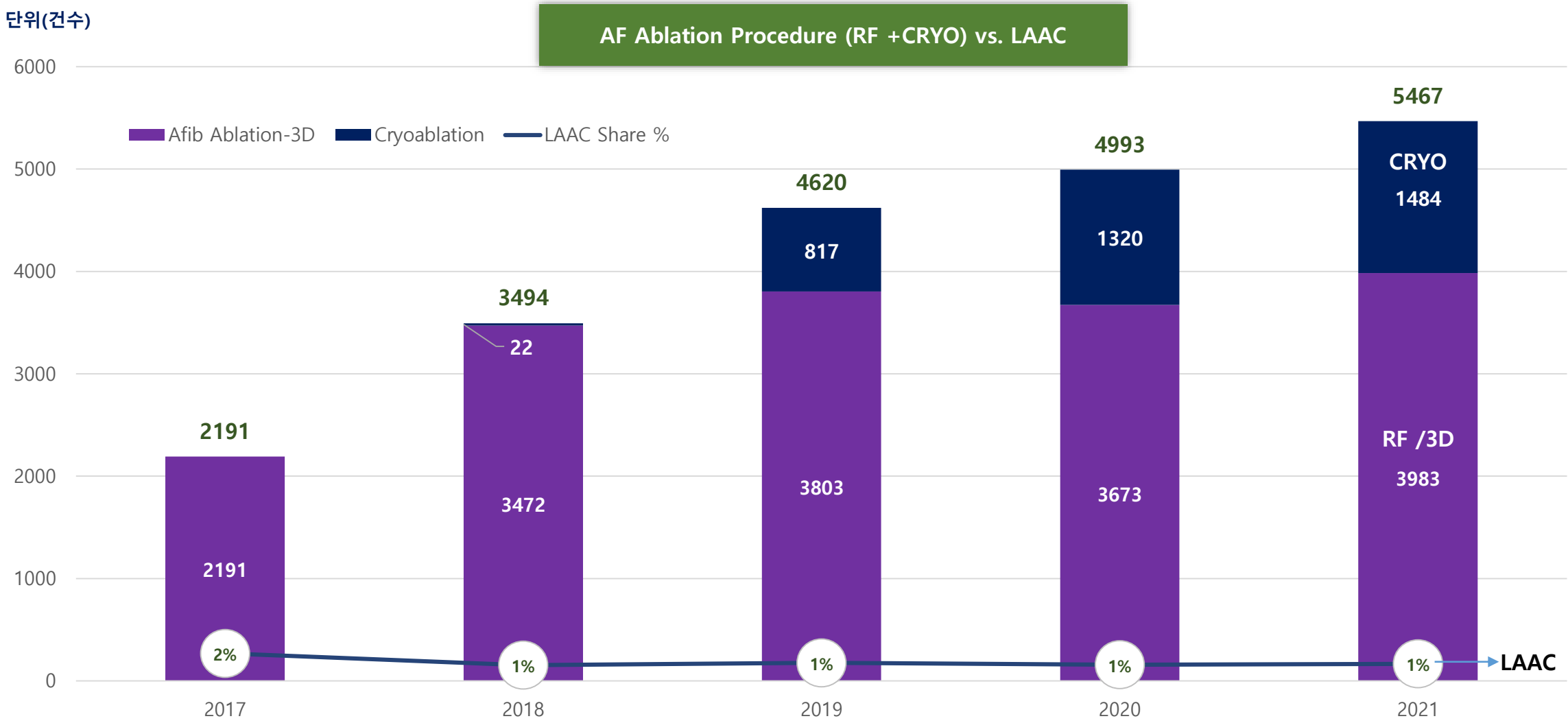
  i.e. Atriclip 50%, extended coverage in TAVR (>80 YO)

Is it Reasonable?

AF Procedure in Korea

2017-2021(5 yrs)

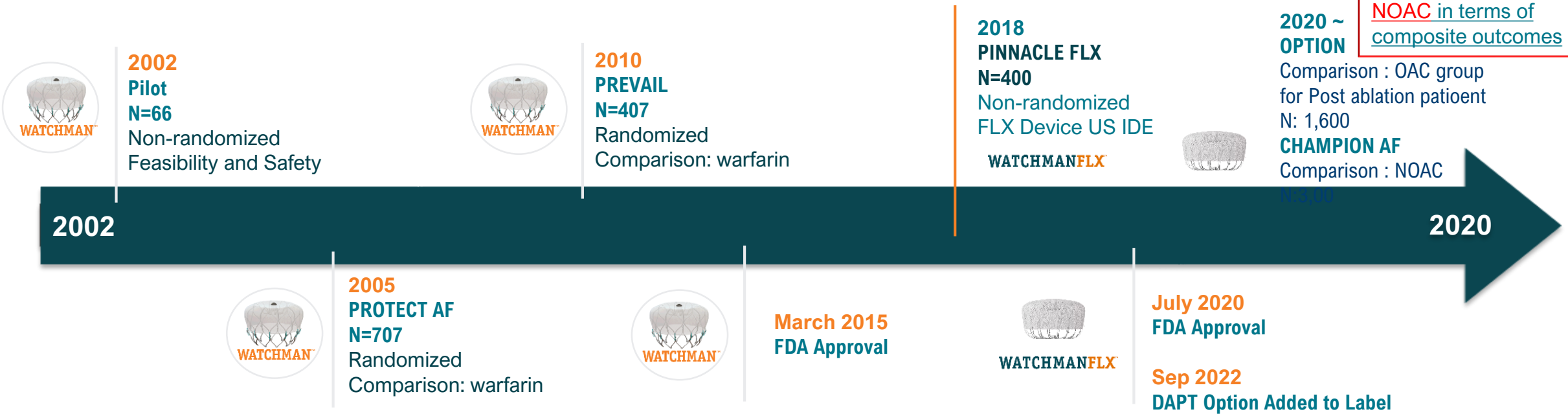
Ablation and LAAC are similar in total cost.
But ablation is fully covered by HIRA (90%).



Market Data by HIRA

WATCHMAN Clinical Data Overview

BUILT ON THE MOST STUDIED AND IMPLANTED LAAC DEVICE IN THE WORLD WATCHMAN FLX IS DESIGNED TO ADVANCE PROCEDURAL PERFORMANCE AND SAFETY WHILE EXPANDING THE TREATABLE PATIENT POPULATION



LAAC Studies Overview WM or WM FLX

WATCHMAN FLX™ LAAC Device

PINNACLE FLX >

PINNACLE FLX Prohibitive Anatomy >

IDE Trials >

SEAL FLX Study >

SWISS APERO Study >

SURPASS 45-Day Results >

SURPASS 1-Year Results >

Meta-Analysis >

ALSTER-FLX Registry >

Safety and Acute Procedural Outcomes of LAAO >

CHAMPION-AF Clinical Trial >

OPTION Clinical Trial >

DAPT FLX >

Legacy WATCHMAN™

PROTECT-AF and PREVAIL Clinical Trials >

NCDR-LAAO Registry™ >

PROTECT-AF, PREVAIL, CAP2 Leak Analysis >

LAAC Therapy

LAA Occlusion Study (LAAOS III) Trial >

PRAGUE 17 4-Year Outcomes >

Provided by BSc

Study Overview

LAAO vs NOAC for stroke prevention
in patients with non-valvular atrial fibrillation (NCT03108872)

From 5 tertiary cardiovascular centers
(Sejong General Hospital, Chung-ang university Hospital, Severance Cardiovascular Hospital, Korea University Anam Hospital, Ulsan university hospital)

Korean LAAO Registry [KoLAR]

Successful LAAO

Exclusion criteria

1. Patients who failed to successfully implant LAAO
2. Patients who receive NOAC less than 6 months without clinical events
3. Patients with mitral stenosis more than mild grade
4. Patients with prosthetic heart valve

NOAC with similar risk

LAAO registry (n=206)
Jan/2014 ~ Dec/2019
From 5 cardiovascular centers

NOAC registry (n=1,356)
Jan/2014 ~ Dec/2019
From 4 cardiovascular centers

1:2 Propensity-score matched population (170 vs. 304)

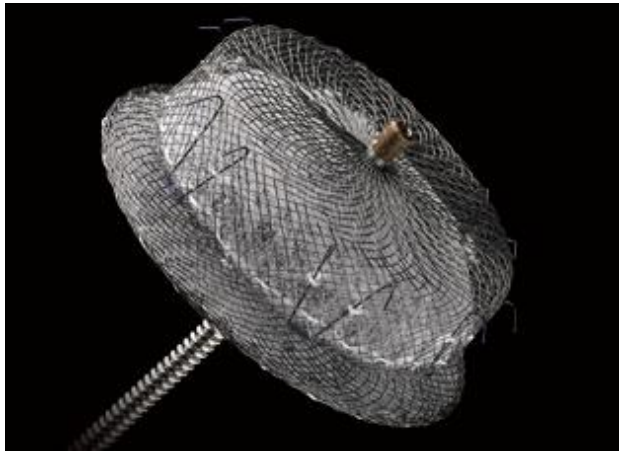
Long-term clinical outcome (>3 years) &
National Population Registry of Korea National Statistical Office

SY Shin, H Lee et al. Preparing submission

KoLAR

LAAO Group

- Plug type device (Watchman®) 34.6%
- Lobe and disc type device (ACP or Amulet™) 65.4%



- Mean procedure time: 97±35 minutes
- Median hospital stay: 5 days (range: 4–8 days)
- Mean dimension of device: 27±3.5mm
- Anticoagulation at discharge: 72.8%
- Mean duration of post-procedural anticoagulation: 83 days (48–184)

- **ANY Peri-device leak: 10.2%** (mean jet width: 1.4±1.2 mm)

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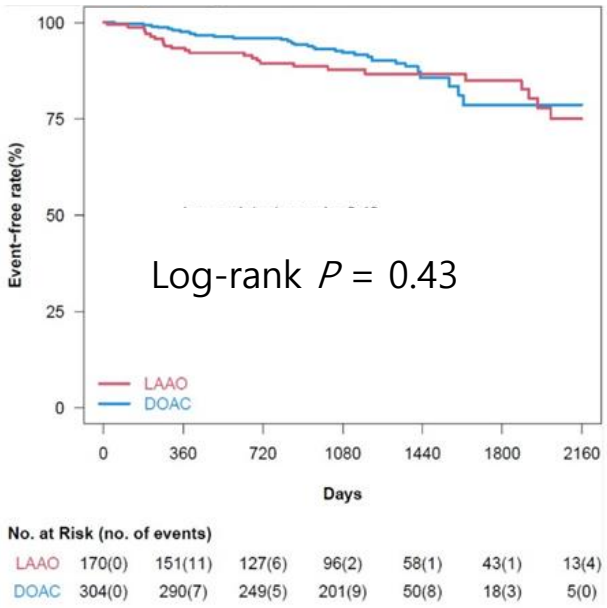
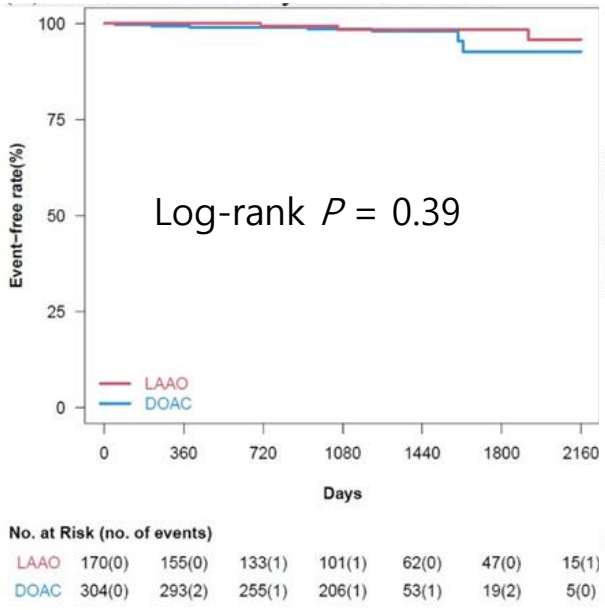
Similar in Composite/Individual Outcomes btw. LAAO & NOAC

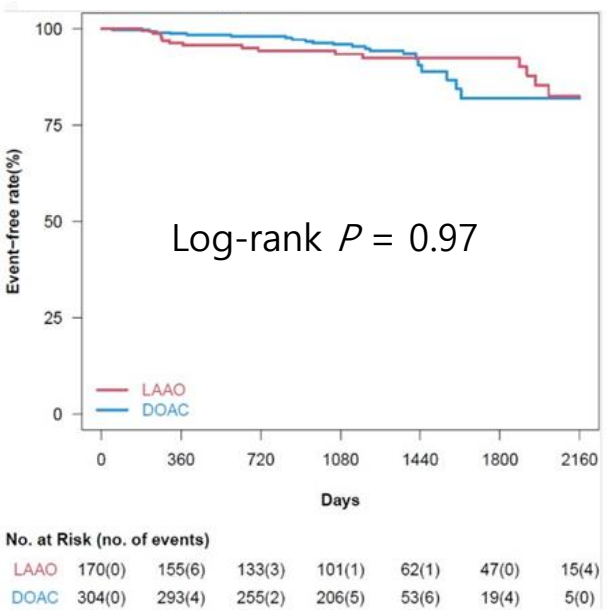
A. Primary composite outcomes



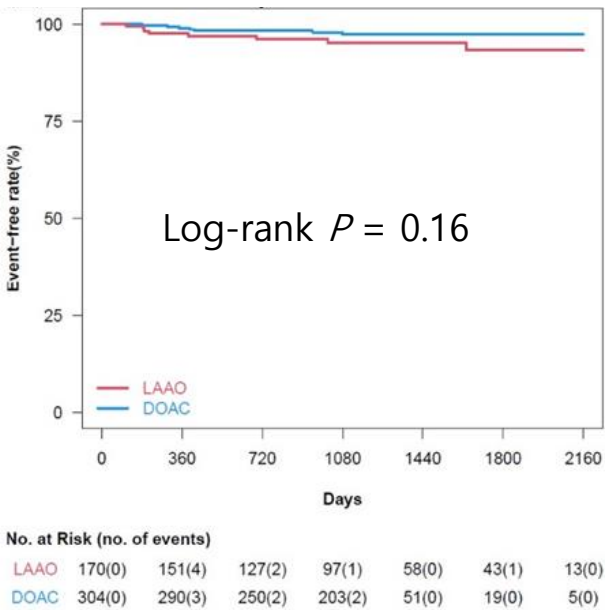
B. Ischemic stroke or systemic embolism



C. Major bleeding



D. All cause mortality



A. Primary composite outcomes = Ischemic stroke or systemic embolism + all cause mortality + major bleeding

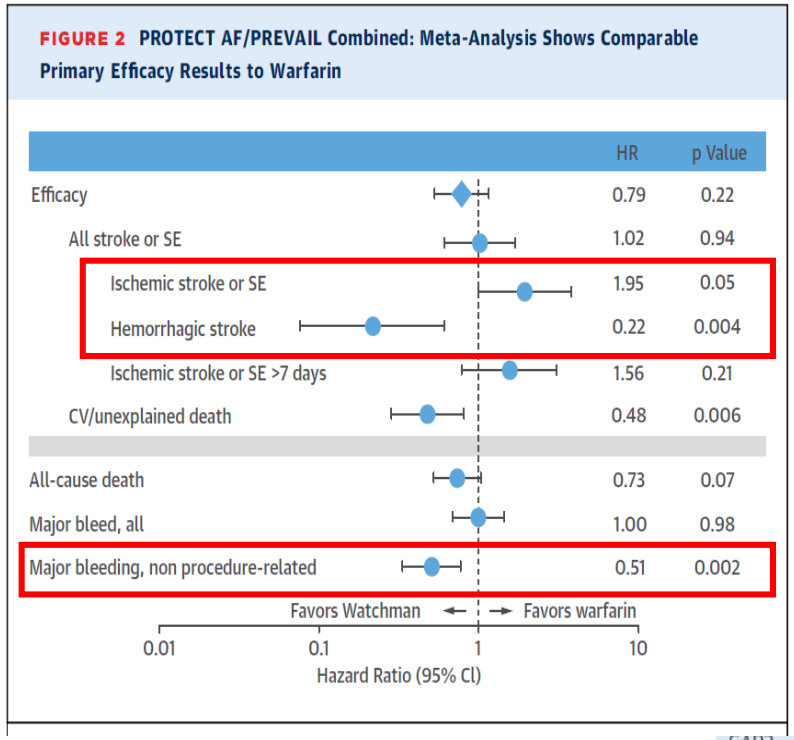
SY Shin, H Lee et al. Preparing submission

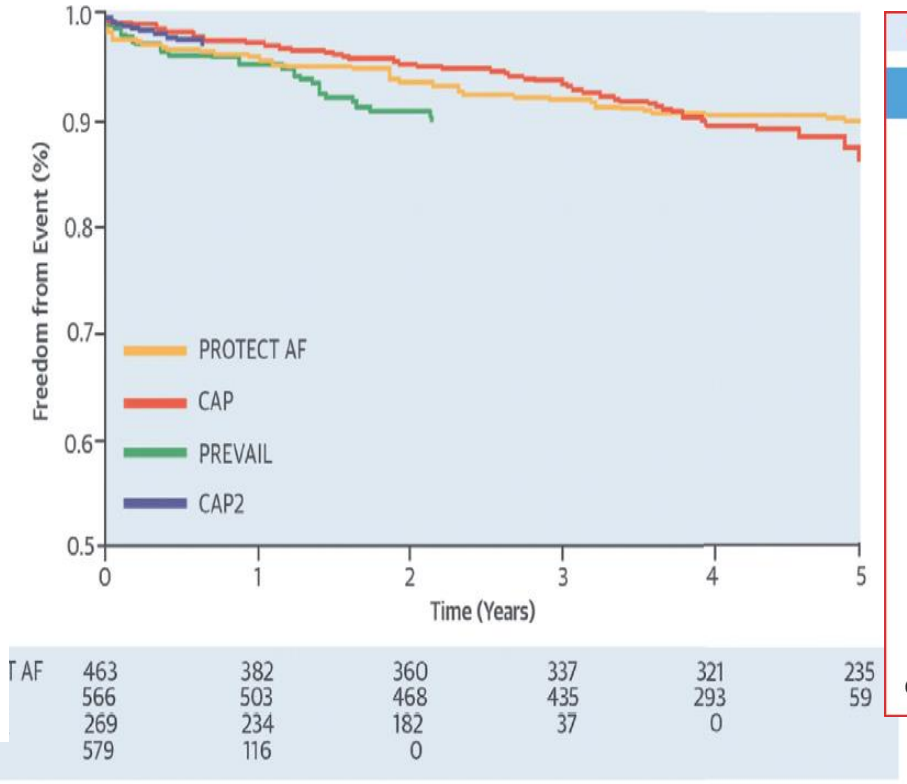
RCTs

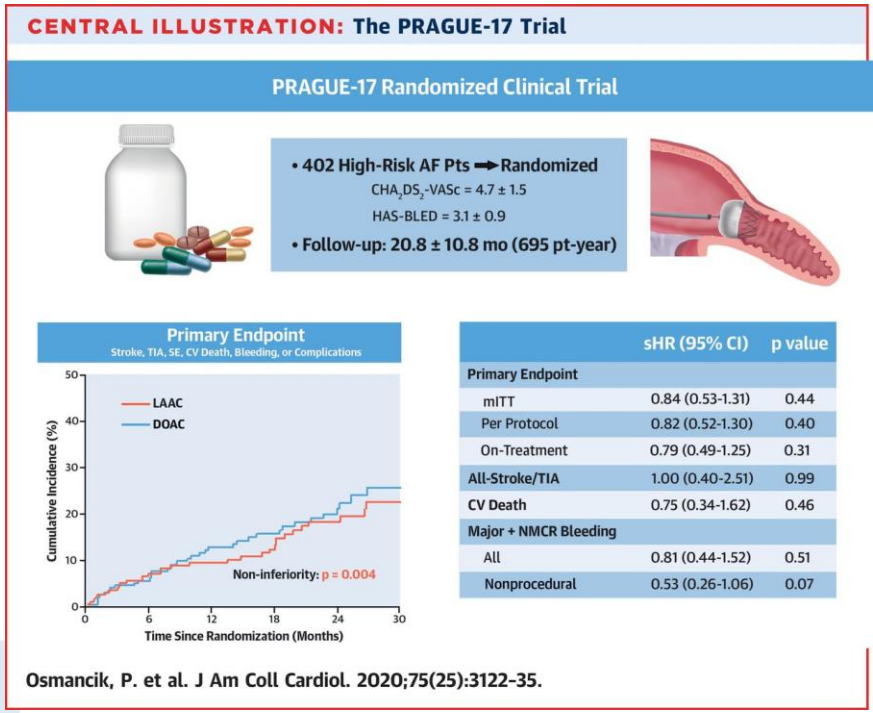
Clinically Proven Efficacy & Safety

1.8 WM/pt

- Non-inferiority in comparison with **VKA & NOAC**







➔ **Composite Outcome benefit mainly driven by reduced major bleeding events, esp. hemorrhagic stroke, non-procedure-related**

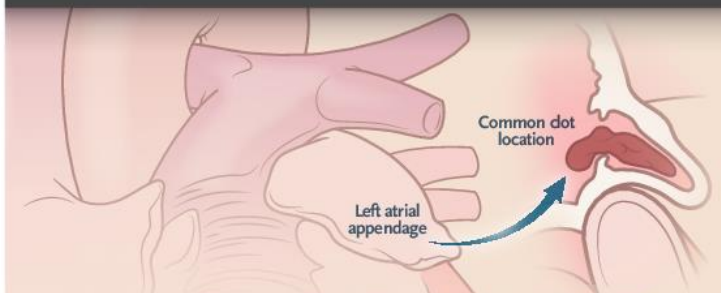
In Surgical LAA Exclusion,

Is Peri-device Leakage (PDL) a Culprit?

The NEW ENGLAND JOURNAL of MEDICINE

Left Atrial Appendage Occlusion during Cardiac Surgery to Prevent Stroke

MULTICENTER, RANDOMIZED, CONTROLLED TRIAL



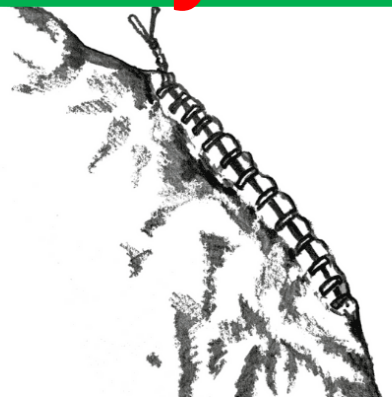
4811 Adults with a history of atrial fibrillation and a CHA_2DS_2-VASc score of ≥2 undergoing cardiac surgery

	Cardiac surgery plus left atrial appendage occlusion (N=2400)	Cardiac surgery without left atrial appendage occlusion (N=2411)
Ischemic stroke or noncerebral systemic embolism during follow-up	4.8%	7.0%
	HR, 0.67; 95% CI, 0.53–0.85; P=0.001	
Oral anticoagulation at 3 yr	75.3%	78.2%

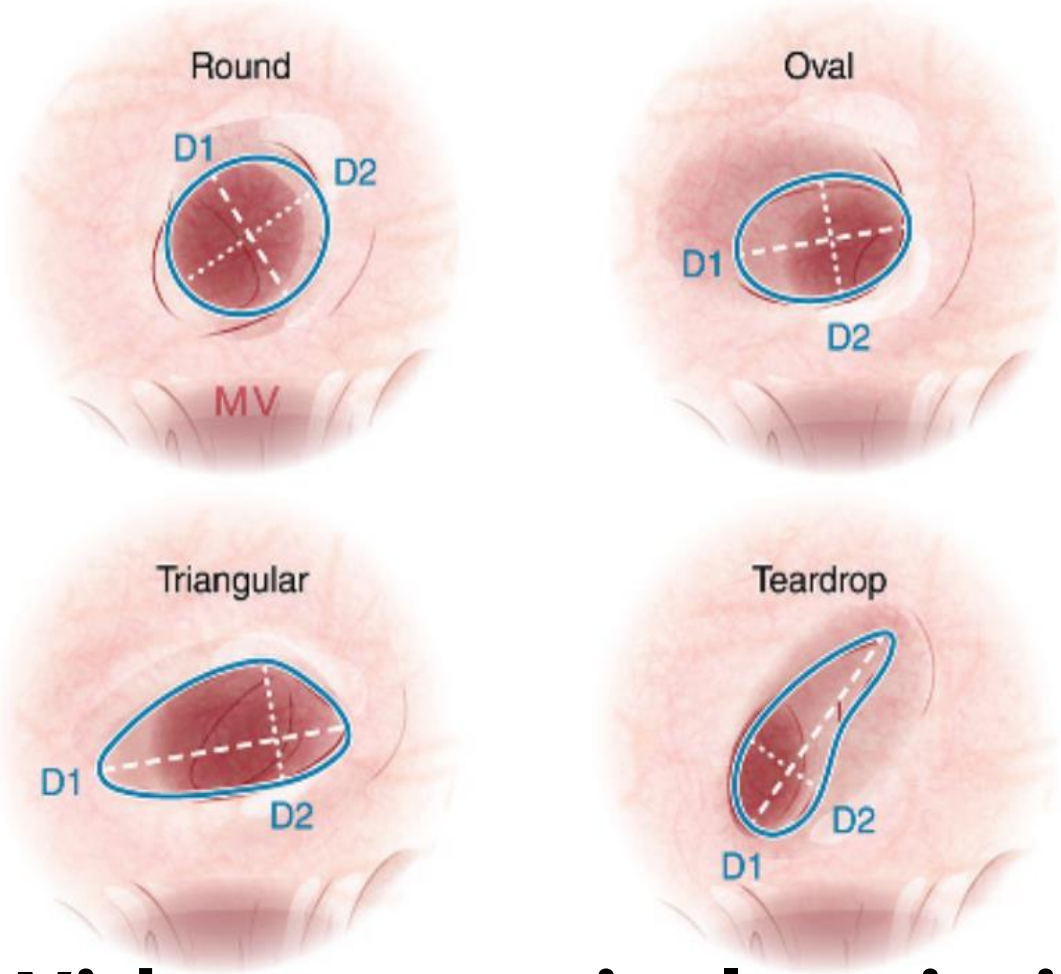
Left atrial appendage occlusion during cardiac surgery reduced risk of ischemic stroke or systemic embolism in participants with a history of atrial fibrillation

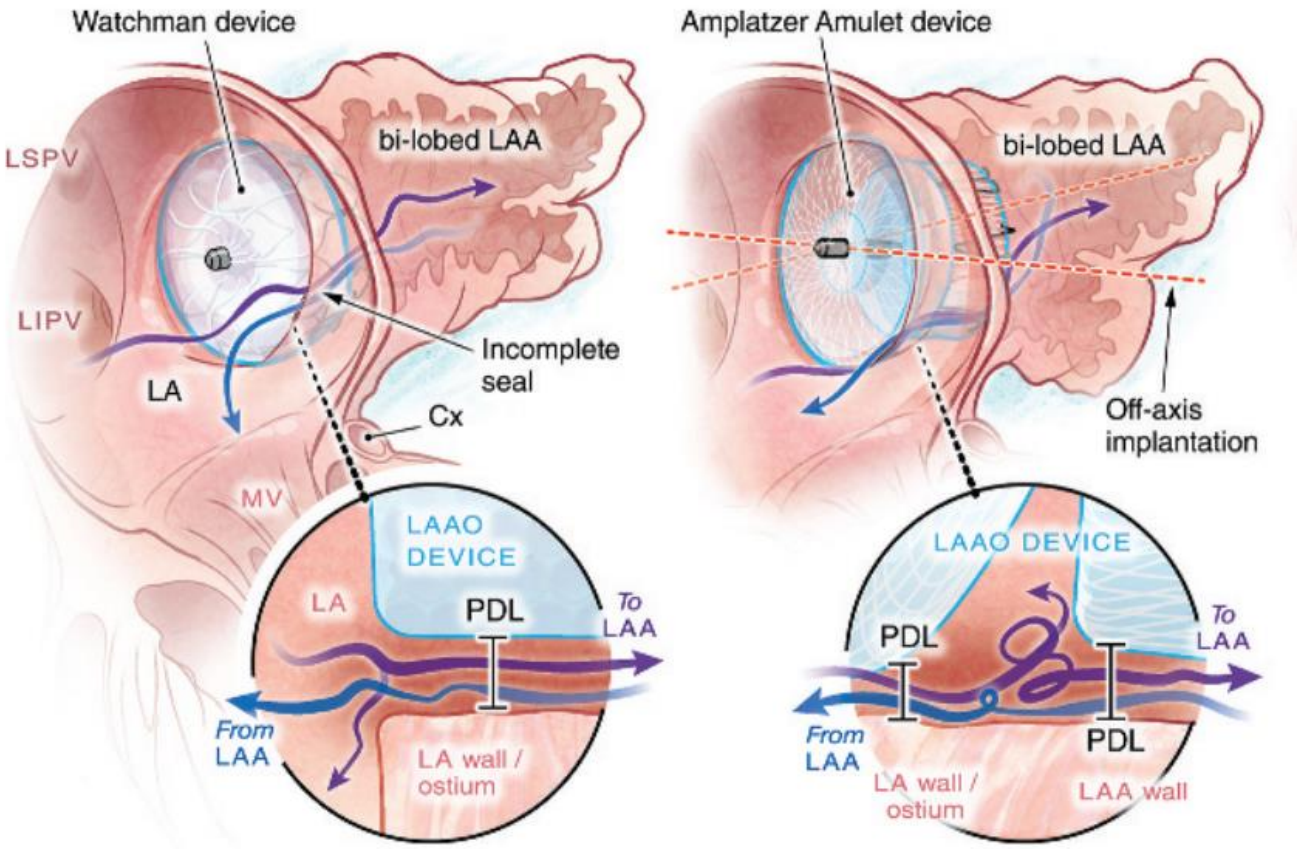
R.P. Whitlock et al. 10.1056/NEJMoa2101897

Complete Excision Reduced Ischemic Stroke by 33 %



If PDL is Small, Is it acceptable?





Wide anatomical variation & Circular device ➔ PDL!

STRUCTURAL HEART 2020, 4(6):475–481. https://doi.org/10.1080/24748706.2020.1817642

Clinical Impact of PDL

- FDA approved **PDL < 5 mm accepted "sufficient LAA closure"**
- Re-categorized PROTECT-AF, PREVAIL, CAP2 participants' TEE at 45 days & 1 year ➔ Absence of PDL vs. PDL < 5 mm
- N = 1,054
- 404 (38.3%) PDL < 5 mm at 45 days TEE
- 272 (27.7%) **PDL < 5 mm at 1 year TEE** → increased 5 year stroke or SE risk (adjusted HR 1.94, 95% CI 1.15-3.29, P = 0.014)
- Mainly driven by **Non-fatal stroke**

J Am Coll Cardiol. 2022 Aug 2;80(5):469-483.

Peri-Device Leakage (PDL) is More Prevalent than Our Expectation

Table 1. Summary of definitions, frequency, modality for detection, and impact on outcomes of PDL in percutaneous LAAO studies.

Device	Year	Patients (n)	Definition and Timing of PDL	Presence of PDL or Leak (LARIAT)	Anticoagulation Regimen	Imaging	Impact of PDL on outcomes
WATCHMAN (Boston	2009	463	>5 mm, 45 days	14%[31]	See notes below	TEE	N/A
				%/<1%[30]		TEE	None
				%[20]		CT	N/A
				%[32]		TEE	None
				%[33]		CT	N/A
				59%[34]		TEE	N/A
				%[34]		CT	N/A
				e[35]		TEE	N/A
				%[20]		CT	N/A
				8%[36]		TEE	N/A
				%[21]		CT	N/A
				%[20]		CT	N/A
				%[33]		CT	N/A
				%[29]		TEE	None
				[37]		TEE	N/A
				%[32]		TEE	None
				e[38]		TEE	N/A
				5%[16]		TEE	None
				7%[39]		TEE	N/A
				%[40]		TEE	N/A
				[41]		TEE	N/A
				[42]		TEE	N/A
				e[43]		TEE	N/A
				12%/3%[44]		TEE	N/A
				[45]		N/A	N/A

?

Anticoagulation regimen in patients receiving LAAO by study:

[31] 45 days warfarin (until no PDL or PDL<5 mm), 75 mg clopidogrel + 81–325 mg aspirin (until 6 month follow-up), 81–325 mg aspirin (indefinitely)
[30] 45 days warfarin (until no PDL or PDL<5 mm), clopidogrel + aspirin (until 6 month follow-up), aspirin (indefinitely).
[20] "typically" aspirin + clopidogrel for 1–3 months, followed by aspirin alone indefinitely.
[32] Watchman: 45 days warfarin, oral antiplatelet agent for 6 months, continuation of either oral anticoagulants or antiplatelet agents "was left to the operator's discretion". Lariat: "oral anticoagulants and antiplatelet agents were discontinued immediately after the procedure in the majority and at 4–6 weeks in some. Subsequent continuation of these agents was left to the operator's discretion based on patient situation".
[33] Watchman: 45 days warfarin, dual-antiplatelet therapy for 6 months, single-antiplatelet therapy indefinitely. ACP: dual-antiplatelet therapy for several weeks to months, and a single-antiplatelet drug or no medication thereafter.
[34] Oral anticoagulation for 45 days unless PDL >5 mm, clopidogrel up to 6 months, aspirin indefinitely.
[35] Dual anti-platelet therapy (aspirin 80 mg/day and clopidogrel 75 mg/day) for a minimum of three months followed by aspirin indefinitely.
[36] Following implantation, a loading dose (6… mg) of clopidogrel was administered, and treatment was started with 300 mg aspirin (ASA) on the first day and 100 mg daily thereafter. Clopidogrel was maintained for 6 months, barring hemorrhagic complications, and ASA for 12 months. If thrombus occurred, subcutaneous enoxaparin in a therapeutic dose was added for 2 weeks, clopidogrel was prolonged and the TOE was repeated to check for disappearance. If the result was negative, the decision to prolong the treatment for another week or hospitalize the patient and begin treatment with intravenous heparin was evaluated.
[21] Anticoagulation therapy was discontinued at discharge in all patients (one patient had thrombus treated with 3 weeks of LMWH).
[29] Antithrombotic therapy … the device … closure was aspirin … to 3 months, followed by aspirin 100 to 300 mg/day … at least … months. However, the choice … on the basis of physician preference and recorded at admission and last follow-up visit
• Antithrombotic therapy use post–LAA closure was available in 255 patients; of these, 159 were on dual-antiplatelet therapy, 79 were on single-antiplatelet therapy, 16 were on OAC, and 1 was receiving no antithrombotic agent post–LAA closure.
[37] Discharged on a single-antiplatelet agent (23.0%), dual antiplatelets (54.3%) or an oral anticoagulant (18.9%).
[38] Patients with a contraindication to warfarin remained off warfarin. Patients with a CHADs-VASC score of 2 or higher who could tolerate warfarin (i.e., noncompliant or labile international normalized ratio level) were recommended to continue warfarin or a NOAC. Patients with a CHADS-VASC score of 1, anticoagulation was left to the discretion of the referring physician.
[16] Post-procedural medical therapy (including antithrombotic therapy) was prescribed according to the operator's preference
• 85% of patients were discharged on antithrombotic therapy: 50% on antiplatelet therapy (aspirin in 18%, clopidogrel in 2%, and dual-antiplatelet therapy in 30%) and 35% on OAC (warfarin in 26%, rivaroxaban in 5%, and dabigatran in 4%).
• At 6-month follow-up, 31% of patients were on OAC and 44% on antiplatelet therapy.
• At 12-month follow-up, 19% were on OAC and 48% on antiplatelet therapy. Patients were kept on OAC either because leaks were observed or because they underwent AF ablation procedures at follow-up.
[39] Anticoagulation was resumed after LAA exclusion in all patients except those with prohibitive bleeding (67.4%) and high fall risk (11.6%). The other 21% patients were on OAC at 6 weeks, and all of them were off OAC at 6, 12, and 24 months, unless they were found to have a thrombus on follow-up TEE (n ¼12) that required reinitiating of OAC.
[40] Clopidogrel 75 mg daily for … months then aspirin 100 mg daily indefinitely.
[41] Dual antiplatelet therapy with aspirin and clopidogrel for 3 months, followed by aspirin alone. At 1 month a relevant leak of ≥5 mm was observed in 3/60 (5%) patients, which persisted during 12- month follow-up. After its detection, antiplatelet therapy was switched to oral anticoagulation.
[42] 100 mg aspirin and 75 mg clopidogrel was recommended for 3 months
• 2 patients required warfarin for device thrombus and maintained INR > 2 until 3-month follow-up, then phenprocoumon.
• 2 patients required warfarin for device thrombus and maintained INR > 2 until 3-month follow-up, then phenprocoumon.
[43] Aspirin 81 mg/day and clopidogrel 75 mg/day for 3 months and single-antiplatelet therapy (usually aspirin) indefinitely.
[44] Most patients (~90%) were discharged on single or dual-antiplatelet therapy, whereas only 4% of patients received oral anticoagulation.
• 5 patients with device-related thrombosis received oral anticoagulation.
• 5 patients with device-related thrombosis received oral anticoagulation.
[45] Not reported.

Post-LAAO Anti-thrombotic regimens are not standardized!

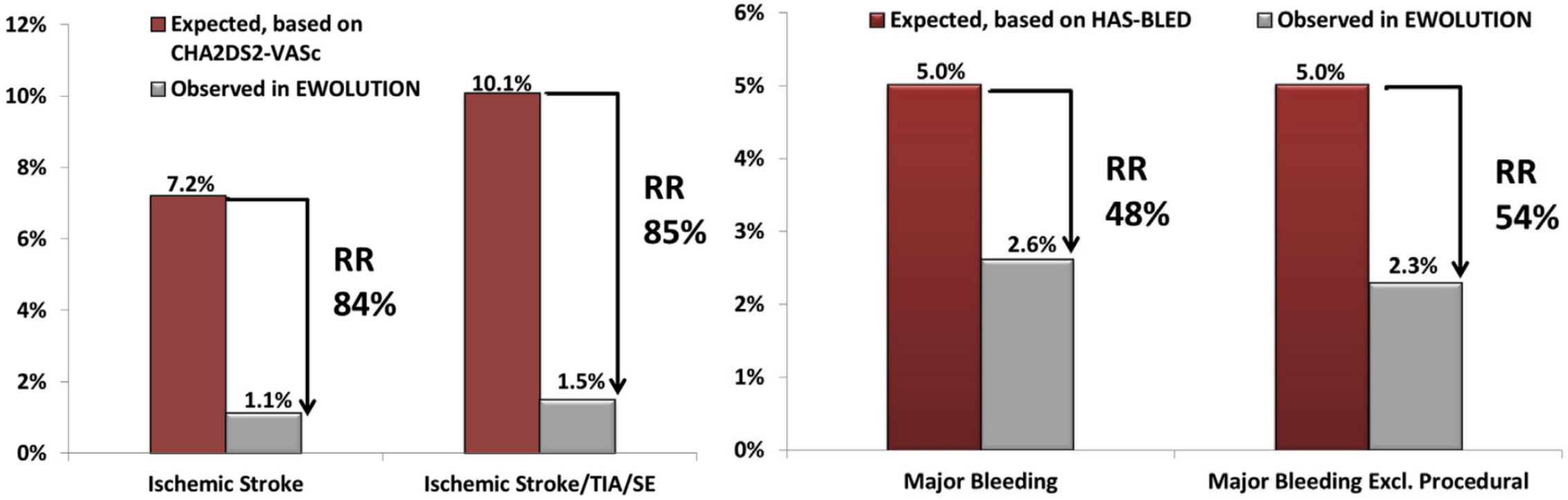
Should be individualized according to indication & procedural outcomes!

Notes. Abbreviations: PDL, peri-device leak; TEE, transes…

STRUCTURAL HEART 2020, 4(6):475–481. https://doi.org/10.1080/24748706.2020.1817642

Stroke Preventive Efficacy for LAAO

- **EWOLUTION (Registry)**
- At 1 Y, stroke rate 7.2 % (expected) vs. 1.1 % (observed)



Boersma et al. *Heart Rhythm* 2017; 14: 1302 – 1308.

RWE

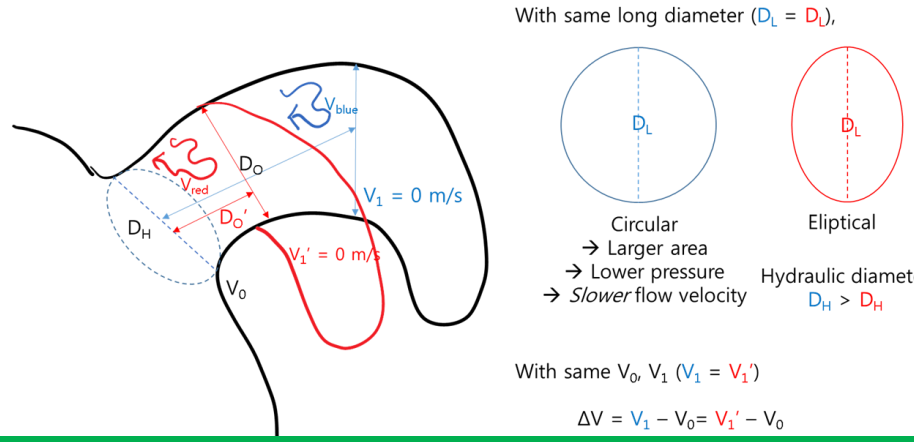
Largest Real World Data in the U.S.

- **NCDR (National Cardiovascular Data Registry, U.S.)**
- N = 38,158 (Jan. 2016 ~ Dec. 2018)
- Mean age 76.1±8.1 Y
- **Mean CHA_2DS_2-VASc = 4.6 points (Prior stroke 27.3 %)**
- Mean HASBLED = 3 points
- Follow-up: 2 Y
- **Stroke = 0.17 %**
- Major bleeding = 1.25 %

Freeman et al. *JACC* 2020; 14: 1302 – 1308.

Unanswered Questions?

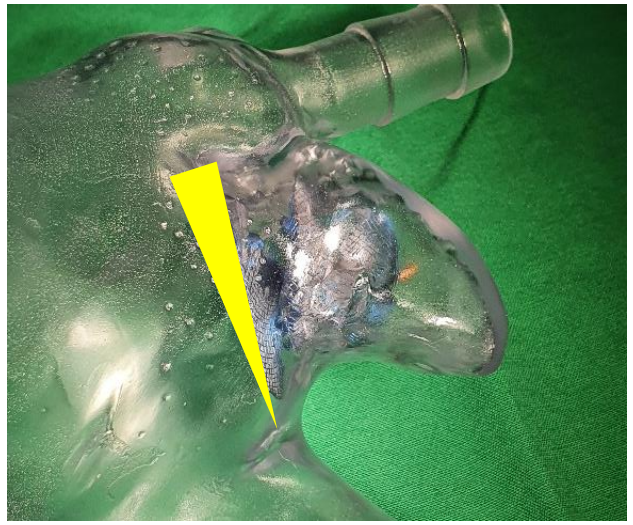
- Why results are contradictory?
  - Excision vs. Closure?
  - Ideal closure or not?
  - Peri-device leakage matters?
- What is appropriate **post-procedural anti-thrombotic therapy (ATT)** regimen? Are clinical factors enough for deciding ATT in a given patient?
- **Hemodynamic changes** within left atrium after LAAO?

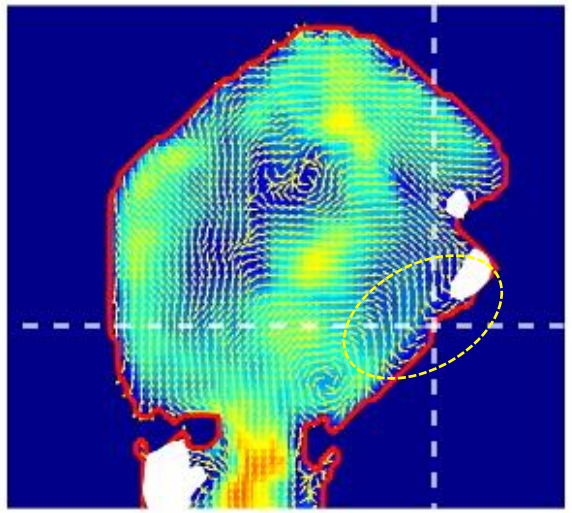


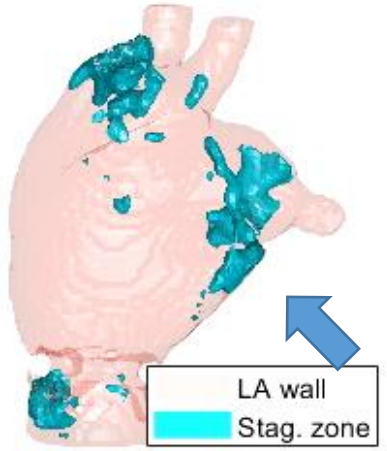
Larger/Deeper = More thrombogenic

Shin SY, Park JW, *Int J Cardiol*. 2021; Feb.

Hemodynamic Difference & Remnant Pouch

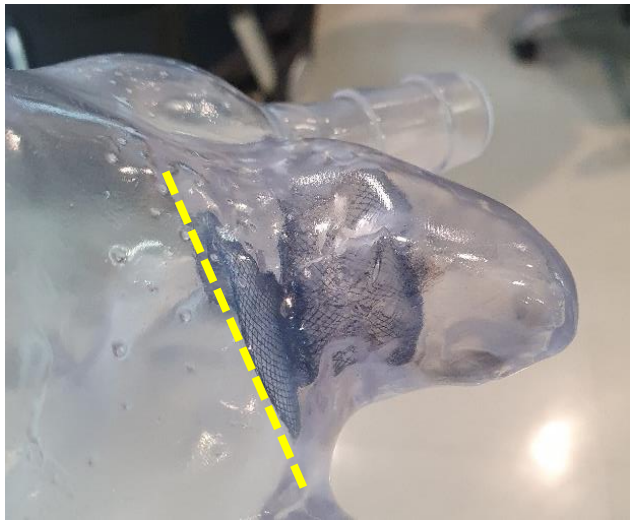


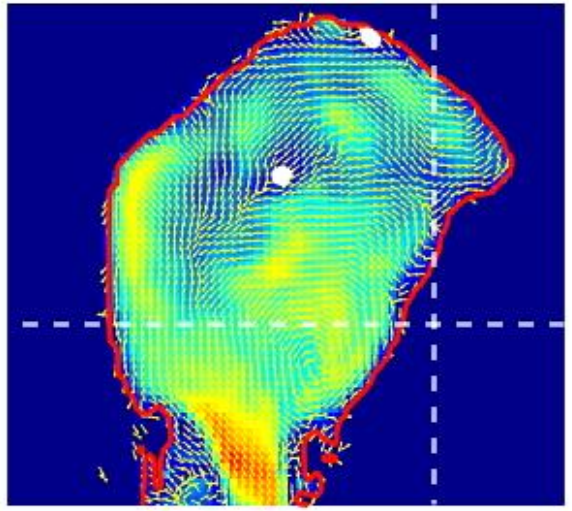


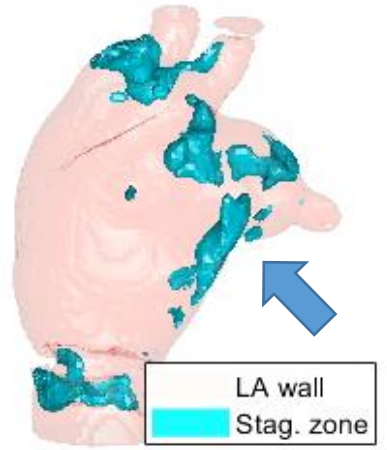


Remnant pouch (+)

Larger stagnant zone





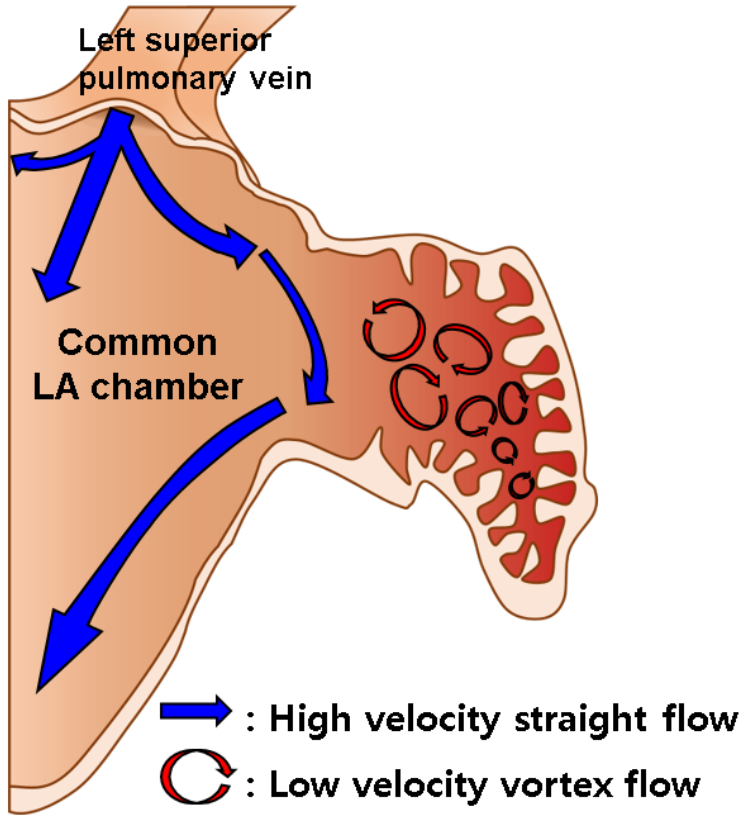


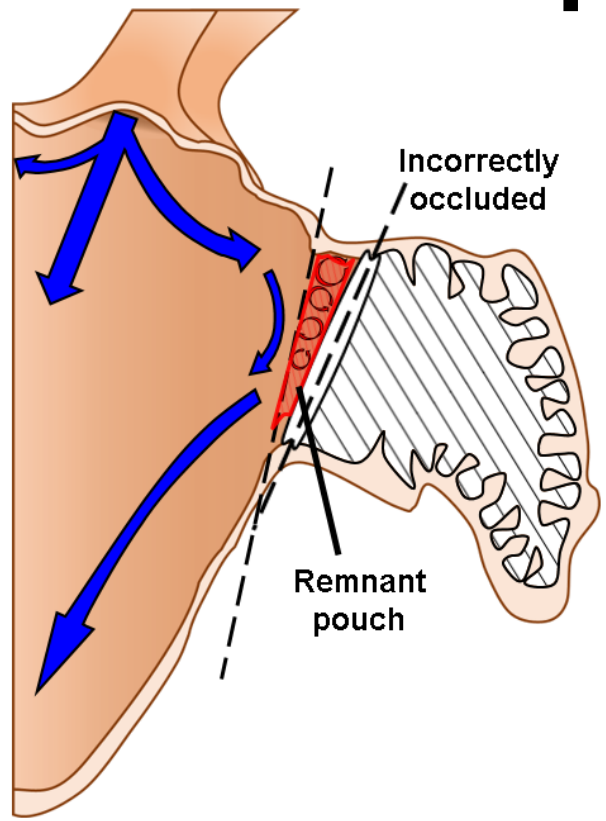
Remnant pouch (-)

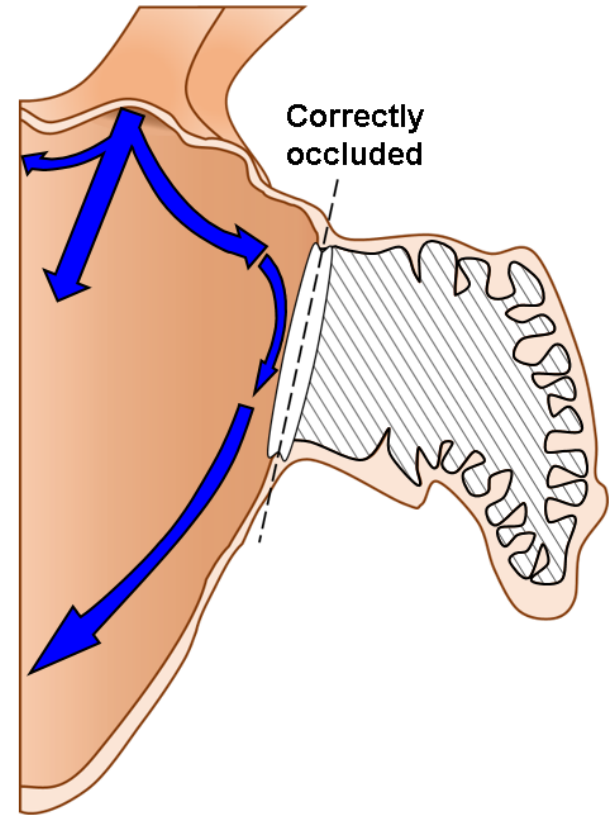
Smaller stagnant zone

An DG, Song S, Cha MJ, Shin SY et al. Just accepted in KJR

Correct Closure Further Improve Outcomes!







Pre-occluded state (PRE)	Incorrectly occluded state (INC)	Correctly occluded state (COR)
• Highest volume and percentage of flow stasis and thrombogenicity • **LA appendage** is a main source of thrombosis	• **Remnant pouch** has substantially high volume and percentage of flow stasis • Potential source of thrombosis	• **Common LA chamber** shows similar volume and percentage of flow stasis (PRE ≈ INC ≈ COR) • Maximized reduction of flow stasis and thrombogenicity

→ **Post-procedureal anti-thrombotic treatment** should be determined by both clinical and haemodynamic conditions

Long-Term Results *in vivo*

F/ 37

Corutesy of Y Cho

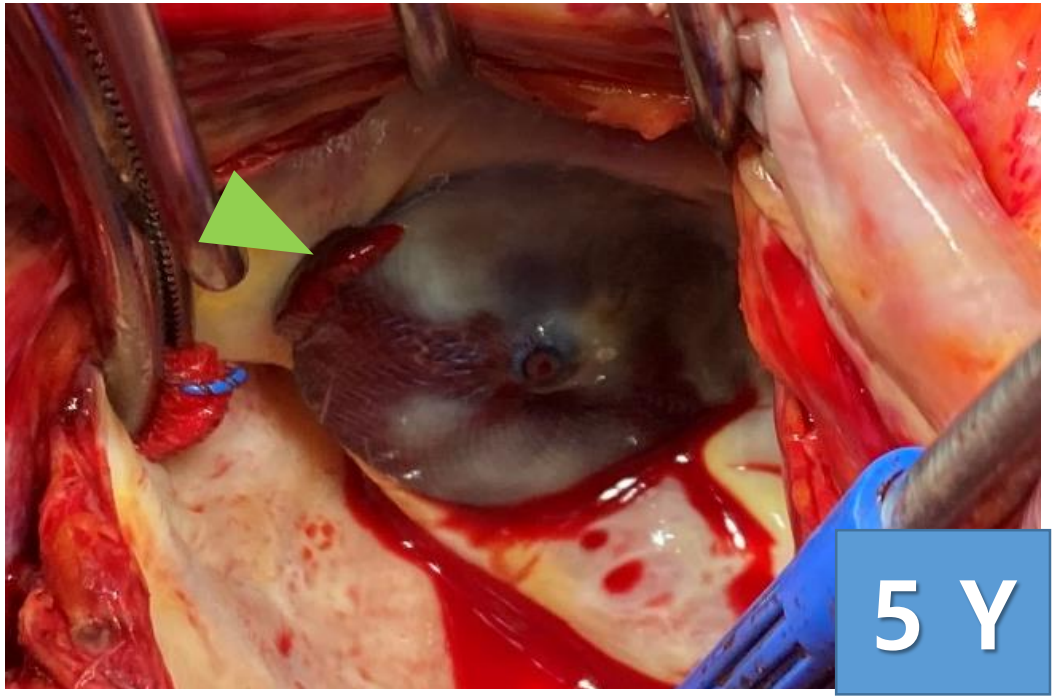
LV non-compaction (EF 28%)

Permanent AF

Recurrent SEE (renal infarct) during OAC & Chronic Anemia (Hb 8-9, associated with prolonged menstrual bleeding),

LAAO with **Amulet (2016) (No additional stroke or SEE)**

→ Heart transplantation in 2018



F/76

Corutesy of J Hong

Persistent AF, Mitral valve regurgitation (MR)

LAAO d/t non-major recurrent bleeding (2016)

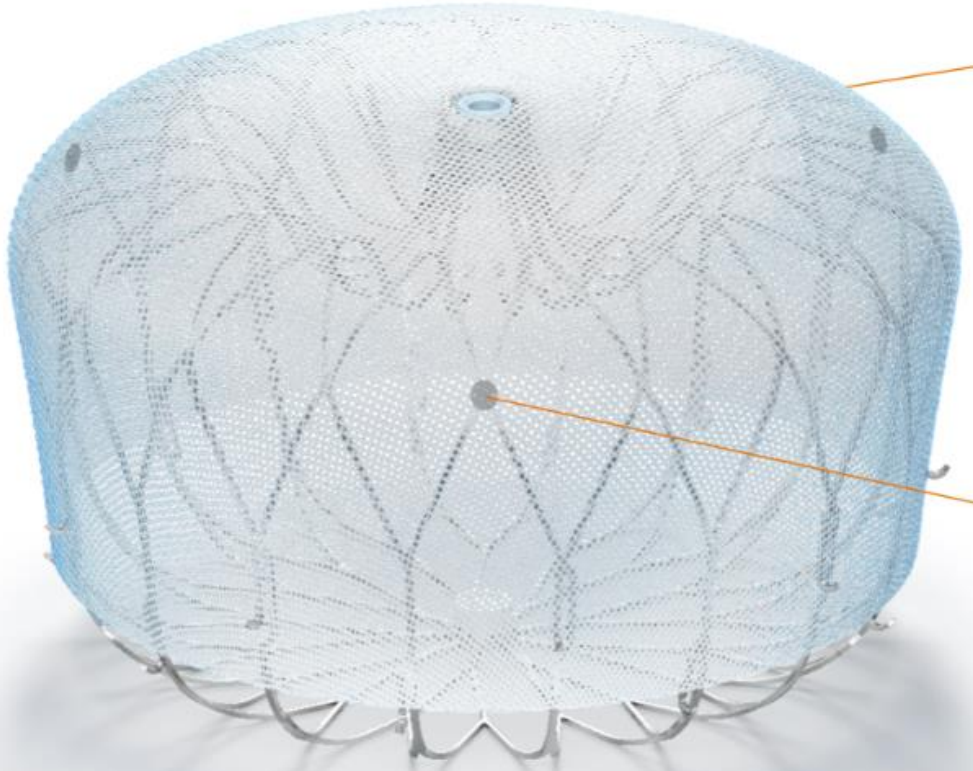
MR progression → MV replacement & Maze op. in 2021

Device related thrombi – Not detected in pre-op. TEE

Kim YJ et al. JACC CV Intv. 2021;14(21):2405-2406.

Effort to improve/facilitate endothelialization

WATCHMAN FLX Platform
with proven safety &
procedural performance



New 40mm device
to treat the widest range of anatomies

HEMOCOAT Technology
a hemocompatible coating to
promote faster, more complete
endothelialization

Three new radiopaque markers
help position and anchor device
with a new level of visual accuracy

More efficient ways using ICE?

CHORUS Minimalist Approach (MA)

- **C**omprehensive
- **H**ybrid
- **O**rganized
- **R**esources
- **U**tilization
- **S**trategy

*** Key Components for CHORUS MA**

- Pre-procedural device size determination
- No Intra-procedural LAA angiography & no touch device delivery (minimize the risk of (micro) thromboembolism)
- By using ICE, general anesthesia becomes unnecessary
- Intra-procedural steps are minimized

*** Advantages of CHORUS style minimalist approach**

- Harmony of improved efficiency & minimized risk
- Minimize redundant (imaging tools/personnel, other personnel – anesthesiologist and accompanying personnel, etc.)

CAUH's Experience

Minimalist approach vs. Conventional approach

	Minimalist approach (n = 28)	**Conventional approach (n = 53)**	***P* value**
Age (years)	74.8 ± 9.5	75.4 ± 11.4	0.815
Male (n, %)	14 (50.0 %)	28 (52.8 %)	0.993
CHA_2DS_2-VASc score (pts)	4.5 ± 1.4	4.1 ± 1.6	0.500
Prior Ischemic Stroke	14 (50.0 %)	21 (39.6 %)	0.509
HAS-BLED score (pts)	3.9 ± 0.6	3.9 ± 0.8	0.751
Procedure-Related Outcomes			
Success rate	28 (100 %)	52 (98.1 %)	0.455

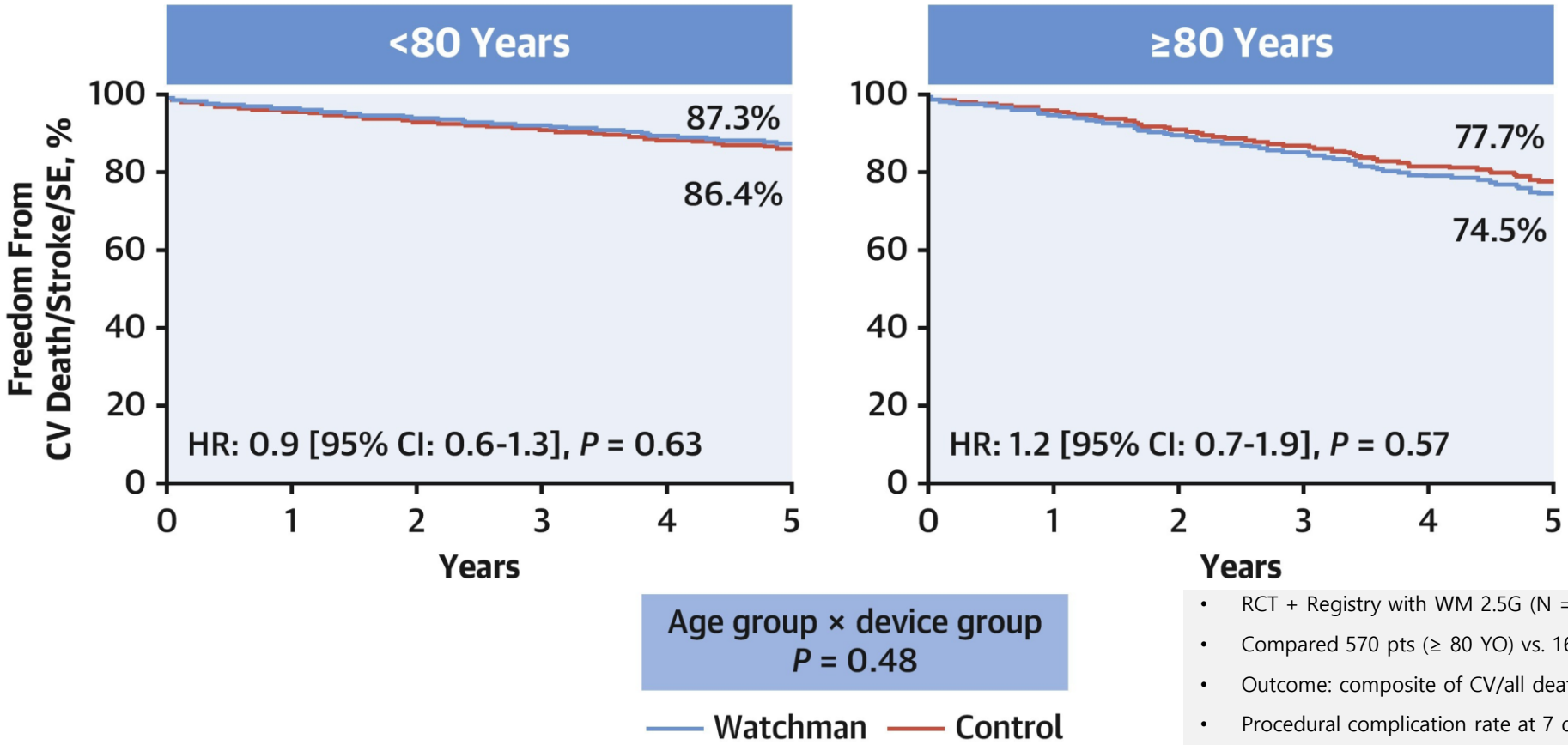
Poster Presentation in HRS 2023

	Minimalist approach (n = 28)	Conventional approach (n = 53)	*P* value
Procedure-Related Outcomes			
Procedure duration (min)	88.7 ± 62.1	108.0 ± 37.6	0.141
Fluoroscopy time (min)	10.2 ± 4.8	20.6 ± 9.8	< 0.001
Radiation exposure (DAP)	44.0 ± 48.3	131.9 ± 128.8	0.001
Contrast (mL)	150.9 ± 73.2	296.5 ± 155.8	0.002
Device size (mm)	26.8 ± 3.0	27.9 ± 3.7	0.443
# of Implantation Attempt	1.6 ± 0.9	2.8 ± 2.1	< 0.001
# of Angiography	2.0 ± 1.3	5.7 ± 4.7	< 0.001
Pericardial effusion	1 (14.3 %)	3 (6.8 %)	1.000
Peri-device leakage			0.935
Insignificant (< 3mm)	11 (39.2 %)	28 (59.6 %)	
Significant (≥ 3mm)	0	3 (5.7 %)	
Device embolization	0	1 (1.9 %) *	0.455
Peri-procedural Stroke	0	1 (1.9%) **	0.455

In Elderly Patients (≥80 years old), LAAO is similarly effective

Extended Application – Elderly (>80 Y)

CENTRAL ILLUSTRATION: 5-Year Kaplan-Meier Curves for the Primary Composite Outcome of CV Death, Stroke, or Systemic Embolism Stratified by Age

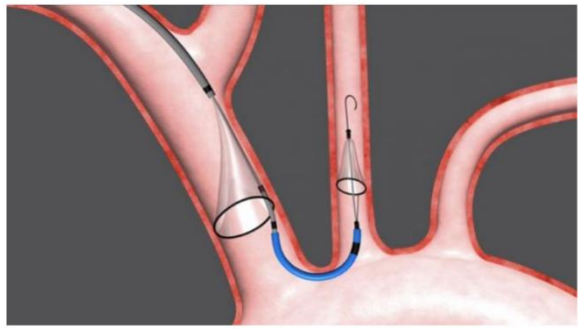


Sulaiman S, et al. J Am Coll Cardiol EP. 2023;9(5):669-676.

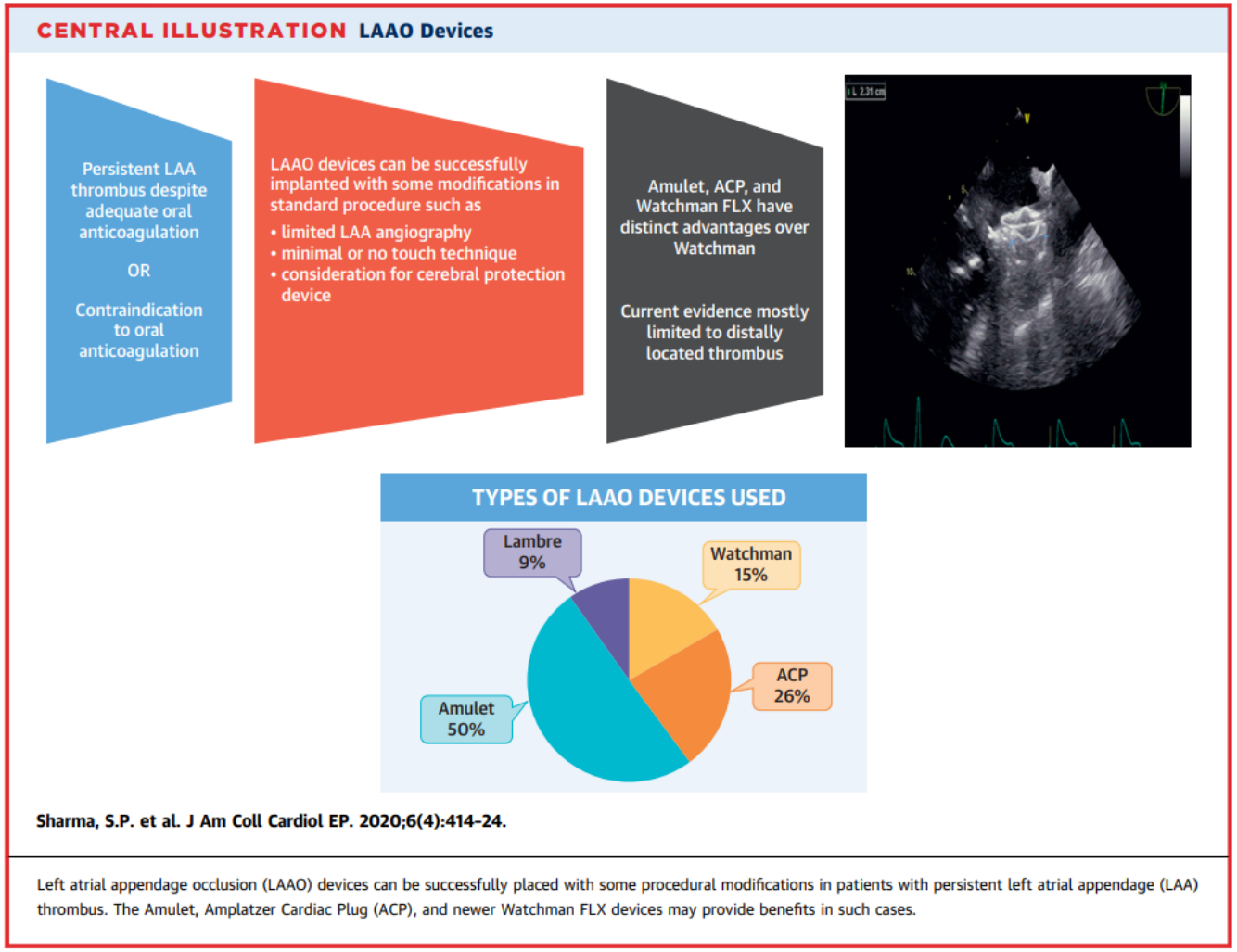
- RCT + Registry with WM 2.5G (N = 2,258)
- Compared 570 pts (≥ 80 YO) vs. 1688 (<80 YO)
- Outcome: composite of CV/all death + stroke/SE at 5 years
- Procedural complication rate at 7 days: similar in both groups
- In <80 YO group: 12.0% in device group vs. 13.8% in control group (HR 0.9, 95% CI: 0.6–1.4)
- In ≥ 80 YO group: 25.3% vs. 21.7% (HR 1.2, 95% CI: 0.7–2.0)
- Interaction P = 0.48 (no interaction between age and treatment)

In Cases with LAA Thrombi…

- (N)OAC failure?
- In spite of appropriate anticoagulation, LAA thrombi persists
- Lobe & disc type m/c (85%)
- Cerebral protection device (CPD) use: 29%

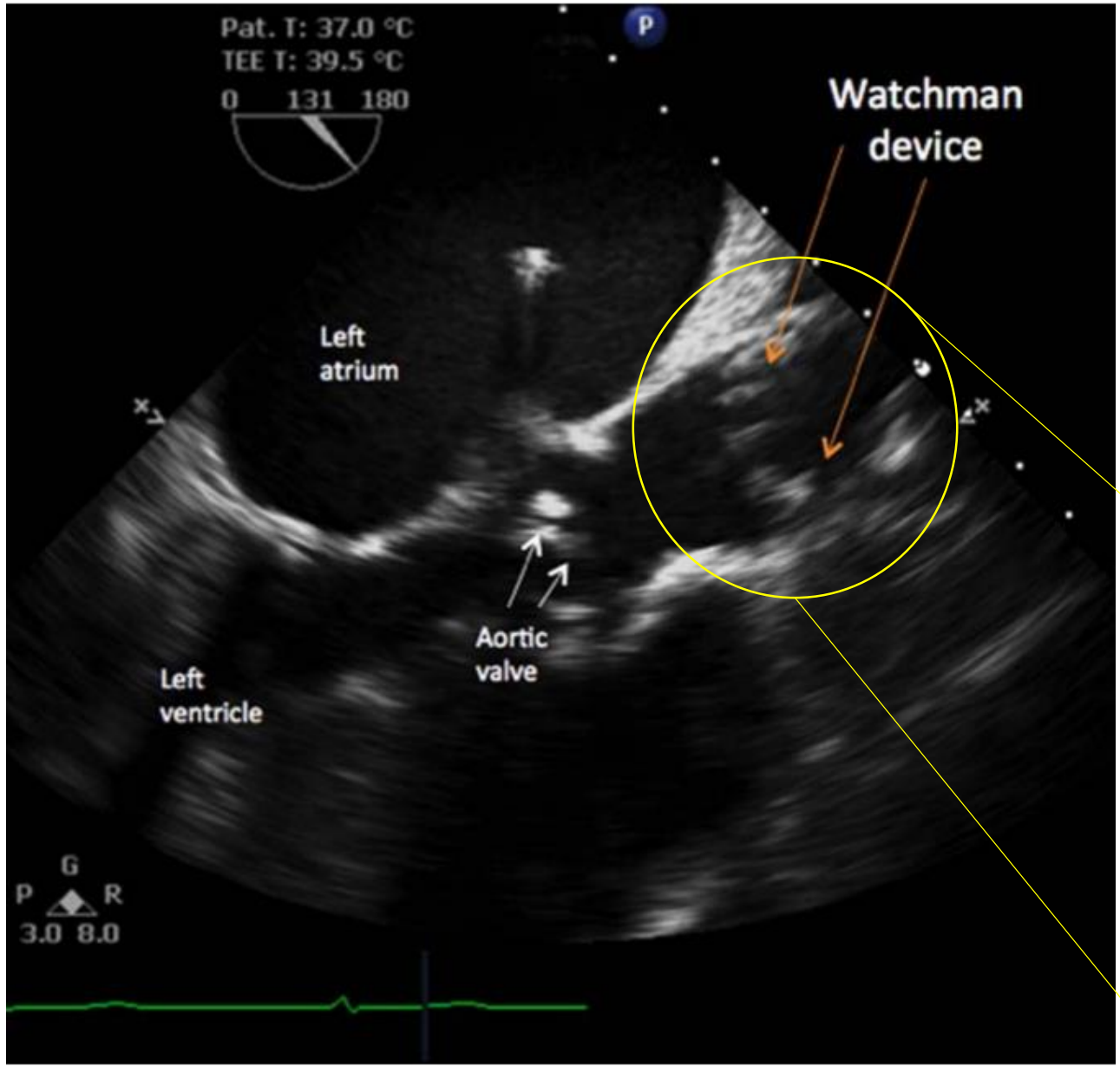


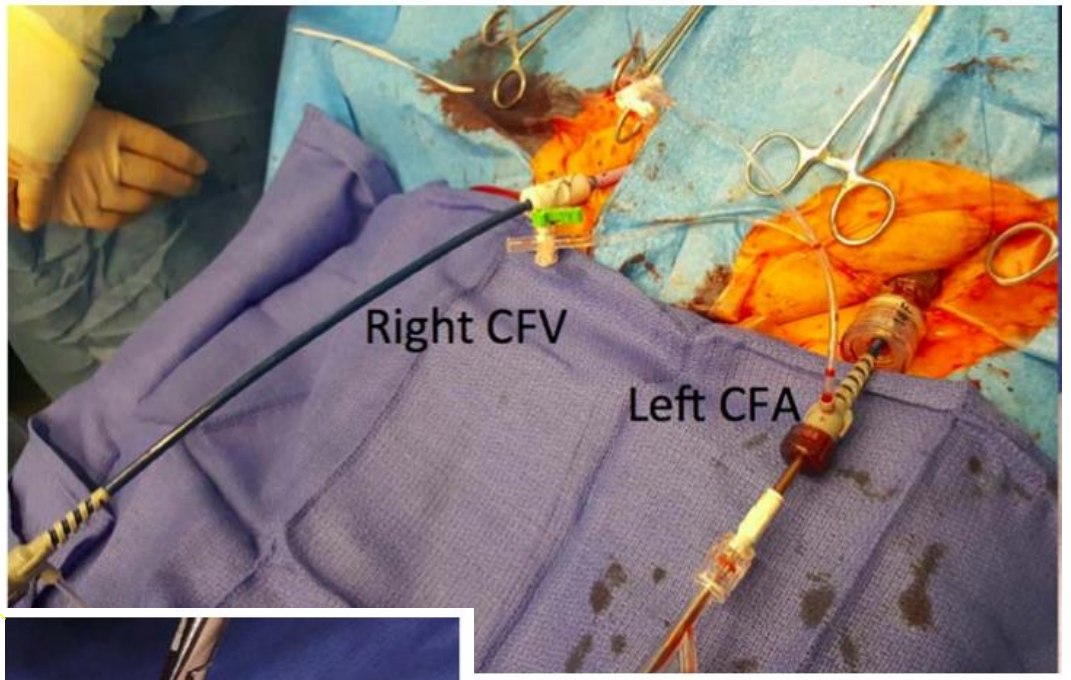
Sentinel device
Not applicable to LAAO
Only for TAVR!!

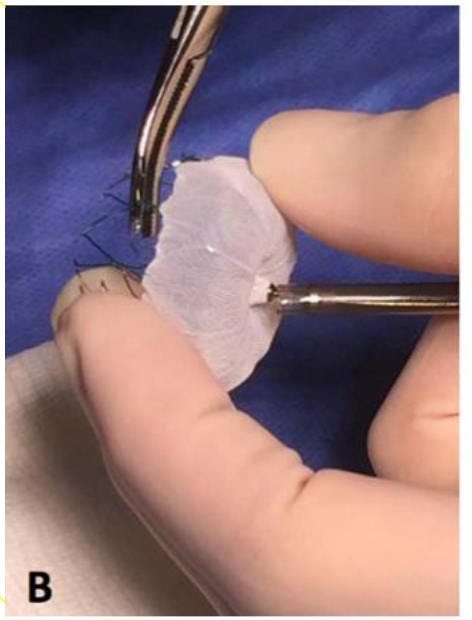


J Am Coll Cardiol EP 2020;6:414–24

WM Used as CPD





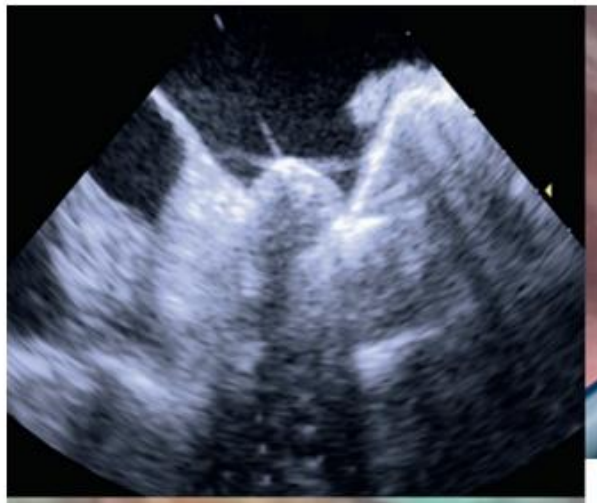


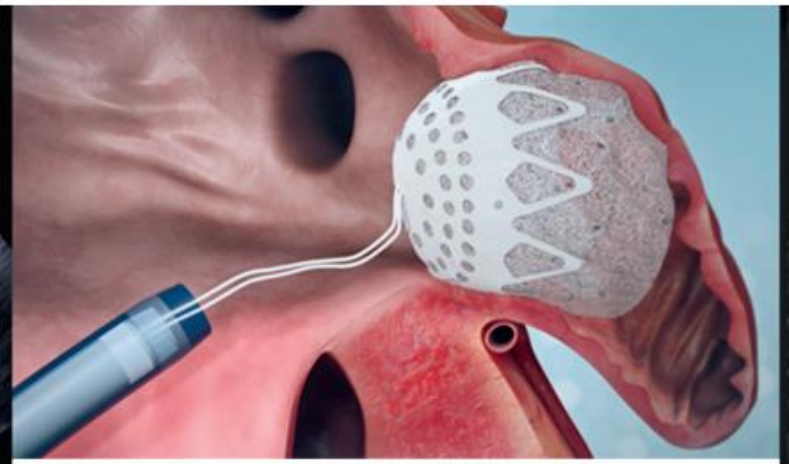
Anchoring barbs were manually inverted!

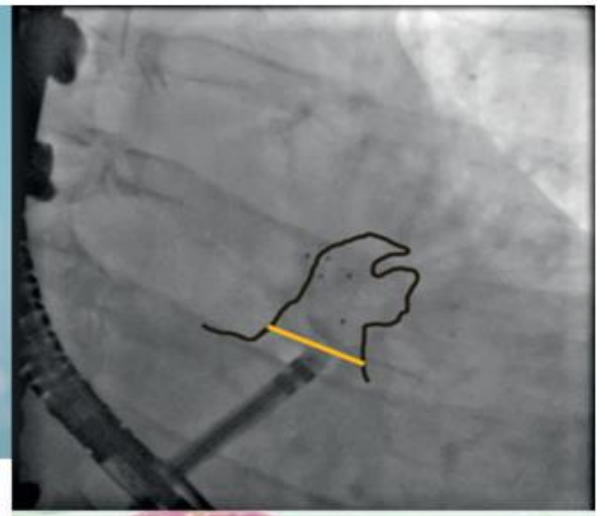
Yadav et al. Catheterization and Cardiovascular Interventions 2018; 92:433–436.

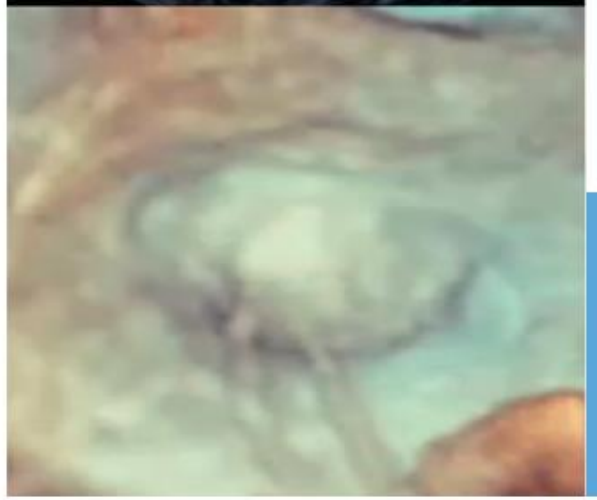
More Conformability & Generous Sizing

CENTRAL ILLUSTRATION Left Atrial Appendage Occlusion With the Novel Conformable Device Using Intracardiac Echocardiography



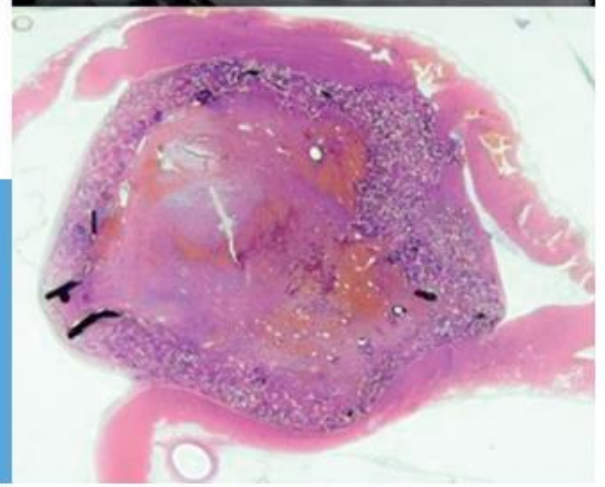


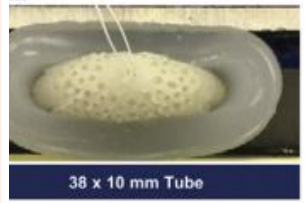


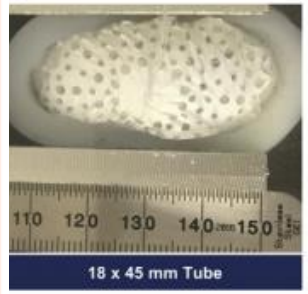


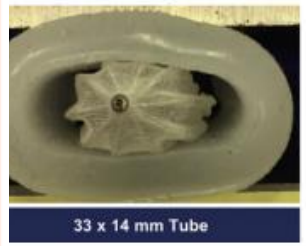
15 AF pts underwent left atrial appendage occlusion using intracardiac echocardiography
CHA_2DS_2-VASc score 4.1 ± 1.7
All pts received dual antiplatelet therapy post left atrial appendage occlusion

Technical success 100%
Major procedure related complications 0%
Peri device leak ≥5 mm 0%
Device related thrombus 1 pt (6.6%)
Stroke/thromboembolism 0%
Device embolization 0%









Turagam, M.K. et al. J Am Coll Cardiol EP. 2022;8(2):197–207.

LAAO is Usual Practice, More in the Future!

- Growing evidences support LAAO's efficacy & safety, globally
- Better outcomes by achieving correct closure
- Better safety by embolic protection devices esp. in OAC failure
- New devices with improved design and function will be available soon – improved conformability, generous sizing
- Adopt deflectable delivery system – BSc, Abbott, Lifetech, etc.
- Improved workflow by minimalist approach, ICE, newer trans-septal system – direct approach with delivery system

Take Home Messages

- **LAAO** became a part of **usual clinical practice with concrete & growing evidences** regardless of gov't policy in KOREA
- **LAAO** is **NOT merely an alternative option for OAC contraindication, BUT a non-pharmacological adjunctive tool for thrombotic burden reduction**
- **LAAO's safety & efficacy is dramatically improving** in association with imaging & engineering (3DP simulation, CFD analysis, ICE (2D → 3/4D)materials facilitating endothelialization & improved device design)
- For facilitated adoption, **close collaboration between cardiology and neurology (NU, NS) is critical!**


Thank you
for
Your Attention
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