Left Atrial Appendage occlusion in AF

2024 Heart & Vascular Conference

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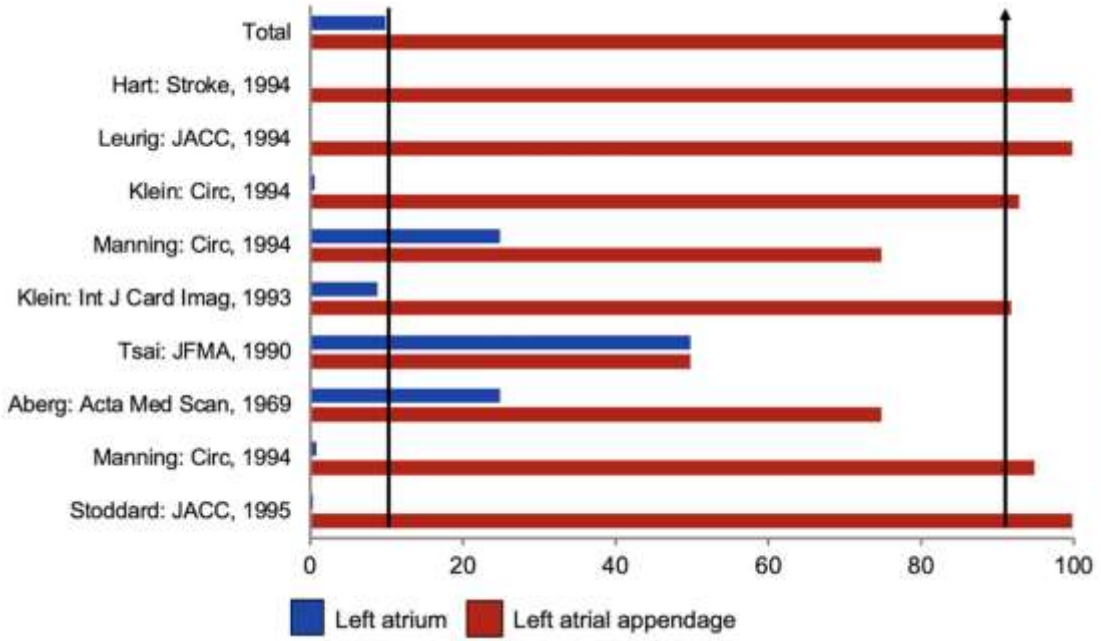
Disclosures

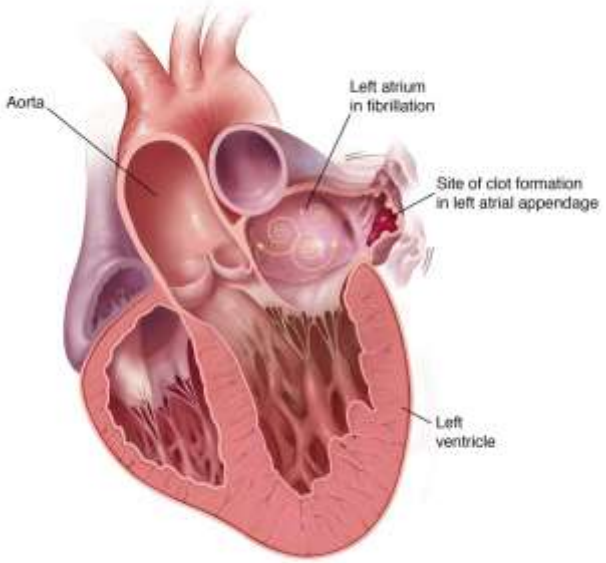
Consultant- Biosense Webster
Consultant - Medtronic

Left Atrial Appendage Thrombus

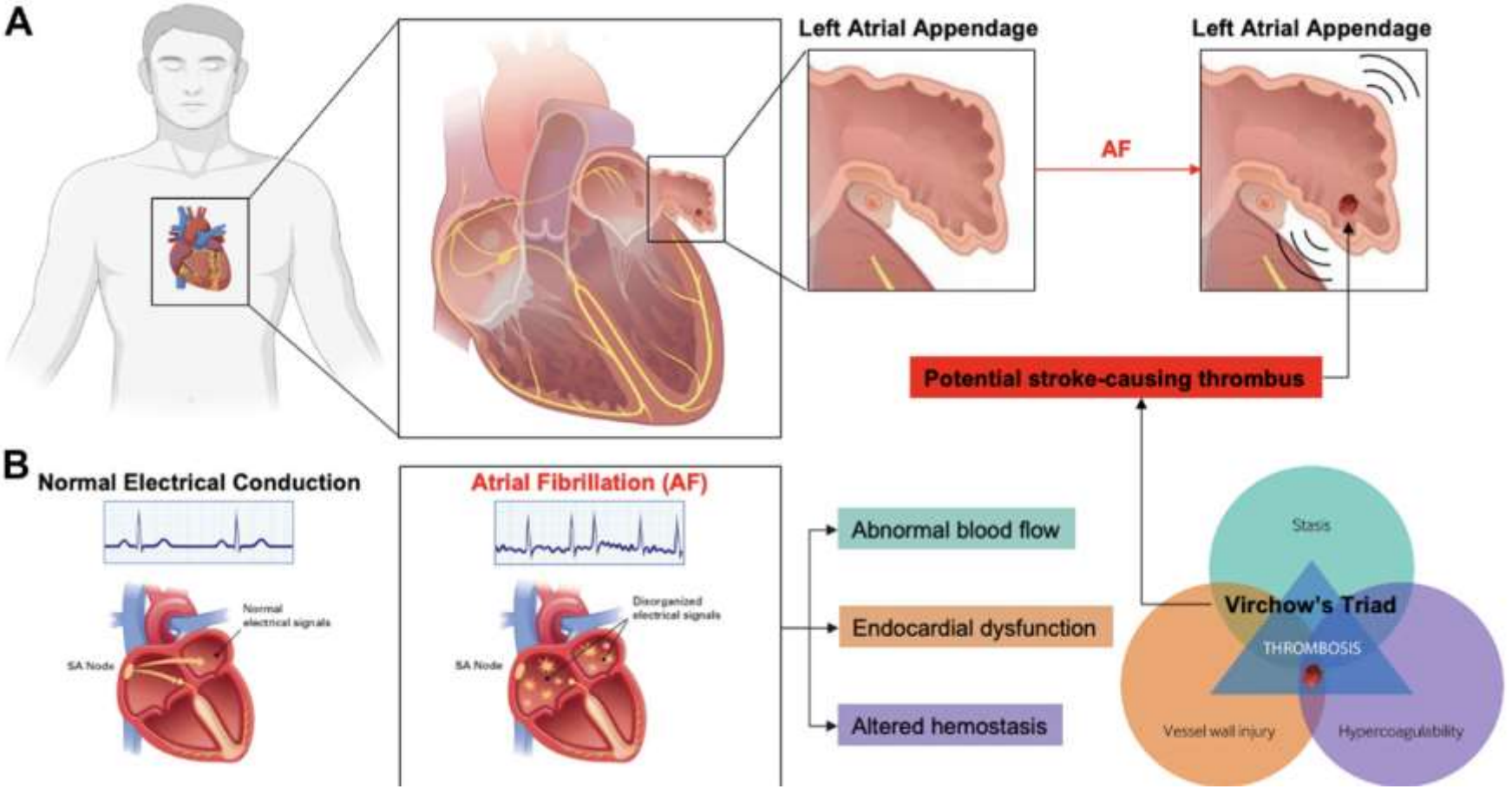

Total
Hart: Stroke, 1994
Leurig: JACC, 1994
Klein: Circ, 1994
Manning: Circ, 1994
Klein: Int J Card Imag, 1993
Tsai: JFMA, 1990
Aberg: Acta Med Scan, 1969
Manning: Circ, 1994
Stoddard: JACC, 1995
0
20
40
60
80
100
Left atrium
Left atrial appendage

91% in LAA

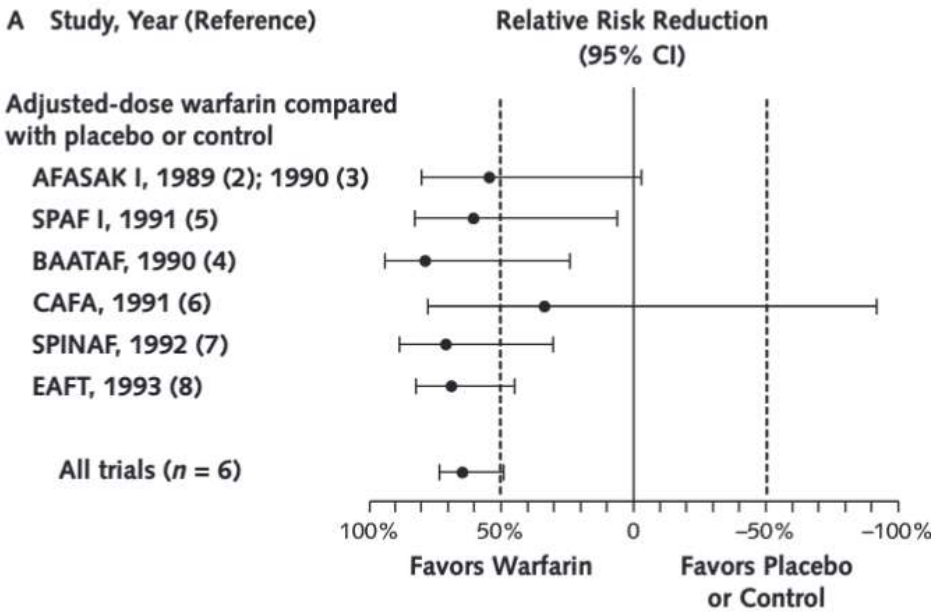

METRIC 1
2

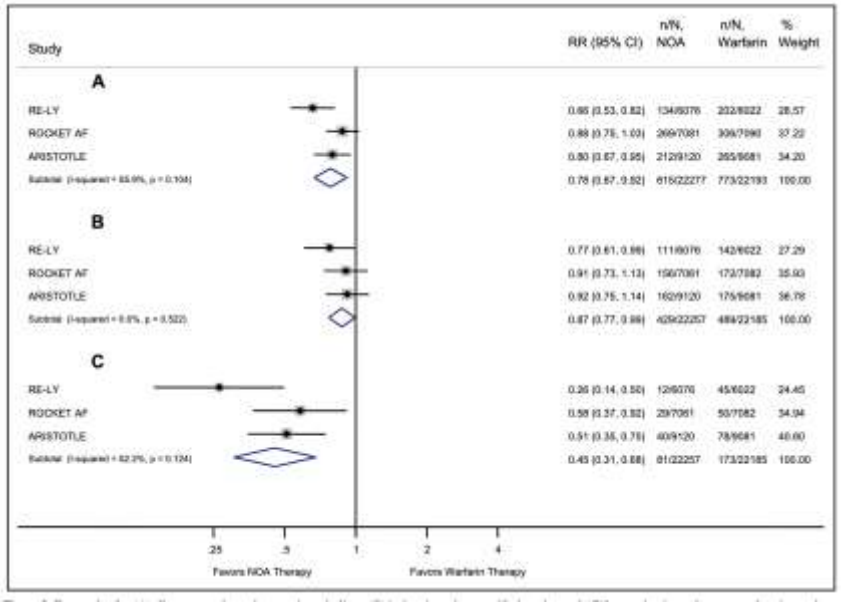

Aorta
Left atrium in fibrillation
Site of clot formation in left atrial appendage
Left ventricle

Pathophysiology 101



We know anticoagulation works

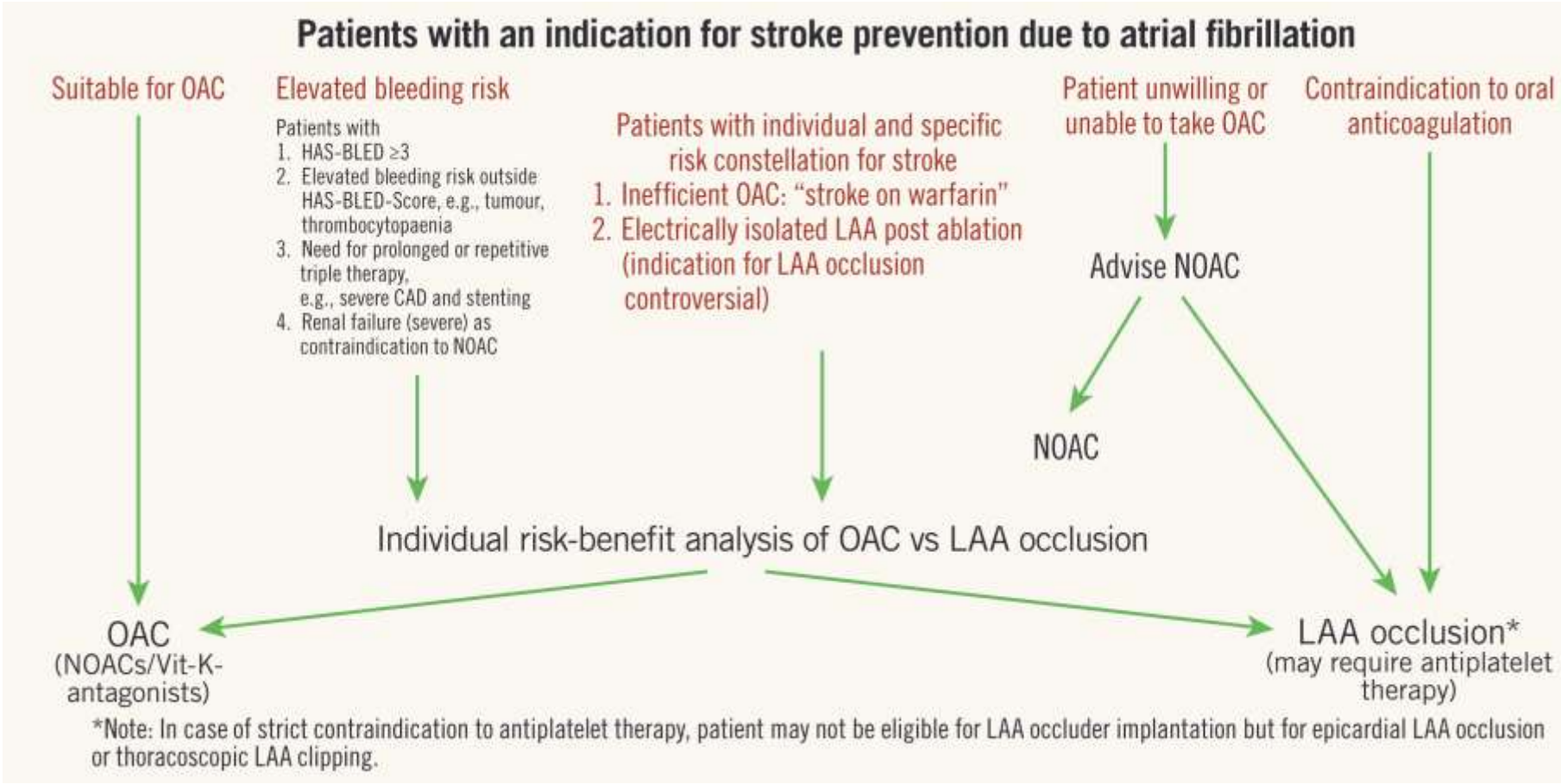




1.Hart RG, Pearce LA, Aguilar MI. Meta-analysis: antithrombotic therapy to prevent stroke in patients who have nonvalvular atrial fibrillation. Ann Intern Med. 2007 Jun 19;146(12):857-67. doi: 10.7326/0003-4819-146-12-200706190-00007. PMID: 17577005.

2.Miller, C. S., Grandi, S. M., Shimony, A., Filion, K. B. & Eisenberg, M. J. Meta-Analysis of Efficacy and Safety of New Oral Anticoagulants (Dabigatran, Rivaroxaban, Apixaban) Versus Warfarin in Patients With Atrial Fibrillation. *Am J Cardiol* **110**, 453–460 (2012).

So, who then, is the LAAO Candidate?



Noncompliant patients or patients unwilling to take OAC.

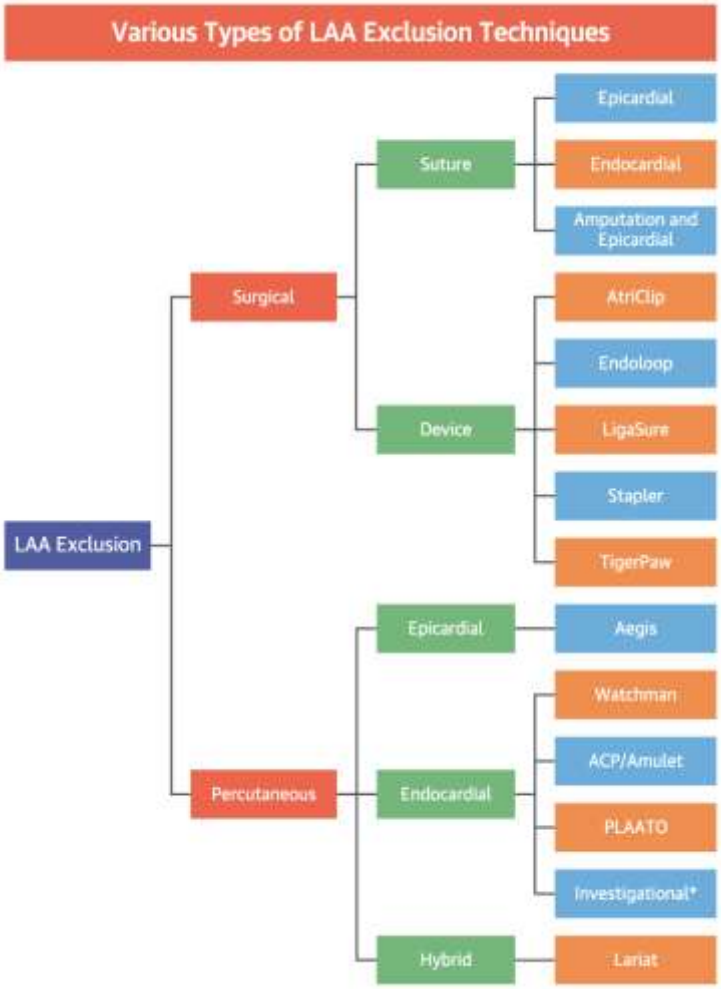
Clinical situation and therapeutic concept	Consensus statement	Icon
Any AF patients with an increased risk for stroke and embolism and no contraindication for OAC should receive personal and detailed advice that according to current evidence long-term OAC treatment is the preferred prophylactic strategy.	"Should do this"	
In AF patients with a high risk score for stroke and embolism who refuse OAC even after personal and detailed advice, LAA occlusion may be considered	"May do this"	
In patients with documented noncompliance, LAA occlusion can be discussed as a therapeutic alternative after attempts to resolve the reasons for noncompliance	"May do this"	
In patients who are opposed to chronic drug intake, LAA occlusion is currently not offered as a simple and equally effective treatment alternative	"Should not do this"	

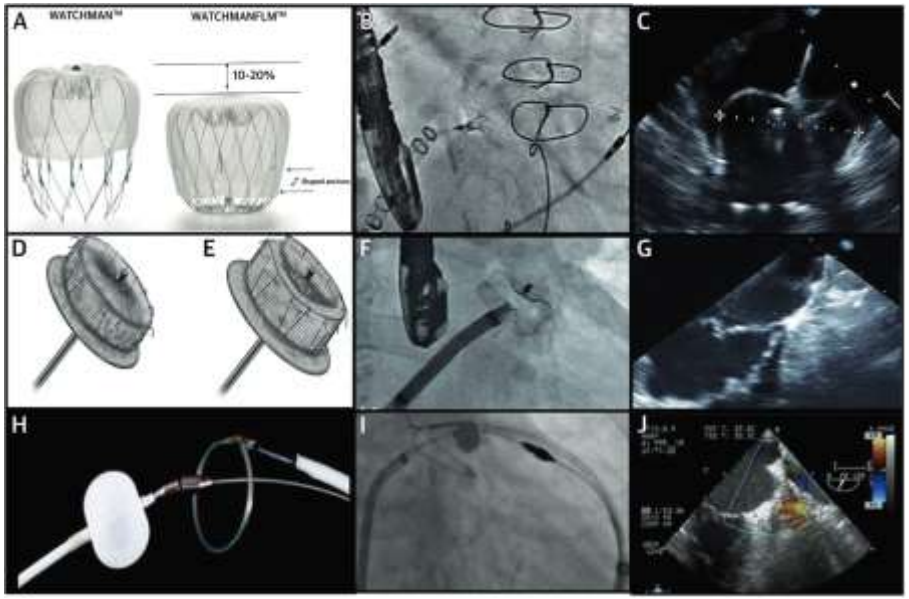
Recommendations for Percutaneous Approaches to Occlude the LAA
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	Recommendations
2a	B-NR	1. In patients with AF, a moderate to high risk of stroke (CHA_2DS_2-VASc score ≥2), and a contraindication (Table 14) to long-term oral anticoagulation due to a nonreversible cause, percutaneous LAAO (pLAAO) is reasonable.[1–4]
2b	B-R	2. In patients with AF and a moderate to high risk of stroke and a high risk of major bleeding on oral anticoagulation, pLAAO may be a reasonable alternative to oral anticoagulation based on patient preference, with careful consideration of procedural risk and with the understanding that the evidence for oral anticoagulation is more extensive.[1–3,5,6]

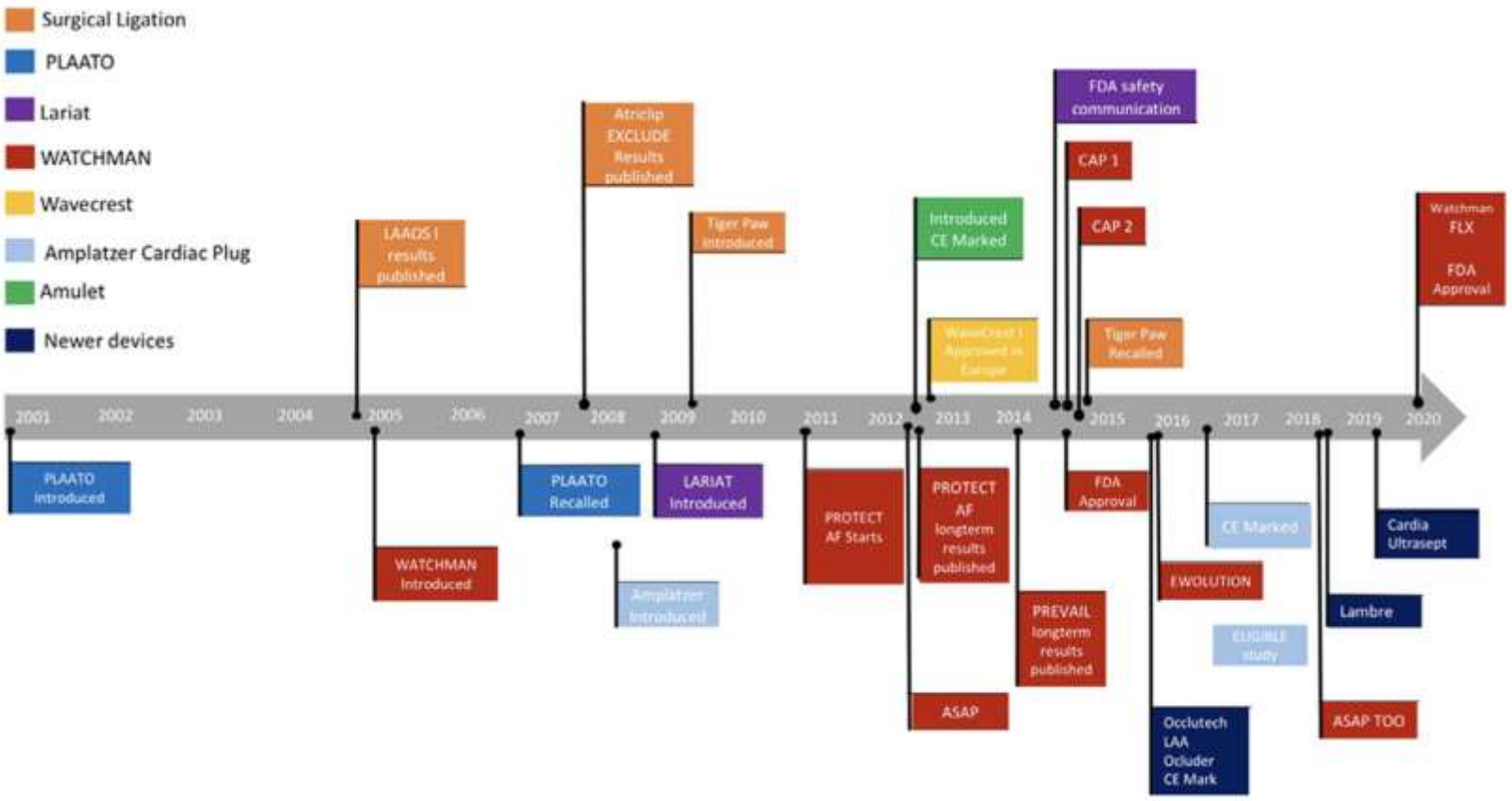
Joglar, J. A. et al. 2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation 149, e1–e1

Percutaneous LAA Exclusion Devices

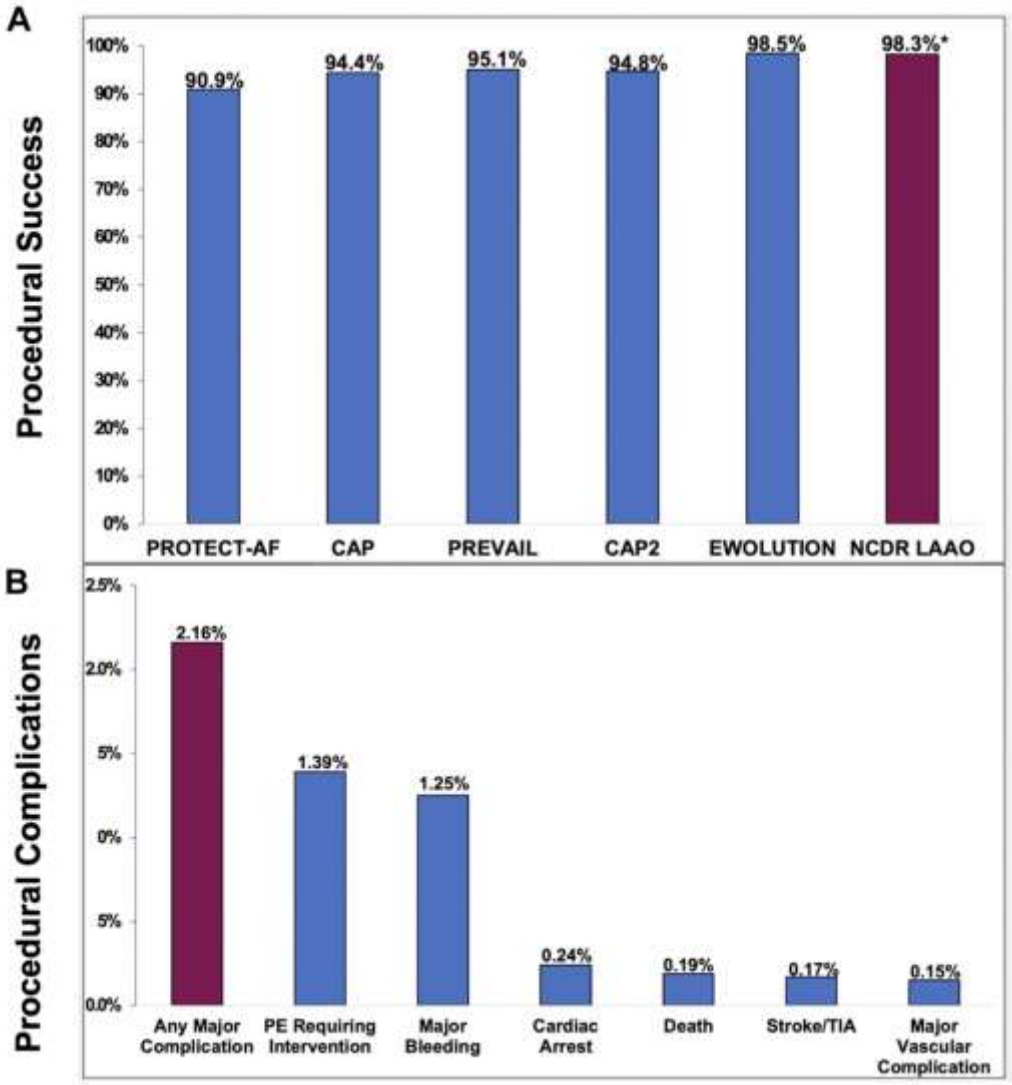




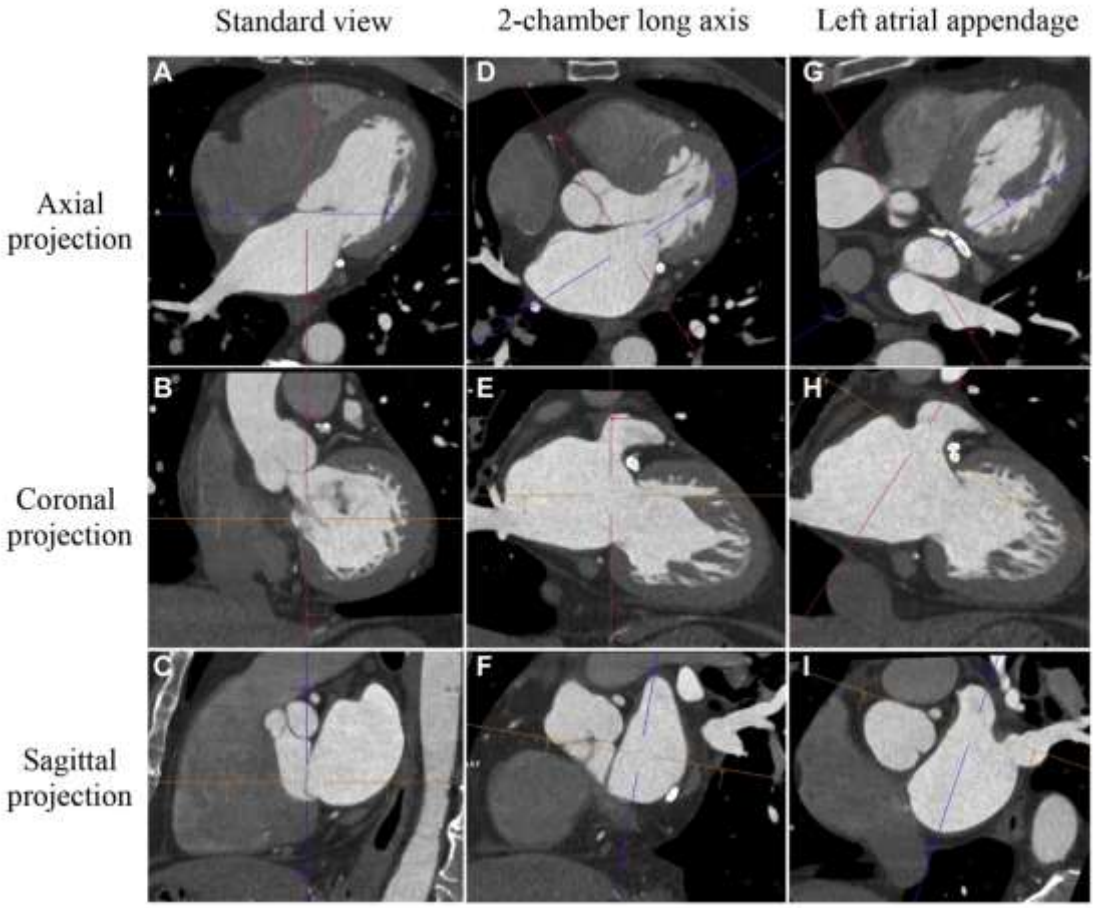
Timeline showing important dates of left atrial appendage occlusion trials and US FDA milestones in the United States.



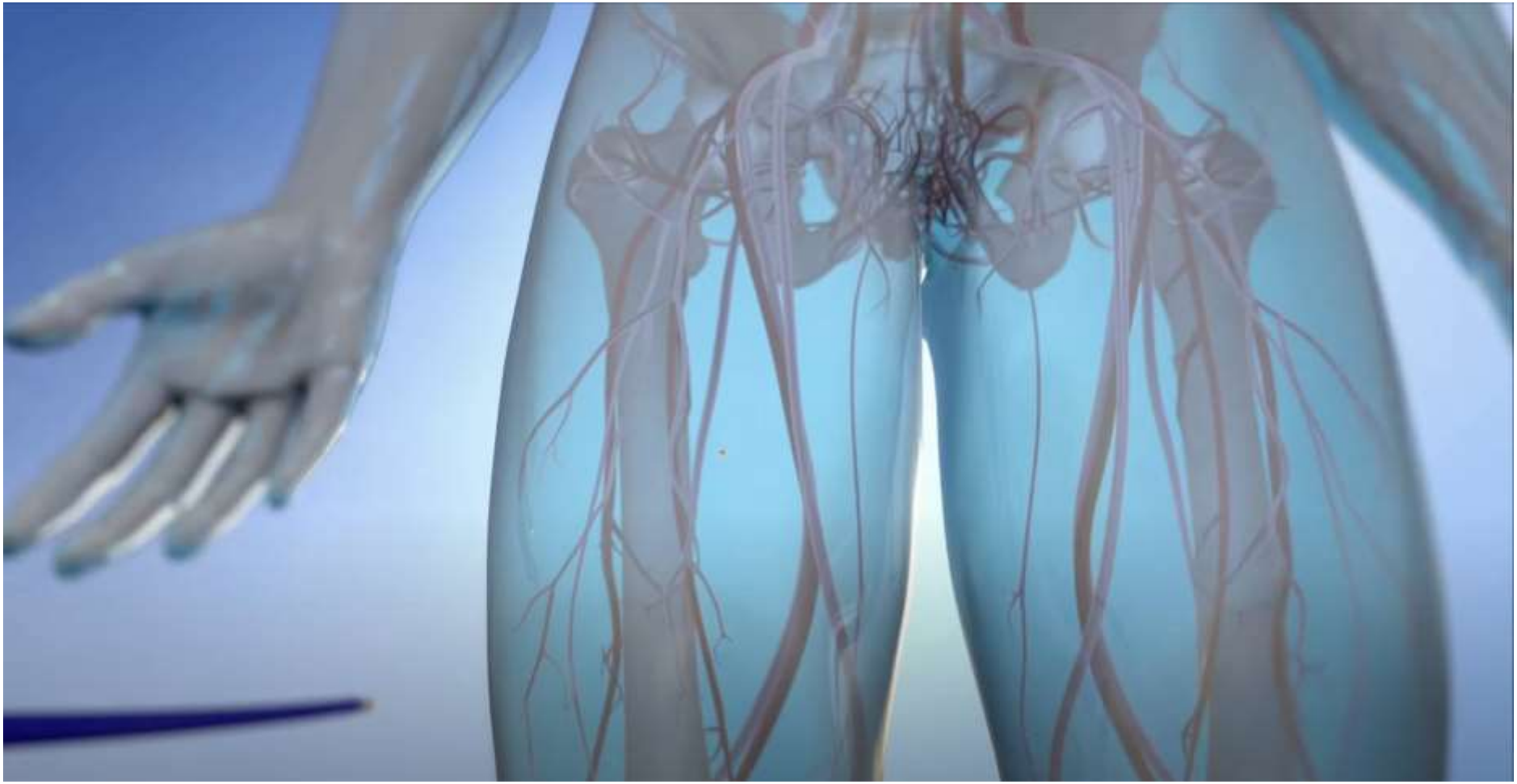
Procedural Outcomes in the NCDR LAAO Registry

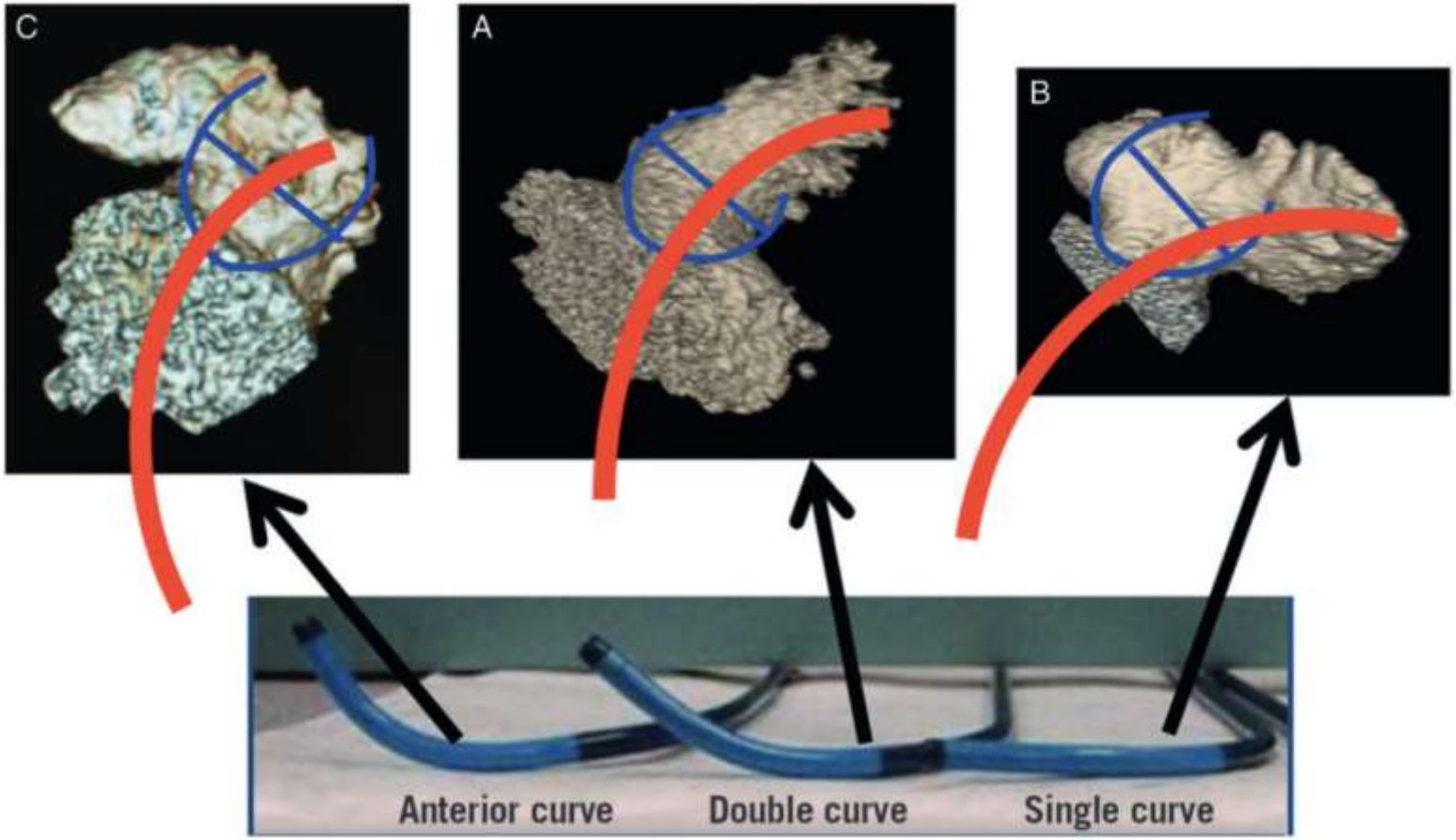


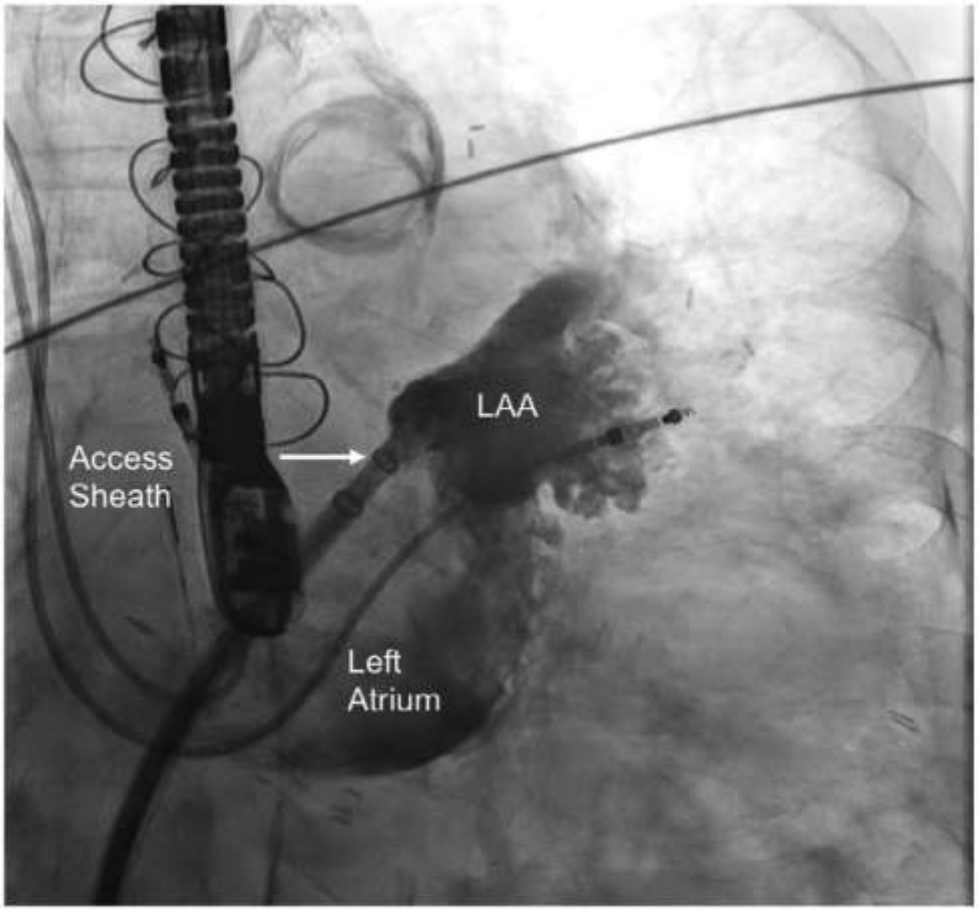
Imaging Analysis of Cardiac Computed Tomographic Images for Left Atrial Appendage Occlusion

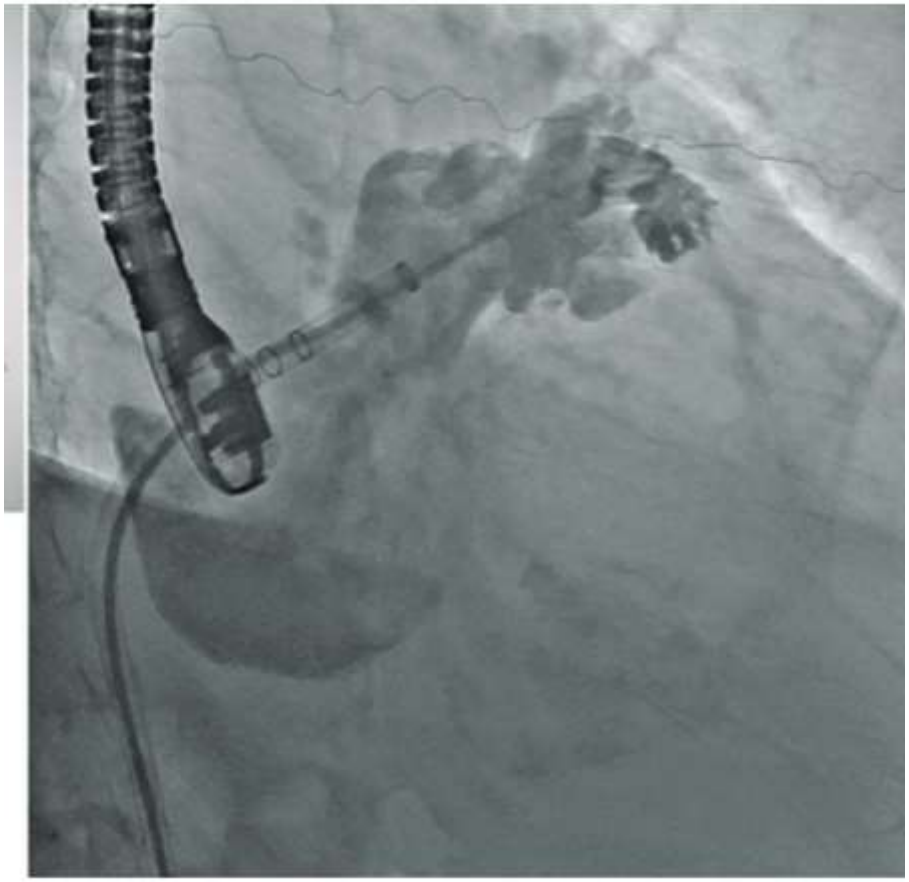


LAAO implant Procedure

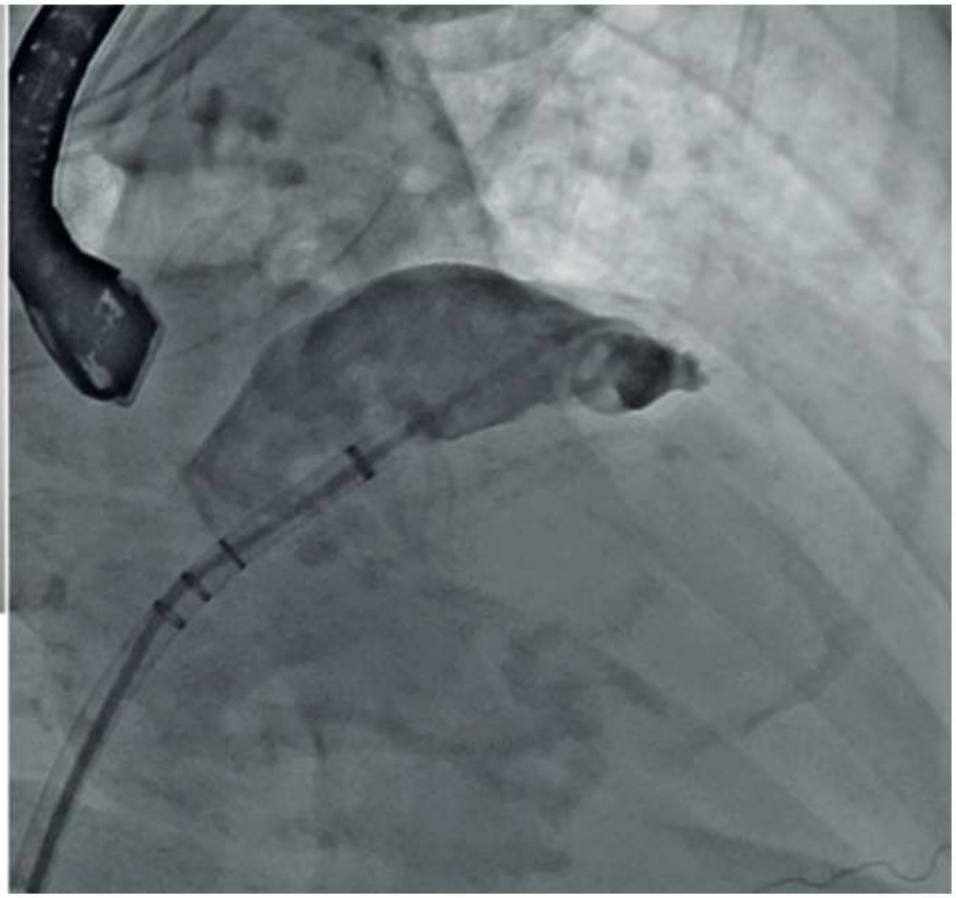



C
A
B
Anterior curve
Double curve
Single curve

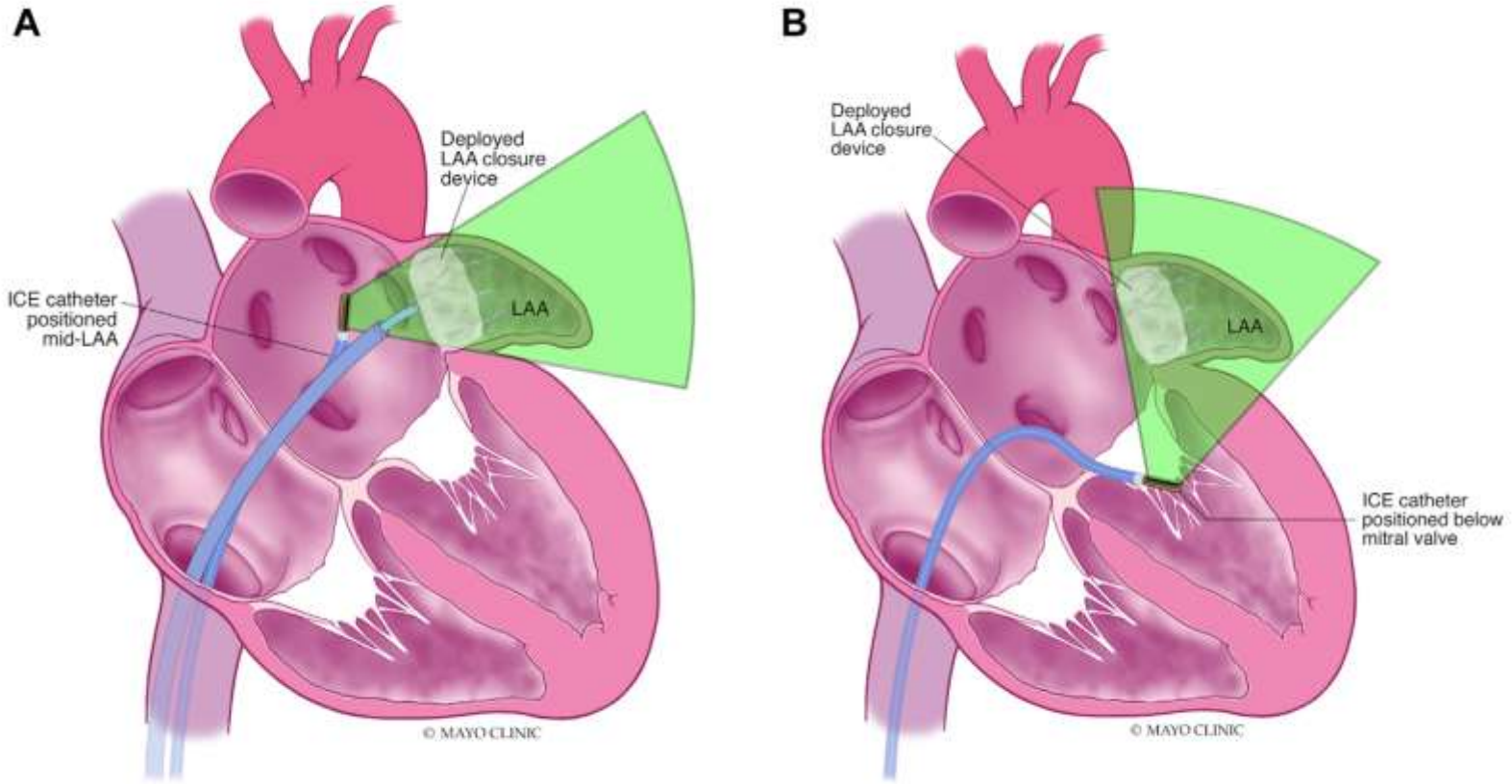

LAA
Access
Sheath
Left
Atrium



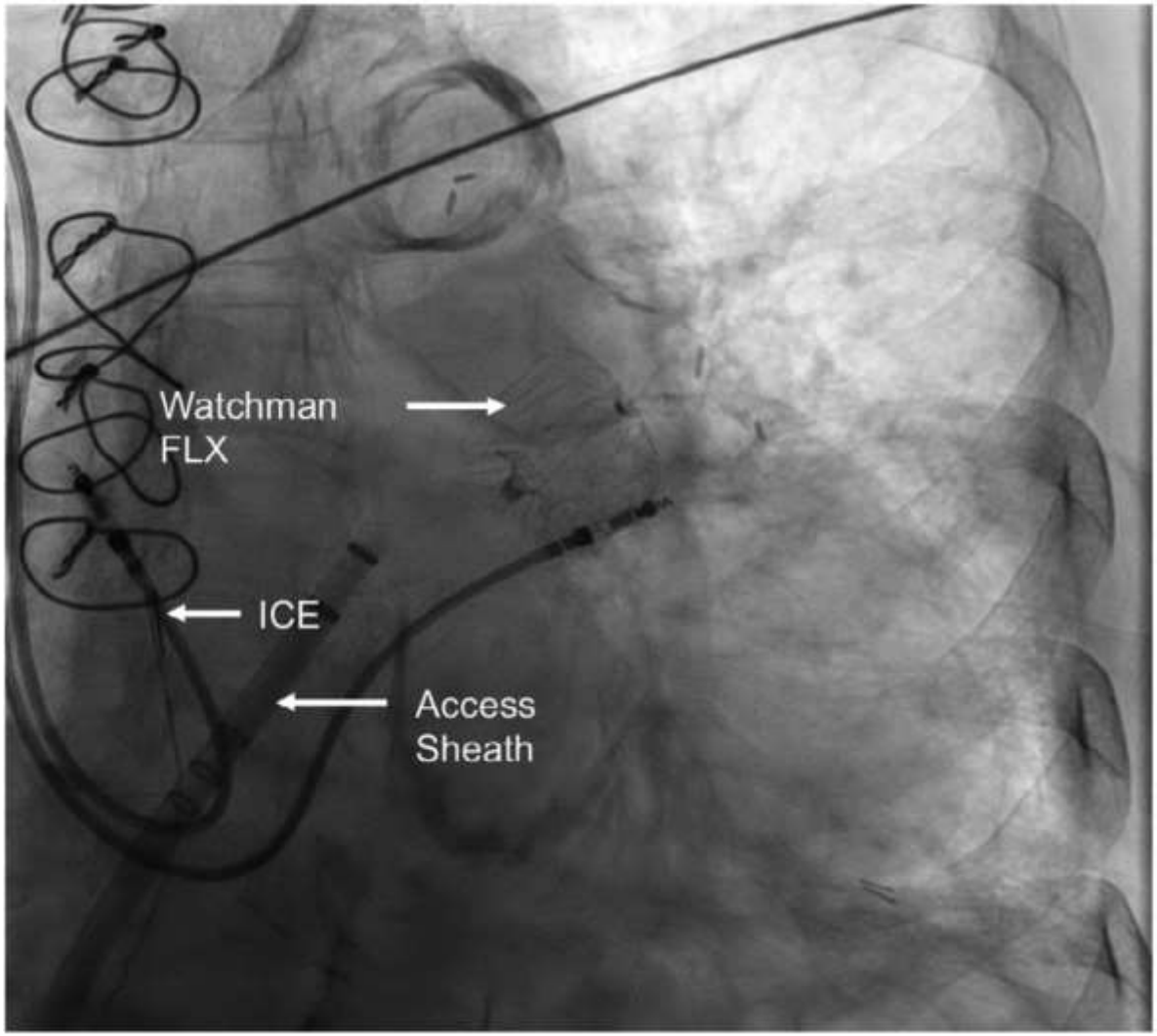
RAO cranial



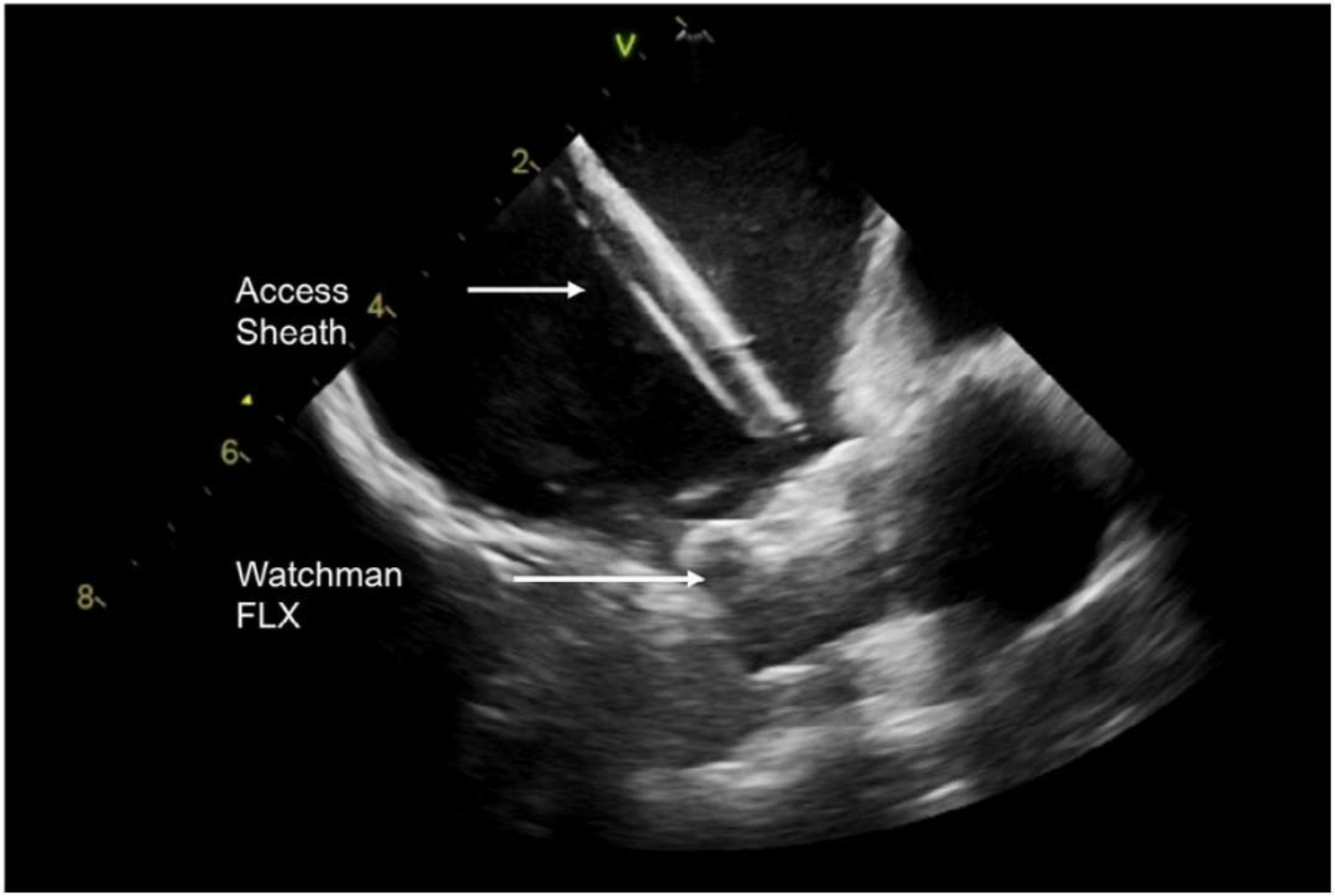
Simplified Imaging Protocol for ICE-Guided LAAO



Fluoroscopic image of a Watchman FLX device released using intracardiac echo guidance (ICE)

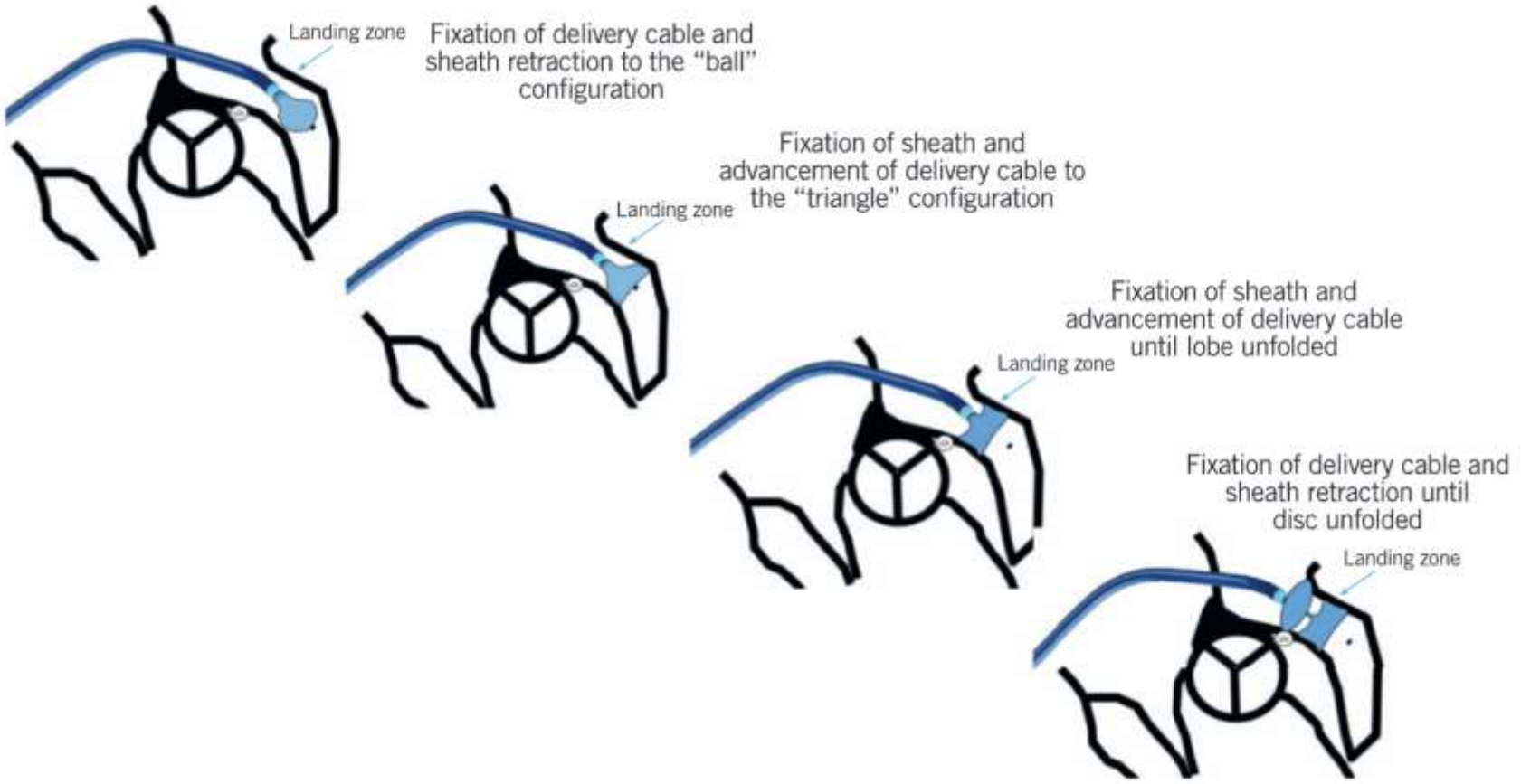


Intracardiac echocardiogram image of a deployed Watchman FLX device

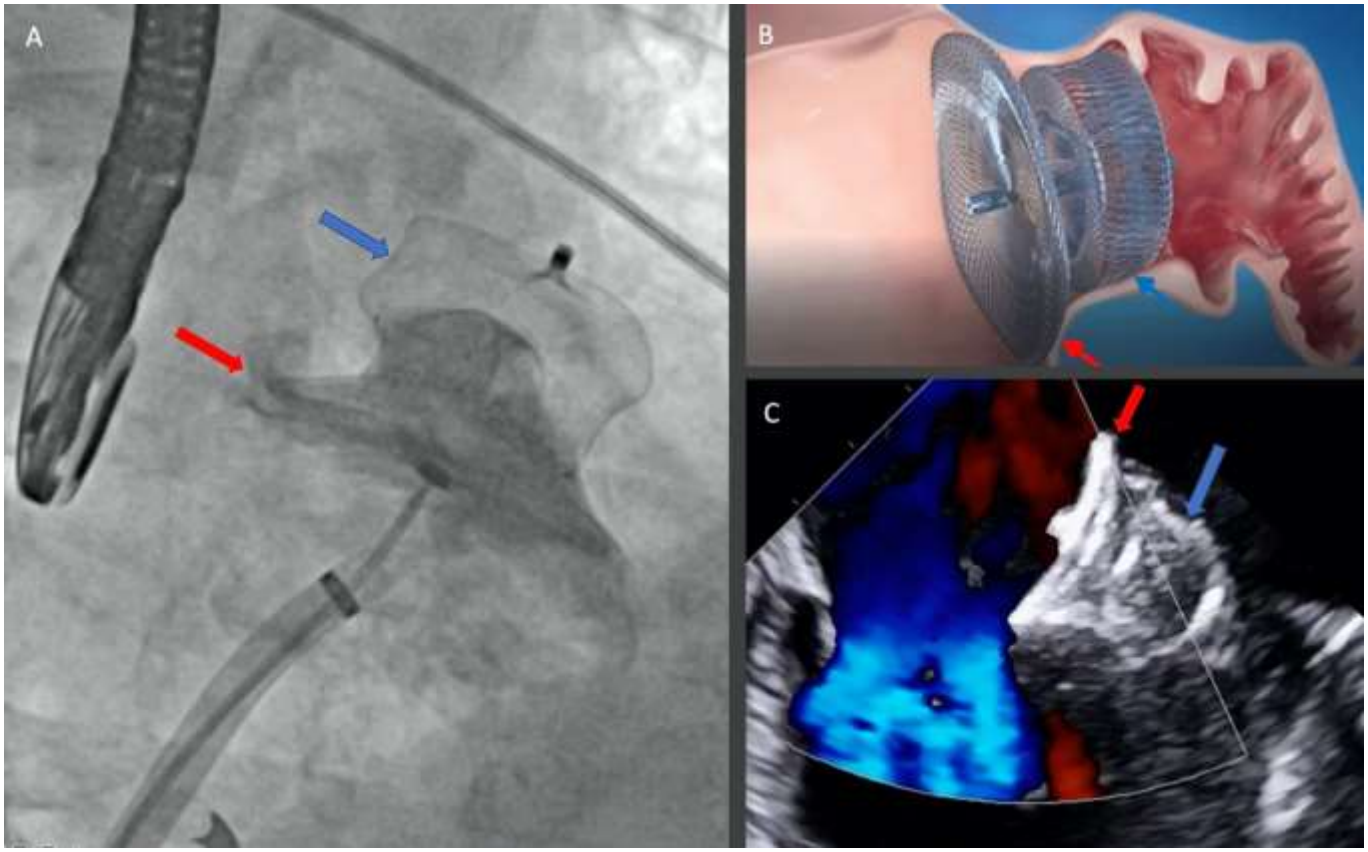


PASS criteria for device release

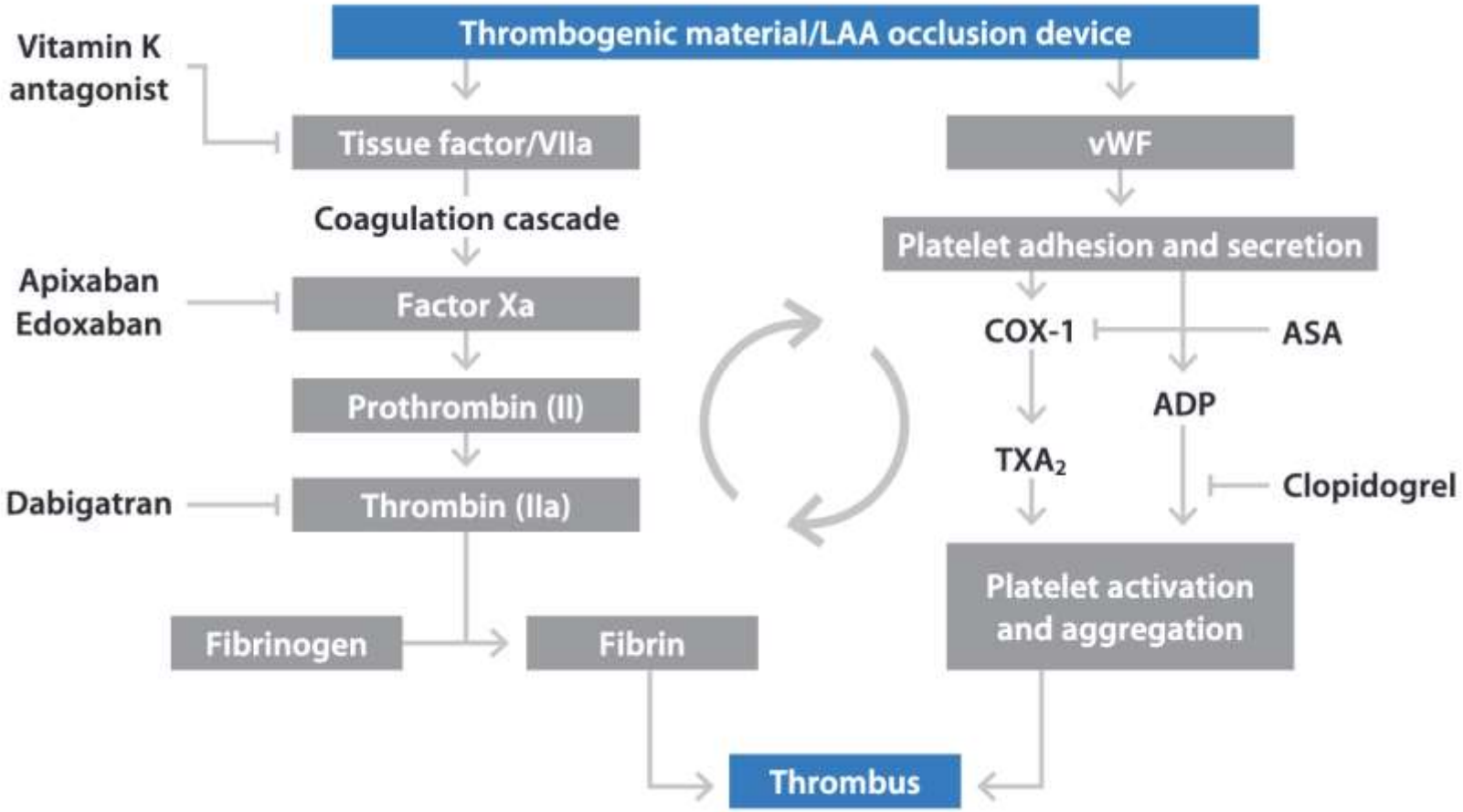
- Position: The proximal shoulders of the device are at or just distal to the LAA ostium and span the entire breadth of the LAA ostium.
- Anchor: The device does not shift and the device and LAA move together when the deployment knob is gently withdrawn and released.
- Size: There is adequate device compression according to the maximal shoulder-to-shoulder diameter of the device by TEE (see Table 1).
- Seal: All lobes are distal to the shoulders of the device and are sealed (defined by $\leq$5-mm jet on TEE).


Landing zone
Fixation of delivery cable and sheath retraction to the "ball" configuration
Landing zone
Fixation of sheath and advancement of delivery cable to the "triangle" configuration
Landing zone
Fixation of sheath and advancement of delivery cable until lobe unfolded
Fixation of delivery cable and sheath retraction until disc unfolded
Landing zone

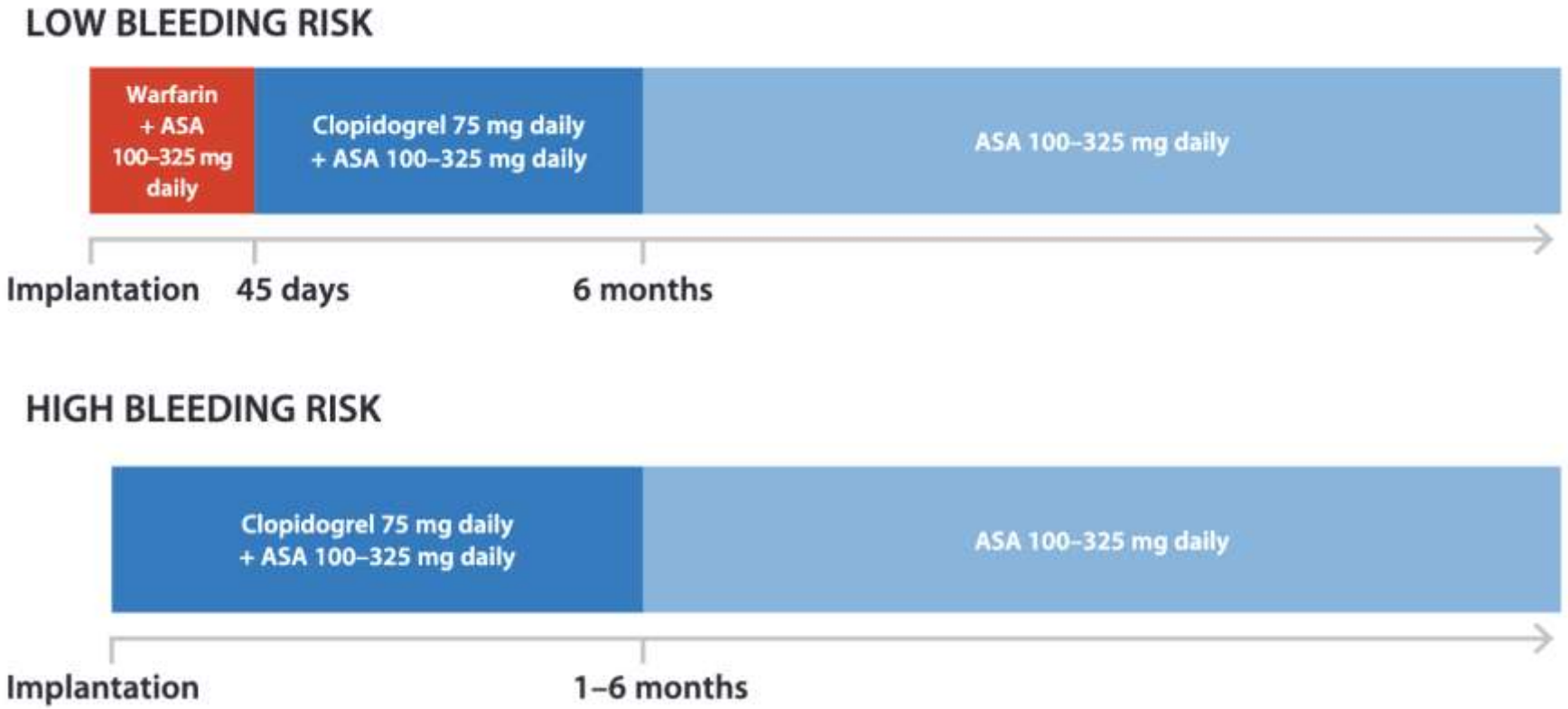
Amulet device



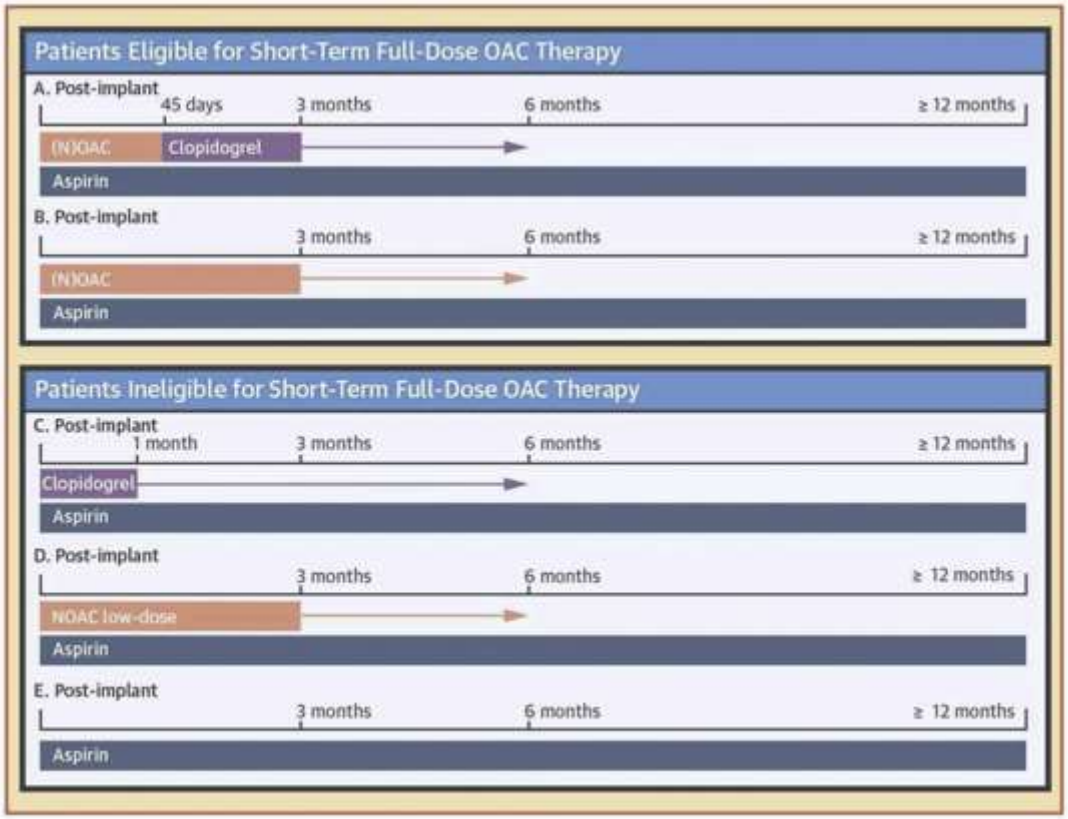
Short Term OAC is necessary



Timeline of antithrombotic treatment after LAA occlusion with the Watchman device



All Options Include Low-Dose Aspirin for Minimum of 12 Months



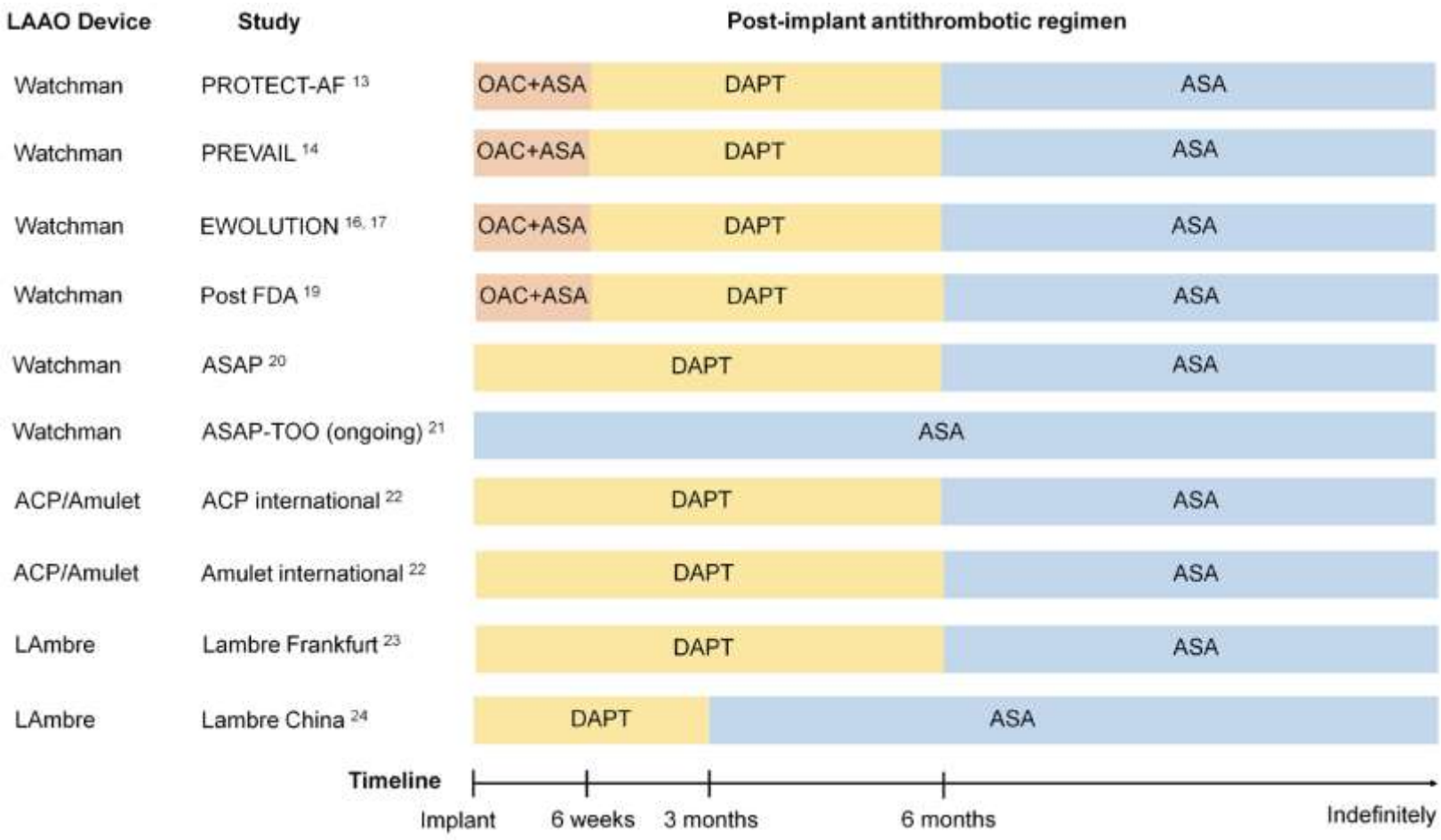
Saw, J. et al. J Am Coll Cardiol Intv. 2019;12(11):1067-76.

TABLE 2 Potential Risk Factors for Device-Related Thrombus

Category	Mechanism	Specific Details
Unmodifiable patient factors	Increased clot formation	Echocardiographic parameters • LVEF <40% • Spontaneous echocardiographic contrast • Low LAA peak emptying velocity Hematological: relative platelet count elevation Female sex High CHA_2DS_2VASc score
	Reduced clot dispersion	Medication responsiveness Medication acceptability (bleeding)
	Slow device endothelialization	Unmeasurable/unpredictable even at young age
Post-procedural medication	Potency of strategy Compliance	Choice of SAPT, DAPT, direct OAC, OAC, or LMWH • Subtherapeutic INR • Noncompliance • Early medication discontinuation
Mechanical factors	Implantation result	Deep implantation, forming neoappendage Failure of disc apposition Residual leak
	Device	Intracardiac vs. extracardiac devices Exposed screw
	Periprocedural	Thrombus on device/wire during implantation

INR = international normalized ratio; LAA = left atrial appendage; LMWH = low-molecular weight heparin; LVEF = left ventricular ejection fraction; other abbreviations as in Table 1.

Antithrombotic regimens

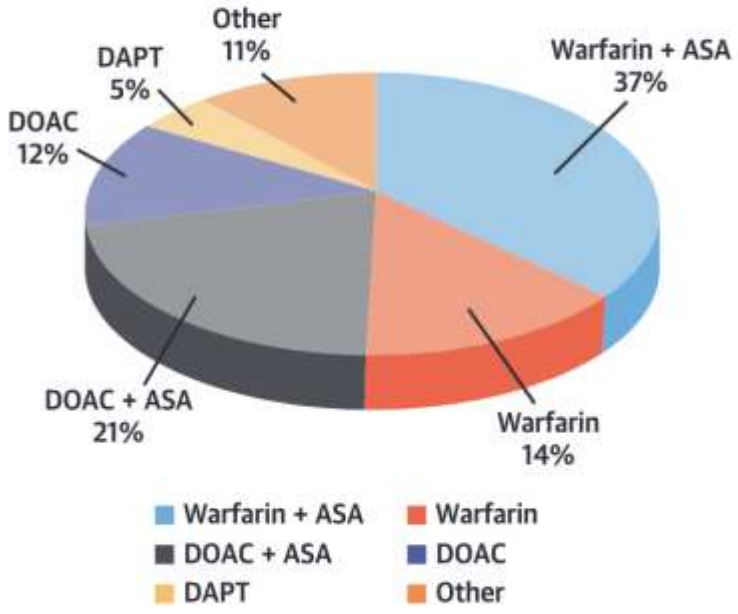


Registry Data

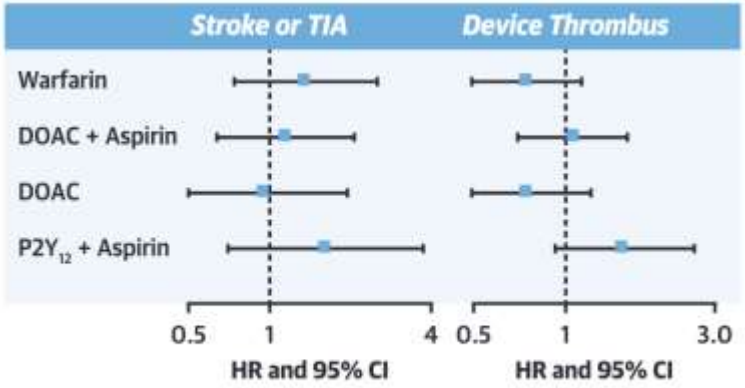
NCDR LAAO Registry: 31,994 Patients With Watchman Implants

Most Common Discharge Antithrombotic Strategies

- ***Only 12.2% received FDA-approved postimplant regimen***

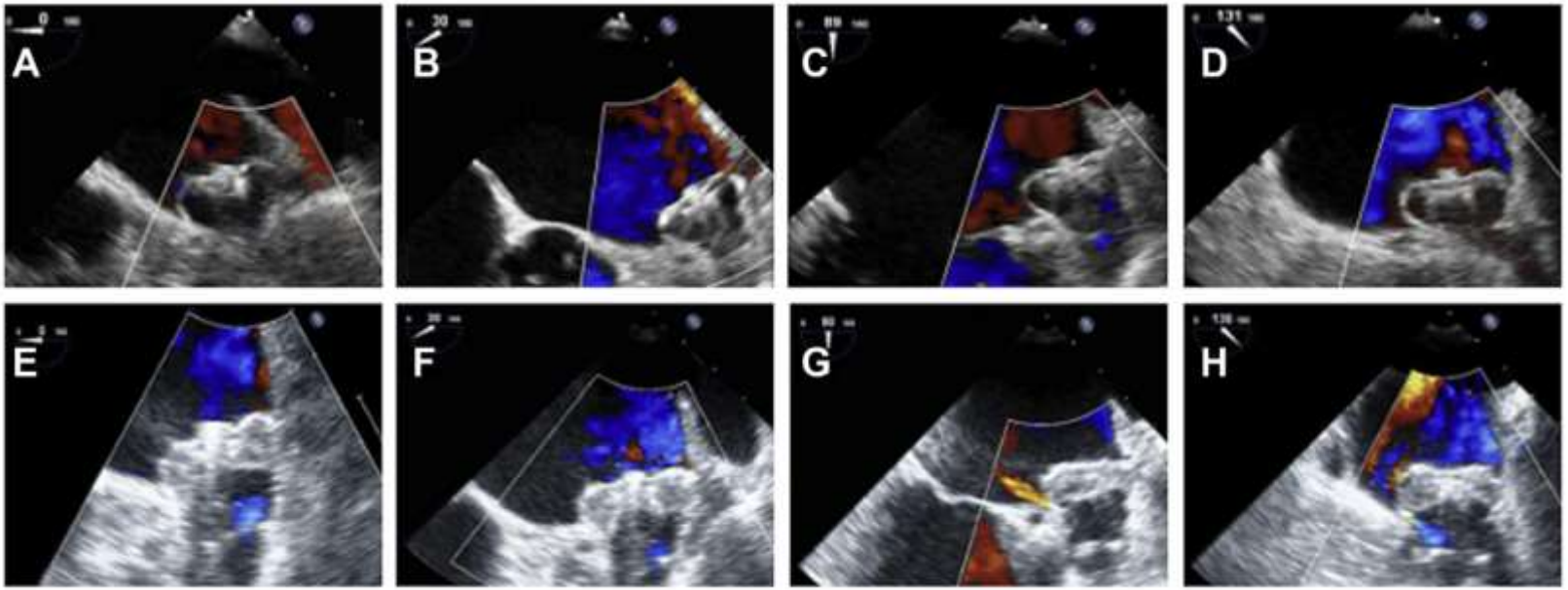


Any Adverse Event	HR	95% CI	*P* Value
Warfarin	0.69	0.57 – 0.84	< 0.001
DOAC + Aspirin	1.00	0.83 – 1.21	0.96
DOAC	0.73	0.57 – 0.93	0.011
$P2Y_{12}$ + Aspirin	1.04	0.79 – 1.38	0.76

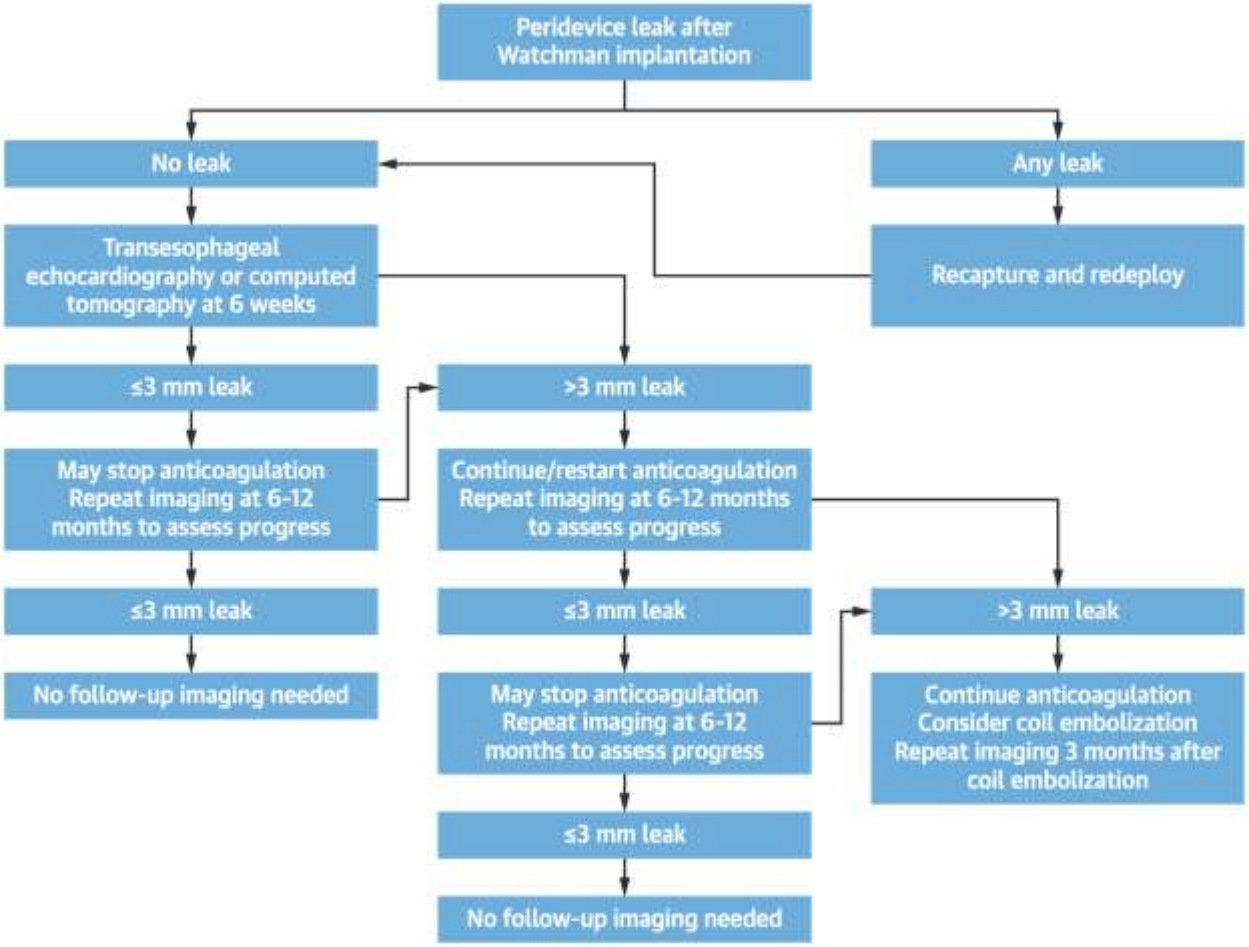


Freeman JV, et al. J Am Coll Cardiol. 2022;79(18):1785-1798.

Identification of PDL Using TEE Imaging

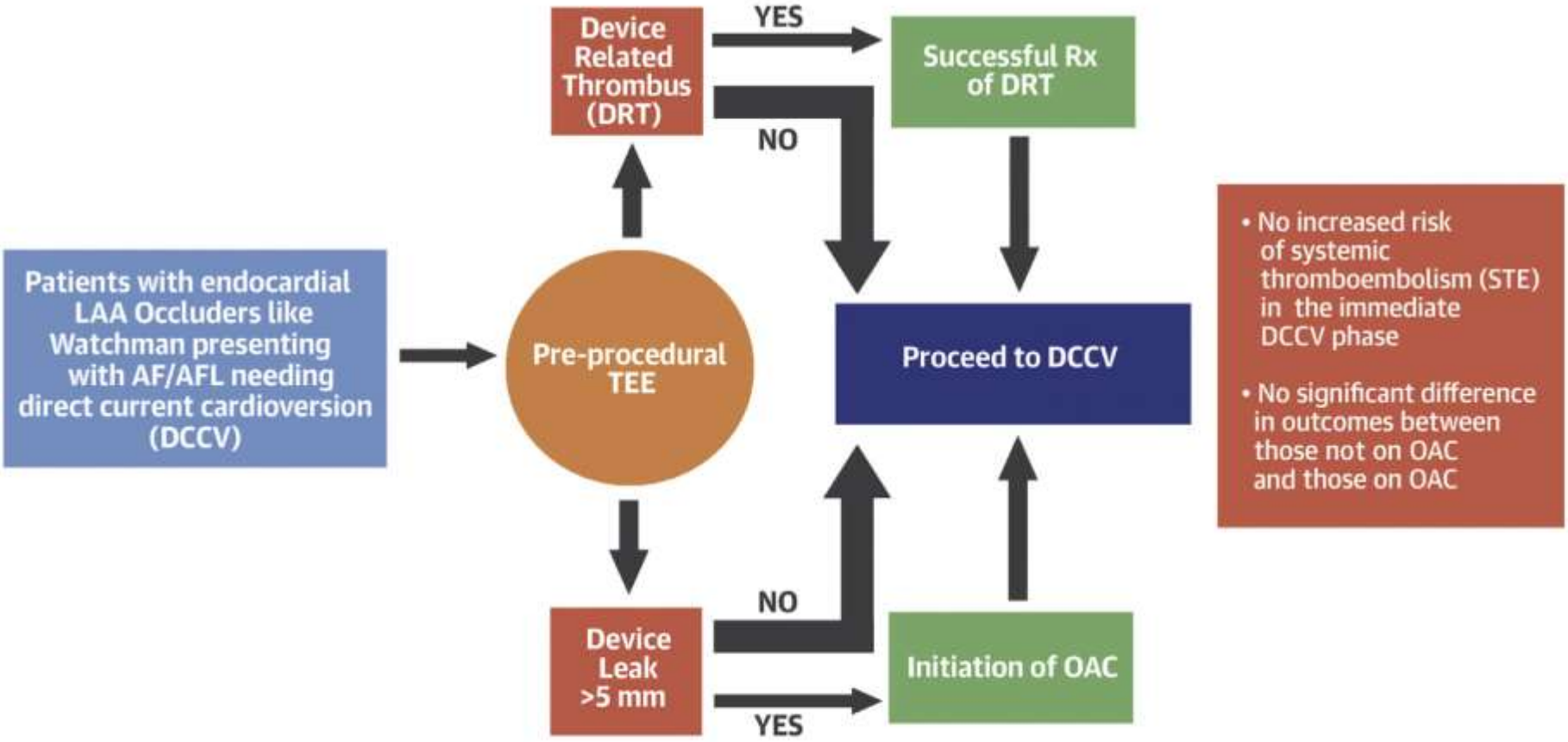


Proposed Strategy to Manage Peridevice Leak



Minor PDL <3 mm	Small PDL ≥ 3 - < 5 mm	Moderate PDL ≥ 5 - 9 mm	Large PDL ≥ 10 mm
			
• Presumed low risk for stroke • No clear indication for closure • Discontinue OAC	• Unclear risk for stroke • Options: - Discontinue OAC - Continue OAC - PDL closure	• Persistent risk for stroke • Options: - Continue OAC - PDL closure	• Persistent risk for stroke • Options: - Continue OAC - PDL closure
No indications or data to support PDL closure	**Endovascular Coils & Endovascular Plugs**		**LAA Closure Device**

Direct Current Cardioversion in Patients With Left Atrial Appendage Occlusion Devices



Sharma, S.P. et al. J Am Coll Cardiol. 2019;74(18):2267-74.

Left atrial appendage occlusion (LAAO) devices can be successfully placed with some procedural modifications in patients with persistent left atrial appendage (LAA) thrombus

Persistent LAA thrombus despite adequate oral anticoagulation

OR

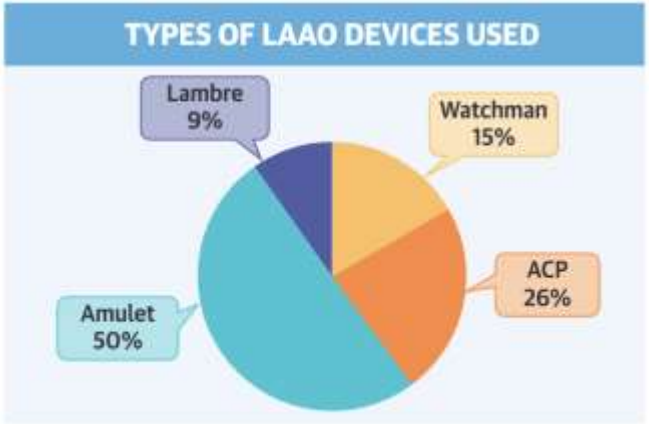
Contraindication to oral anticoagulation

LAAO devices can be successfully implanted with some modifications in standard procedure such as

- limited LAA angiography
- minimal or no touch technique
- consideration for cerebral protection device

Amulet, ACP, and Watchman FLX have distinct advantages over Watchman

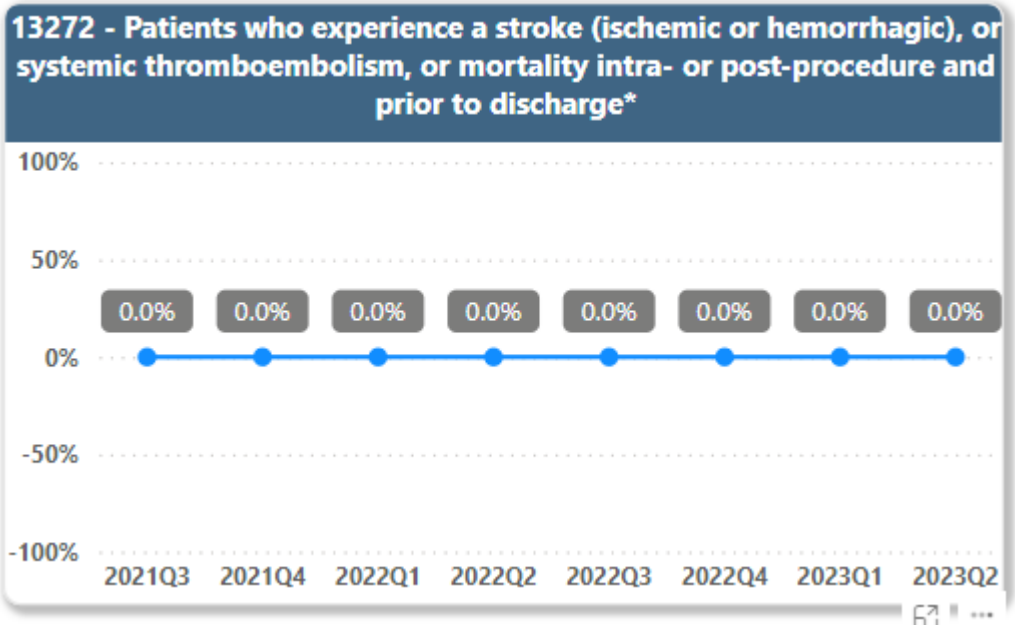
Current evidence mostly limited to distally located thrombus

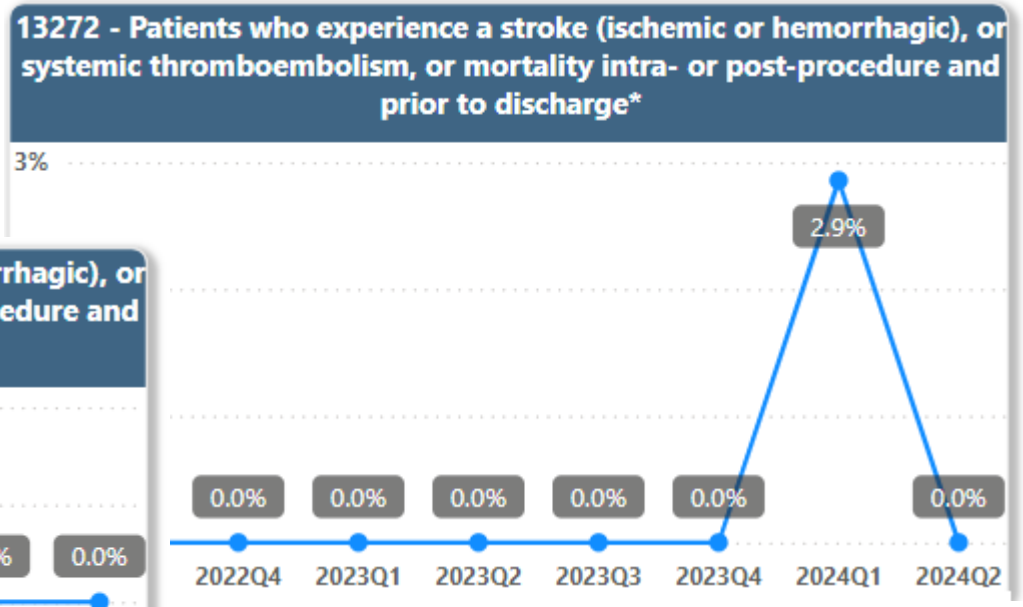


Sharma, S.P. et al. J Am Coll Cardiol EP. 2020;6(4):414-24.

Outcome Metrics: Stroke

0.7%





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