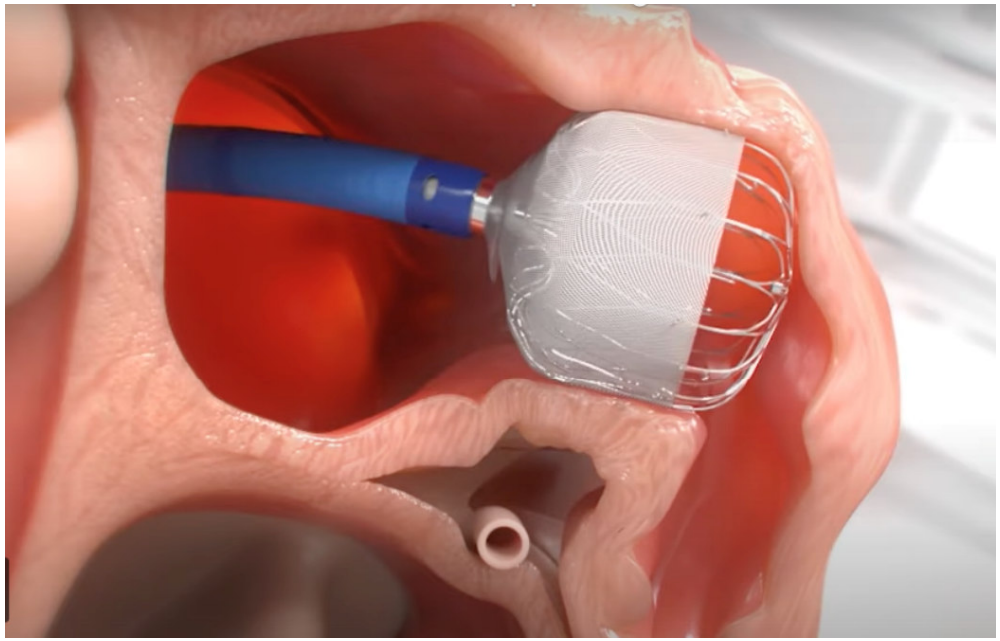
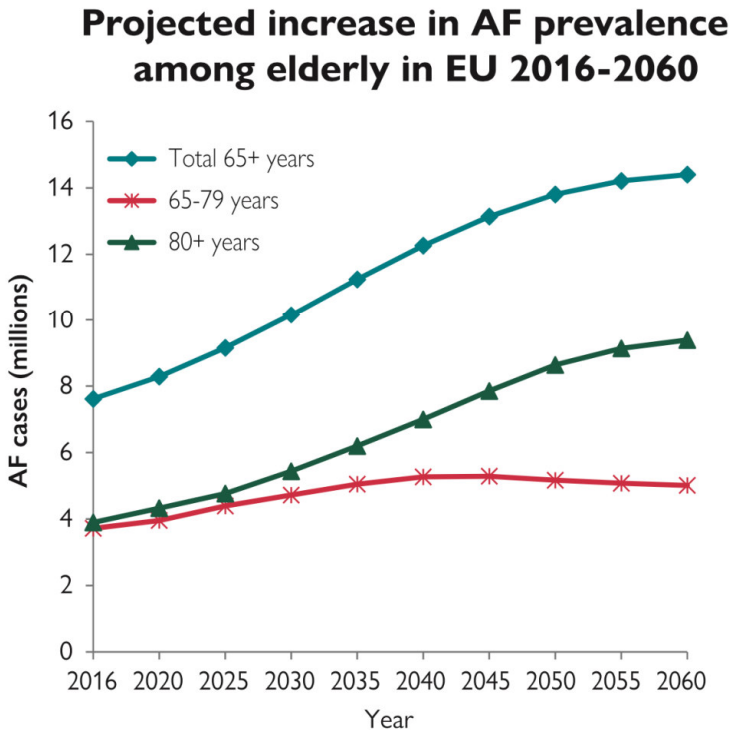
CIERRE PERCUTANEO DE OREJUELA IZQUIERDA



Juan Sánchez-Rubio Lezcano
Jose Gabriel Galache Osuna

FA: Factor de riesgo independiente para ACV



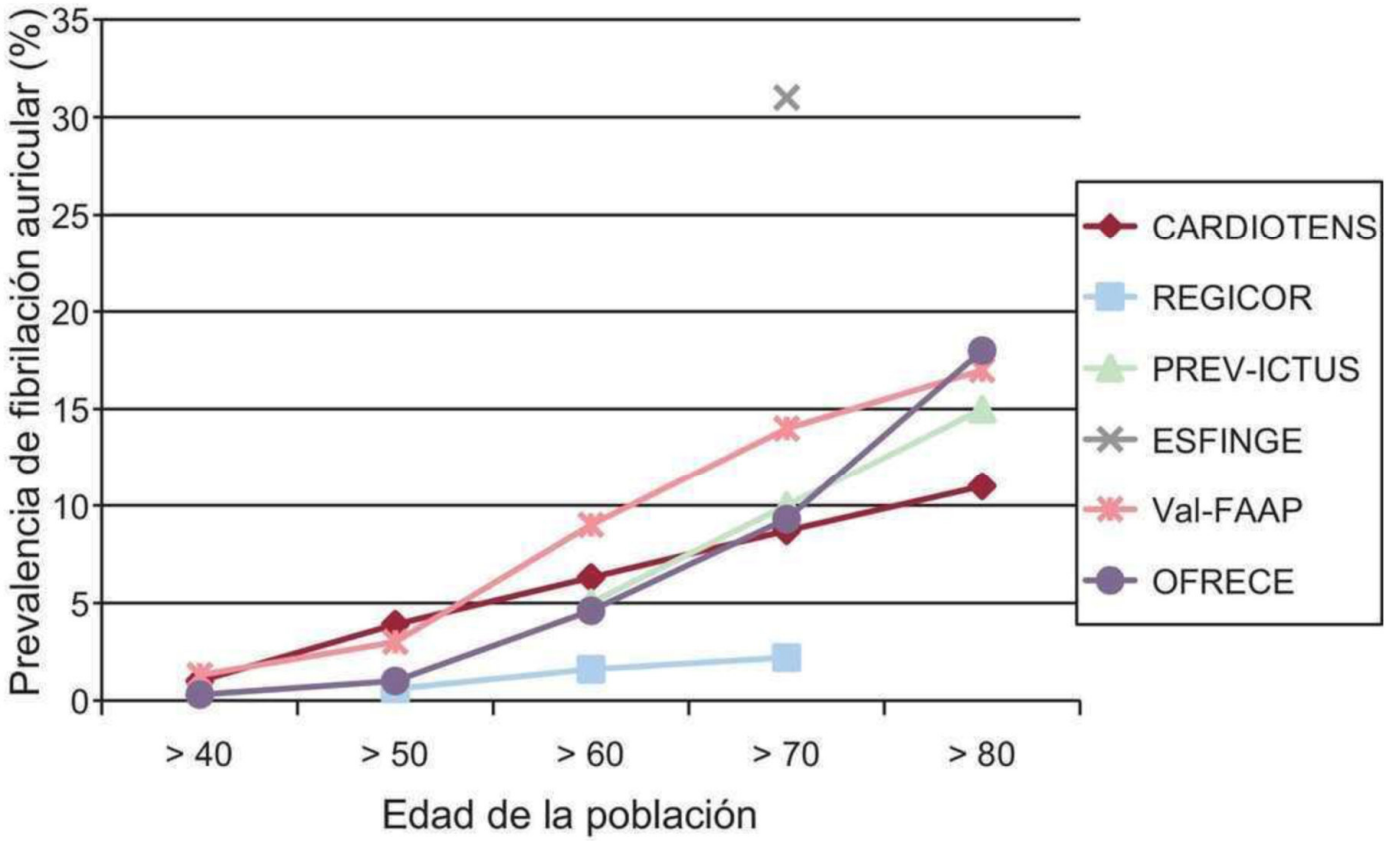
[1]

5X Incremento del riesgo para ACV en pacientes en FA[2]

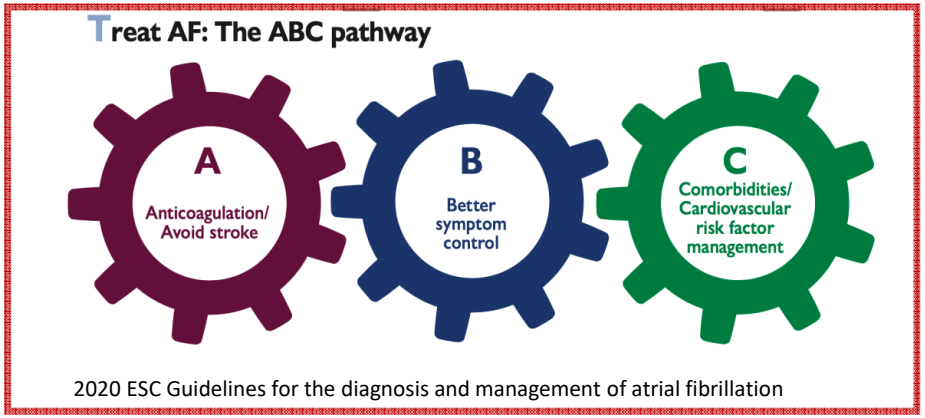
1 de cada 6 ACV sucede en paciente en FA[3]

~2X Mayor probablilidad de recurrencia en pacientes en FA[4]

[1]2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS) .
[2]Holmes DR, Atrial Fibrillation and Stroke Management: Present and Future, Seminars in Neurology 2010;30:528–536
[3]Hart RG, Halperin JL. Atrial fibrillation and thromboembolism: a decade of progress in stroke prevention. *Ann Intern Med.* 1999.
[4]Wolf PA et al, Duration of Atrial Fibrillation and the Imminence of Stroke: The Framingham Study, Stroke 1983; 14:664-667



Rev Esp Cardiol. 2013;66:561–5



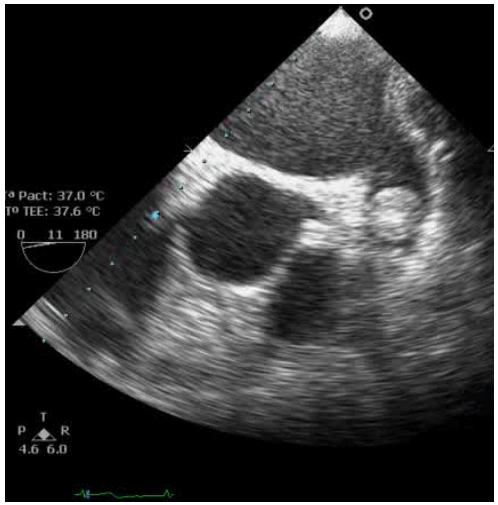
2020 ESC Guidelines for the diagnosis and management of atrial fibrillation

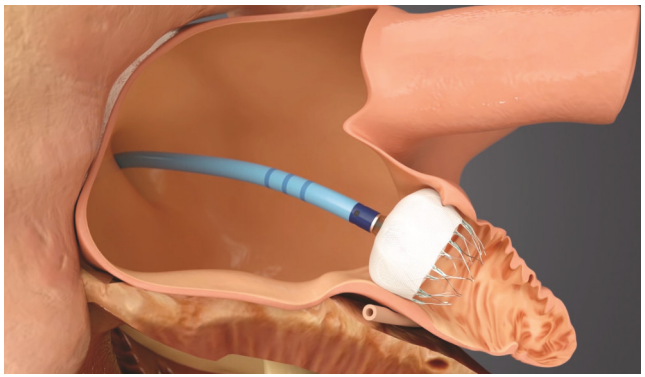
	Rivaroxaban	Apixaban	Dabigatran	Edoxaban	Warfarina
Estudio	ROCKET-AF	ARISTOTLE	RE-LY	ENGAGE AF	
Abandono	24%	25%	21%	34%	17-35%
Sangrado mayor (incidencia/año)	3,6%	2,13%	3,32%	2,8%	3,1-3,4%
Sangrado mayor > 75 años	4,9%	3,4%	5,1%	4,0%	4,4-5,2%
HIC >75 años	0,66%	0,43%	0,4%	0,5%	0,8-1,29%

FA favorece la formación de trombos en la AI, especialmente en la orejuela.

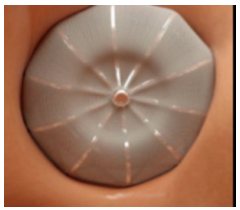
El flujo lento o “humo” en la OI es un predictor para sufrir AIT[1] o ACV[2].

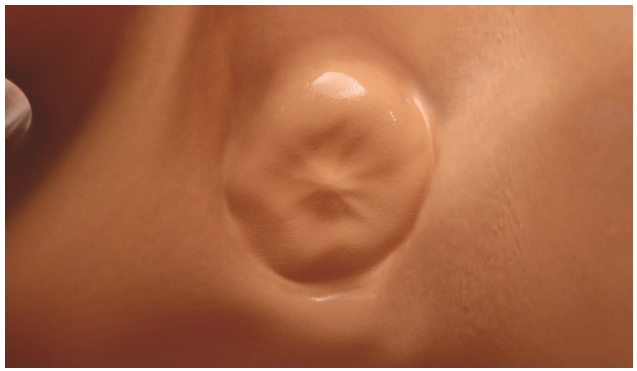
En la FANV más del 90% de los trombos causante de ACV que proviene de la AI proceden de la OI[3]



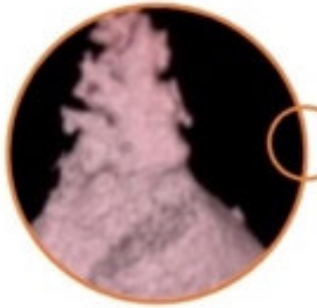


45 días

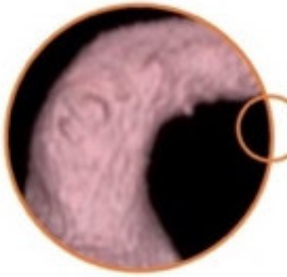




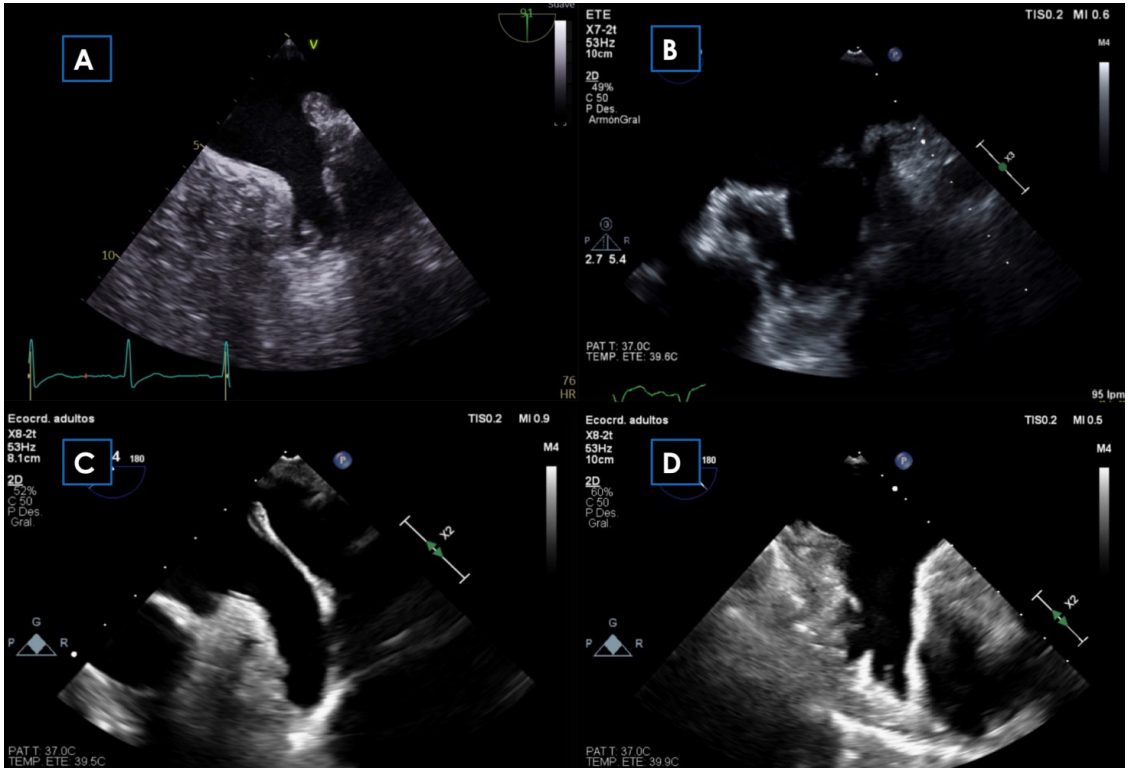
[1]Stoddard et al. Am Heart J. 2003; 145(4): 676-682. [2]Goldman et al. J Am Soc Echocardiography. 1999: 12(12):1080-.1087. [3]Blackshear JL., Odell JA. Annals of Thoracic Surg. 1996; 61: 755-759

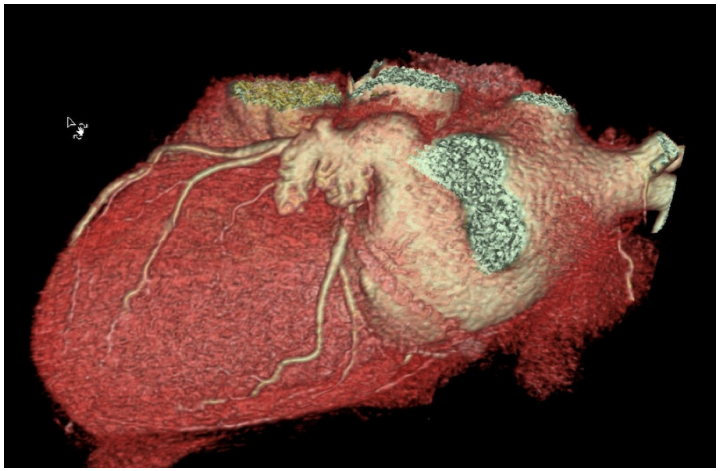


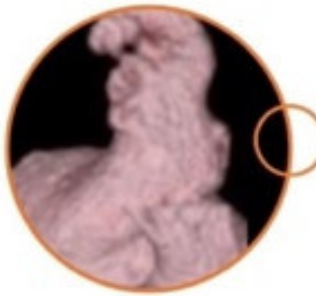
Coliflor



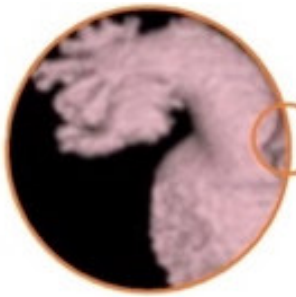
Ala de pollo



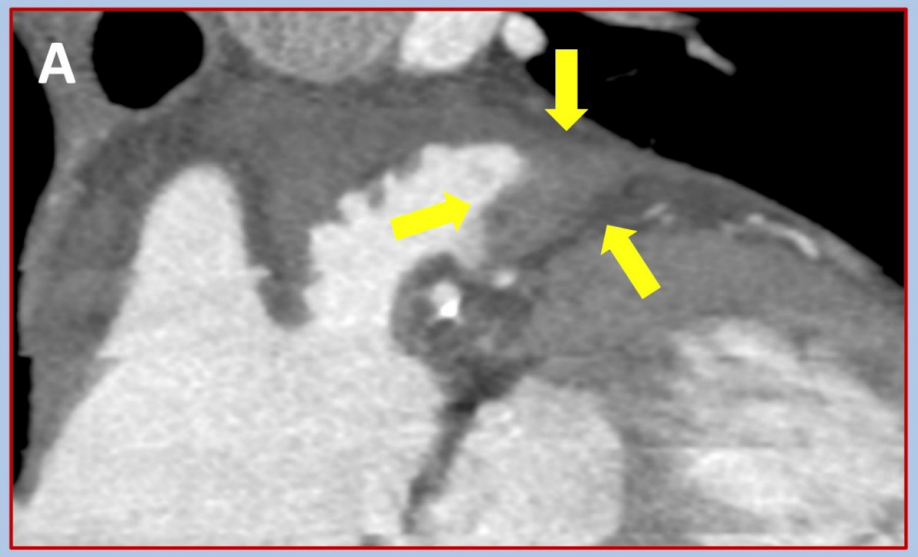


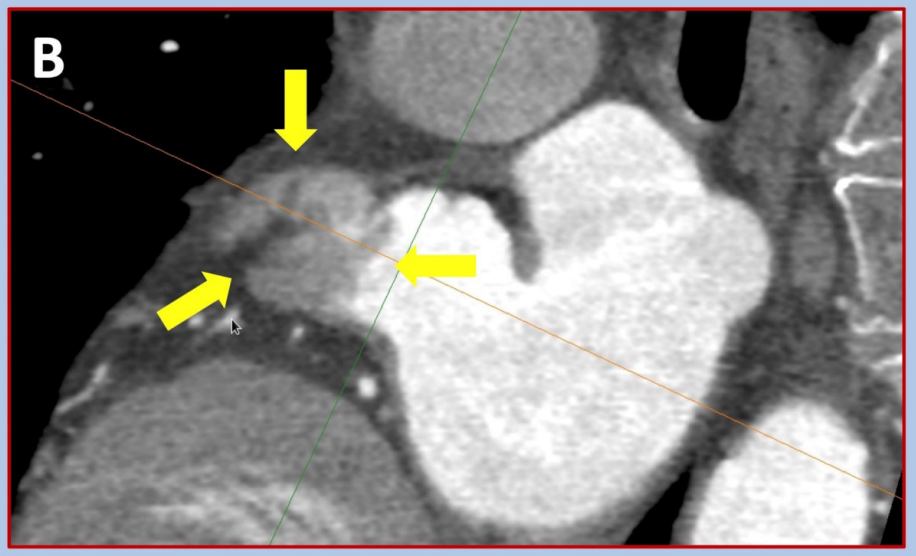


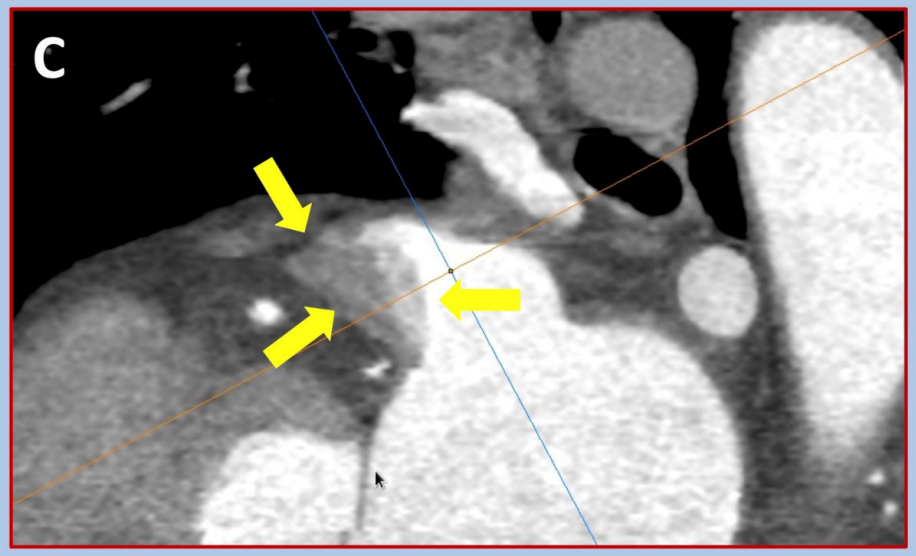
Manga de viento



Cactus


A


B

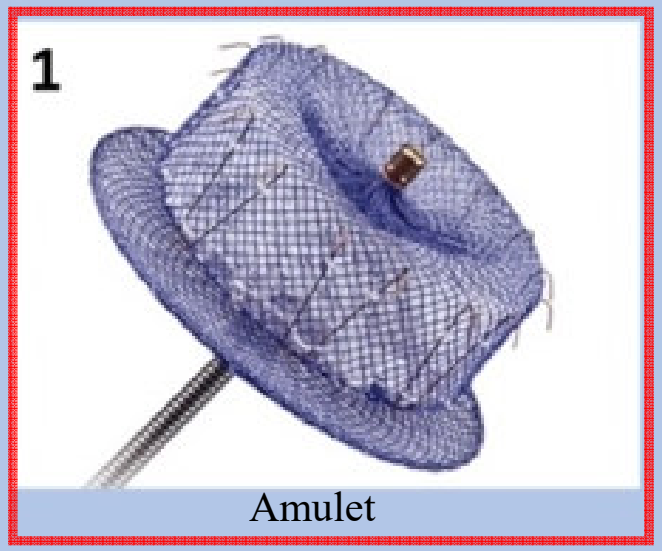

C

Dispositivos de cierre percutáneo de OI

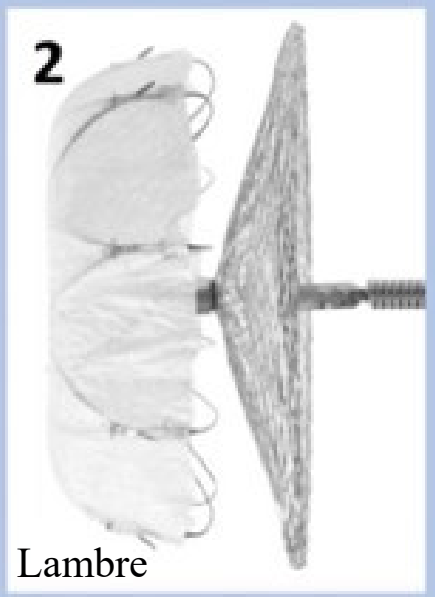
WaveCrest

Watchman Flex

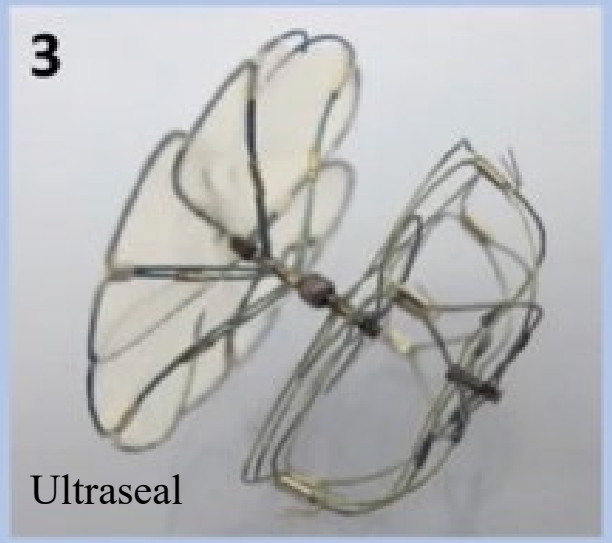
Watchman



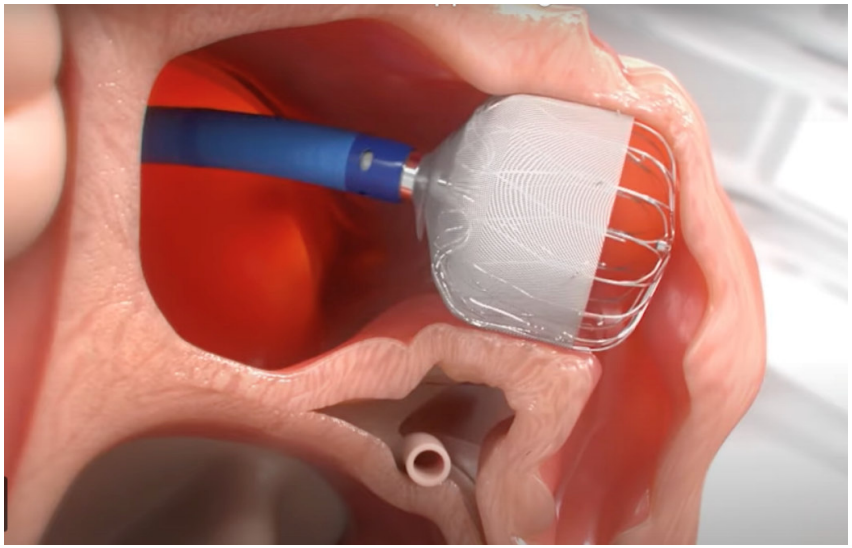
Amulet



Lambre

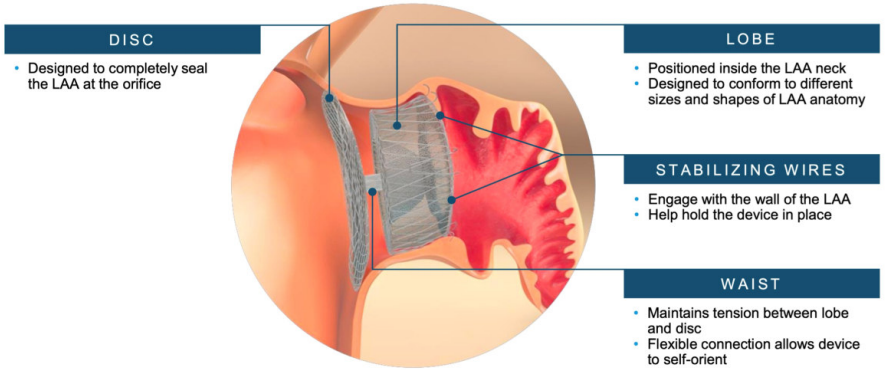


Ultraseal



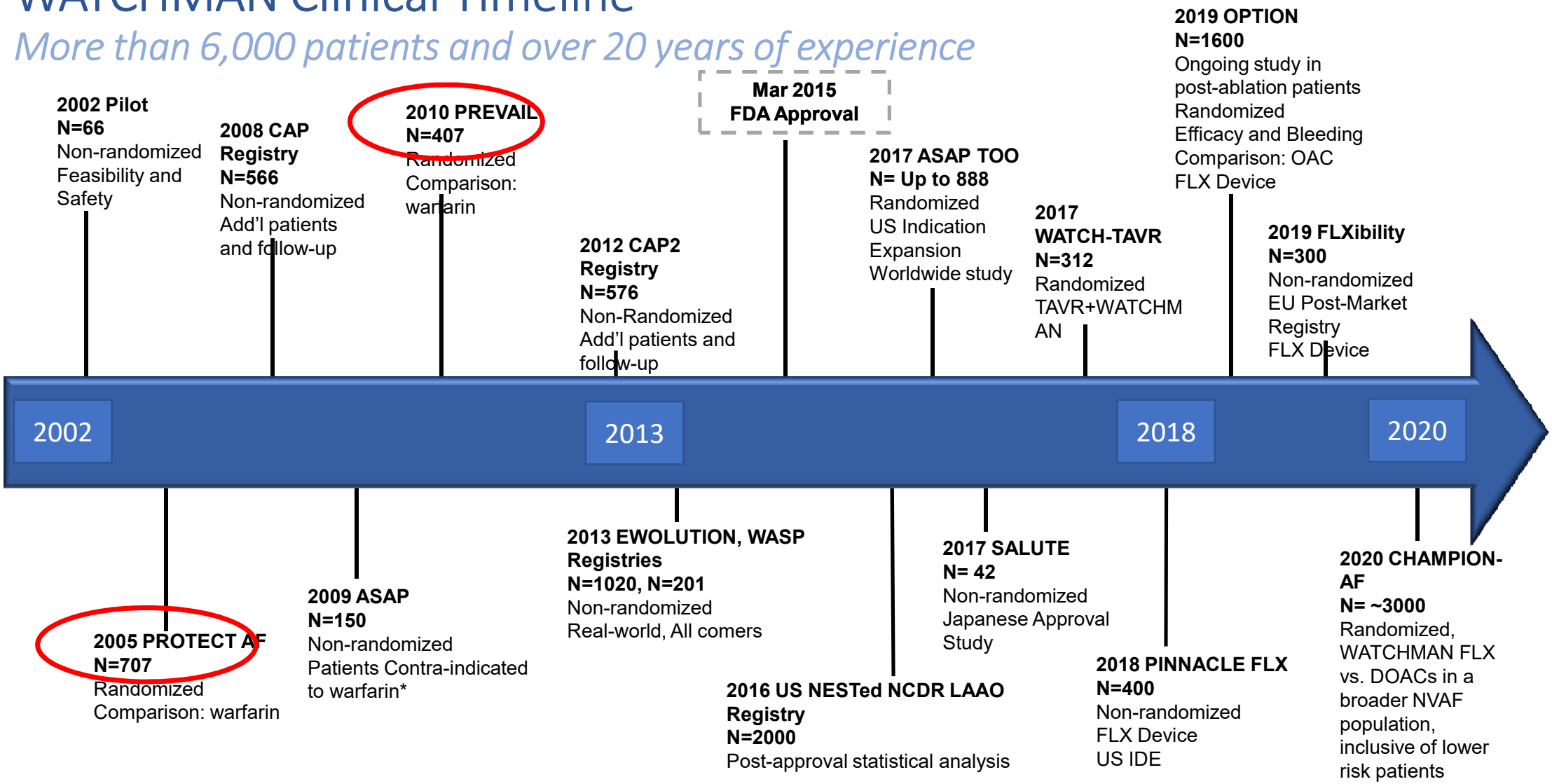
AMPLATZER™ Amulet™

Design

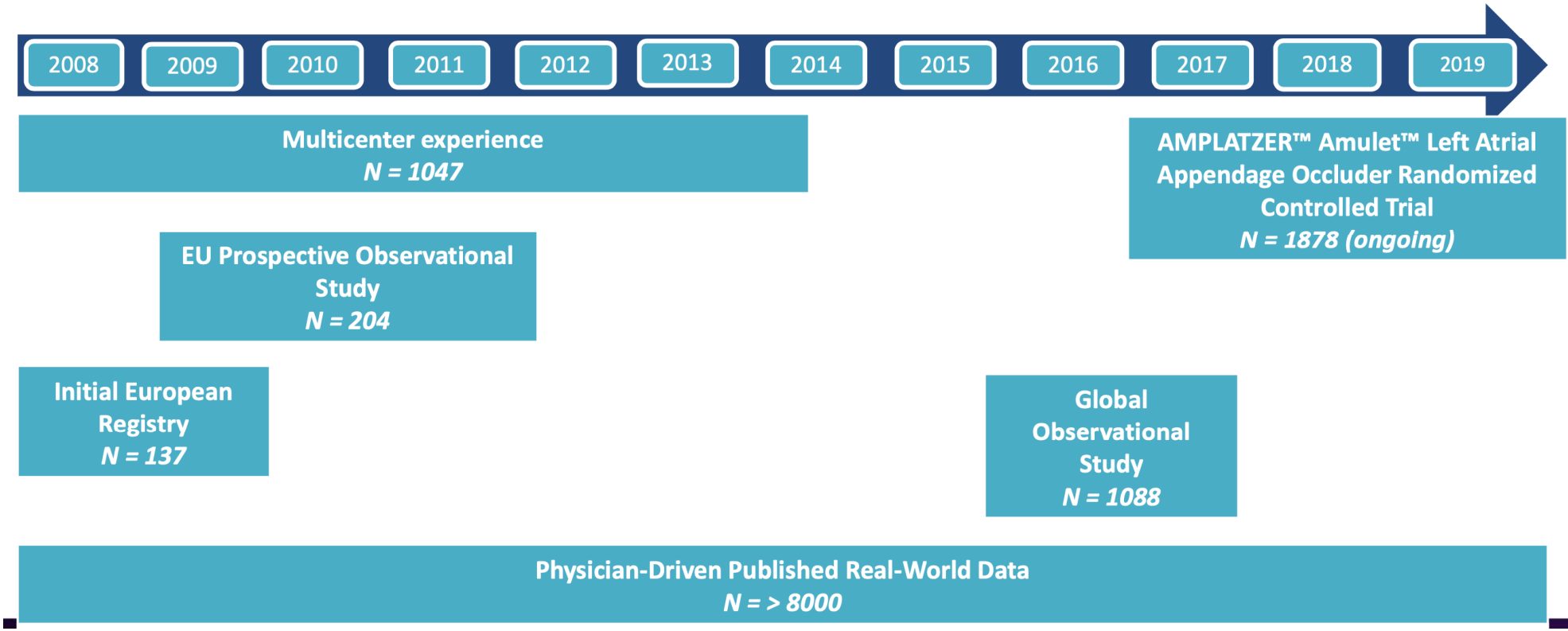


WATCHMAN Clinical Timeline

More than 6,000 patients and over 20 years of experience



AMPLATZER™ LAAO Clinical Data



Stroke

Percutaneous Left Atrial Appendage Closure for Stroke Prophylaxis in Patients With Atrial Fibrillation

2.3-Year Follow-up of the PROTECT AF (Watchman Left Atrial Appendage System for Embolic Protection in Patients With Atrial Fibrillation) Trial

Vivek Y. Reddy, MD; Shephal K. Doshi, MD; Horst Sievert, MD; Maurice Buchbinder, MD; Petr Neuzil, MD, PhD; Kenneth Huber, MD; Jonathan L. Halperin, MD; David Holmes, MD; on behalf of the PROTECT AF Investigators

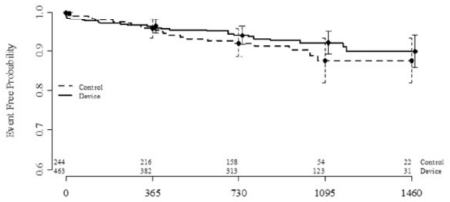
Circulation

Volume 127, Issue 6, 12 February 2013; Pages 720-729

https://doi.org/10.1161/CIRCULATIONAHA.112.114

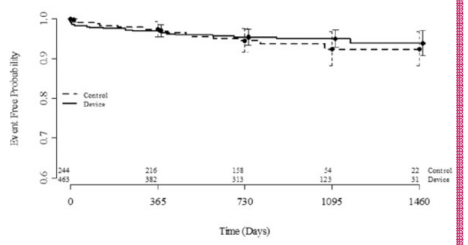
-FA con indicación ACO
-Aleatorización 2:1 n=707
-CPOI (463):Warfarina (244)
-2,4 años

Primary Efficacy

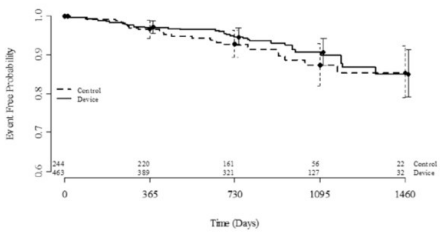


ACV isquémico, ACV hemorrágico, embolia, muerte CV/inexplicada

Stroke



All-Cause Mortality



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http://dx.doi.org/10.1016/j.jacc.2014.04.029

ORIGINAL INVESTIGATIONS

Prospective Randomized Evaluation of the Watchman Left Atrial Appendage Closure Device in Patients With Atrial Fibrillation Versus Long-Term Warfarin Therapy

The PREVAIL Trial

David R. Holmes Jr, MD,* Saibal Kar, MD,† Matthew J. Price, MD,‡ Brian Whisenant, MD,§ Horst Sievert, MD,‖ Shephal K. Doshi, MD,¶ Kenneth Huber, MD,# Vivek Y. Reddy, MD**

FA y CHADS2 >=2
Aleatorización 2:1 CPOI (269):Warfarina (138)
20 meses

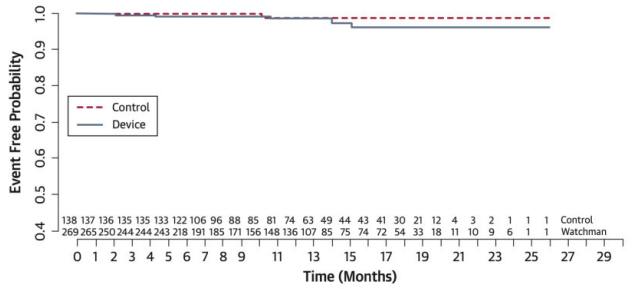


FIGURE 3 Kaplan-Meier Curve: Freedom From Second Primary Endpoint Event (Intention-to-Treat)

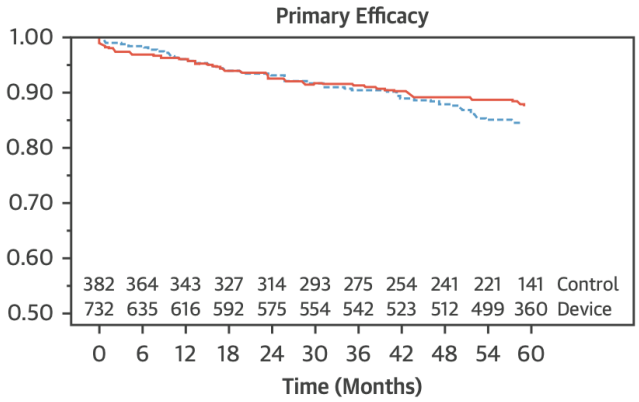
Late-ischemic events (stroke or systemic embolism >7 days' post-randomization) for Watchman **(solid line)** versus warfarin **(dotted line)** in the intent-to-treat population demonstrated noninferiority for the rate difference endpoint.

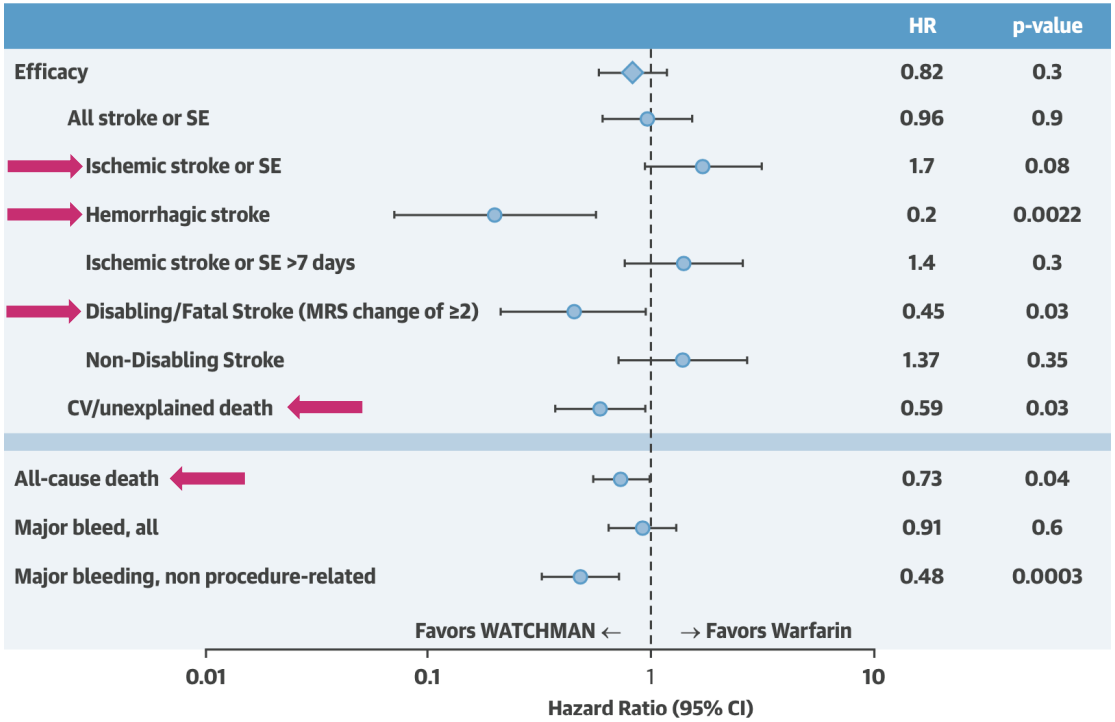
5-Year Outcomes After Left Atrial Appendage Closure

From the PREVAIL and PROTECT AF Trials

Vivek Y. Reddy, MD,[a,b] Shephal K. Doshi, MD,[c] Saibal Kar, MD,[d] Douglas N. Gibson, MD,[e] Matthew J. Price, MD,[e] Kenneth Huber, MD,[f] Rodney P. Horton, MD,[g] Maurice Buchbinder, MD,[h] Petr Neuzil, MD, PhD,[b] Nicole T. Gordon, BSEE,[i] David R. Holmes, Jr, MD,[j] on behalf of the PREVAIL and PROTECT AF Investigators

J Am Coll Cardiol. 2017;70(24):2964–75.





ESC European Society of Cardiology
European Heart Journal (2020) **00**, 1–125
doi:10.1093/eurheartj/ehaa612

ESC GUIDELINES

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS)

Recommendations for occlusion or exclusion of the LAA		
LAA occlusion may be considered for stroke prevention in patients with AF and contraindications for long-term anticoagulant treatment (e.g. intracranial bleeding without a reversible cause).[448,449,481,482]	IIb	B

"The implantation procedure can cause serious complications…"

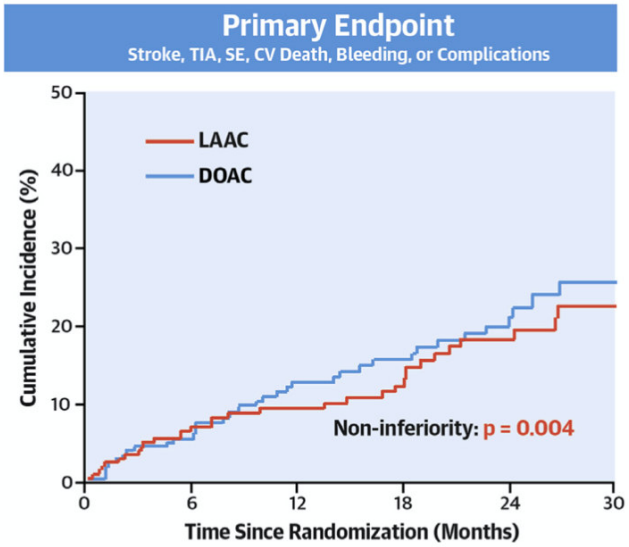
"Antithrombotic management after LAA occlusion has never been evaluated in a randomized trial"

"There is the need for adequately powered trials to define the best indications of LAA occlusion compared with NOAC therapy…"

J Am Coll Cardiol 2020;75:3122–35

Left Atrial Appendage Closure Versus Direct Oral Anticoagulants in High-Risk Patients With Atrial Fibrillation

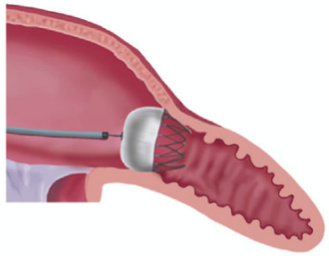
Pavel Osmancik, MD, PhD,[a] Dalibor Herman, MD, PhD,[a] Petr Neuzil, MD, CSc,[b] Pavel Hala, MD,[b] Milos Taborsky, MD, CSc,[c] Petr Kala, MD, PhD,[d] Martin Poloczek, MD,[d] Josef Stasek, MD, PhD,[e] Ludek Haman, MD, PhD,[e] Marian Branny, MD, PhD,[f] Jan Chovancik, MD,[f] Pavel Cervinka, MD, PhD,[g] Jiri Holy, MD,[g] Tomas Kovarnik, MD, PhD,[h] David Zemanek, MD, PhD,[h] Stepan Havranek, MD, PhD,[h] Vlastimil Vancura, MD, PhD,[i] Jan Opatrny, MD,[i] Petr Peichl, MD, PhD,[j] Petr Tousek, MD, PhD,[a] Veronika Lekesova, MD,[b] Jiri Jarkovsky, RNDr, PhD,[k] Martina Novackova, Mgr,[k] Klara Benesova, Mgr,[k] Petr Widimsky, MD, DrSc,[a,*] Vivek Y. Reddy, MD,[b,l,*] on behalf of the PRAGUE-17 Trial Investigators



Osmancik, P. et al. J Am Coll Cardiol. 2020;75(25):3122-35.

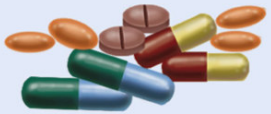
PRAGUE-17 Randomized Clinical Trial

- 402 High-Risk AF Pts ➡ Randomized
  - CHA_2DS_2-VASc = 4.7 ± 1.5
  - HAS-BLED = 3.1 ± 0.9
- Follow-up: 20.8 ± 10.8 mo (695 pt-year)

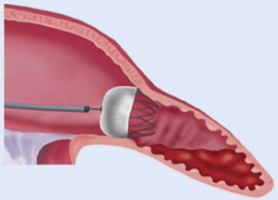


	sHR (95% CI)	p value
Primary Endpoint		
mITT	0.84 (0.53-1.31)	0.44
Per Protocol	0.82 (0.52-1.30)	0.40
On-Treatment	0.79 (0.49-1.25)	0.31
All-Stroke/TIA	1.00 (0.40-2.51)	0.99
CV Death	0.75 (0.34-1.62)	0.46
Major + NMCR Bleeding		
All	0.81 (0.44-1.52)	0.51
Nonprocedural	0.53 (0.26-1.06)	0.07

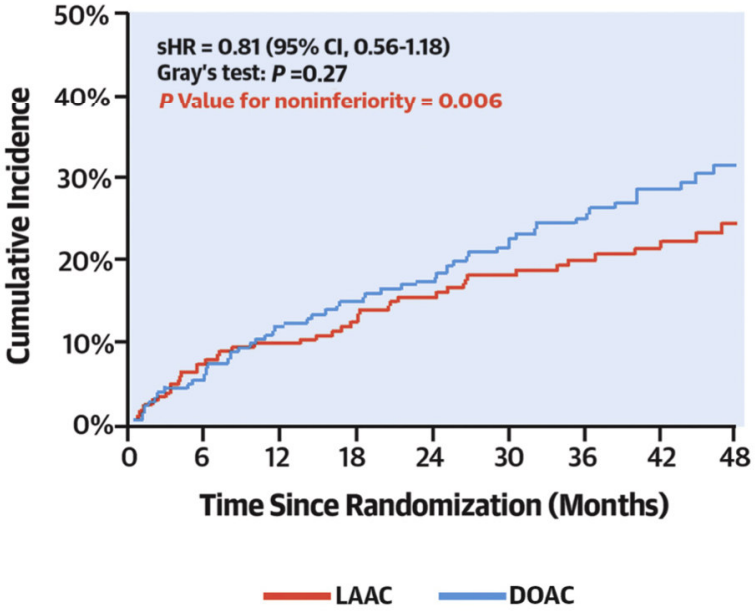
PRAGUE-17 Trial: Long-Term (4-Year) Follow-Up



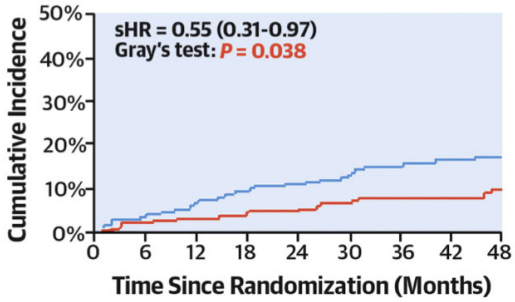
- 402 High-risk AF pts ➡ Randomized
  - CHA_2DS_2-VASc = 4.7 ± 1.5
  - HAS-BLED = 3.1 ± 0.9
- Median Follow-up: 3.5 years (IQR 2.6-4.3), 1,354 pt-year



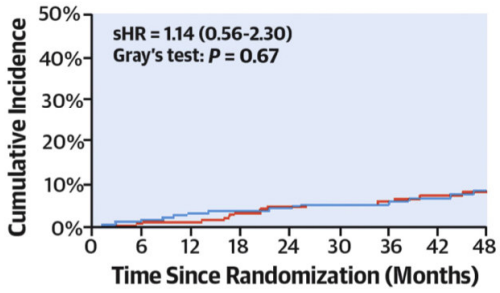
Primary Endpoint
Stroke, TIA, SE, CV Death, Bleeding or Complications



Non-Procedural Clinically Relevant Bleeding



Stroke or TIA



Osmancik, P. et al. J Am Coll Cardiol. 2022;79(1):1-14.

"There is the need for adequately powered trials to define the best indications of LAA occlusion compared with NOAC therapy…"

"Antithrombotic management after LAA occlusion has never been evaluated in a randomized trial"

CHAMPION-AF

Patient Classification and Flow

N≈3000 patients with NVAF and CHA_2DS_2-VASc ≥ 2 in men; ≥ 3 in women

Randomization 1:1

WATCHMAN FLX | **NOAC**

36-Month Co-primary Endpoints
- CV death, stroke, and SE (non-inferiority)
- Post-procedural ISTH major or clinically relevant non-major bleeding (superiority)

Completion of 5 Year Follow-Up

WATCHMAN FLX LAAC DEVICE ARM

*P2Y12 inhibitor may be used in the 3-12 month follow up window, if better tolerated than aspirin. The 3-12 month medication selected is recommended for the duration of the trial.

NOAC ARM

NOTE: For Device and NOAC arms, annual clinical follow-up visits can be via phone or in-office, with the exception of the 3-year clinical follow-up visit, which must be in-office.

Actual Study Start Date ℹ : October 15, 2020
Estimated Primary Completion Date ℹ : December 2025
Estimated Study Completion Date ℹ : December 2027

THE CATALYST TRIAL

Trial Objectives and Design

Scientific Objective	To evaluate the safety and effectiveness of the Amplatzer™ Amulet™ LAA Occluder compared to NOAC therapy in patients with non-valvular AF at increased risk for ischemic stroke and who are recommended for long-term NOAC therapy
Trial Design	• Prospective, randomized, multi-center active control worldwide trial • 2650 subjects randomized at up to 150 worldwide sites • **Study Principal Investigator:** Dr. Vivek Reddy (Mt. Sinai Medical Center) • **Steering Committee Co-Chairs**: Prof. Stephan Windecker (Center Inselspital Bern, Switzerland) and Dr. Elaine Hylek (Boston University)

	CATALYST
Treatment Groups	Amplatzer Amulet vs. NOAC
Study Design	Multicenter, interventional, randomized (1:1)
Sample Size	2650
Follow-Up	2 years
Primary Endpoint	Composite of ischemic stroke, SE, or CV mortality AND Major bleeding or clinically-relevant non-major bleeding
Target Population	NVAF patients with CHA_2DS_2-VASc ≥3

Circulation
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https://doi.org/10.1161/CIRCULATIONAHA.120.050117

ORIGINAL RESEARCH ARTICLE

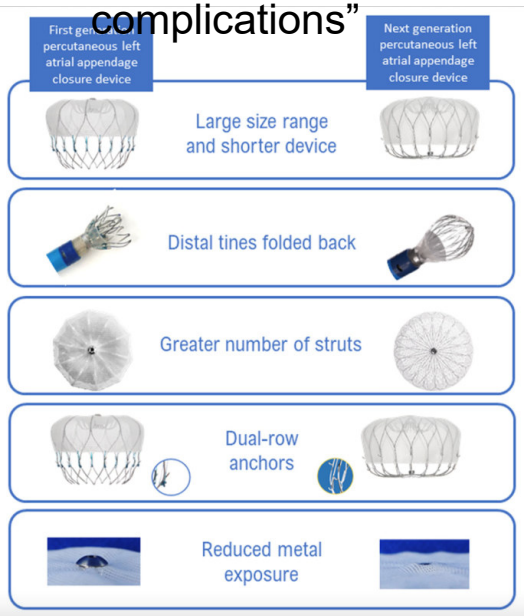
Primary Outcome Evaluation of a Next-Generation Left Atrial Appendage Closure Device

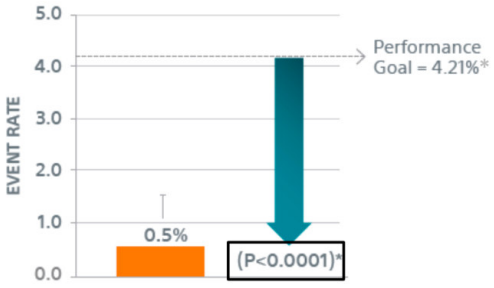
Results From the PINNACLE FLX Trial

-400 pacientes FANV
-CHA2DS2-VASc 4.2±1.5

1) Seguridad: combinado de muerte, ACV isquémico, embolia sistémica, complicación que requiera cirugía
2) Efectividad: Sellado efectivo de la OI (fuga < 5mm) en ETE a 12 meses

"The implantation procedure can cause serious complications"





** Based on PREVAIL and CAP2 combined rate plus a clinically relevant delta*

0.5% Ischemic Stroke (2/400)

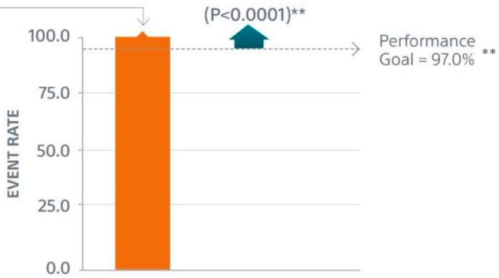
0% All-cause Death

0% Pericardial Effusions Requiring Open Cardiac Surgery

0% Device Embolization

Primary Effectiveness Endpoint:

100% of Subjects Demonstrated Effective LAA Closure at 12 Months*



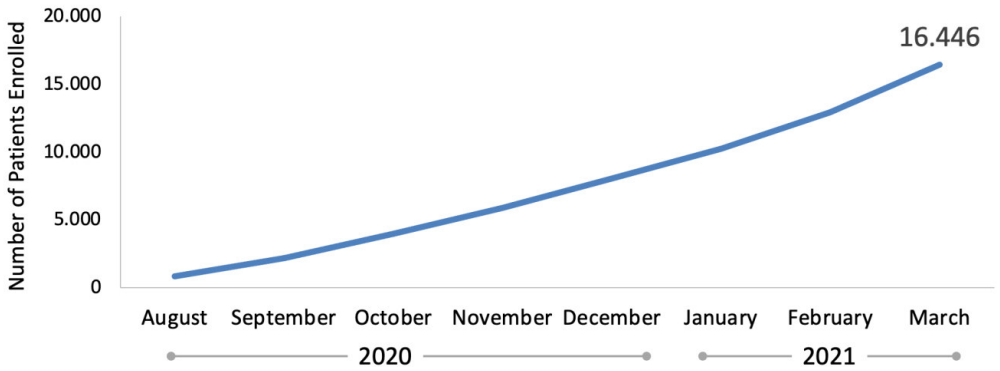
**LAA closure at 12 months (defined as any peri-device flow with jet size ≤ 5mm per core laboratory-assessed TEE)*
***Based on PREVAIL and CAP2 combined rate plus a clinically relevant delta*

Real-world Outcomes with WATCHMAN FLX: Early Results from SURPASS

CRT22 SURPASS Endpoints

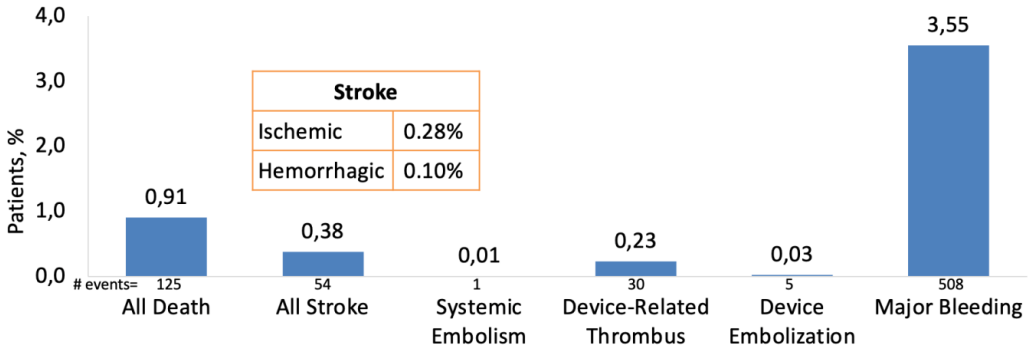
Safety Endpoint	Composite of all-cause death, ischemic stroke, systemic embolism, or device/procedure-related events requiring open cardiac surgery or major endovascular intervention between device implantation and 7 days or hospital discharge (whichever is later)
Effectiveness Endpoint	Occurrence of ischemic stroke or systemic embolism at 24 months post-implant
Additional Endpoints	• Death • Stroke • Device-related Thrombus • Systemic Embolism • Major Bleeding • Effective Device Closure • Implant Success • Device Embolization

Enrolment Cadence



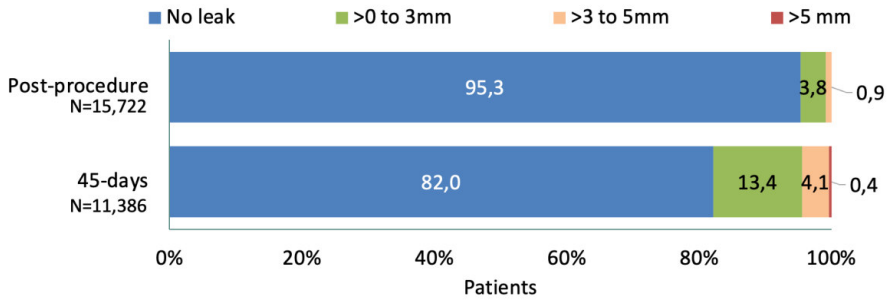
Characteristics	SURPASS N=16,048	PINNACLE FLX N=400	Characteristics	SURPASS N=16,048	PINNACLE FLX N=400
Age at Enrollment, Years	76 ± 8	74 ± 8	CHA_2DS_2-VASc Score	4.8 ± 1.5	4.2 ± 1.5
Female, %	40.3	35.5	HAS-BLED Score	2.4 ± 1.0	2.0 ± 1.0
Race, %			Atrial Fibrillation Pattern, %		
White	94.2	93.7	Paroxysmal	60.5	51.8
Black/African American	4.3	4.7	Persistent >7 days	21.5	Persistent 36.5
Hispanic/Latino Ethnicity	3.1	2.6	Persistent Long-standing	6.2	
Asian	1.2	0.5	Permanent	11.8	10.5

Key Clinical Events at 45 days



Stroke	
Ischemic	0.28%
Hemorrhagic	0.10%

LAA Closure Assessment



Circulation: Arrhythmia and Electrophysiology

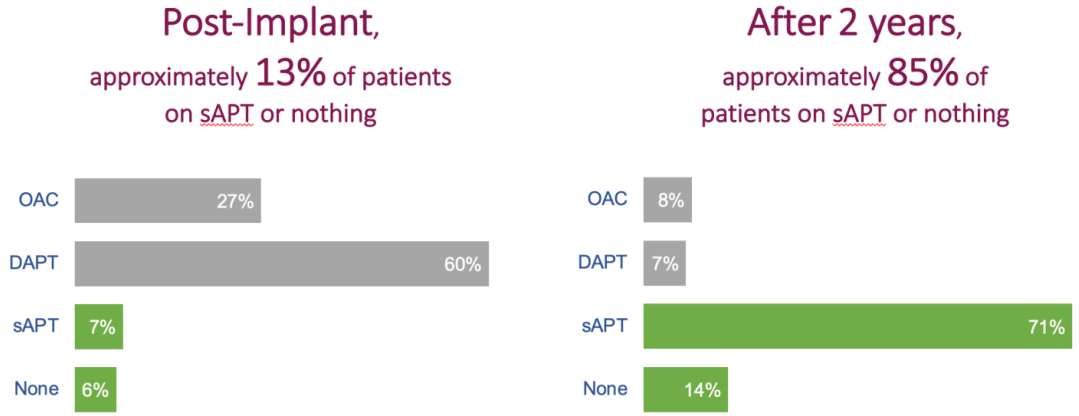
ORIGINAL ARTICLE

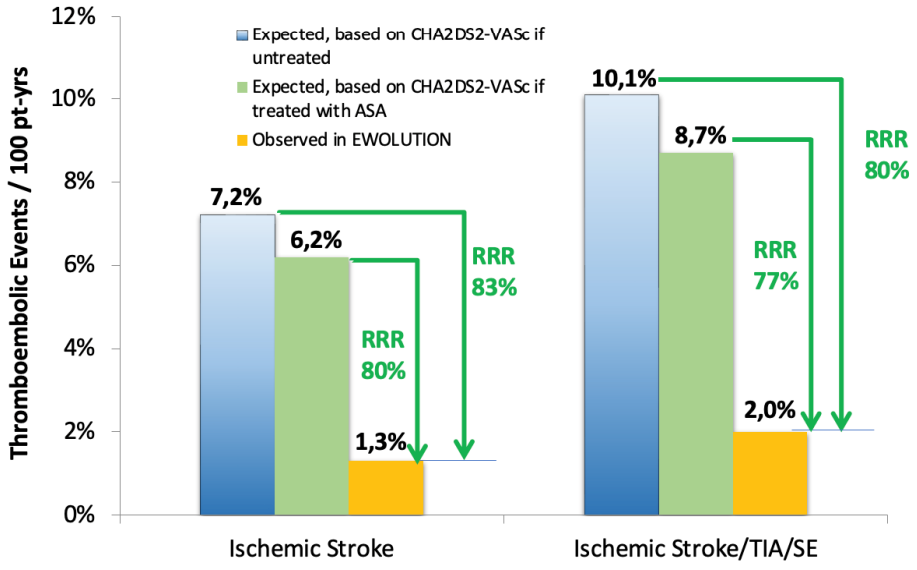
Evaluating Real-World Clinical Outcomes in Atrial Fibrillation Patients Receiving the WATCHMAN Left Atrial Appendage Closure Technology

Final 2-Year Outcome Data of the EWOLUTION Trial Focusing on History of Stroke and Hemorrhage

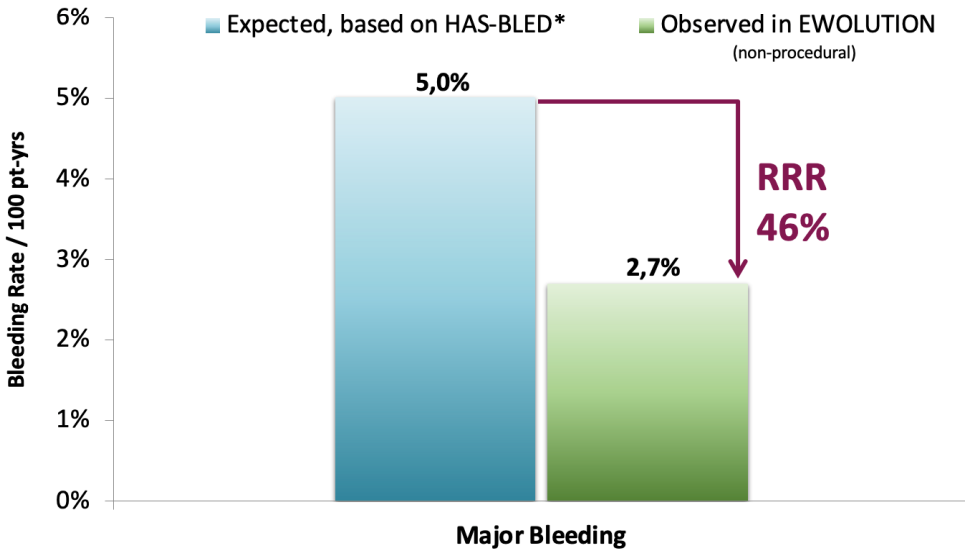
Circ Arrhythm Electrophysiol. 2019;12:e006841. DOI: 10.1161/CIRCEP.118.006841

1020 pacientes seguidos durante 2 años. 73% contraindicación para ACO.
Sin diferencias Entre no antiagregante o monoterapia/resto. ACV o sangrado





*Effectiveness in stroke reduction vs. estimated in the absence of therapy for comparable CHA_2DS_2-VASc scores based on Friberg et al. EHJ 2012



*Effectiveness in bleeding reduction vs. estimated under VKA therapy for comparable HAS-BLED scores based on Lip et al. JACC 2011

Principales Registros de COI con > 500 pacientes en pacientes alto riesgo de sangrado o contraindicaciones para ACO

Registro	EWOLUTION Registry (El de menor riesgo de sangrado ?)	Multicenter AMPLATZER	AMULET Registry	II Iberian Registry	Italian Registry
Población	**1025**	**1047**	**1088**	**598**	**N=613**
Edad media	73.4 ± 8.9	75 ± 8	74 ± 8	75.4	75.1 ± 8.0
Seguimiento	12	13	12	22.9	20 meses
CHA2DS2-VASc	4.5 ± 1.6	4.5 ± 1.6	4.5 ± 1.6	4.4 ± 1.5	4.2 ± 1.5
HASBLED	2.3 ± 1.2	3.1 ± 1.2	3.3 ± 1.1	3.4 ± 1.2	3.2 ± 1.1
Eventos					
Muerte	9.8%	4.3%	8.4%	7%	7.4%
Historia de ictus	30.5%	39%	28%	39%	36,3%
Historia de sangrado	**31%**	**47%**	**72%**	**46%**	**41.6%**
Eventos Observados vs Esperados					
Ictus	1.1% vs 7.2% (CHA2DS2-VASc) RRR, 83%	1.8% vs 5.62% (CHA2DS2-VASc) RRR, 59%	2.9 vs 6.7% (CHA2DS2-VASc) RRR, 57%	1.6 vs 8.5% (RR 81%)	2.9 vs 8,6% (RR 66%)
Sangrados graves	2.7% vs 5% (HAS-BLED) RRR, 46%	5.34% (HAS-BLED) RRR, 46%	7.1-10.3% primer año (4% al 2º año)	3.9 vs 6.4% (RR 39%)	4.5% vs 6.3% (RR 29%)

Reunión Anual de la Sección de
Cardiología Geriátrica
DE LA SOCIEDAD ESPAÑOLA DE CARDIOLOGÍA

ELSEVIER

American Heart Journal
Volume 189, July 2017, Pages 68-74

Trial Design

The Assessment of the Watchman Device in Patients Unsuitable for Oral Anticoagulation (ASAP-TOO) trial

David R. Holmes MD [a], Vivek Y. Reddy MD [b], Maurice Buchbinder MD [c], Kenneth Stein MD [d], Myriah Elletson [d], Martin W. Bergmann MD [e], Boris Schmidt MD [f], Jacqueline Saw MD, FRCPC [g]

888 pacientes
2:1

ASAP-TOO

To establish the safety and effectiveness of Watchman for subjects deemed not suitable for anti-coagulation

Study Objective	Evaluate LAA Closure with WATCHMAN in NVAF patients deemed not suitable for oral anti-coagulation therapy
Study Design	Prospective, multi-center Randomized 2:1 (Watchman vs Control) Event-driven endpoint
Primary Endpoint	Effectiveness Endpoint Time to first occurrence of ischemic stroke or systemic embolism Safety Endpoint 7-day rate of all-cause death, ischemic stroke, systemic embolism, or device- or procedure-related events requiring open cardiac surgery or major endovascular intervention
Patient Population	888
Number of Sites	120 global sites
Follow-up	• 3 month with TEE • 6.18 month phone visit • 12 month with TEE • Bi-annually for years 2-5
Status	Currently Enrolling

Holmes et al. AHJ 2017; 189: 68-74. NCT02928497

ASAP-TOO Randomization Assignments

Device Group Medical Therapy

Visit Interval	Aspirin	Clopidogrel*
Discharge through 3-month visit	Yes, suggested dose: 75-100mg	Yes Suggested dose: 75mg
3-month visit through 12-month visit**	Yes, suggested dose: 75-100mg	No, unless other indication
Following the 12-month visit**	No, unless other indication	No, unless other indication

Control Group Treatment

- Single antiplatelet therapy or no therapy for the duration of the trial at the discretion of the study physician.
- Subjects will be allowed to be on dual antiplatelet therapy if indicated.

***Clopidogrel may be substituted with ticagrelor or prasugrel if the subject requires the medication for other indications (e.g. acute coronary syndromes treated with drug eluting stents) or if the subject has a known resistance to clopidogrel.**

****Patients are allowed to be on dual antiplatelet therapy (outside of the protocol required 3- months period) if indicated due to a condition other than WATCHMAN implantation.**

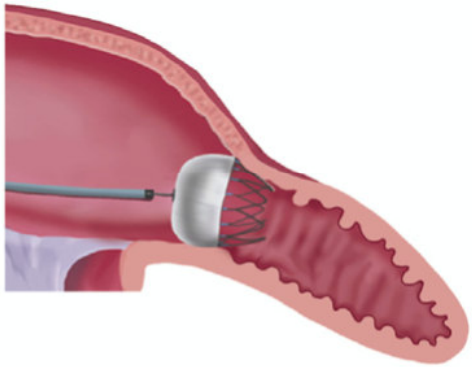
Note: Brain imaging required at baseline if prior stroke or TIA

Holmes et al. AHJ 2017; 189:68-74

History of acute or chronic gastrointestinal bleeding (overt-showed or occult-only appeared as iron-deficiency anaemia), with a BARC scale ≥ 3 or recurrent ≥ 2.

N=36	N (%); X ± SD
Age	78,27 ± 6,79 (range: 59-89)
Sex (M/F)	24/11 (68,6%/30,55%)
CHA_2DS_2VASc	4,75 ± 1,27
HAS-BLED	4,88 ± 1,06
Chronic kidney disease	8 (22.22%)
Watchman™	23 (63.88%)
Amplatzer™	13 (36.11%)
Nº previous OAC	
≥2	19 (52.77%)
≥3	5 (13.88%)
LAAC indication	
Angiodysplasias	20 (55.5%)
GB occult origin	8 (22.2%)
Other	8 (22.2%)

	X ± DE		p
Nº	12 months Before LAAC	12 months After LAAC	<0.001
Hospitalization	2,44±1,94	0,05±0,23	
Days of admission	19,77±14,54	0,16±0,7 days	
Endoscopic procedures	4,29±2,97	0,28±0,78	
Concentrados hematíes (U)	8,00±2,10	1,33±1,63	
Haemoglobin value (g/dL)	8±0,94	11,8±0,54	

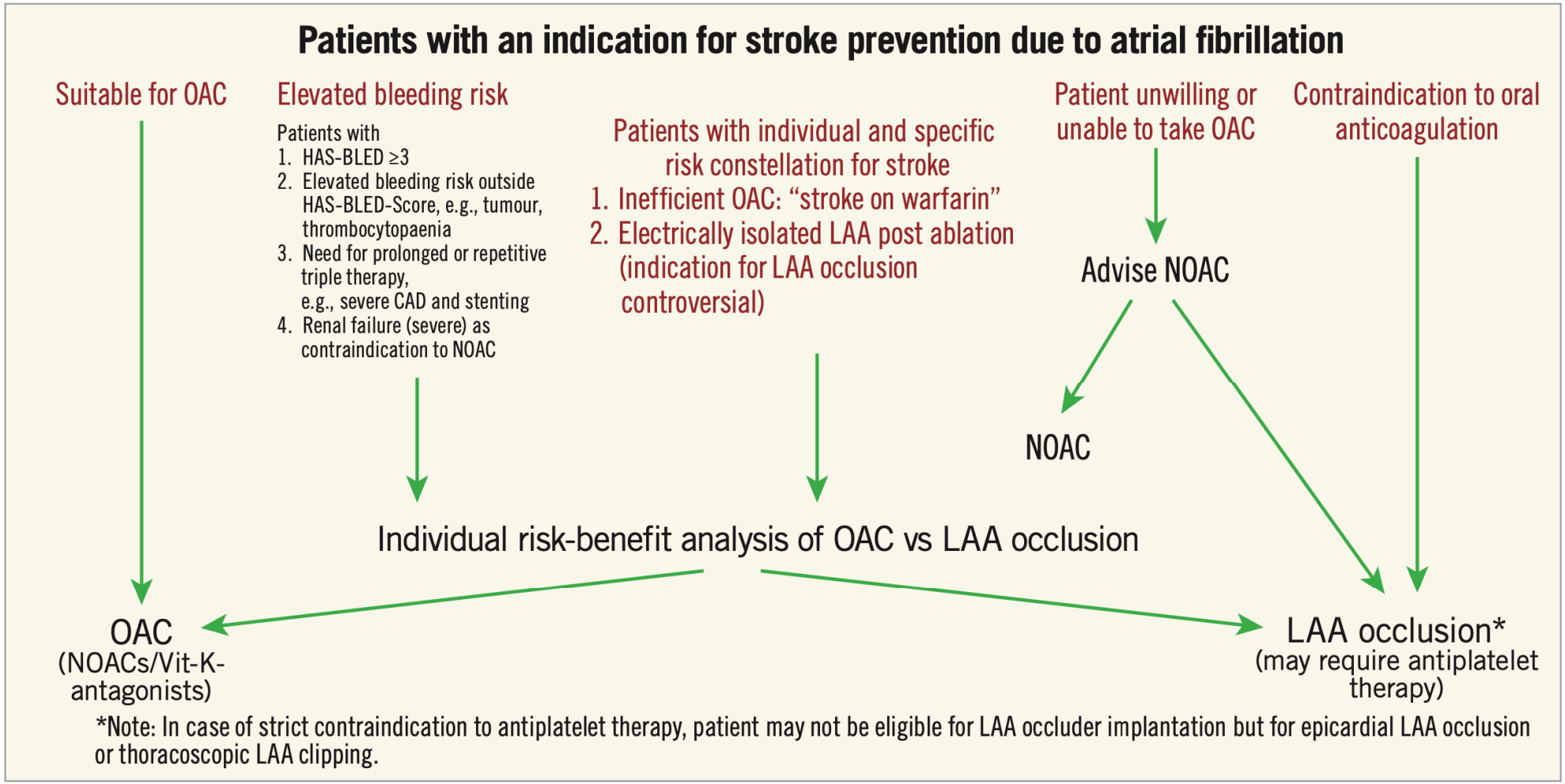


EHRA/EAPCI expert consensus statement on catheter-based left atrial appendage occlusion – an update

Michael Glikson[1]*; Rafael Wolff[1]; Gerhard Hindricks[2]; John Mandrola[3]; A. John Camm[4]; Gregory Y.H. Lip[5,6]; Laurent Fauchier[7]; Tim R. Betts[8]; Thorsten Lewalter[9,10]; Jacqueline Saw[11]; Apostolos Tzikas[12]; Leonid Sternik[13]; Fabian Nietlispach[14]; Sergio Berti[15]; Horst Sievert[16,17,18,19]; Stefan Bertog[16]; Bernhard Meier[20]

EuroIntervention 2020;15:**1133-1180** published online ahead of print August 2019

Árbol de decisión para el cierre de la OI



Conclusiones

- El CPOI es una técnica “madura”, con más de 20 años de desarrollo.
- Es procedimiento seguro, con una alta tasa de éxito de cierre eficaz de la OI y una baja incidencia de complicaciones.
- Para la planificación del CPOI es necesario conocer su anatomía, dimensiones y descartar trombo en su interior. Para ello podemos utilizar el TC o el ETE.
- El CPOI es una alternativa a la ACO en pacientes en FA en determinadas situaciones clínicas.
  - Contraindicación sistémica para ACO (hemorragia digestiva/cerebral).
  - Pacientes con riesgo hemorrágico alto/muy alto.
  - Ictus cardioembólico en paciente correctamente anticoagulado.
  - FA con indicación de ACO y determinadas profesiones/actividades de riesgo o negativa del paciente para recibir tto ACO.