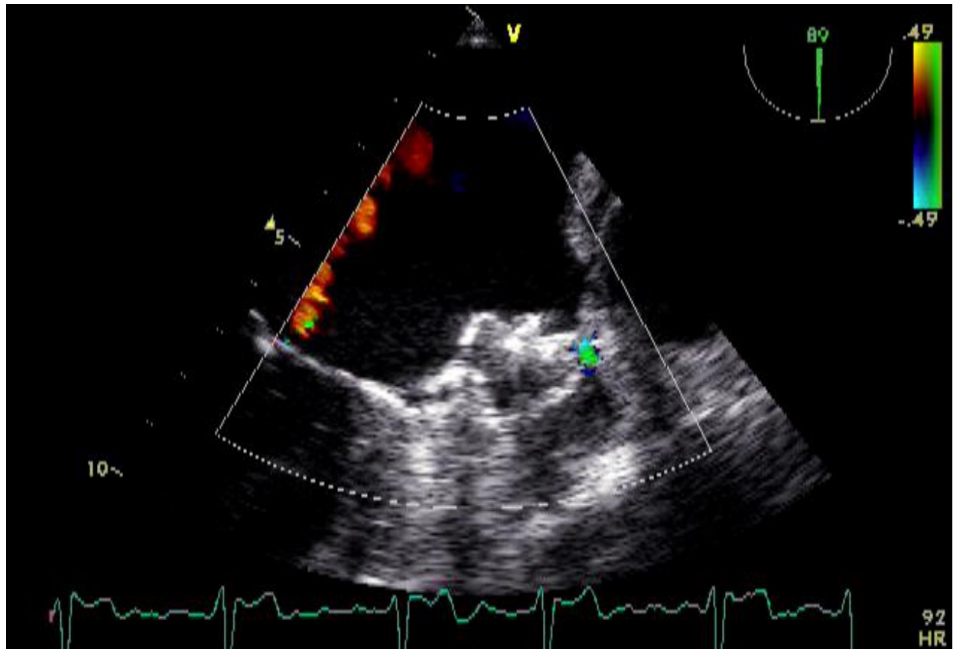
Cihaz Kenarından Kaçırma: Önemi ve Tedavisi



Dr. Abdullah Orhan Demirtaş

Adana Şehir Eğitim ve Araştırma Hastanesi

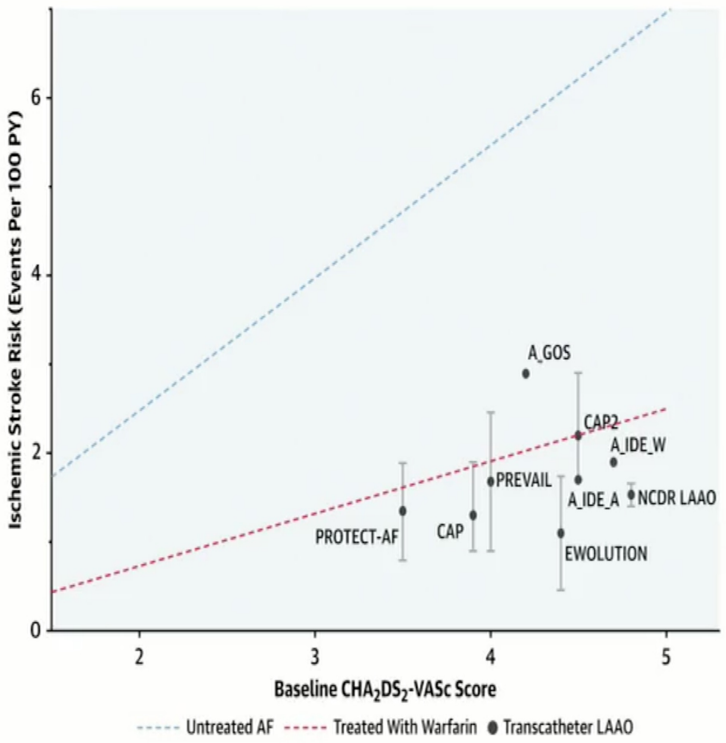
- İnmelerin yaklaşık %25'i atrial fibrilasyon (AF) ile ilişkili!
- AF'de 5 kat inme oranını arttırmaktadır.
- Otopsi ve TEE ile yapılan çalışmalarda kardiyoembolik embolilerin %90'ı LAA kaynaklı!
- Nonvalvüler AF'de CHADSVaSC skoruna göre oral antikoagülan (OAK) tedavi verilmekte. OAK inme oranını 2/3 oranında azalmaktadır.
- Ancak %30 u bu ilaçları bir sebepten ötürü kulanamamaktadır.
- GIS veya serebral kanaması geçirenlerin %90'ı OAK tedaviye kesmek zorunda kalıyor.

Freedman B et al. European Heart Journal Supplements (2020)

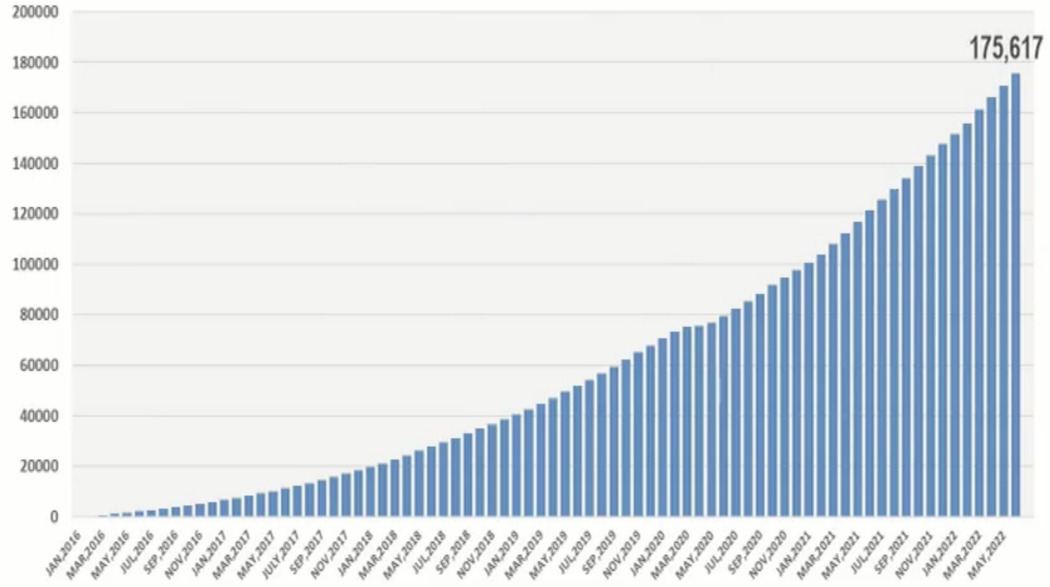
Glikson M et al EHRA/EAPCI expert consensus statement on catheter-based left atrial appendage occlusion Europace 2020.

- PROTECT AF and PREVAIL çalışmalarında sol atrial appendiks kapama (LAAC) vs Warfarin : inme riski noninferior + kanama ve ölüm oranı daha iyi!
- 2015'de Watchman 2.5, 2020'de Watchman Flx, 2021'de Amplatzer Amulet FDA onayı aldı.

Ischemic Stroke Rates in Randomized Trials and Observational Registries of LAAO as a Function of Baseline CHA_2DS_2-VASc Score



NDCR LAAO Registry: Cumulative Number of LAAO Procedures in the United States



Klavuz önerileri

Recommendation for
Percutaneous Approaches to Occlude the LAA

COR	LOE	Recommendation
IIb	B-NR	1. Percutaneous LAA occlusion may be considered in patients with AF at increased risk of stroke who have contraindications to long-term anticoagulation. NEW: Clinical trial data and FDA approval of the Watchman device necessitated this recommendation.

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
Surgical occlusion or exclusion of the LAA may be considered for stroke prevention in patients with AF undergoing cardiac surgery.[459,483]	IIb	C

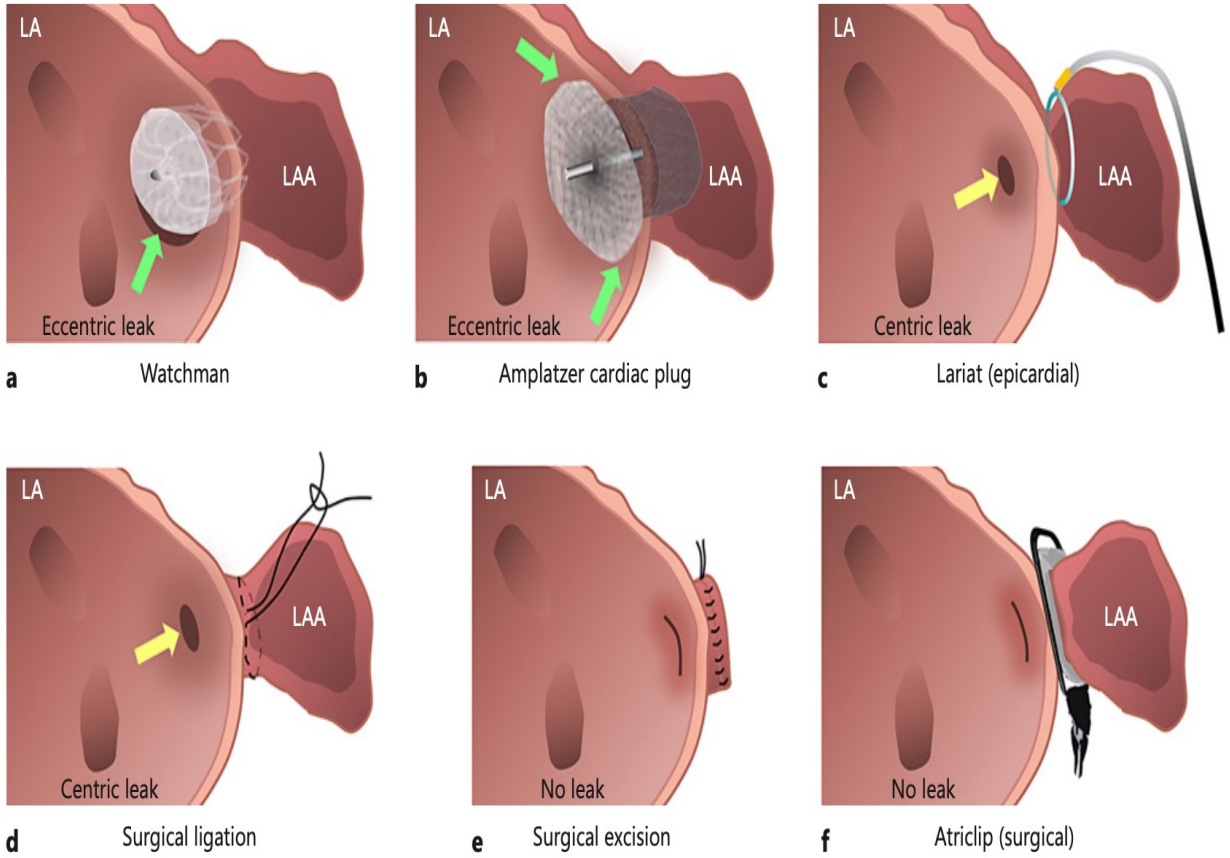
Hindricks et al ESC guideline 2020

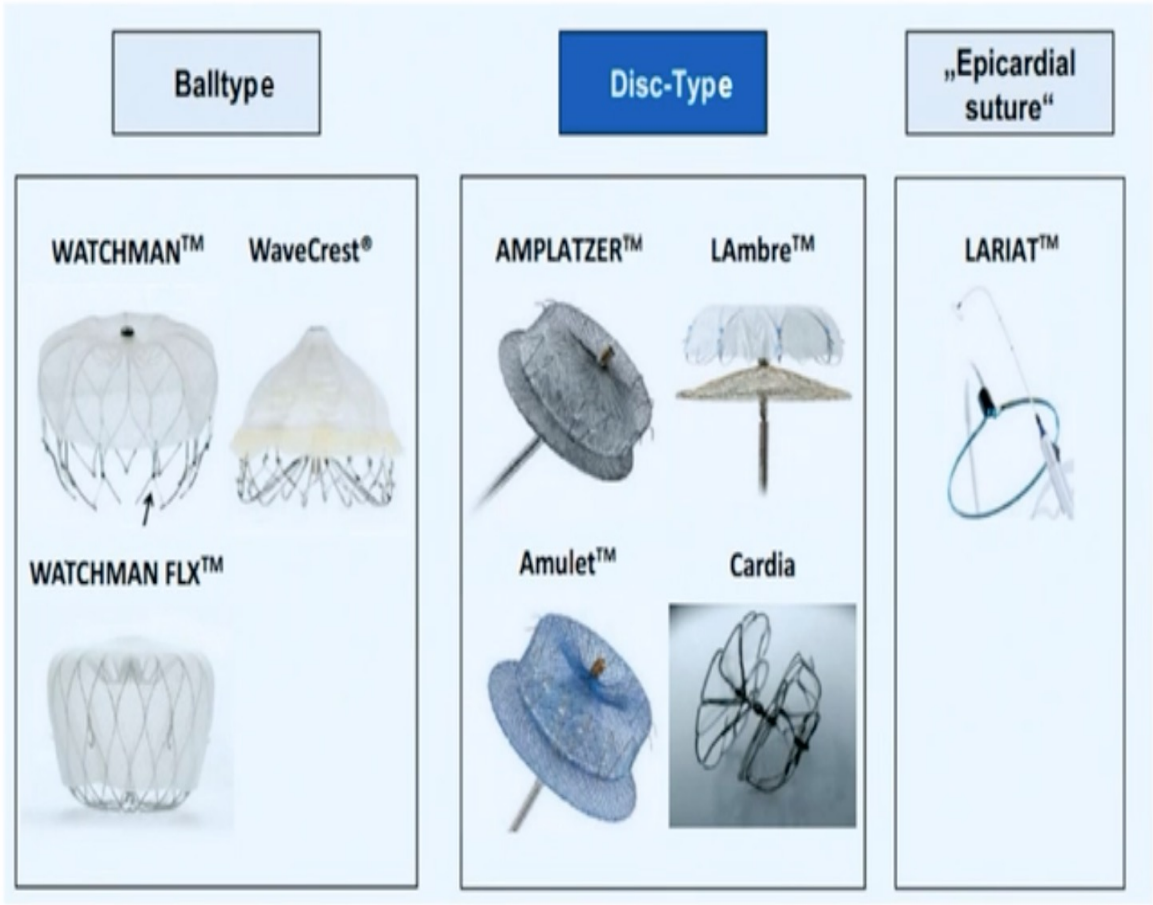
COR	LOE	RECOMMENDATIONS
2a	B-NR	1. In patients with AF, a moderate to high risk of stroke (CHA_2DS_2-VASc score ≥2), and a contraindication (Table 14) to long-term oral anticoagulation due to a nonreversible cause, percutaneous LAAO (pLAAO) is reasonable.[1-4]

COR	LOE	RECOMMENDATIONS
1	A	1. In patients with AF undergoing cardiac surgery with a CHA_2DS_2-VASc score ≥2 or equivalent stroke risk, surgical LAA exclusion, in addition to continued anticoagulation, is indicated to reduce the risk of stroke and systemic embolism.[1-3]
1	A	2. In patients with AF undergoing cardiac surgery and LAA exclusion, a surgical technique resulting in absence of flow across the suture line and a stump of <1 cm as determined by intraoperative trans-esophageal echocardiography should be used.[1,4,5]

CLINICAL PRACTICE GUIDELINE

2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation





Jang SJ et al Cardiology 2021

Komplikasyonlar

Periprocedural complications	Postprocedural complications
Death (<0.2%)	Late pericardial effusion & tamponade (~1%)
Stroke (<0.2%): Ischemic: air or thromboembolism; Hemorrhagic	Peridevice leak: >5 mm on TEE: 1%-3%; >3 mm on TEE: 10%-25%
Systemic embolism (rare)	Device-related thrombus (3%-5%)
Pericardial tamponade (~1%)	Late device migration/ embolization (infrequent)
Device embolization (~0.2%)	Device erosion (rare)
Vascular complications: retroperitoneal bleed, arteriovenous fistula, pseudoaneurysm	Iatrogenic atrial septal defects (rare to require intervention)
Other: major bleeding, renal failure, respiratory failure, sepsis, MI, endotracheal/ esophageal damage, interfering surrounding structures, device/contrast allergy, pericarditis	

Saw et la CAI/HRS Expert Consensus Statement on Transcatheter LAAC 2023

Cihaz kenarından kaçak (PDL)

PDL Mekanizması:

-Cihazın küçük kalması

-Malpozisyon

-Sol atrial appendiksi (LAA) kavranması (bir lobu kaçırma)

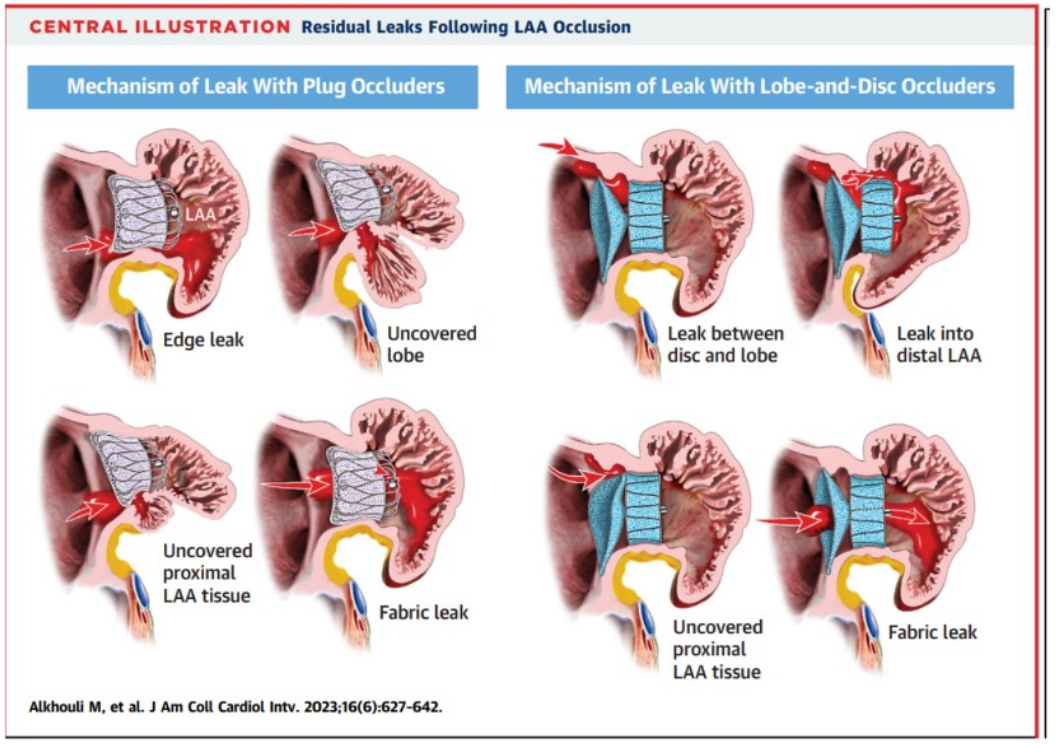
-Migrasyon

-İnkomplet endotelizasyon

- PDL sıklığı TEE ve BT görüntülemede farklılık gösteriyor.

Lakkireddy D et al. Circulation 2021.

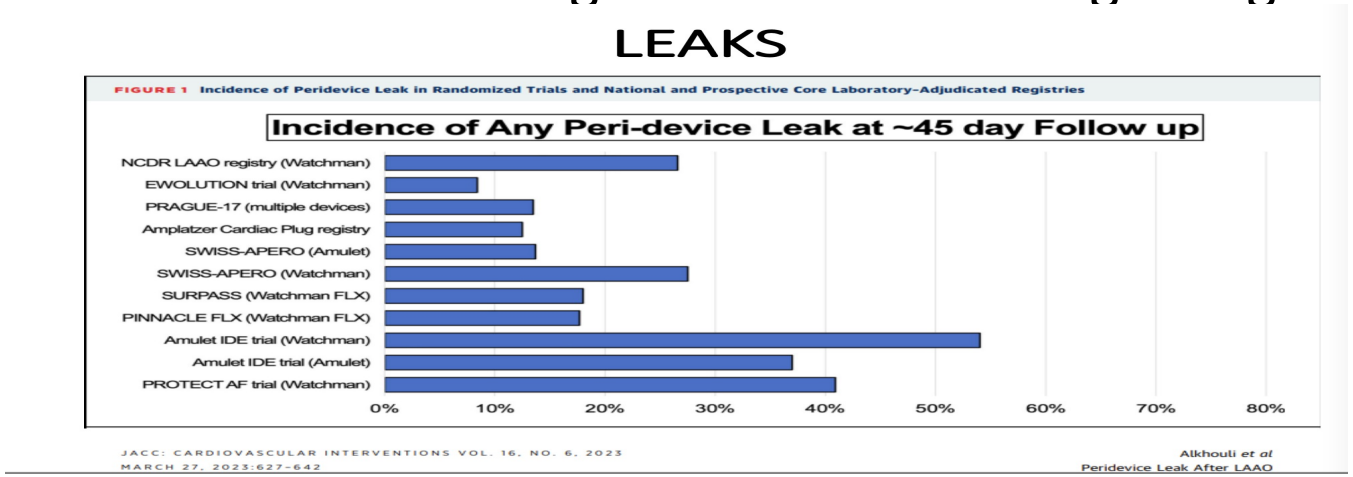
Saw J et al Eur Heart CV Imaging 2015



JACC: CARDIOVASCULAR INTERVENTIONS VOL. 16, NO. 6, 2023
MARCH 27, 2023:627-642

PDL İnsidansı ve FDA önerisi

- PDL'ler nadir değildir ve implante edilen cihaza ve kullanılan görüntüleme yöntemine bağlı olarak transkateter LAAC prosedürlerinin %11 ila %57'sinde rapor edilmektedir.
- FDA Watchman cihazları için 45. gündeki görüntülemede cihaza bağlı trombüs (%2-4 sıklığında gözlenir, DRT) veya PDL>5mm gözlenmezse OAK yi kesmemizi öneriyor.
- Neyse ki 5 mm üstü PDL oranı genel olarak %1 sıklığında gözükmektedir.



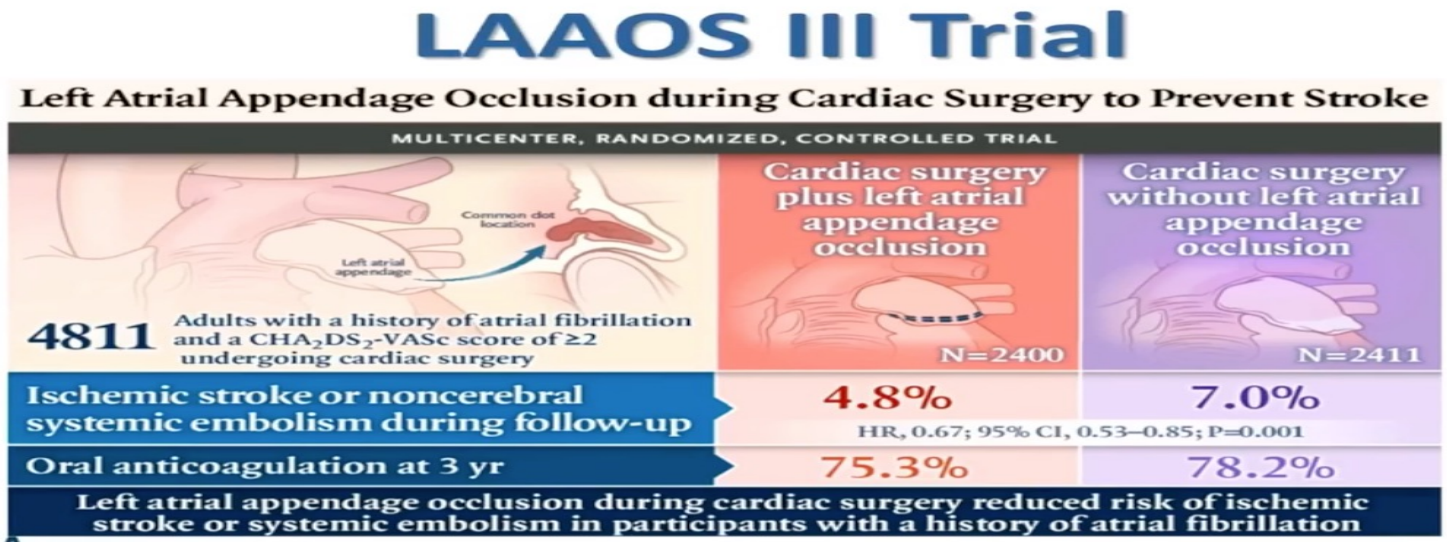
Saw et la CAI/HRS Expert Consensus Statement on Transcatheter LAAC 2023

PDL ve boyutunun önemi

- >5 mm PDL'ler emboliye sebep olabileceği kabul görmüş olmasına rağmen küçük PDL'ler için durum böyle değildir.
- PROTECT AF: <1, 1 - 3 ve >3 mm PDL boyutları arasında olumsuz olay oranlarında herhangi bir fark olmadığını gözlendi . (>5 mm PDL değerlendirmedi)
- NCDR LAAO Çalışması: 51.333 hastada, 1 yıl içinde saptanan PDL<5 mm'lerde biraz daha yüksek bir inme, geçici iskemik atak (TIA) ve embolizasyon oranıyla ilişkili olduğunu buldu. (HR 1,152; %95 CI, 1,025-1,294).
- Cihazlar arasında ve kapama yöntemleri arasında farklılıklar mevcut!

Afzal M, Ellis C et al; JACC EP 2022

Cerrahi LAA Kapama



Whitlock et al NEJM Med 2021

Association between incomplete surgical ligation of left atrial appendage and stroke and systemic embolization

Arash Aryana [1], Steve K Singh [2], Sheldon M Singh [3], P Gearoid O'Neill [4], Mark R Bowers [4], Shelley L Allen [5], Sammi L Lewandowski [5], Eleanor C Vierra [5], André d'Avila [6]

İnme: tam kapatılmış LAA vs. inkomplet LAA ligasyonu (ISLL,24%)

• Başka cerrahiye ek LAA ligasyonu retrospektif CT görüntülerin bakılıp embolizasyon oranları karşılaştırılmış

• Sistemik embolizasyon oranı tüm cohortta %1.9

– 6.5% ISLL OAK alan

– 14% ISLL OAK almayan grup

Amulet

Amulet-IDE

Circulation

ORIGINAL RESEARCH ARTICLE

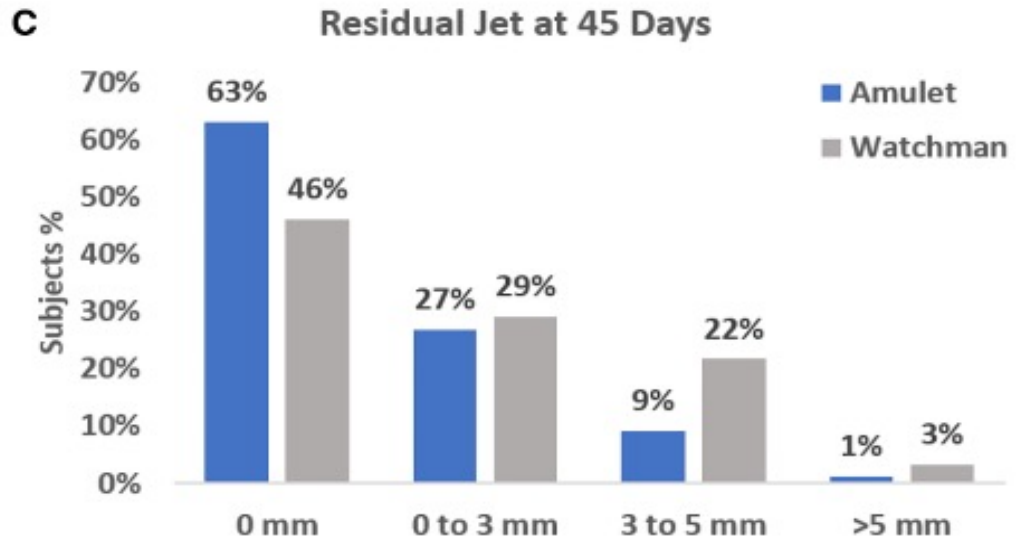
Amplatzer Amulet Left Atrial Appendage Occluder Versus Watchman Device for Stroke Prophylaxis (Amulet IDE)

A Randomized, Controlled Trial

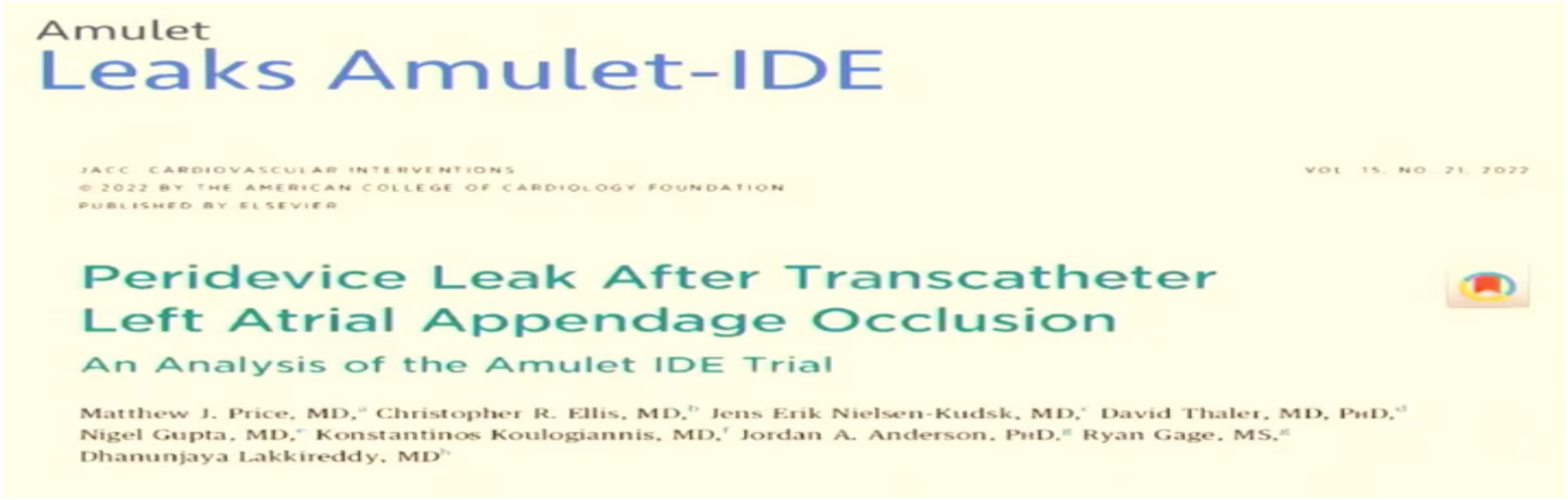
Dhanunjaya Lakkireddy, MD; David Thaler, MD, PhD; Christopher R. Ellis, MD; Vijendra Swarup, MD; Lars Sondergaard, MD; John Carroll, MD; Michael R. Gold, MD, PhD; James Hermiller, MD; Hans-Christoph Diener, MD, PhD; Boris Schmidt, MD; Lee MacDonald, MD; Moussa Mansour, MD; Brijeshwar Maini, MD; Laura O'Brien, PhD; Stephan Windecker, MD; on behalf of the Amulet IDE Investigators

1:1 Amulet Watchman (eski jenerasyon) randomize edilmiş.
-1878 hasta alınmış.
Sonlanım noktası:
1.Güvenlik: 12. ayda cihaza bağlı komplikasyon, bütün nedenlere bağlı ölüm ve majör kanama
2.Efektiflik: 19. ayda iskemik inme, sistemik embolizasyon
3. LAA kapanma oranı: 45 günde TEE ile karar verilmiş.

-Amulet güvenlik ve efektiflik olarak Watchman'a göre non inferior çıktı.
-Amulette daha fazla komplikasyon gözlendi. (%4.5 'vs %2.5-perikardiyal effüzyon ve cihaz embolizasyonu)
-Amulette LAA kapama oranı daha iyi olarak gözlendi.



Amulet %98.9 vs Watchman %96.8
(95% CI, 0.41-3.66, p <0.001)



- 1593 hasta LAAC hastası alınmış ve 3 mm üzeri kaçak randomize kontrol çalışma olarak araştırılmış.
- 45. gün (88.9%vs 74.1%, p<0.01) ve 12. ayda (90.5% vs 78.3%, p<0.01) Amulet kapama oranı daha iyi!
- 18 ay takiplerinde PDL inme, sistemik embolizasyon ve ölümü arttırdığı gösterilmiş. (8.1% vs. 4.7%; P = 0.04).

Journal of Interventional Cardiac Electrophysiology
https://doi.org/10.1007/s10840-022-01336-4

Check for updates

Left atrial appendage sealing performance of the Amplatzer Amulet and Watchman FLX device

Kasper Korsholm[1] · Anders Kramer[1] · Asger Andersen[1] · Jacqueline Saw[2] · Bjarne Linde Nørgaard[1] · Jesper Møller Jensen[1] · Jens Erik Nielsen-Kudsk[1]

- Tek merkezli kohort çalışması.
- Amulet (n:150) vs Watchman FLX (n:150) ’in 2 ay sonraki çekilmiş BT’leri karşılaştırılıyor.
- Tam kapama Amulet (30.5%) vs Watchman FLX (71.8%), $p < 0.001$.
- PDL boyutu W Flx grubunda daha küçük bulunuyor.

Circulation

ORIGINAL RESEARCH ARTICLE

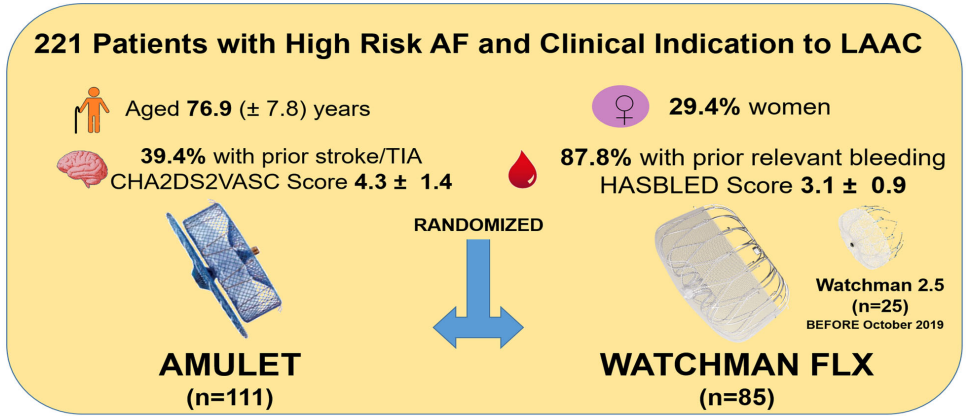
Amulet or Watchman Device for Percutaneous Left Atrial Appendage Closure: Primary Results of the SWISS-APERO Randomized Clinical Trial

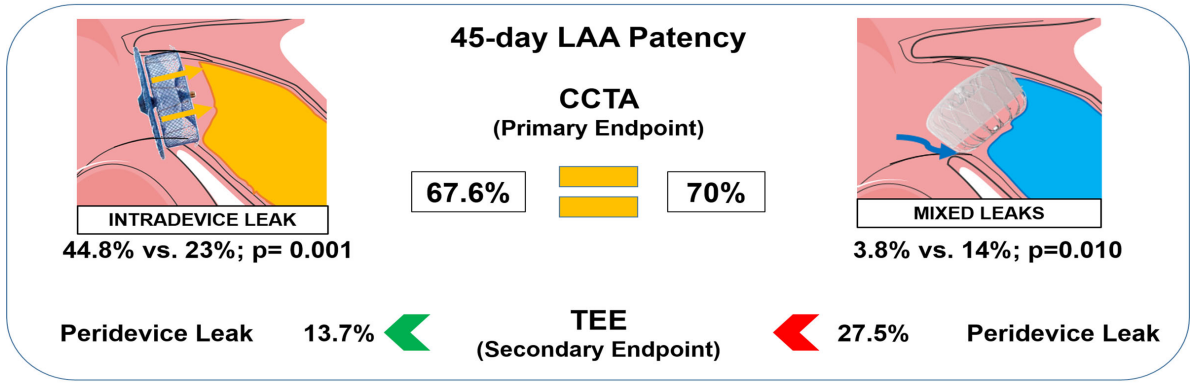
Roberto Galea, MD; Federico De Marco, MD; Nicolas Meneveau, MD; Adel Aminian, MD; Frédéric Anselme, MD, PhD; Christoph Gräni, MD, PhD; Adrian T. Huber, MD, PhD; Emmanuel Teiger, MD, PhD; Xavier Iriart, MD; Flora Babongo Bosombo, PhD; Dik Heg, PhD; Anna Franzone, MD, PhD; Pascal Vranckx, MD, PhD; Urs Fischer, MD; Giovanni Pedrazzini, MD; Francesco Bedogni, MD; Lorenz Räber, MD, PhD; Marco Valgimigli, MD, PhD

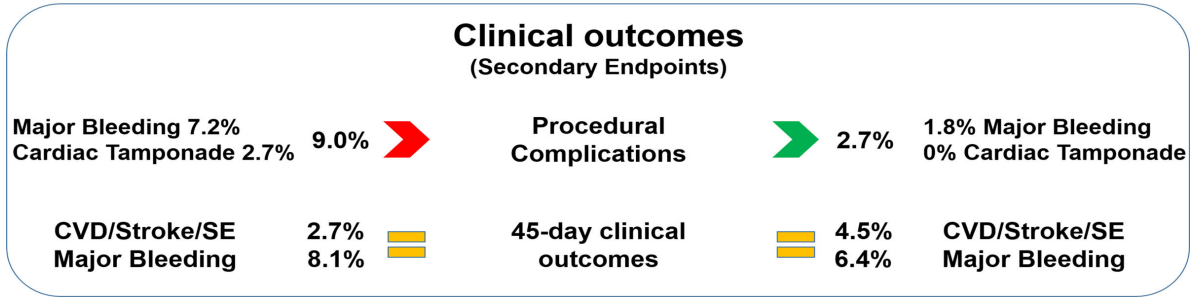
Multicentre randomize kontrol çalışma Amulet (n: 111) vs Watchman 2.5 veya FLX (n:110)

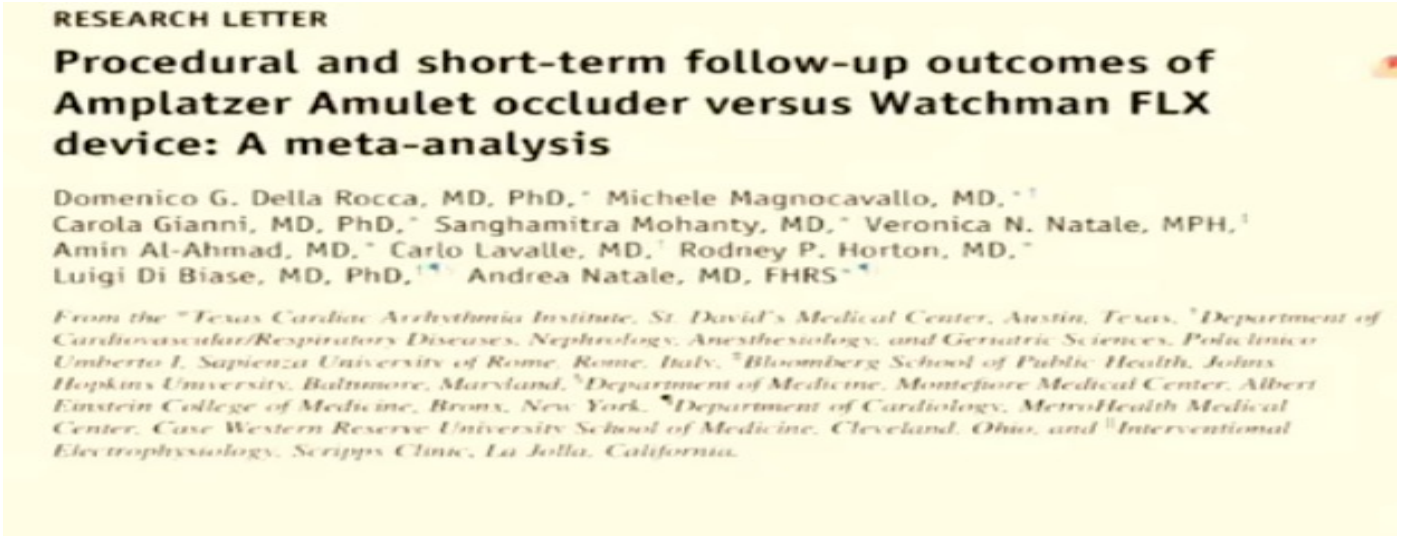
Primer sonlanım:
İşlem esnasındaki LAA açıklığı ve 45. günde BT ile LAA açıklığı
Sekonder sonlanım:
İşleme bağlı komplikasyonlar, 45. gündeki TEE'de gözlenen DRT, PDL

Primer endpoint eşit
-Amulet de daha az PDL (TEE, 45 . Gün, BT'de Normal!!!)
-Amulet de daha fazla işleme bağlı komplikasyon görüldü
-45. gün klinik sonuçları benzer









RESEARCH LETTER

Procedural and short-term follow-up outcomes of Amplatzer Amulet occluder versus Watchman FLX device: A meta-analysis

Domenico G. Della Rocca, MD, PhD,* Michele Magnocavallo, MD,*†
Carola Gianni, MD, PhD,* Sanghamitra Mohanty, MD,* Veronica N. Natale, MPH,‡
Amin Al-Ahmad, MD,* Carlo Lavalle, MD,† Rodney P. Horton, MD,*
Luigi Di Biase, MD, PhD,‖¶ Andrea Natale, MD, FHRS*¶

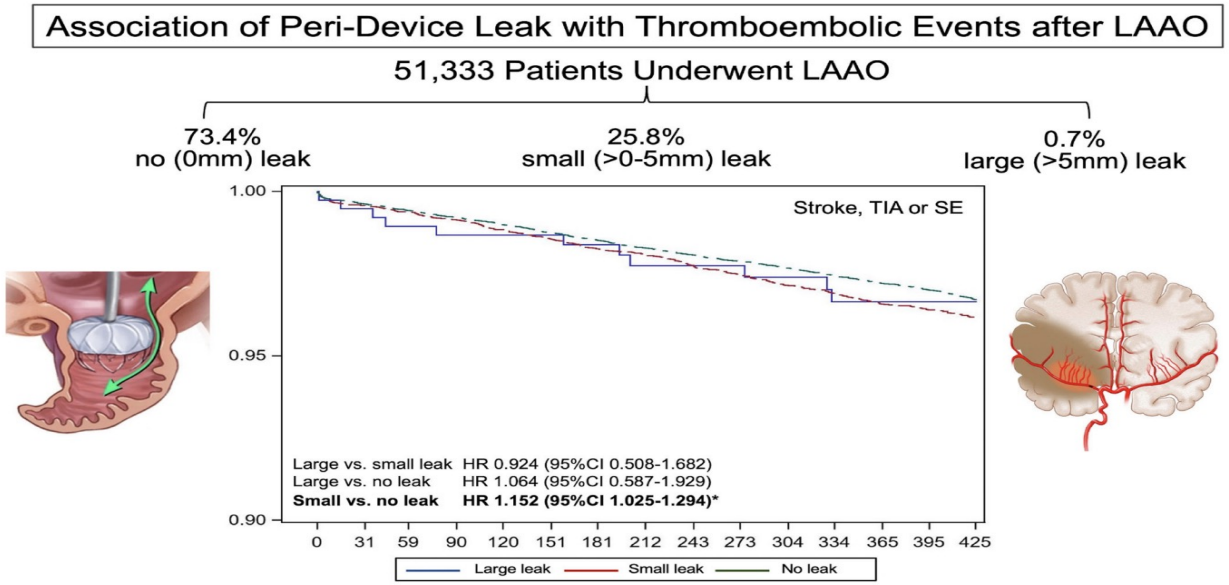
*From the *Texas Cardiac Arrhythmia Institute, St. David's Medical Center, Austin, Texas, †Department of Cardiovascular/Respiratory Diseases, Nephrology, Anesthesiology, and Geriatric Sciences, Policlinico Umberto I, Sapienza University of Rome, Rome, Italy, ‡Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, §Department of Medicine, Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, New York, ¶Department of Cardiology, MetroHealth Medical Center, Case Western Reserve University School of Medicine, Cleveland, Ohio, and ‖Interventional Electrophysiology, Scripps Clinic, La Jolla, California.*

21 çalışmada toplam 4186 LAAO hastası alımış- Metaanaliz
-Amulet (n:3187) vs Watchman FLX (999)
-Tromboembolik risk benzer!
-İşlem başarısı Amulet (99.4%) vs W FLX (99.9 %) benzer!
-Primer sonlanımı (ölüm, inme, kanama, MI, vasküler komp, device embolization, pericardial)
Amulet (4.5) vs FLX (0.6)---p:0.01--- W FLX lehine
- PDL> 5 mm Amulet (0.34%) vs FLX (0.01%)---- (P: 0.04)

Sonuç: Watchman FLX de işlem esnasında komplikasyon ve PDL Amulete göre daha az

Clinical Impact of Residual Leaks Following Left Atrial Appendage Occlusion: Insights from the NCDR LAAO Registry

Mohamad Alkhouli, MD,[1] Chengan Du, PhD,[2,3] Ammar Killu, MD,[1] Trevor Simard, MD,[1] Peter A Noseworthy, MD,[1] Paul A Friedman, MD,[1] Jeptha P Curtis, MD,[2,3] James V Freeman, MD,[2,3] and David R Holmes, MD[1]



Central Illustration: Association of Peri-Device Leak with Thromboembolic Events after LAAO. Among >50,000 patients who underwent LAAO in the US (2016–2019), 1 in 4 patients had peri-device leak detected on follow up imaging at 45 days. Majority of leaks were small <5 mm in diameter. Small leaks, however, we associated with a modest increase in the composite endpoint of stroke, TIA, or SE at 1 year follow up.
LAAO; left atrial appendage occlusion, TIA; transient ischemic attack, SE; systemic embolization, HR; hazard ratio.

-5mm altı PDL'lar daha fazla tromboembolik olayla ilişkili bulunmuş. 5mm üstü cihazlarda bu gözlenmemiş. Bunun sebebi bu grubun OAK kullanması olarak düşünülmüştür.

-Burda büyük kaçakları olanlarda daha büyük LAA orifisi, persistant AF ve kardiyomiyopati mevcut.

Jacc Clin Electrophysiology 2022

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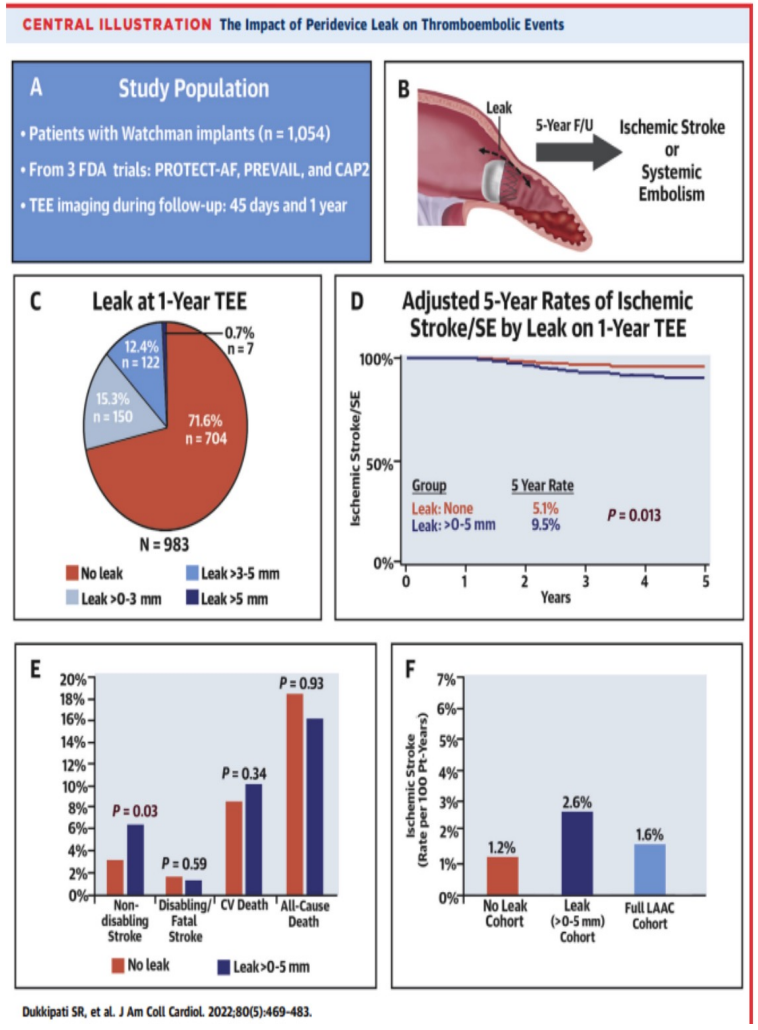
AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION

VOL. 80, NO. 5, 2022

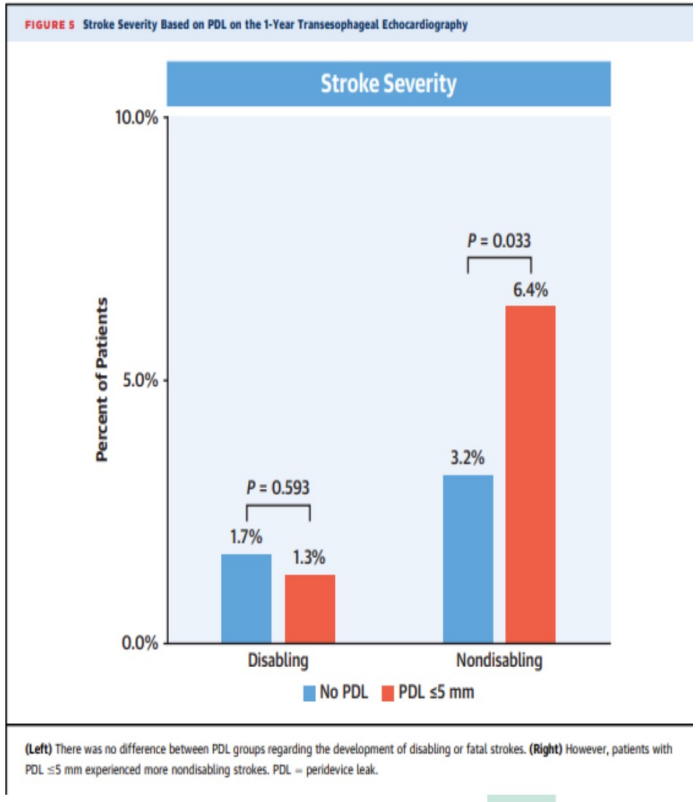
ORIGINAL INVESTIGATIONS

Impact of Peridevice Leak on 5-Year Outcomes After Left Atrial Appendage Closure

Srinivas R. Dukkipati, MD,[a] David R. Holmes, Jr, MD,[b] Shephal K. Doshi, MD,[c] Saibal Kar, MD,[d] Sheldon M. Singh, MD,[e] Douglas Gibson, MD,[f] Matthew J. Price, MD,[f] Andrea Natale, MD,[g] Moussa Mansour, MD,[h] Horst Sievert, MD,[i] Vicki M. Houle, PhD,[j] Dominic J. Allocco, MD,[j] Vivek Y. Reddy, MD[a]



Dukkipati SR, et al. J Am Coll Cardiol. 2022;80(5):469-483.



(Left) There was no difference between PDL groups regarding the development of disabling or fatal strokes. (Right) However, patients with PDL ≤5 mm experienced more nondisabling strokes. PDL = peridevice leak.

Watchman'ın 3 çalışmasında 45. gün ve 1 yıl (n:1054) PDL oranlarına bakıldı.
5 mm den büyük PDL %0.7
45. Günde %38 PDL<5mm
1. Yılda %27 PDL<5mm

Sonuç:
-45. günde olmasa da 1. yılda 5 mm altı kaçak olması 5 yıllık takiplerde inme riskini arttırdığı görülmüştür (HR 1.94, p 0.0014).
-Bu fark sakat bırakmayan inmeler de görülmüştür. Sakat bırakan inmeler ve mortalite istatiksel olarak fark gözlenmemiştir.

Peridevice Leak After Left Atrial Appendage Occlusion: Incidence, Mechanisms, Clinical Impact, and Management

GET ACCESS

State-Of-The-Art Review

Mohamad Alkhouli, Ole De Backer, Christopher R. Ellis, Jens Erik Nielsen-Kudsk, Horst Sievert, Andrea Natale, Dhanunjaya Lakkireddy, and David R. Holmes

J Am Coll Cardiol Intv. 2023 Mar, 16 (6) 627–642

LEAKS

FIGURE 1 Incidence of Peridevice Leak in Randomized Trials and National and Prospective Core Laboratory-Adjudicated Registries

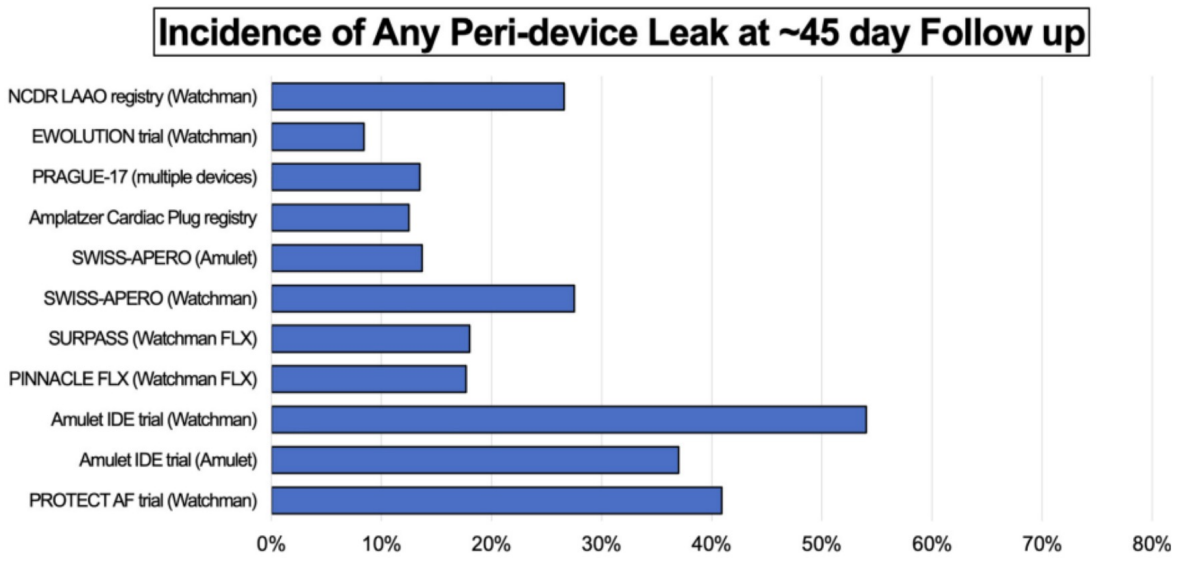
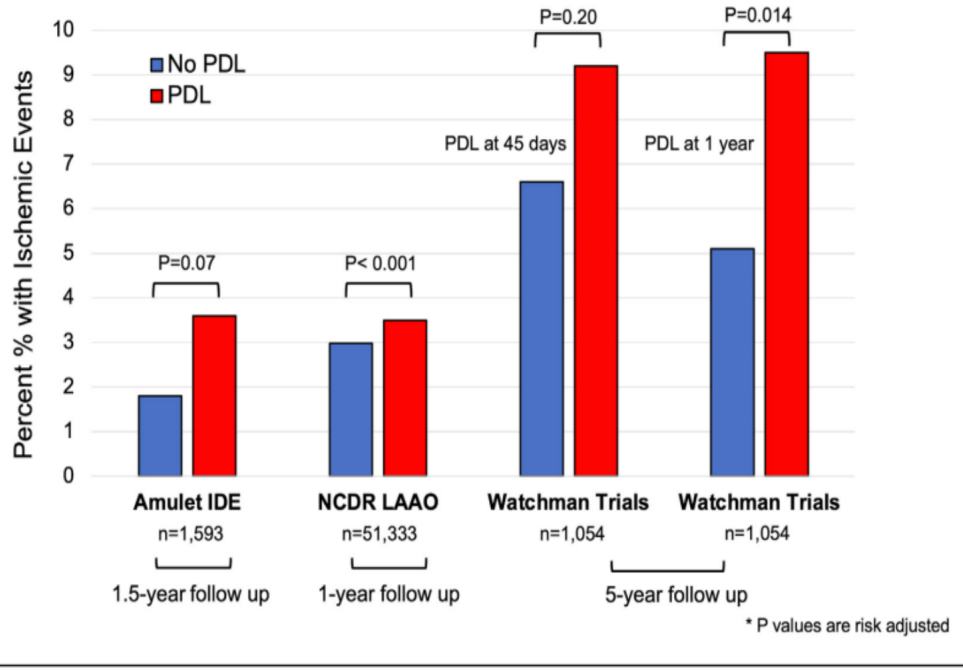


FIGURE 4 Summary of Recent Studies Documenting an Association of PDL With Ischemic Events



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

Results From the PINNACLE FLX Trial

Saibal Kar, Shephal K. Doshi, Ashish Sadhu, Rodney Horton, Jose Osorio, Christopher Ellis, James Stone Jr, Manish Shah, Srinivas R. Dukkipati, Stuart Adler, Devi G. Nair, Jamie Kim, Oussama Wazni, Mathew J. Price, Federico M. Asch, David R. Holmes Jr, Robert D. Shipley, Nicole T. Gordon, Dominic J. Allocco, Vivek Y. Reddy and On behalf of the PINNACLE FLX Investigators

Originally published 6 Apr 2021 | https://doi.org/10.1161/CIRCULATIONAHA.120.050117 | Circulation. 2021;143:1754–1762

Table 3. LAA Closure (Core Laboratory Assessment)

Peri-device flow	Implant	45 days	12 mo
Jet size ≤5 mm	100.0% (376/376) [99.0%, 100.0%]	100.0% (389/389) [99.1%, 100.0%]	100.0% (344/344) [98.9%, 100.0%]
Jet size >0 and ≤5 mm	7.4% (28/376) [5.0%, 10.6%]	17.2% (67/389) [13.6%, 21.4%]	10.5% (36/344) [7.4%, 14.2%]
Jet size >5 mm	0.0% (0/376) [0.0%, 1.0%]	0.0% (0/389) [0.0%, 0.9%]	0.0% (0/344) [0.0%, 1.1%]
Transesophageal echocardiogram deemed not evaluable for leak by Core Laboratory*	2.3% (9/385) [1.1%, 4.4%]	0.8% (3/392) [0.2%, 2.2%]	0.9% (3/347) [0.2%, 2.5%]

Data are % (n/N) [min, max].

* Site evaluation of transesophageal echocardiograms assessed peri-device flow as ≤5 mm in all cases.

400 kilişik nonrandomize prospektif çalışma.

-Güvenlik sonlanım noktası: Hastane içi ve 7 günlük ölüm inme emboli, cihaza bağlı cerrahi oranına.

-Etkinlik sonlanım noktası: 12. aydaki PDL oranı (5 mm altı)

Sonuç:

-5 mm üstü PDL gözlenmedi.

-Güvenlik oranı çok iyi. (P. effüzyon, acil cerrahi, embolizasyon gözlenmedi.)

-DRT 7 hastada gözlendi. (%2 altında)

-Eski cihazlara göre daha az komplikasyon ve daha iyi kapama oranı gözlenmiş oldu.

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REVIEW Open Access

Systematic review on left atrial appendage closure with the LAmbre device in patients with non-valvular atrial fibrillation

Muhammad Ali[1†], Angelos G. Rigopoulos[1†], Mammad Mammadov[1], Abdelrahman Torky[1], Andrea Auer[1], Marios Matiakis[1], Elena Abate[1], Constantinos Bakogiannis[2], Stergios Tzikas[2], Boris Bigalke[3], Daniel Sedding[1] and Michel Noutsias[1*]

Abstract

Background: Percutaneous closure (LAAC) of the left atrial appendage (LAA) is an efficacious preventive procedure for patients with non-valvular atrial fibrillation (NVAF) and considerable bleeding risk. We sought to systematically review the available LAAC data on the novel occluder device LAmbre™.

Methods: For this systematic review, a search of the literature was conducted by 3 independent reviewers, reporting the safety and therapeutic success of LAAC in patients being treated with a LAmbre™. Publications reporting the safety and therapeutic success of LAAC using LAmbre™ in $n \geq 5$ patients were included.

Results: The literature search retrieved $n = 10$ publications, encompassing $n = 403$ NVAF patients treated with a LAmbre™ LAAC, with relevant data regarding safety and therapeutic success of the procedure. The mean CHA_2DS_2-VASc Score was 4.0 ± 0.9, and the mean HAS-BLED score was 3.4 ± 0.5. The implantation success was 99.7%, with a mean procedure time of 45.4 ± 18.7 min, and a fluoroscopy time of 9.6 ± 5.9 min, and a contrast agent volume of 96.7 ± 0.7 ml. The anticoagulation regimen was switched to DAPT post procedure in the majority of the patients (96.8%). Partial and full recapture were done in 45.5% and in 25.6%, respectively. Major complications were reported in 2.9%, with 0.3% mortality, 1.7% pericardial tamponade, 0.3% stroke, and 0.6% major bleeding complications; no device embolization was observed. During follow up at 6 or 12 months, major adverse cardiovascular events were reported in 3.3%: Stroke or TIA in 1.7%, thrombus formation on the device in 0.7%, and residual flow > 5 mm in 1.0%. In some publications, the favorable implantion properties of the LAmbre™ for difficult anatomies such as shallow or multilobular LAA anatomies were described.

Conclusions: This systematic review on the LAmbre™ LAA-occluder including $n = 403$ NVAF patients demonstrates an excellent implantion success rate, promising follow-up clinical data, and favorable properties for also challenging LAA anatomies,. While its design seems to be helpful in preventing device embolization, pericardial tamponade may not be substantially reduced by the LAmbre™ as compared with other established LAAC devices. Further larger prospective multicenter registries and randomized trials are needed to scrutinize the value of the LAmbre™ compared with established LAAC devices.

Görüntüleme Teknikleri- Nasıl Yapalım

Table 5 Imaging surveillance modality and optimal imaging at different postdevice implantation time points.

Imaging timing	Immediate postdevice implant	Prehospital discharge	45-d follow-up	1-y follow-up (optional)
Transthoracic echocardiogram	−	+++	−	−
Transesophageal echocardiogram	+++	−	++	++
CCTA	−	−	+++	+++
Complication surveillance	**Pericardial effusion**	**Device embolization**	**Peridevice leak**	**Device-related thrombus**
Transthoracic echocardiogram	+++	+	−	−
Transesophageal echocardiogram	+++	+++	++	+++
CCTA	+++	+++	+++	+++

Saw et la CAI/HRS Expert Consensus Statement on Transcatheter LAAC 2023

Ne zaman yapıyoruz?

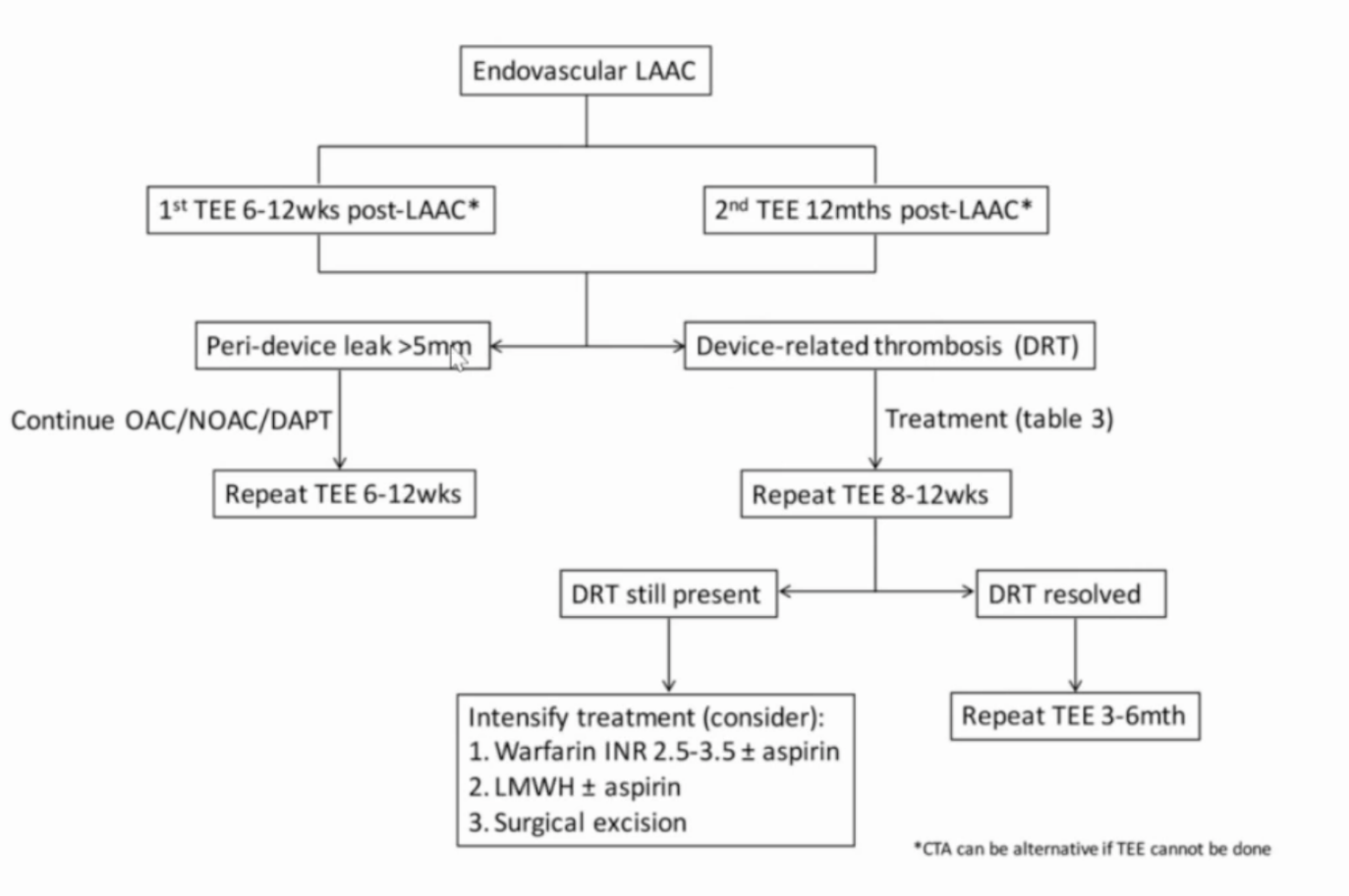


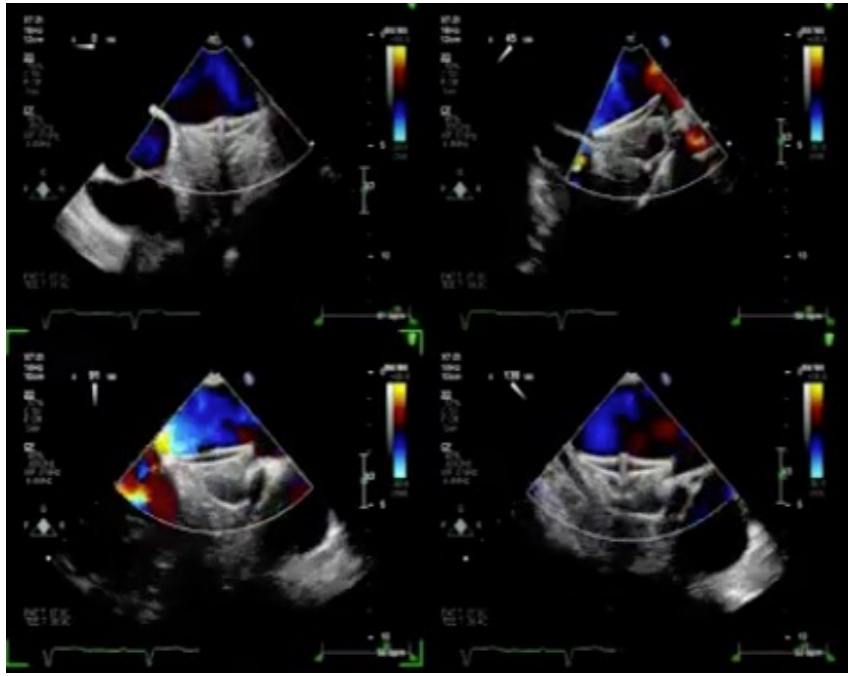
Table 8 **Scientific rationale of recommendations for LAA closure imaging**

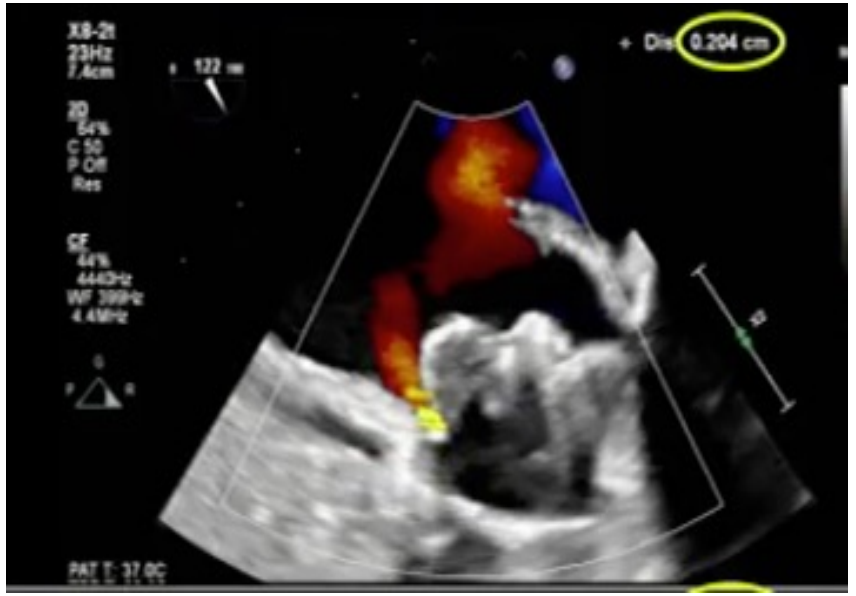
Recommendations	Consensus statement instruction	Symbol
Preprocedural imaging should be performed with either CCTA or TOE to rule out pre-existing LAA thrombus and anatomic suitability for LAA closure	"Should do this"	♥
Procedural imaging should be performed with either TOE or ICE guidance	"Should do this"	♥
Post-procedural imaging should be performed at 6-24 weeks post implantation to assess for DRT	"Should do this"	♥
Post-procedural imaging may be repeated after 12 months post implantation to assess for DRT	"May do this"	♥
Presence of DRT on the atrial side of the device should be treated with intensified anticoagulation to resolve thrombus	"Should do this"	♥

Saw et al Jacc cardiovascular interventions 2009: 1067-76.
Glikson M et al EHRA/EAPCI expert consensus statement on catheter-based left atrial appendage occlusion

PDL Ölçümü

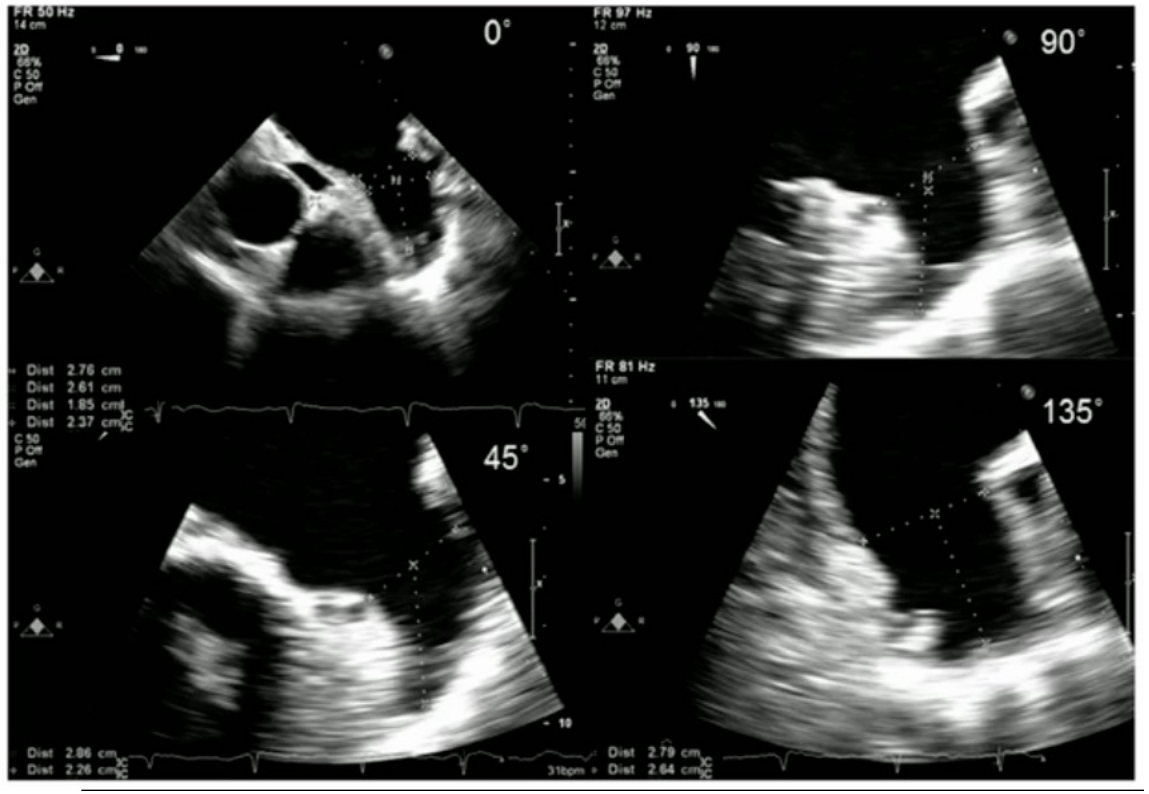
- Farklı açılarda LAA ostiumu ölçülmeli ve en büyük ölçümü dikkate almalıyız.(0,45,90,135)
- LA basıncı >12 mmhg üzerinde ölçüm almalıyız. İşlem öncesi çok iyi hidrate olmalıdır.
- Renkli doppler Nyquist düşürmeliyiz (30 cm/sn)
- Jet'in genişliği zoom yapıp ölçülmeli.
- İşlem esnasında acele etmemeliyiz.
- BT'de TEE'ye göre daha büyük LAA çapları elde ederiz. İşlem öncesi BT ninde çekilmesi önemlidir.
- 3D Eko bize PDL yi daha iyi görmemizde ek bilgi verebilir.

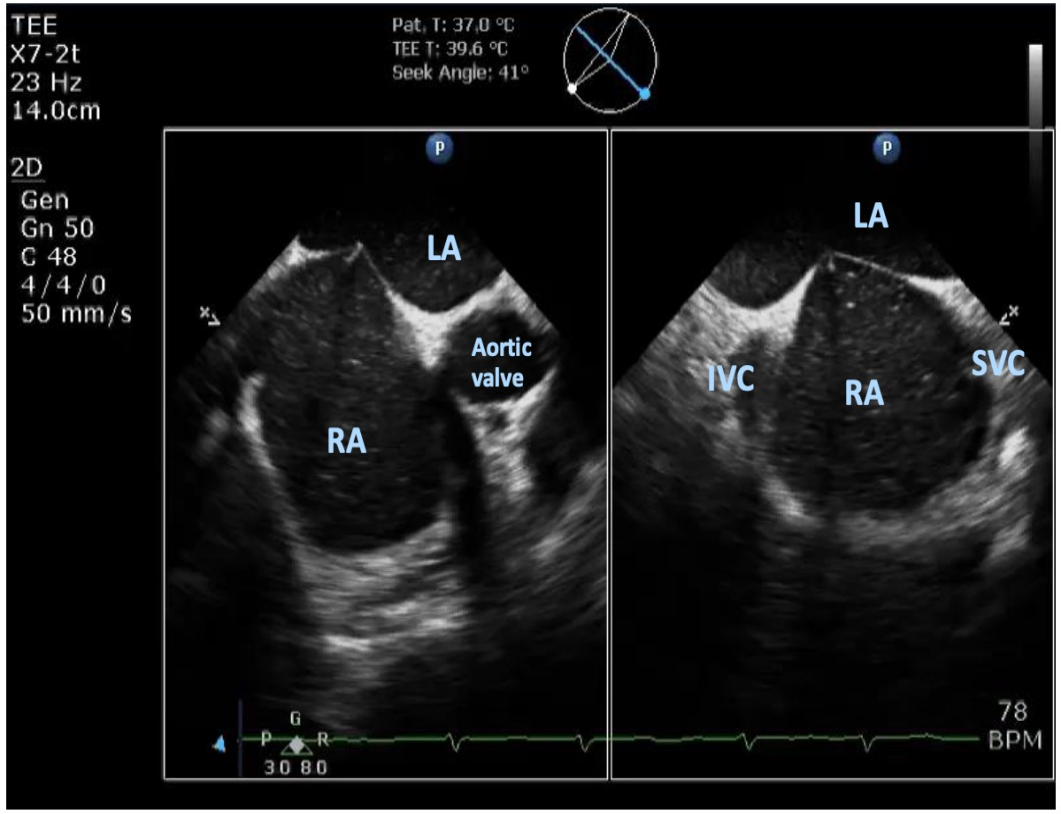




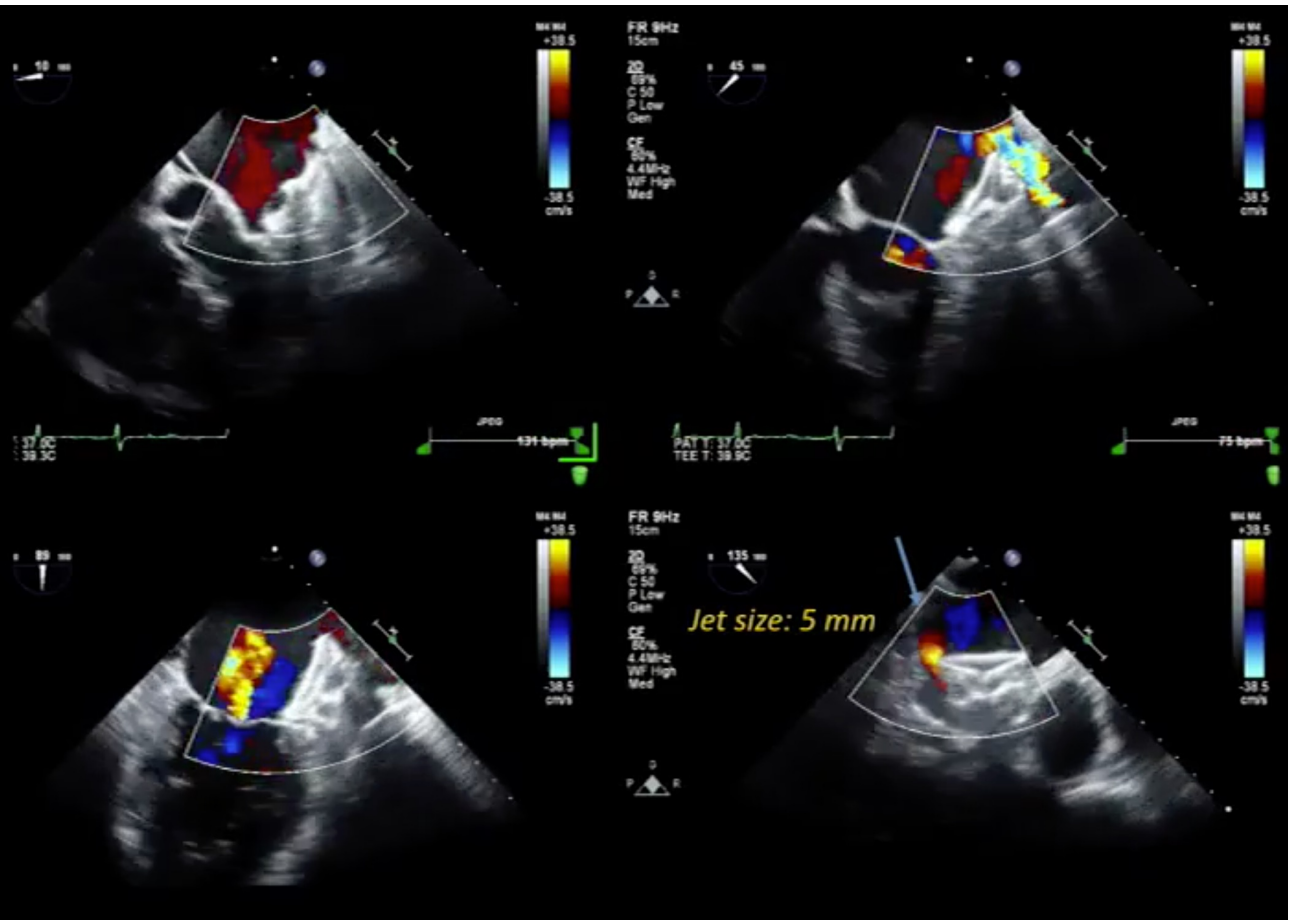
Tzikas et al Europace 2017

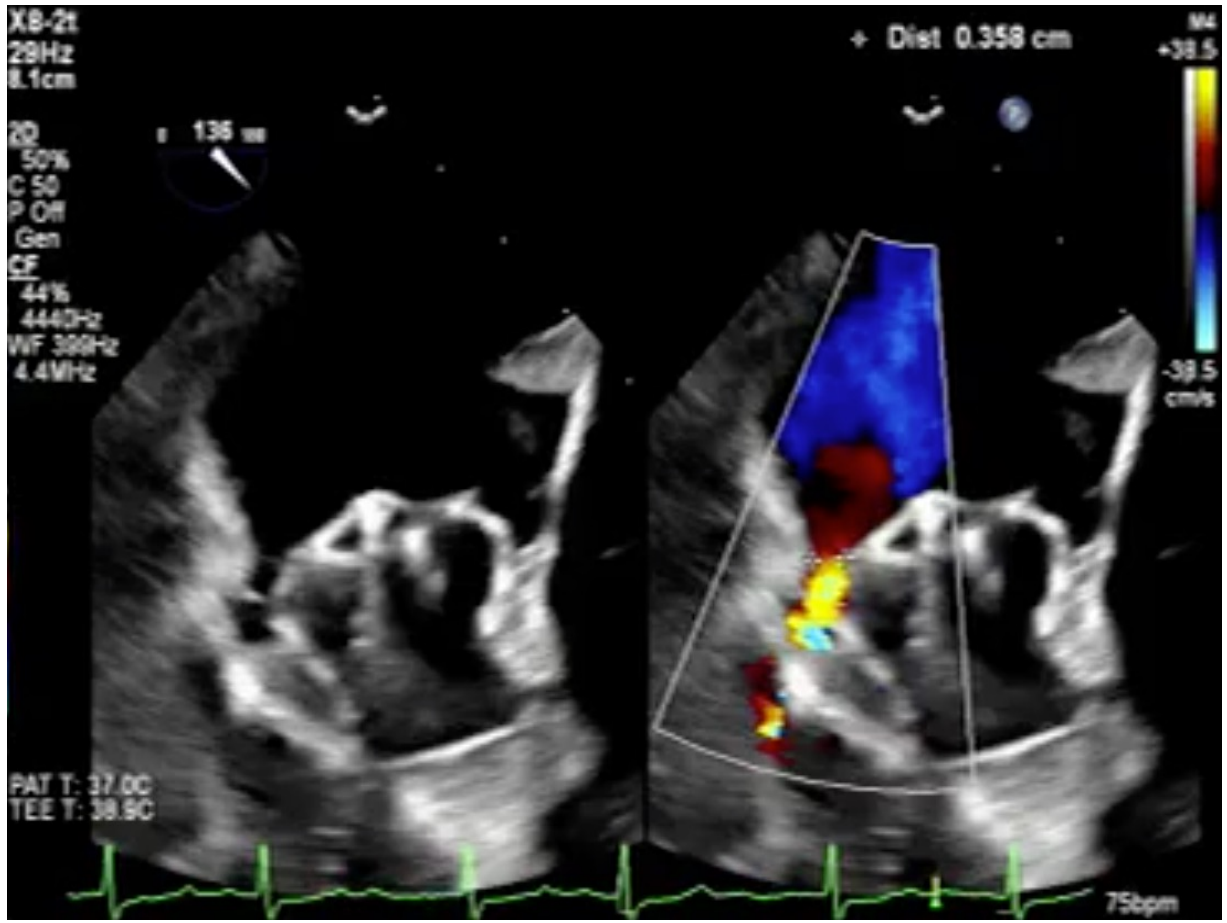
TEE (LAA trombüs,ostium çapı ve derinliği, TSP)



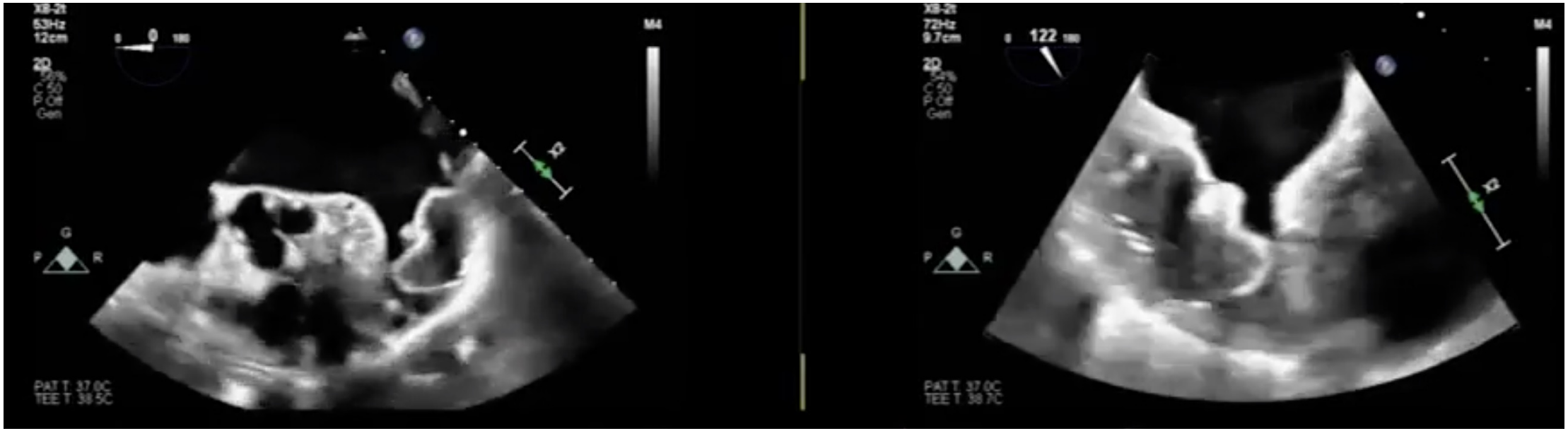


Amulet ve Watchman PDL örnekleri



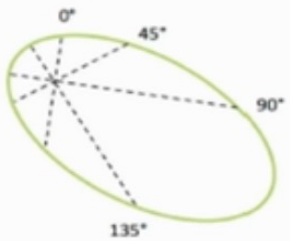


Burda da küçük boyutta olan bir cihazın 45. gün kontrol TEE sinde migrasyonunu görüyoruz.



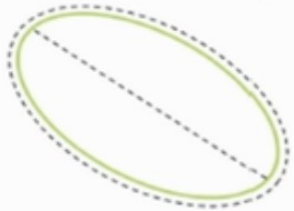
2D vs. 3D measurements

A **TEE-based sizing**



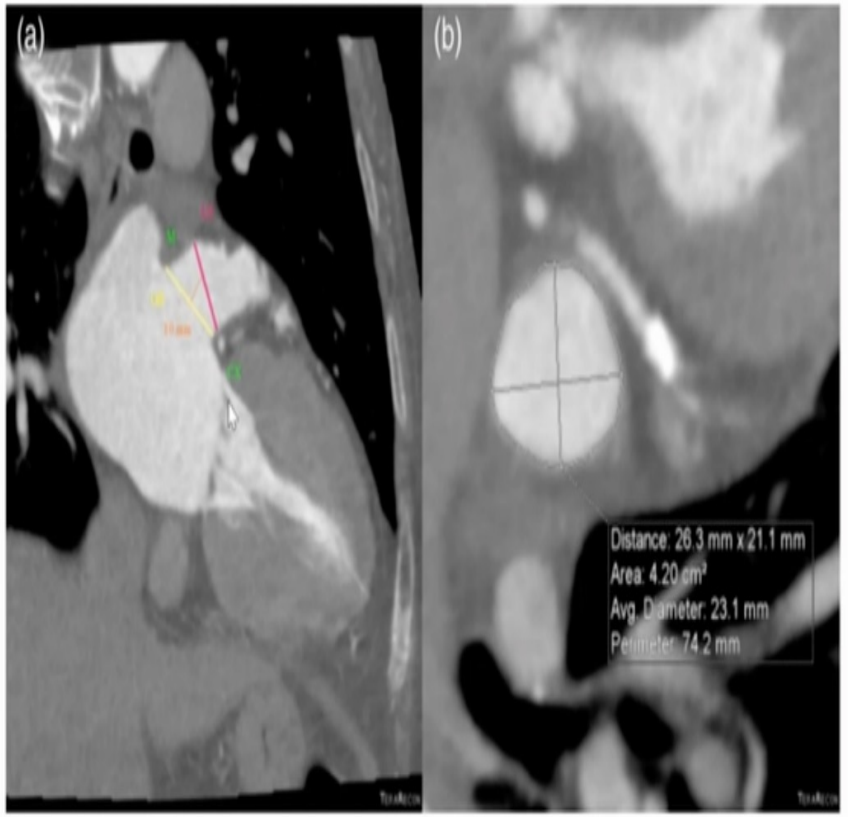
Measured maximal LAA diameter
<< Actual maximal LAA diameter

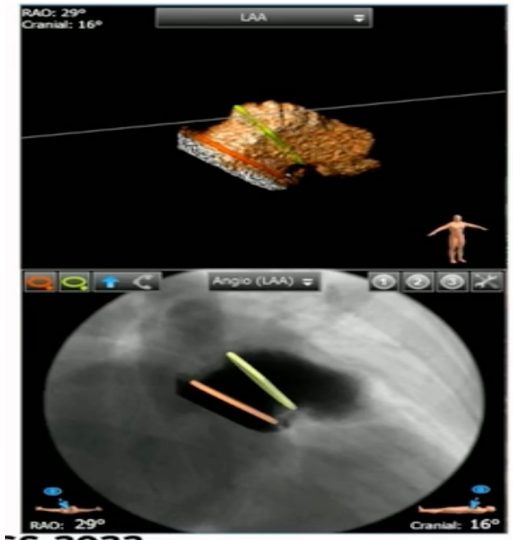
B **CT-based sizing** / 3D echo



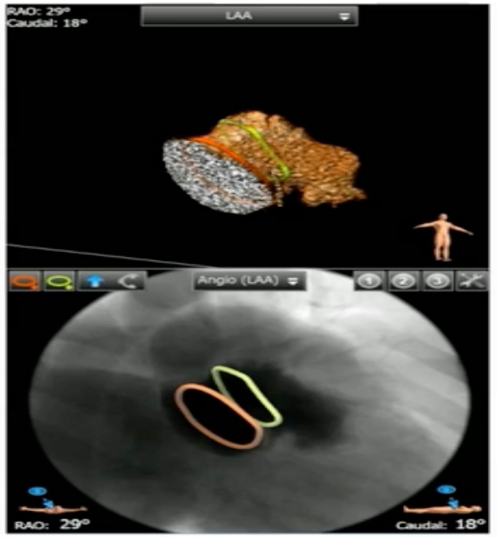
Accurate measurement of:

- Perimeter-derived mean diameter
- Maximal diameter

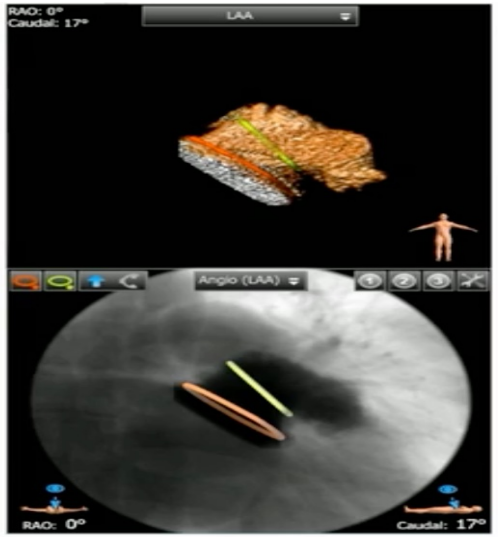




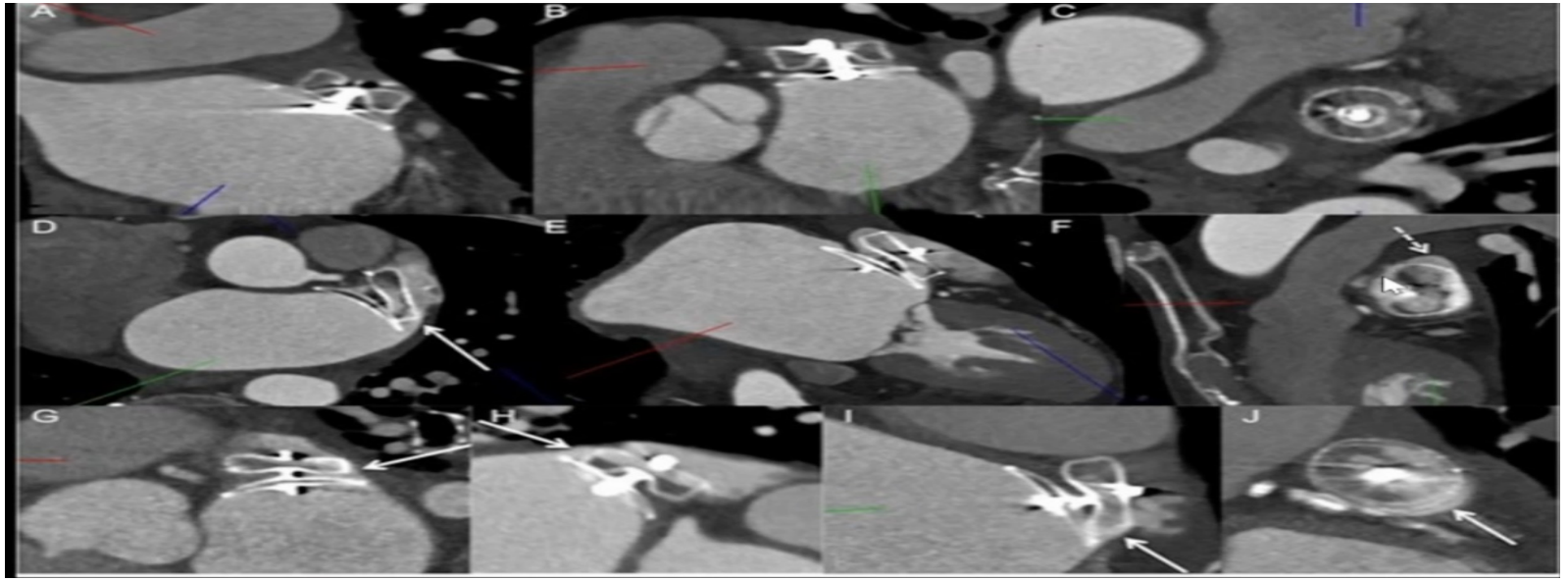
RAO 29° – Cra 16°

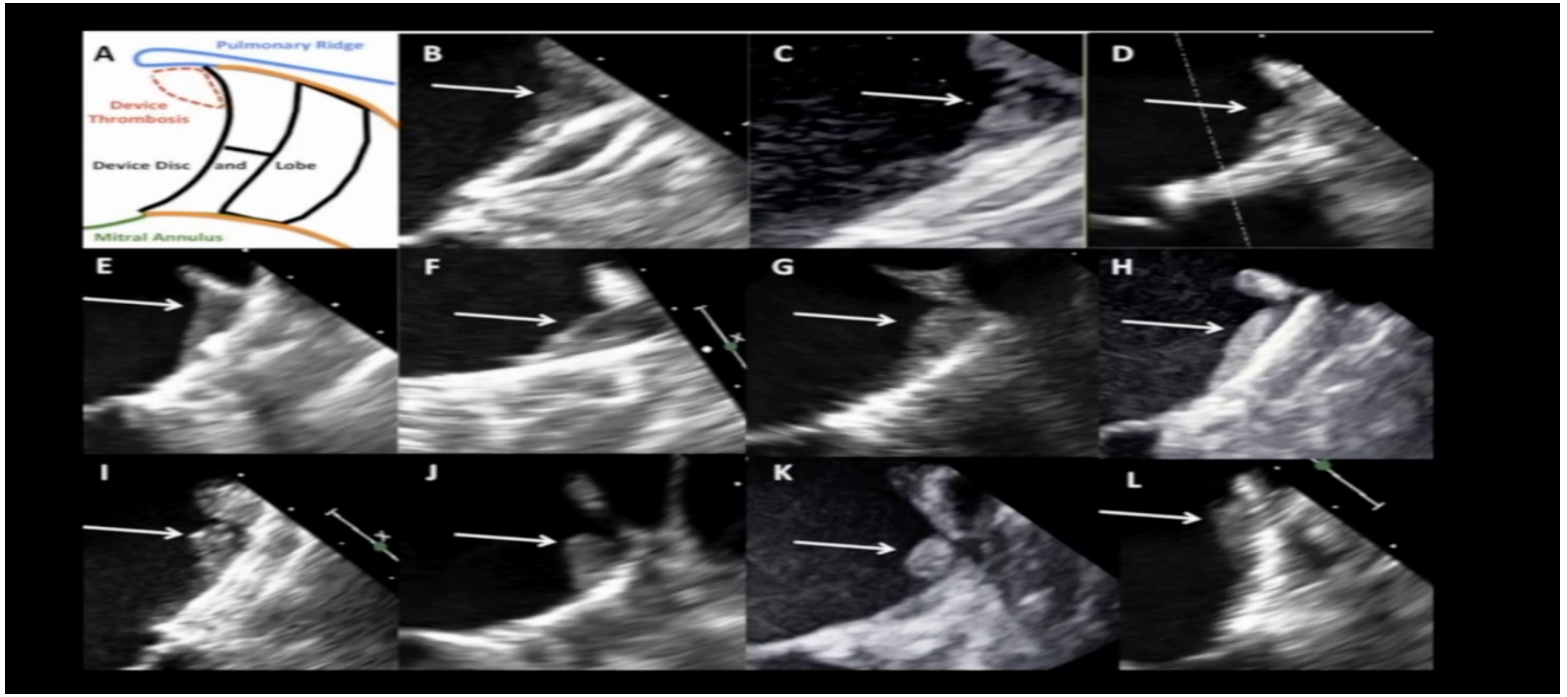


RAO 29° – Cau 18°



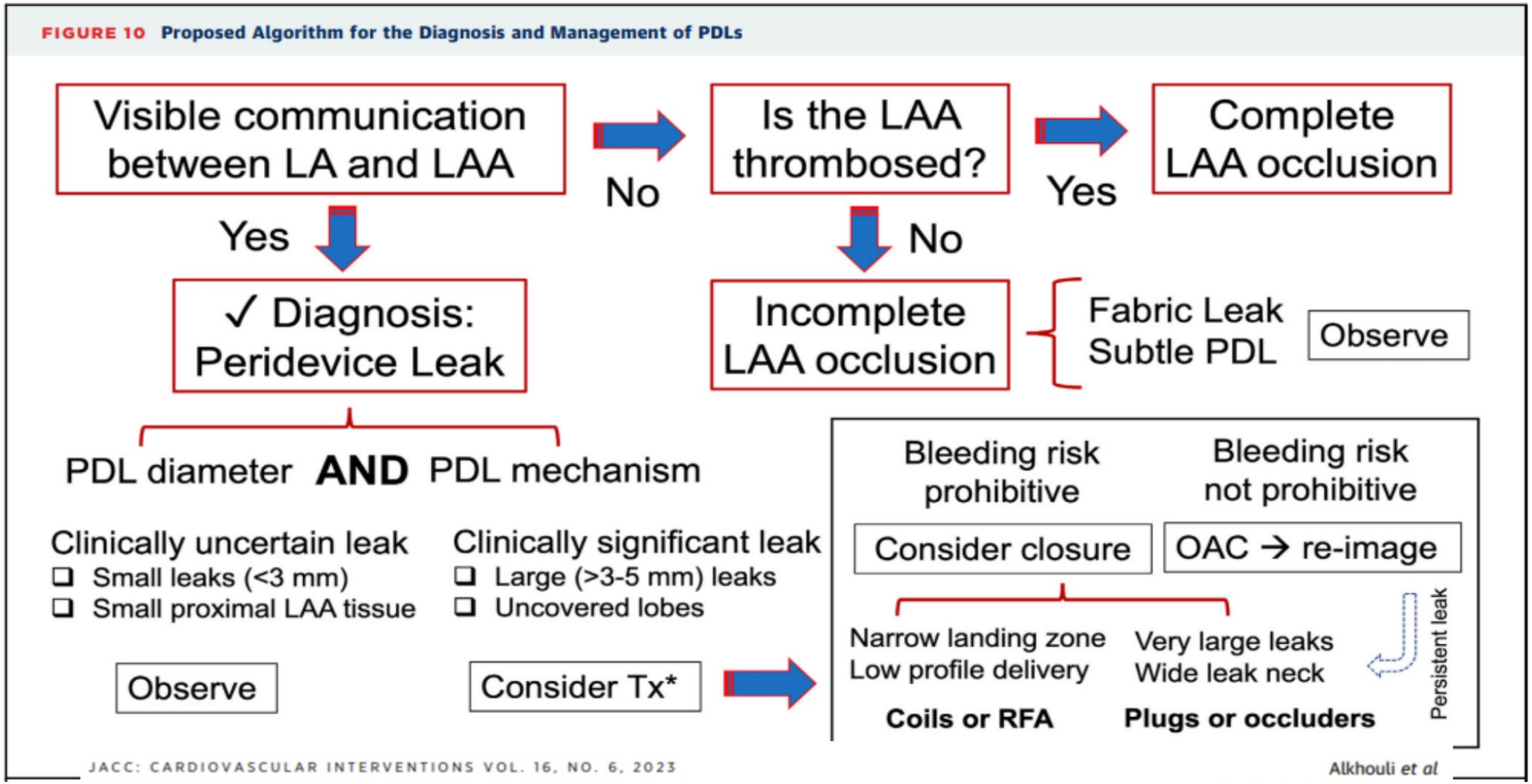
RAO 0° – Cau 17°





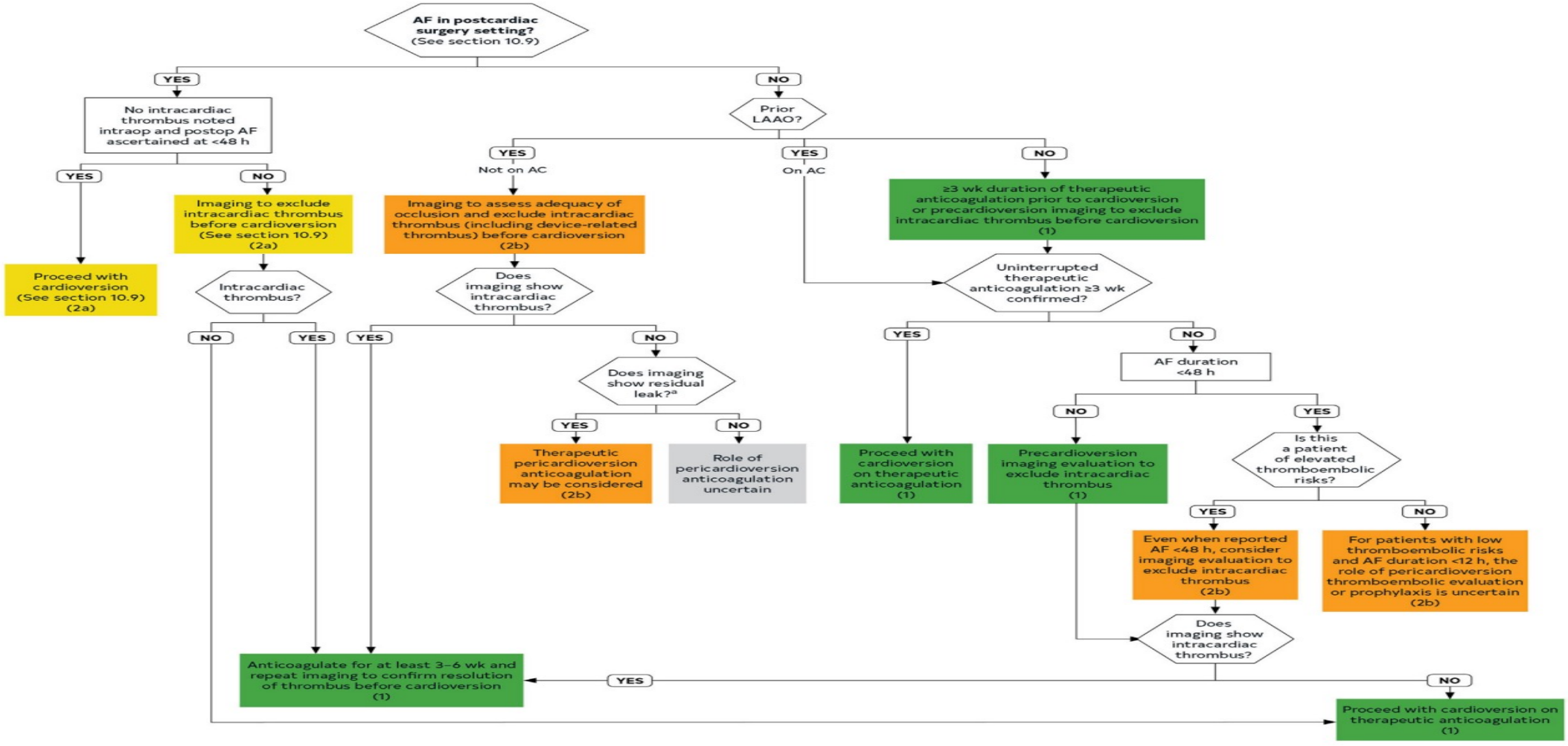
-BT de kaçak TEE ye göre daha sensitif olan çalışmalar var, DRT’ de ise eşittir.
-Bazen appendiks tam endotelize olmadığından dolayı dolabilir. Önemli olan kaçağı göstermektir.

LEAKS Treatment



2b	B-NR	4. In patients with AF and previous LAAO who are not on anticoagulation, imaging evaluation to assess the adequacy of LAAO and exclude device-related thrombosis before cardioversion may be reasonable.[9-19]
2b	C-LD	5. In patients with AF and previous LAAO with residual leak, pericardioversion anticoagulation may be considered and continued thereafter.[9-11,20]

FIGURE 21 Patients With Hemodynamically Stable AF Planned for Cardioversion



Sonuç

- LAAC cihazlarından sonra DRT veya büyük PDL(>5mm, >3mm?) varsa OAK kesmemeliyiz.
- İşlem esnasında TEE PDL değerlendirmesi önemli! Sıfır PDL ile çıkılmaya çalışılmalı.
- 6-12 (24) hafta ve 12. aylarda TEE veya kardiyak BT ile takip etmeliyiz.
- 1 yıl sonunda 3 mm üstü PDL'si olanlarda OAK tedavi açısından tekrar değerlendirilmelidir.
- Uzun dönemde yeni cihazlar ve sheatlerle (Watchman FLX vs, sterable sheat), operatör tecrübesi arttıkça ve daha çok görüntüleme sistemi kullanılarak(3D Eko, CT, 3D printer, bilgisayar simülasyon programları) PDL oranı azaltılması umulmaktadır.


Teşekkürler