AF ABLASYONUNDA YENİ ÇALIŞMALAR

Antikoagülan ilaç yönetim çalışmaları

Dr. Alpay ARIBAŞ
NEÜ Meram Tıp Fakültesi

2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS

The Task Force for the management of atrial fibrillation of the European Society of Cardiology (ESC)

Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC

Endorsed by the European Stroke Organisation (ESO)

Authors/Task Force Members: Paulus Kirchhof* (Chairperson) (UK/Germany) Stefano Benussi*[1] (Co-Chairperson) (Switzerland), Dipak Kotecha (UK), Anders Ahlsson[1] (Sweden), Dan Atar (Norway), Barbara Casadei (UK), Manuel Castella[1] (Spain), Hans-Christoph Diener[2] (Germany), Hein Heidbuchel (Belgium), Jeroen Hendriks (The Netherlands), Gerhard Hindricks (Germany), Antonis S. Manolis (Greece), Jonas Oldgren (Sweden), Bogdan Alexandru Popescu (Romania), Ulrich Schotten (The Netherlands), Bart Van Putte[1] (The Netherlands), and Panagiotis Vardas (Greece)

Mevcut kılavuzlar warfarin tedavisindeki hastaların ablasyon prosedürü boyunca tedaviye devam etmelerini önermektedir (INR = 2.0–3.0)

Feasibility and Safety of Dabigatran Versus Warfarin for Periprocedural Anticoagulation in Patients Undergoing Radiofrequency Ablation for Atrial Fibrillation

Results From a Multicenter Prospective Registry

Dhanunjaya Lakkireddy, MD,* Yeruva Madhu Reddy, MD,* Luigi Di Biase, MD, PHD,†‡§ Subba Reddy Vanga, MD,* Pasquale Santangeli, MD,† Vijay Swarup, MD,‖ Rhea Pimentel, MD,* Moussa C. Mansour, MD,¶ Andre D'Avila, MD, PHD,# Javier E. Sanchez, MD,† J. David Burkhardt, MD,† Fadi Chalhoub, MD,¶ Prasant Mohanty, MBBS, MPH,† James Coffey, MD,# Naushad Shaik, MD,** George Monir, MD,†† Vivek Y. Reddy, MD,# Jeremy Ruskin, MD,¶ Andrea Natale, MD†§‡‡

Kansas City, Kansas; Austin, Texas; Foggia, Italy; Phoenix, Arizona; Boston, Massachusetts; New York, New York; Kissimmee and Orlando, Florida; and San Francisco, California

European Heart Journal (2015) **36**, 1805–1811
doi:10.1093/eurheartj/ehv177

Uninterrupted rivaroxaban vs. uninterrupted vitamin K antagonists for catheter ablation in non-valvular atrial fibrillation

Riccardo Cappato[1,2], Francis E. Marchlinski[3], Stefan H. Hohnloser[4], Gerald V. Naccarelli[5], Jim Xiang[6], David J. Wilber[7], Chang-Sheng Ma[8], Susanne Hess[9], Darryl S. Wells[10], George Juang[11], Johan Vijgen[12], Burkhard J. Hügl[13], Richard Balasubramaniam[14], Christian De Chillou[15], D. Wyn Davies[16], L. Eugene Fields[17], and Andrea Natale[18]*, on behalf of the VENTURE-AF Investigators

[1]Arrhythmia and Electrophysiology Center, IRCCS Humanitas Research Hospital, Rozzano, Milan, Italy; [2]Gavazzeni Hospital, Second Arrhythmia and EP Unit, Bergamo, Italy; [3]Section of Cardiac Electrophysiology, Hospital of the University of Pennsylvania, Philadelphia, PA, USA; [4]Department of Cardiology, Division of Clinical Electrophysiology, JW Goethe University, Frankfurt, Germany; [5]Heart and Vascular Institute, Penn State University College of Medicine, Hershey, PA, USA; [6]Biostatistics and Programming, Janssen Research & Development, LLC, Raritan, NJ, USA; [7]Department of Medicine, Cardiovascular Institute, Loyola University, Chicago, IL, USA; [8]Cardiology Division, Beijing AnZhen Hospital, Capital Medical University (CMU), Beijing, China; [9]Medical Affairs, Bayer Healthcare Pharmaceuticals, Berlin, Germany; [10]Cardiac Electrophysiology, Swedish Heart & Vascular Institute, Seattle, WA, USA; [11]Heart and Arrhythmia Care of New York, Manhasset, NY, USA; [12]Division of Cardiac Electrophysiology, Jessa Hospitals, Hasselt, Belgium; [13]Department of Cardiology and Rhythmology, Marienhaus Klinikum St. Elisabeth, Neuwied, Germany; [14]Department of Cardiology, Royal Bournemouth Hospital, Bournemouth, United Kingdom; [15]Département de Cardiologie, CHU de Nancy, Nancy, France; [16]Waller Department of Cardiology, St. Mary's Hospital, Imperial College NHS Trust, London, United Kingdom; [17]Medical Affairs, Janssen Scientific Affairs, LLC, Raritan, NJ, USA; and [18]Texas Cardiac Arrhythmia Institute at St. David's Medical Center, 3000 N. I-35, Suite 720, Austin, TX 78705, USA

Received 8 April 2015; revised 18 April 2015; accepted 24 April 2015; online publish-ahead-of-print 14 May 2015

VENTURE-AF ara verilmeden uygulanan NOAC ile VKA tedavilerini karşılaştıran ilk randomize prospektif kontrollü çalışma

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Uninterrupted Dabigatran versus Warfarin for Ablation in Atrial Fibrillation

Hugh Calkins, M.D., Stephan Willems, M.D., Edward P. Gerstenfeld, M.D., Atul Verma, M.D., Richard Schilling, M.D., Stefan H. Hohnloser, M.D., Ken Okumura, M.D., Ph.D., Harvey Serota, M.D., Matias Nordaby, M.D., Kelly Guiver, M.Sc., Branislav Biss, M.D., Marc A. Brouwer, M.D., Ph.D., and Massimo Grimaldi, M.D., Ph.D., for the RE-CIRCUIT Investigators*

RE-CIRCUIT

2017 HRS/EHRA/ECAS/APHRS/SOLAECE expert consensus statement on catheter and surgical ablation of atrial fibrillation

A full list of authors and affiliations appears at the end of the article.

Keywords

Ablation; Arrhythmia; Atrial fibrillation; Atrial flutter; Atrial tachycardia; Catheter ablation; Surgical ablation; Stroke; Anticoagulation

ESC European Society of Cardiology

Europace (2018) **20**, e1–e160
doi:10.1093/europace/eux274

EHRA CONSENSUS DOCUMENT

2017 HRS/EHRA/ECAS/APHRS/SOLAECE expert consensus statement on catheter and surgical ablation of atrial fibrillation

Hugh Calkins, MD (Chair),[1] Gerhard Hindricks, MD (Vice-Chair),[2*]
Riccardo Cappato, MD (Vice-Chair),[3¶] Young-Hoon Kim, MD, PhD (Vice-Chair),[4§]
Eduardo B. Saad, MD, PhD (Vice-Chair),[5‡] Luis Aguinaga, MD, PhD,[6‡]
Joseph G. Akar, MD, PhD,[7] Vinay Badhwar, MD,[8#] Josep Brugada, MD, PhD,[9*]
John Camm, MD,[10*] Peng-Sheng Chen, MD,[11] Shih-Ann Chen, MD,[12§]
Mina K. Chung, MD,[13] Jens Cosedis Nielsen, DMSc, PhD,[14*] Anne B. Curtis, MD,[15||]
D. Wyn Davies, MD,[16¶] John D. Day, MD,[17] André d'Avila, MD, PhD,[18‡‡]
N.M.S. (Natasja) de Groot, MD, PhD,[19*] Luigi Di Biase, MD, PhD,[20*]
Mattias Duytschaever, MD, PhD,[21*] James R. Edgerton, MD,[22#]
Kenneth A. Ellenbogen, MD,[23] Patrick T. Ellinor, MD, PhD,[24]
Sabine Ernst, MD, PhD,[25*] Guilherme Fenelon, MD, PhD,[26‡]
Edward P. Gerstenfeld, MS, MD,[27] David E. Haines, MD,[28]
Michel Haissaguerre, MD,[29*] Robert H. Helm, MD,[30] Elaine Hylek, MD, MPH,[31]
Warren M. Jackman, MD,[32] Jose Jalife, MD,[33] Jonathan M. Kalman, MBBS, PhD,[34§]
Josef Kautzner, MD, PhD,[35*] Hans Kottkamp, MD,[36*] Karl Heinz Kuck, MD, PhD,[37*]

Correspondence: Heart Rhythm Society, 1325 G Street NW, Suite 400, Washington, DC 20005. E-mail address: clinicaldocs@hrsonline.org

Anticoagulation strategies: pre-, during, and postcatheter ablation of AF

	Recommendation	Class	LOE	References
Preablation	For patients undergoing AF catheter ablation who have been therapeutically anticoagulated with warfarin or dabigatran, performance of the ablation procedure without interruption of warfarin or dabigatran is recommended.	I	A	400,532,829,830,833,834,837,841
	For patients undergoing AF catheter ablation who have been therapeutically anticoagulated with rivaroxaban, performance of the ablation procedure without interruption of rivaroxaban is recommended.	I	B-R	842
	For patients undergoing AF catheter ablation who have been therapeutically anticoagulated with a NOAC other than dabigatran or rivaroxaban, performance of the ablation procedure without withholding a NOAC dose is reasonable.	IIa	B-NR	1395
	Anticoagulation guidelines that pertain to cardioversion of AF should be adhered to in patients who present for an AF catheter ablation procedure.	I	B-NR	5,6
	For patients anticoagulated with a NOAC prior to AF catheter ablation, it is reasonable to hold one to two doses of the NOAC prior to AF ablation with reinitiation postablation.	IIa	B-NR	835–840
	Performance of a TEE in patients who are in AF on presentation for AF catheter ablation and who have been receiving anticoagulation therapeutically for 3 weeks or longer is reasonable.	IIa	C-EO	5,6
	Performance of a TEE in patients who present for ablation in sinus rhythm and who have not been anticoagulated prior to catheter ablation is reasonable.	IIa	C-EO	5,6
	Use of intracardiac echocardiography to screen for atrial thrombi in patients who cannot undergo TEE may be considered.	IIb	C-EO	768,820–824
During ablation	Heparin should be administered prior to or immediately following transseptal puncture during AF catheter ablation procedures and adjusted to achieve and maintain an ACT of at least 300 seconds.	I	B-NR	768,802–804,820,830,840,846–849
	Administration of protamine following AF catheter ablation to reverse heparin is reasonable.	IIa	B-NR	851
Postablation	In patients who are not therapeutically anticoagulated prior to catheter ablation of AF and in whom warfarin will be used for anticoagulation postablation, low molecular weight heparin or intravenous heparin should be used as a bridge for initiation of systemic anticoagulation with warfarin following AF ablation. *	I	C-EO	
	Systemic anticoagulation with warfarin * or a NOAC is recommended for at least 2 months postcatheter ablation of AF.	I	C-EO	1,2
	Adherence to AF anticoagulation guidelines is recommended for patients who have undergone an AF ablation procedure, regardless of the apparent success or failure of the procedure.	I	C-EO	5,6
	Decisions regarding continuation of systemic anticoagulation more than 2 months post ablation should be based on the patient's stroke risk profile and not on the perceived success or failure of the ablation procedure.	I	C-EO	5,6
	In patients who have not been anticoagulated prior to catheter ablation of AF or in whom anticoagulation with a NOAC or warfarin has been interrupted prior to ablation, administration of a NOAC 3 to 5 hours after achievement of hemostasis is reasonable postablation.	IIa	C-EO	835–840
	Patients in whom discontinuation of anticoagulation is being considered based on patient values and preferences should consider undergoing continuous or frequent ECG monitoring to screen for AF recurrence.	IIb	C-EO	

Table 4 Anticoagulation strategies: pre-, during, and postcatheter ablation of AF

	Recommendation	Class	LOE	References
Preablation	For patients undergoing AF catheter ablation who have been therapeutically anticoagulated with warfarin or dabigatran, performance of the ablation procedure without interruption of warfarin or dabigatran is recommended.	I	A	400,532,829,830,833,834,837,841
	For patients undergoing AF catheter ablation who have been therapeutically anticoagulated with rivaroxaban, performance of the ablation procedure without interruption of rivaroxaban is recommended.	I	B-R	842
	For patients undergoing AF catheter ablation who have been therapeutically anticoagulated with a NOAC other than dabigatran or rivaroxaban, performance of the ablation procedure without withholding a NOAC dose is reasonable.	IIa	B-NR	1395
	Anticoagulation guidelines that pertain to cardioversion of AF should be adhered to in patients who present for an AF catheter ablation procedure.	I	B-NR	5,6
	For patients anticoagulated with a NOAC prior to AF catheter ablation, it is reasonable to hold one to two doses of the NOAC prior to AF ablation with reinitiation postablation.	IIa	B-NR	835–840
	Performance of a TEE in patients who are in AF on presentation for AF catheter ablation and who have been receiving anticoagulation therapeutically for 3 weeks or longer is reasonable.	IIa	C-EO	5,6
	Performance of a TEE in patients who present for ablation in sinus rhythm and who have not been anticoagulated prior to catheter ablation is reasonable.	IIa	C-EO	5,6
	Use of intracardiac echocardiography to screen for atrial thrombi in patients who cannot undergo TEE may be considered.	IIb	C-EO	768,820–824
During ablation	Heparin should be administered prior to or immediately following transseptal puncture during AF catheter ablation procedures and adjusted to achieve and maintain an ACT of at least 300 seconds.	I	B-NR	768,802–804,820,830,840,846–849
	Administration of protamine following AF catheter ablation to reverse heparin is reasonable.	IIa	B-NR	851
Postablation	In patients who are not therapeutically anticoagulated prior to catheter ablation of AF and in whom warfarin will be used for anticoagulation postablation, low molecular weight heparin or intravenous heparin should be used as a bridge for initiation of systemic anticoagulation with warfarin following AF ablation.*	I	C-EO	
	Systemic anticoagulation with warfarin* or a NOAC is recommended for at least 2 months postcatheter ablation of AF.	I	C-EO	1,2
	Adherence to AF anticoagulation guidelines is recommended for patients who have undergone an AF ablation procedure, regardless of the apparent success or failure of the procedure.	I	C-EO	5,6
	Decisions regarding continuation of systemic anticoagulation more than 2 months post ablation should be based on the patient's stroke risk profile and not on the perceived success or failure of the ablation procedure.	I	C-EO	5,6
	In patients who have not been anticoagulated prior to catheter ablation of AF or in whom anticoagulation with a NOAC or warfarin has been interrupted prior to ablation, administration of a NOAC 3 to 5 hours after achievement of hemostasis is reasonable postablation.	IIa	C-EO	835–840
	Patients in whom discontinuation of anticoagulation is being considered based on patient values and preferences should consider undergoing continuous or frequent ECG monitoring to screen for AF recurrence.	IIb	C-EO	

An updated meta-analysis of novel oral anticoagulants versus vitamin K antagonists for uninterrupted anticoagulation in atrial fibrillation catheter ablation

Rhanderson Cardoso, MD,*[1] Leonardo Knijnik, MD,†[1] Aditya Bhonsale, MD,* Jared Miller, MD,* Guilherme Nasi, MD,† Manuel Rivera, MD,† Vanessa Blumer, MD,† Hugh Calkins, MD, FHRS*

*From the *Division of Cardiology, Department of Medicine, Johns Hopkins Medical Institutions, Baltimore, Maryland, and †Division of Cardiology, Department of Medicine, University of Miami-Jackson Memorial Hospital, Miami, Florida.*

BACKGROUND Catheter ablation is recommended as a first- or second-line rhythm control therapy for selected patients with atrial fibrillation (AF). There is a wide variability in the periprocedural management of oral anticoagulation in patients undergoing AF ablation.

OBJECTIVE We aimed to perform an updated meta-analysis of novel oral anticoagulants (NOACs) vs vitamin K antagonists (VKAs) as uninterrupted anticoagulation in patients undergoing AF ablation.

METHODS Databases and conference abstracts were searched. Studies were excluded if oral anticoagulants were held at any periprocedural period. The primary outcomes were stroke or transient ischemic attack (TIA) and major bleeding.

RESULTS Twelve studies and 4962 patients were included. Stroke or TIA was rare (NOAC, 0.08%; VKA, 0.16%) and not different between groups (odds ratio [OR] 0.66; 95% confidence interval [CI] 0.19–2.30). The incidence of silent cerebral embolic events was also not significantly different between NOACs (8%) and VKAs (9.6%) (OR 0.86; 95% CI 0.42–1.76). Major bleeding was significantly reduced in the NOAC group (0.9%) as compared with VKA-treated patients (2%) (OR 0.50; 95% CI 0.30–0.84; $P < .01$). This finding was confirmed in a subgroup analysis of randomized and cohort studies with matched controls (OR 0.45; 95% CI 0.24–0.83; $P = .01$). There was no significant difference in the outcomes of individual NOACs and VKAs, although these analyses may have been underpowered to detect minor differences in such rare outcomes.

CONCLUSION In patients undergoing AF ablation, uninterrupted periprocedural NOACs are associated with a low incidence of stroke or TIA and a significant reduction in major bleeding as compared with uninterrupted VKAs.

KEYWORDS Atrial fibrillation; Catheter ablation; Novel oral anticoagulants; Vitamin K antagonists; Stroke; Major bleeding

(Heart Rhythm 2018;15:107–115)

Heart Rhythm. 2018 Jan;15(1):107-115

Çalışmanın özellikleri

Amaç	**Atriyal Fibrilasyon ablasyonu uygulanan hastalarda ara vermeden antikoagülan uygulaması amaçlı Vitamin K antagonistlerine karşı NOAC kullanımı olan çalışmaların güncellenmiş bir meta-analizini yapmak**
Tasarım	Meta-analiz
Dahil Edilme Kriterleri	Ara vermeden antikoagülasyon altında AF ablasyonu uygulanan randomize çalışmalar veya randomize olmayan kohortlar
Hasta Sayısı	12 çalışmada toplam 4962 hasta NOAC Grubu=2504 VKA Grubu=2458
Primer Sonlanım	İnme, Geçici İskemik Atak (TIA), Majör Kanama

İnme, G.İskemik Atak ve Sessiz Serebral Emboli İnsidansları

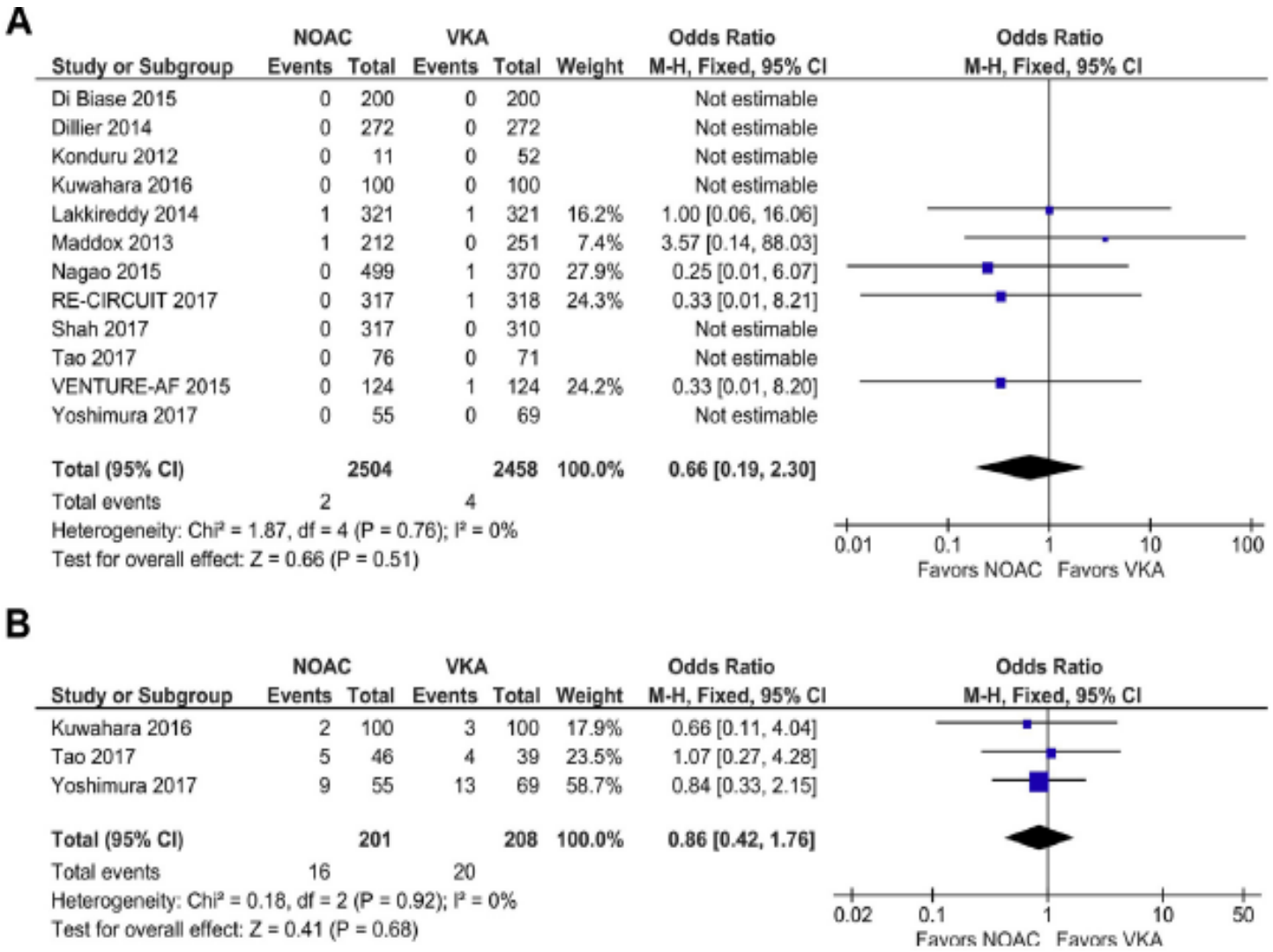


Figure 2 **A:** The incidence of stroke or transient ischemic attack was not significantly different between groups ($P = .51$). **B:** The incidence of silent cerebral embolism was not significantly different between groups ($P = .68$). CI = confidence interval; M-H = Mantel-Haenszel method; NOAC = novel oral anticoagulant; VKA = vitamin K antagonist.

Majör Kanama ve Perikardiyal Tamponad İnsidansları

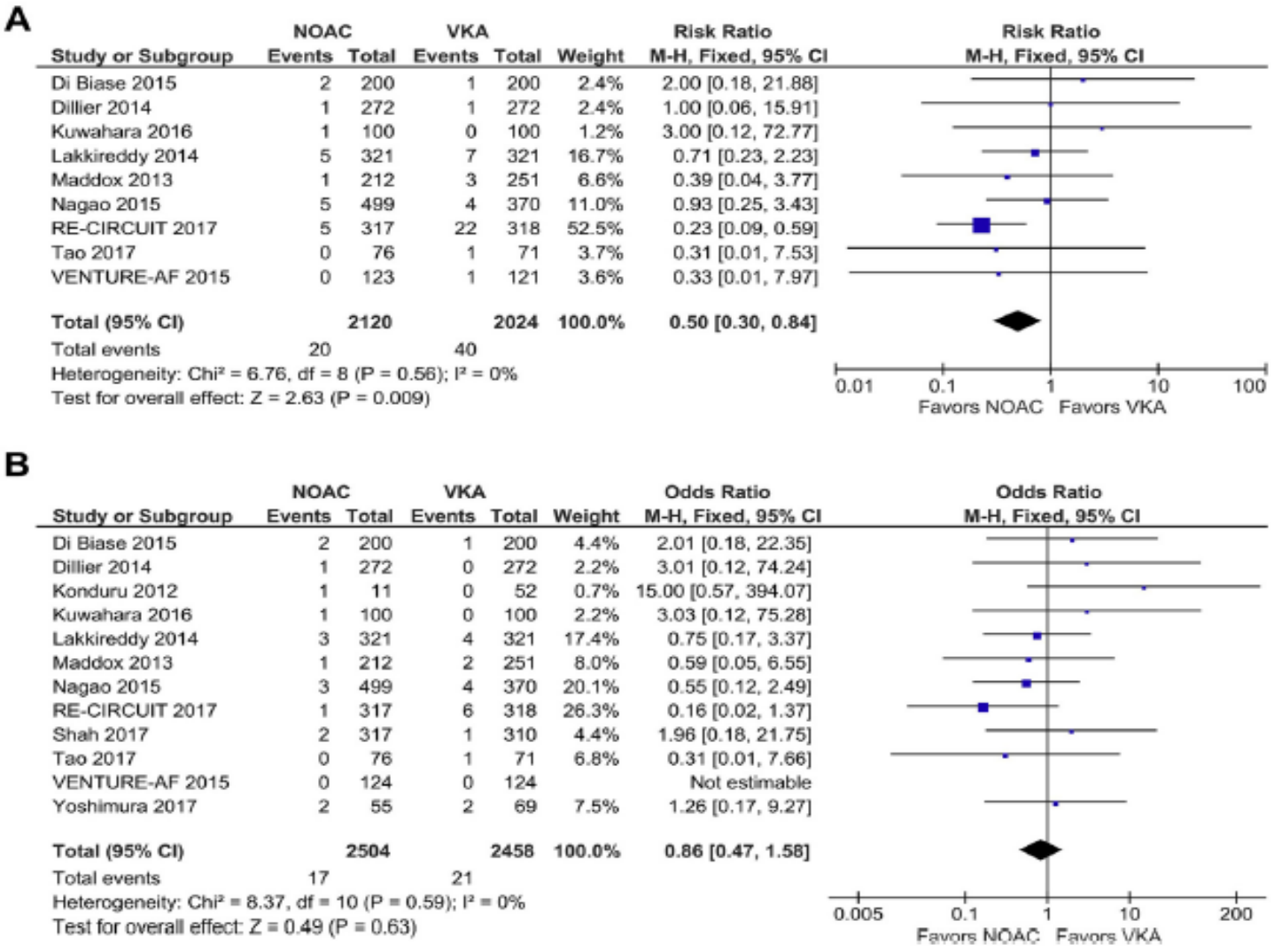


Figure 3 **A:** The incidence of major bleeding was significantly lower in the NOAC group ($P < .01$). **B:** The incidence of pericardial tamponade was not significantly different between groups ($P = .63$). CI = confidence interval; M-H = Mantel-Haenszel method; NOAC = novel oral anticoagulant; VKA = vitamin K antagonist.

SONUÇ

- AF katater ablasyonunda ara vermeden antikoagülasyon için NOAC lar etkin ve güvenli bulunmuştur.
- Serebral tromboembolik olaylar bu ajanlarla düşüktür ve ara vermeden VKA uygulaması ile görülenden farklı değildir.
- Majör Kanamalar NOAC larla anlamlı olarak azalmıştır.
- Toplam Major kanama insidansı bu çalışmada ara verilmeyen NOAC çalışmalarında bildirilenlerden fazla değildir. Ancak tromboembolik olaylar ara vermeden uygulanan bir strateji ile azalmış görünmektedir.
- Tüm bu bulgular HRS / EHRA / ECAS / APHRS / SOLAECE 2017 kateter ve cerrahi ablasyon konusunda uzman konsensüs bildiriminde tavsiye edildiği gibi AF ablasyonu esnasında ara verilmeyen NOAC stratejisini desteklemektedir.

ESC European Society of Cardiology

European Heart Journal (2018) 39, 2942–2955
doi:10.1093/eurheartj/ehy176

FASTTRACK CLINICAL RESEARCH
Arrhythmia/electrophysiology

Apixaban in patients at risk of stroke undergoing atrial fibrillation ablation

Paulus Kirchhof[1,2,3,4]*, Karl Georg Haeusler[4,5], Benjamin Blank[4], Joseph De Bono[1,3], David Callans[6], Arif Elvan[7], Thomas Fetsch[8], Isabelle C. Van Gelder[9], Philip Gentlesk[10], Massimo Grimaldi[11], Jim Hansen[12], Gerhard Hindricks[13], Hussein R. Al-Khalidi[14], Tyler Massaro[15], Lluis Mont[16], Jens Cosedis Nielsen[17], Georg Nölker[18], Jonathan P. Piccini[15,19], Tom De Potter[20], Daniel Scherr[21], Ulrich Schotten[4,22], Sakis Themistoclakis[23], Derick Todd[24], Johan Vijgen[25], and Luigi Di Biase[26,27]

AXAFA – AFNET 5

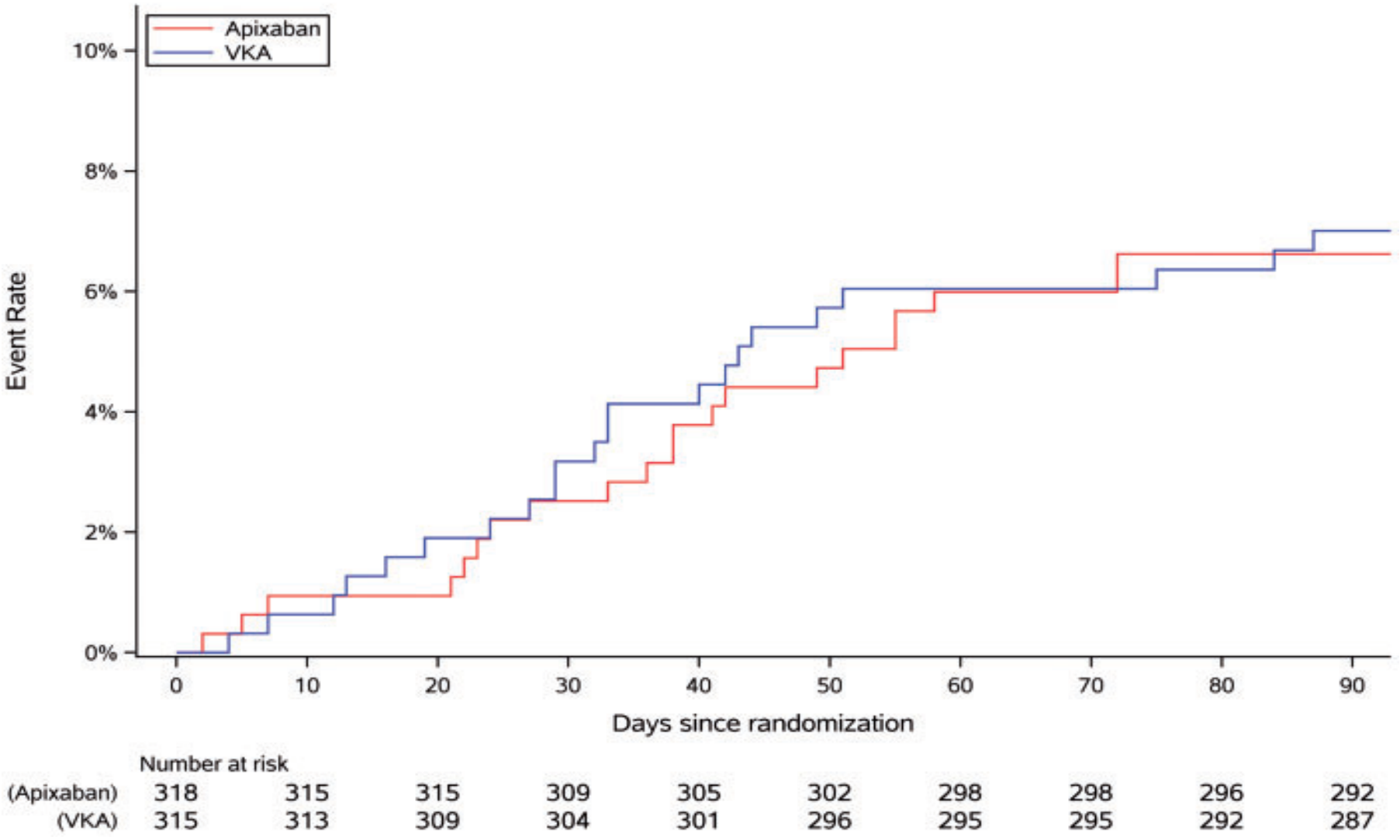
Çalışmanın özellikleri

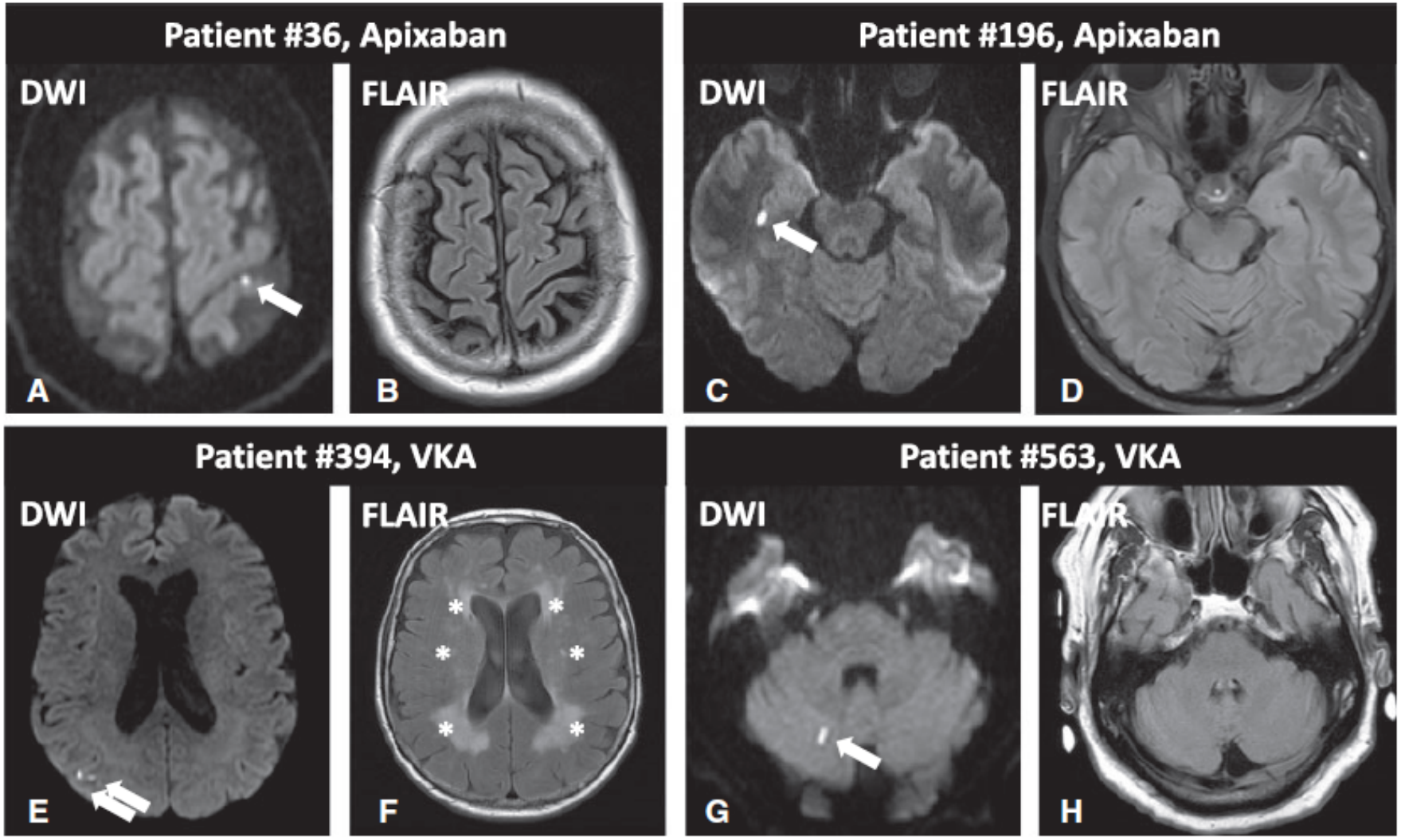
Amaç	**AF ablasyonunda Apiksabana ara verilmeden işlem yapılmasının VKA ara verilmeden işlem yapılmasıyla karşılaştırılması**
Tasarım	Prospektif Randomize kontrollü çalışma
Dahil Edilme Kriterleri	CHADS2 skoruna göre en az 1 risk faktörü olan ve ilk kez AF ablasyonuna gidecek non valvüler AF hastaları
Hasta Sayısı	Apiksaban Grubu=318 (218 Erkek) Median yaş (q1,q3): 57,70 VKA Grubu= 315 (209 Erkek) Median yaş (q1,q3): 58,70
Primer Sonlanım	Ölüm, İnme veya BARC 2-5 kanama toplamı

Table 3 Primary outcomes in the AXAFA – AFNET 5 trial (ablation set), including details of the type of bleeding

	All patients	Apixaban	VKA
Patients with primary endpoint: composite of all-cause death, stroke or major bleeding	45/633 (7.1%)	22/318 (6.9%), non-inferiority P=0.0002	23/315 (7.3%)
Death	2 (0.3%)	1 (0.3%)	1 (0.3%)
Stroke or TIA	2 (0.3%)	2 (0.6%)	0
Major bleeding (BARC 2–5)	45 (7.1%)	20 (6.2%)	25 (7.9%)
Bleeding requiring medical attention (BARC 2)	24 (3.8%)	12 (3.7%)	12 (3.8%)
Bleeding with haemoglobin drop of 30 to <50 g/L or requiring transfusion (BARC 3a)	9 (1.4%)	5 (1.6%)	4 (1.3%)
Bleeding with haemoglobin drop ≥50 g/L, or requiring surgery or iv vasoactive agents, or cardiac tamponade (BARC 3b)	11 (1.7%)	3 (0.9%)	8 (2.5%)
Intracranial haemorrhage (BARC 3c)	1 (0.2%)	0	1 (0.3%, fatal)
TIMI major bleeding (Intracranial bleed, or bleeding resulting in a haemoglobin drop of ≥50 g/L, or bleeding resulting in death within 7 days)	4 (0.6%)	1 (0.3%)	3 (1%)
ISTH major bleeding	24 (3.8%)	10 (3.1%)	14 (4.4%)
Bleeding event by clinical type			
Tamponade	7 (1.1%)	2 (0.6%)	5 (1.6%)
Access site bleed	27 (4.3%)	12 (3.8%)	15 (4.8%)
Bleeding requiring transfusion of red blood cells	3 (0.5%)	2 (0.6%)	1 (0.3%)
Other major bleed	7 (1.1%)	5 (1.6%)	2 (0.6%)

Kümülatif Primer Olay Sıklığı





25 Merkezde 335 hastaya işlem sonrası ilk 48 saatte MRI

Table 5 Acute brain lesions detected by high-resolution diffusion-weighted magnetic resonance imaging (MRI sub-study)

	All patients ($n = 323$)	Apixaban ($n = 162$)	VKA ($n = 161$)	*P*-value
No lesion	239 (74.0%)	118 (72.8%)	121 (75.2%)	0.635
Exactly one lesion	46 (14.2%)	27 (16.7%)	19 (11.8%)	0.211
Exactly two lesions	21 (6.5%)	7 (4.3%)	14 (8.7%)	0.111
More than two lesions	17 (5.3%)	10 (6.2%)	7 (4.3%)	0.463

%25 hastada akut beyin lezyonları

Sonuç

Ara verilmeden uygulanan Apiksaban tedavisi AF ablasyounu uygulanan ve inme riski bulunan hastalarda inme, majör kanama, kognitif fonksiyonlar ve MRI ile tespit edilen akut beyin lezyonları açısından VKA tedavisine alternatif, güvenli ve etkili bir tedavidir.

Heart and Vessels
https://doi.org/10.1007/s00380-018-1294-2

ORIGINAL ARTICLE

A novel protocol for initial heparin administration during catheter ablation for atrial fibrillation in patients taking direct oral anticoagulants

Hideyuki Kishima[1] · Takanao Mine[1] · Eiji Fukuhara[1] · Kenki Ashida[1] · Masaharu Ishihara[1] · Tohru Masuyama[1]

Received: 30 July 2018 / Accepted: 26 October 2018

Çalışmanın özellikleri

Amaç	**NOAC kullanan hastalarda AF ablasyonu esnasında 30 dakika içinde hedef ACT değerlerine ulaşma ile klinik faktörler arasındaki ilişkiyi araştırmak ve bu hastalarda hedef ACT değerlerine erken ulaşabilmeyi sağlayacak uygun bir protokol geliştirmek**
Tasarım	Retrospektif
Dahil Edilme Kriterleri	NOAC tedavisi altında AF ablasyonu uygulanan hastalar
Hasta Sayısı	Başlangıç Kohortu: 190 (127 Erkek 68±9 yaş) Validasyon Kohortu: 138 (94 Erkek 68±10 yaş)
Primer Sonlanım	

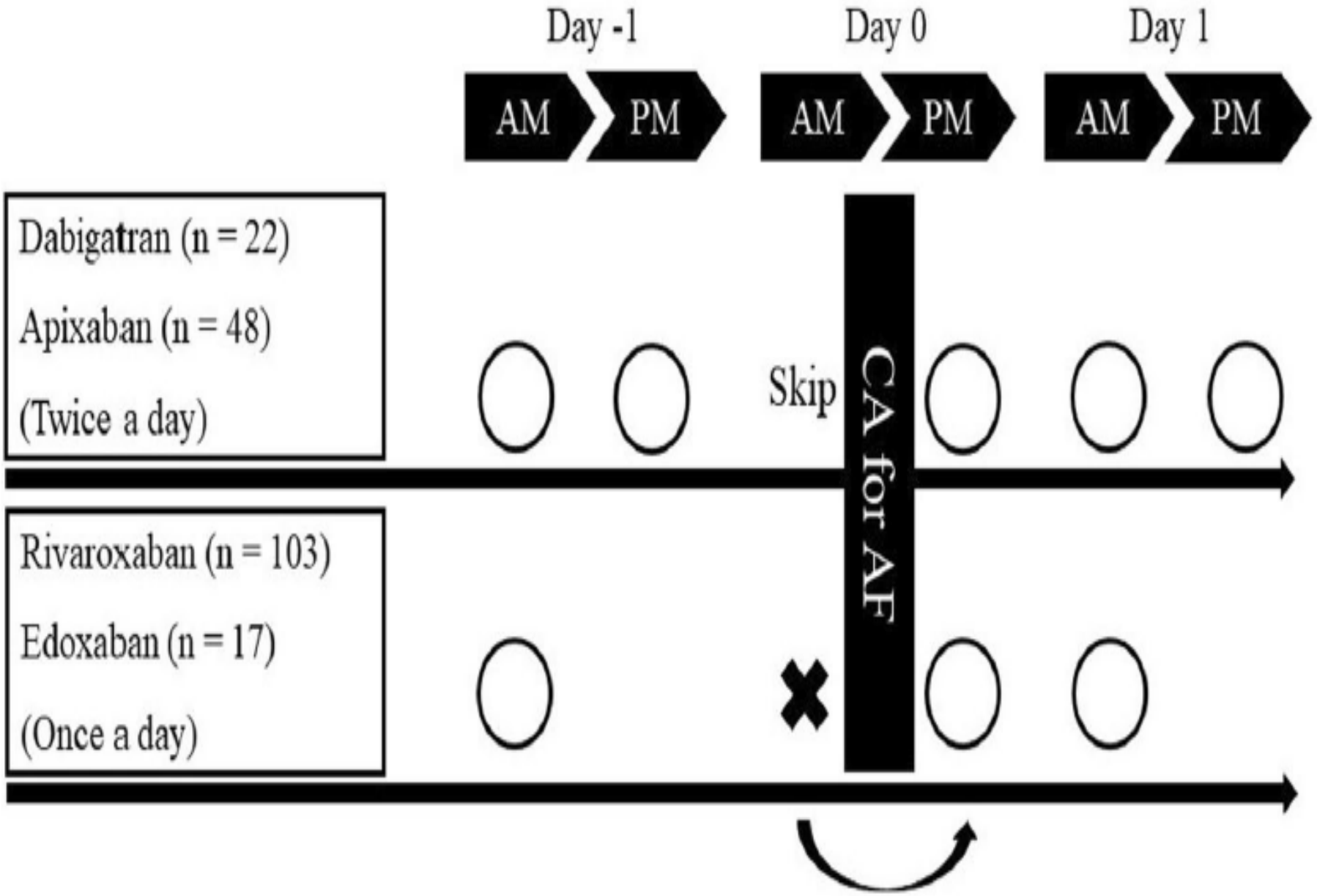
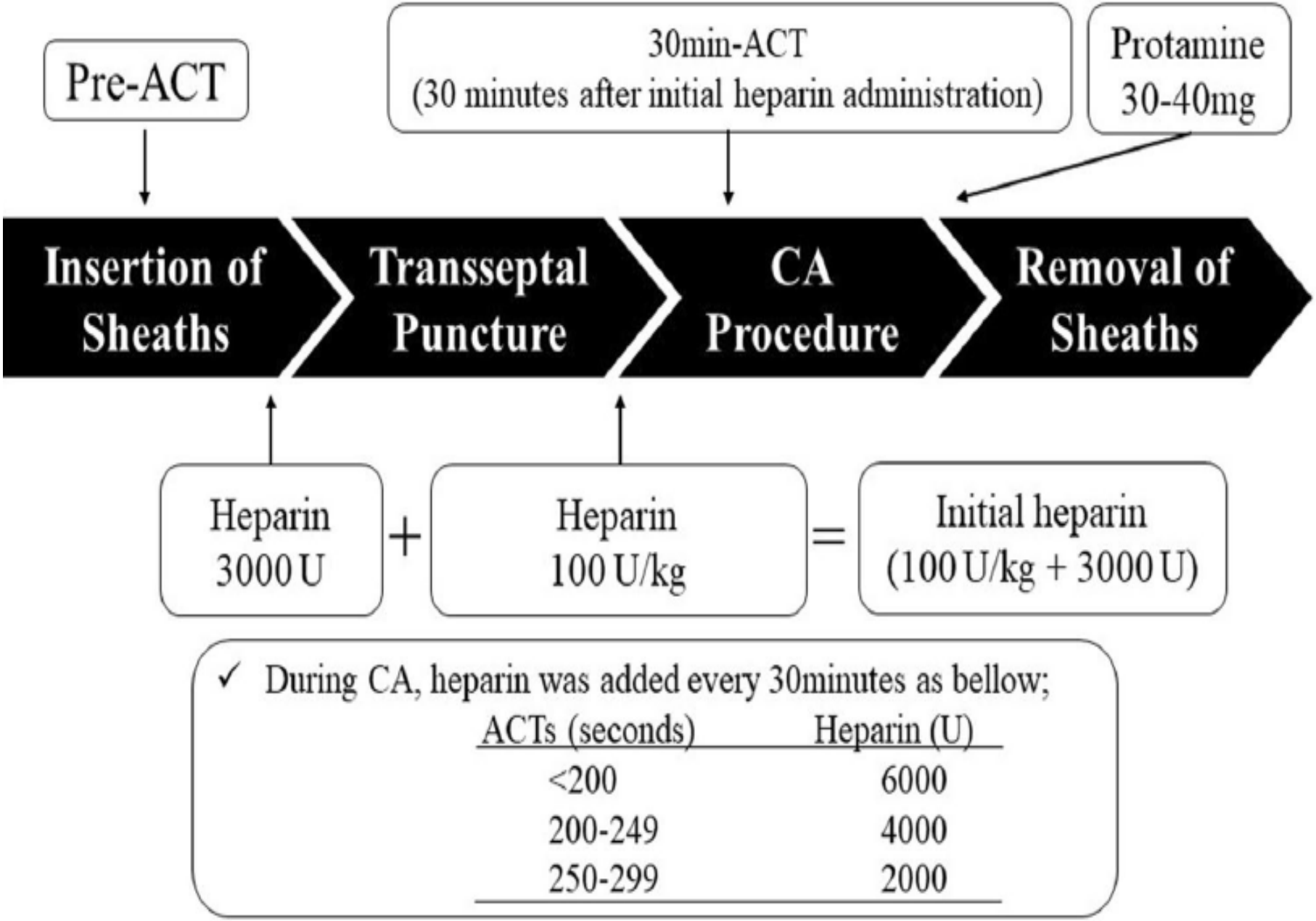
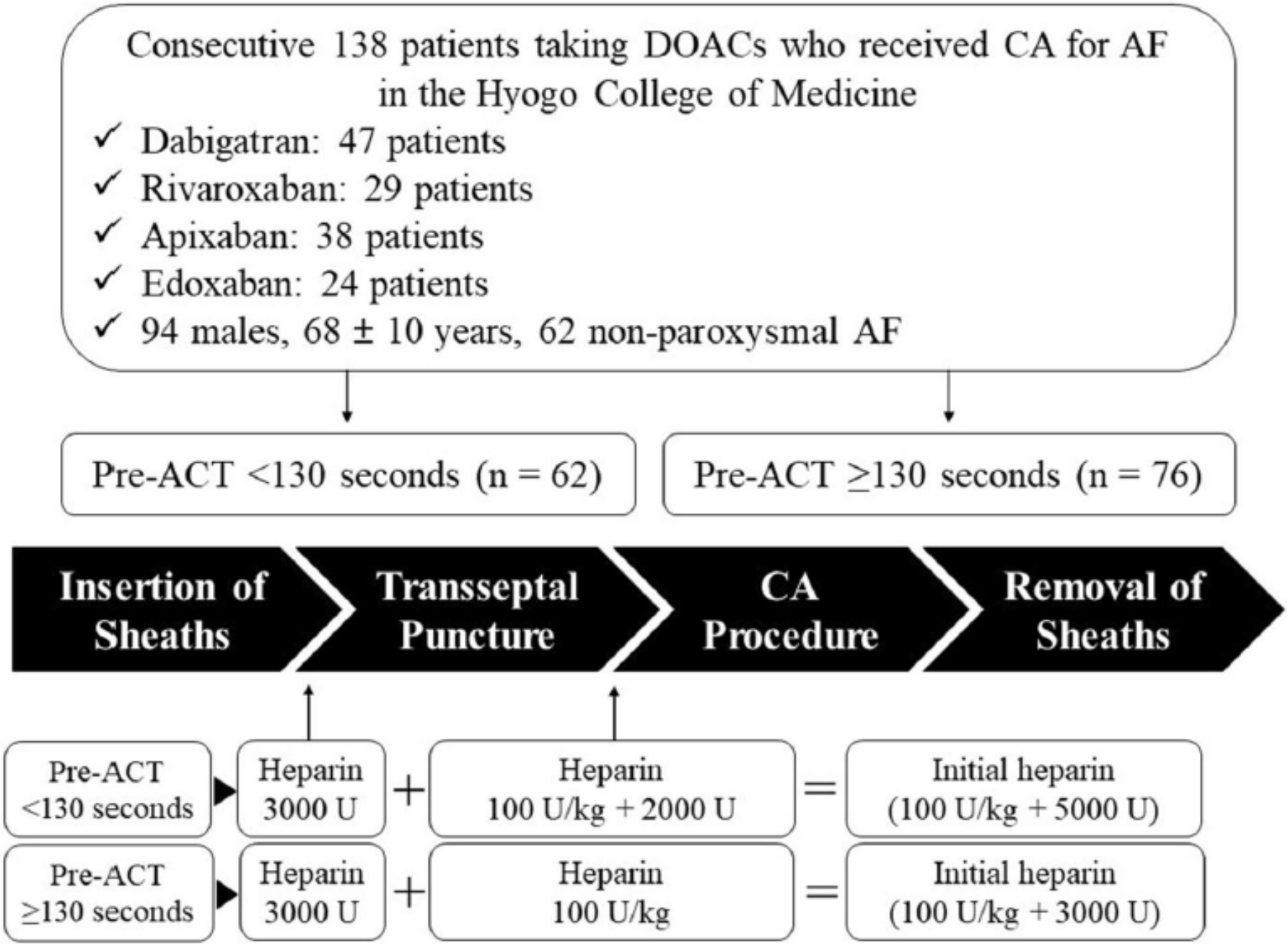

Day -1
Day 0
Day 1
AM
PM
AM
PM
AM
PM
Dabigatran (n = 22)
Apixaban (n = 48)
(Twice a day)
Skip
CA for AF
Rivaroxaban (n = 103)
Edoxaban (n = 17)
(Once a day)

Table 3 Univariate and multivariate analyzes

	Univariate analysis	Multivariate analysis	
	P value	*P* value	Odds ratio (95% CI)
Pre-ACT	0.0009	0.0396	1.014* (1.001–1.020)
PT-INR	0.0063	0.612	
aPTT	0.0013	0.0847	
Antiplatelet	0.0256	0.0964	
Dabigatran	0.0256	0.4442	

Optimal Cut off değeri 130 sn


Pre-ACT
30min-ACT
(30 minutes after initial heparin administration)
Protamine
30-40mg
Insertion of Sheaths
Transseptal Puncture
CA Procedure
Removal of Sheaths
Heparin
3000 U
+
Heparin
100 U/kg
=
Initial heparin
(100 U/kg + 3000 U)
✓ During CA, heparin was added every 30minutes as bellow;
ACTs (seconds) Heparin (U)
<200 6000
200-249 4000
250-299 2000


Consecutive 138 patients taking DOACs who received CA for AF in the Hyogo College of Medicine
✓ Dabigatran: 47 patients
✓ Rivaroxaban: 29 patients
✓ Apixaban: 38 patients
✓ Edoxaban: 24 patients
✓ 94 males, 68 ± 10 years, 62 non-paroxysmal AF
Pre-ACT <130 seconds (n = 62)
Pre-ACT ≥130 seconds (n = 76)
Insertion of Sheaths
Transseptal Puncture
CA Procedure
Removal of Sheaths
Pre-ACT <130 seconds
Heparin 3000 U
+
Heparin 100 U/kg + 2000 U
=
Initial heparin (100 U/kg + 5000 U)
Pre-ACT ≥130 seconds
Heparin 3000 U
+
Heparin 100 U/kg
=
Initial heparin (100 U/kg + 3000 U)

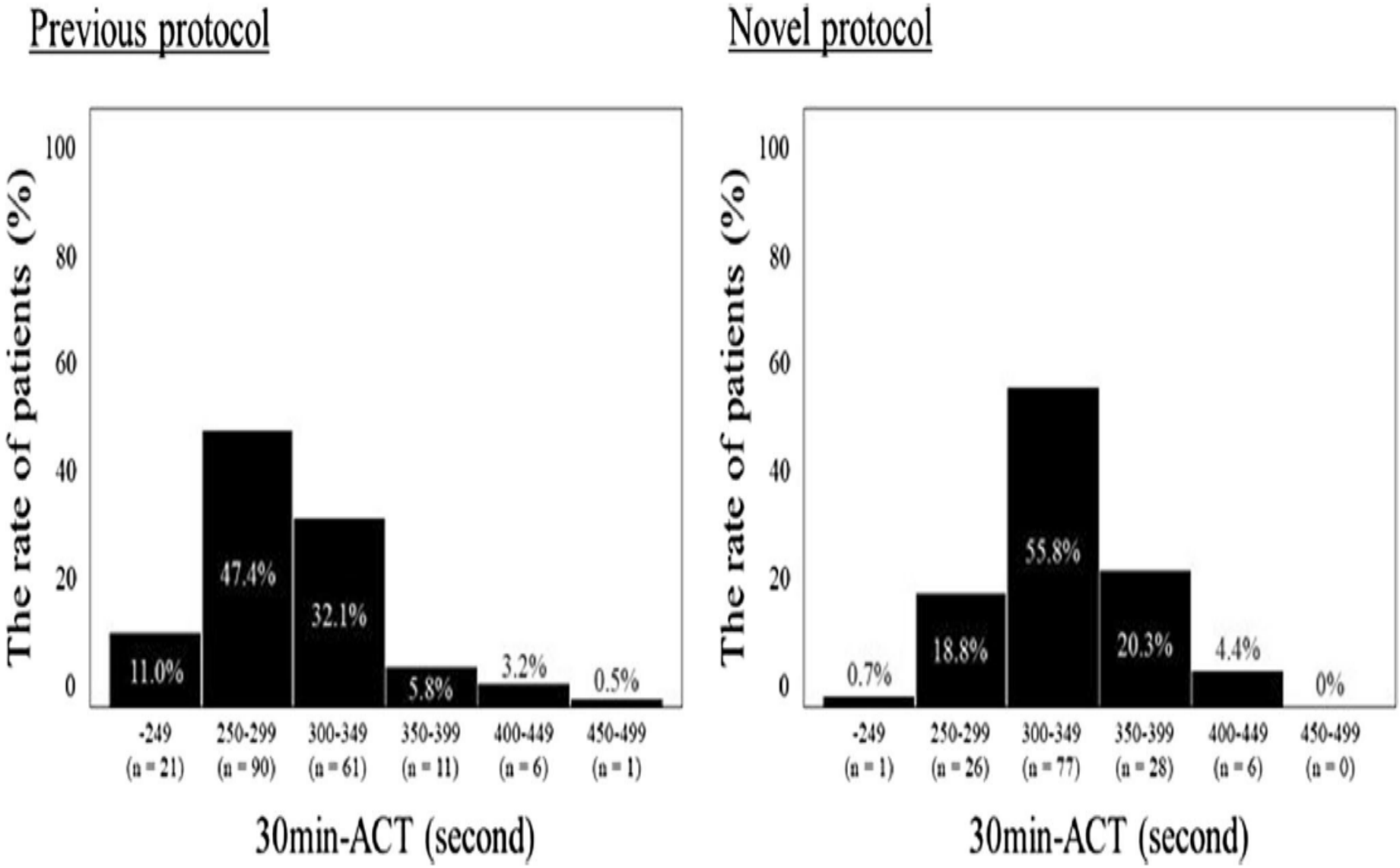


Fig. 5 The distribution of 30-min ACT in previous protocol (left) and novel protocol (right). *ACT* activated clotting time

SONUÇ

- AF katater ablasyonu esnasında İnitial heparin uygulanması için İşlem öncesi ölçülen ACT (Pre-ACT) değerine dayalı bu yeni protokol NOAC alan hastalarda uygun bir sistemik antikoagülasyon sağlamada faydalı bulunmuştur.

ESC European Society of Cardiology

Europace (2018) 0, 1–8
doi:10.1093/europace/euy224

CLINICAL RESEARCH

Impact of periprocedural anticoagulation therapy on the incidence of silent stroke after atrial fibrillation ablation in patients receiving direct oral anticoagulants: uninterrupted vs. interrupted by one dose strategy

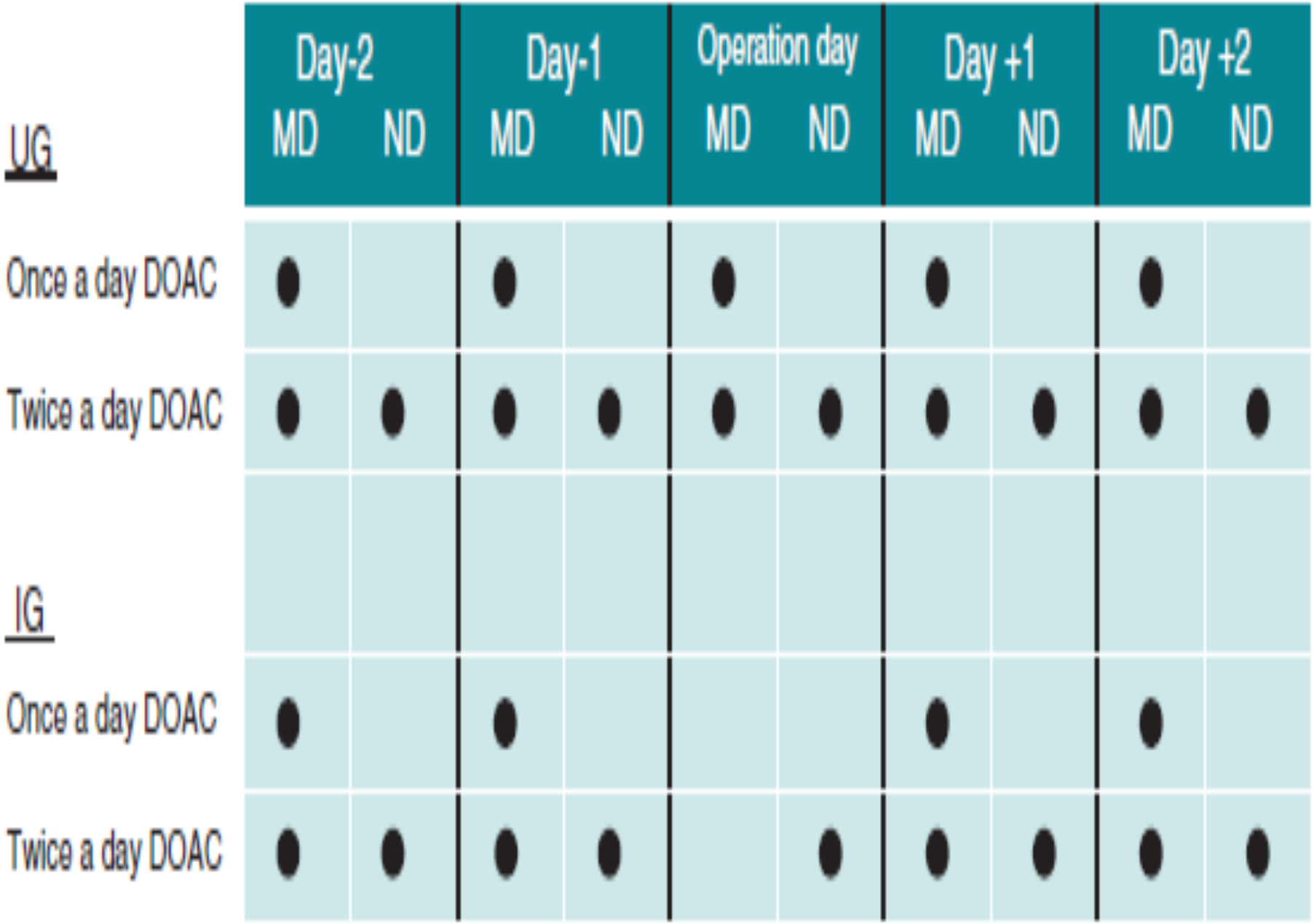
Tomoyuki Nagao[1]*, Hitomi Suzuki[1], Syun Matsunaga[1], Yoshinori Nishikawa[1], Kazuhiro Harada[1], Kumiko Mamiya[1], Norihiro Shinoda[1], Ken Harada[1], Masataka Kato[1], Nobuyuki Marui[1], Tetsuya Amano[2], Yasuya Inden[3], and Toyoaki Murohara[3]

[1]Department of Cardiology, Chubu Rosai Hospital, 10-6 1-Chome Komei, Minato-ku, Nagoya 455-8530, Japan; [2]Department of Cardiology, Aichi-Medical University, 1-1 Yazakokarimata, Nagakute 480-1195, Japan; and [3]Department of Cardiology, Nagoya University Graduate School of Medicine, 65 Tsurumai, Showa, Nagoya, Aichi 466-8550, Japan

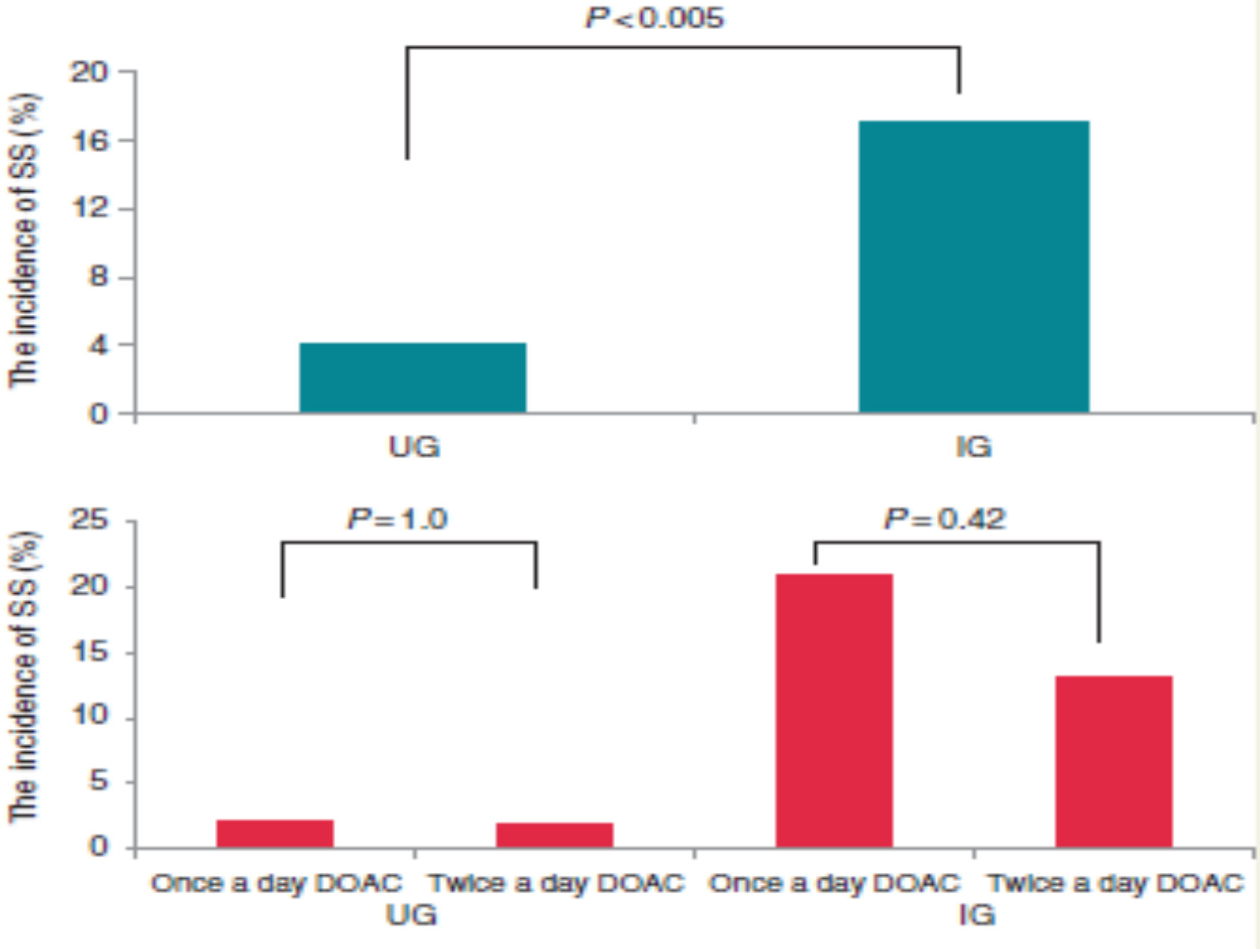
Received 8 April 2018; editorial decision 5 September 2018; accepted 18 September 2018

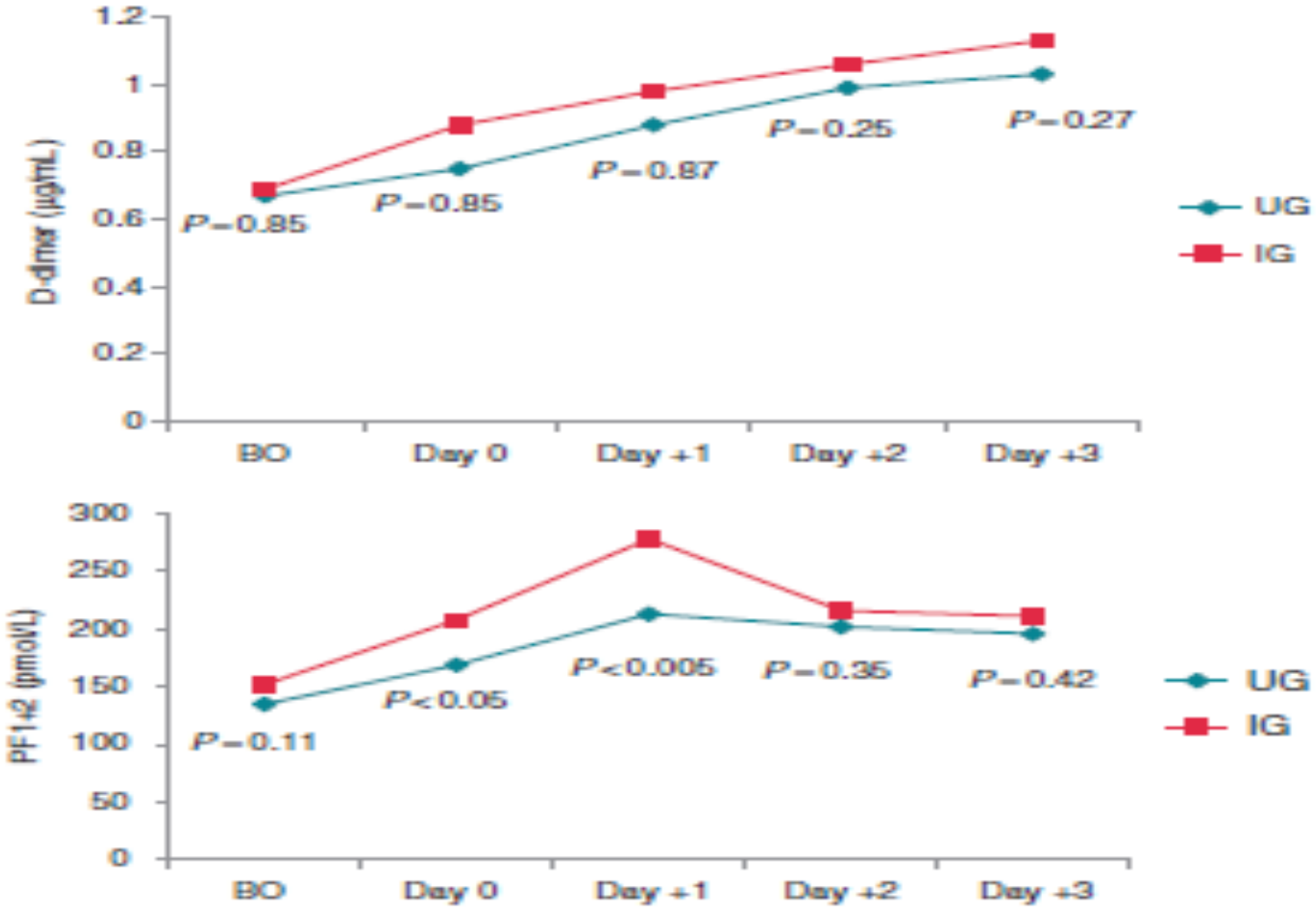
Çalışmanın özellikleri

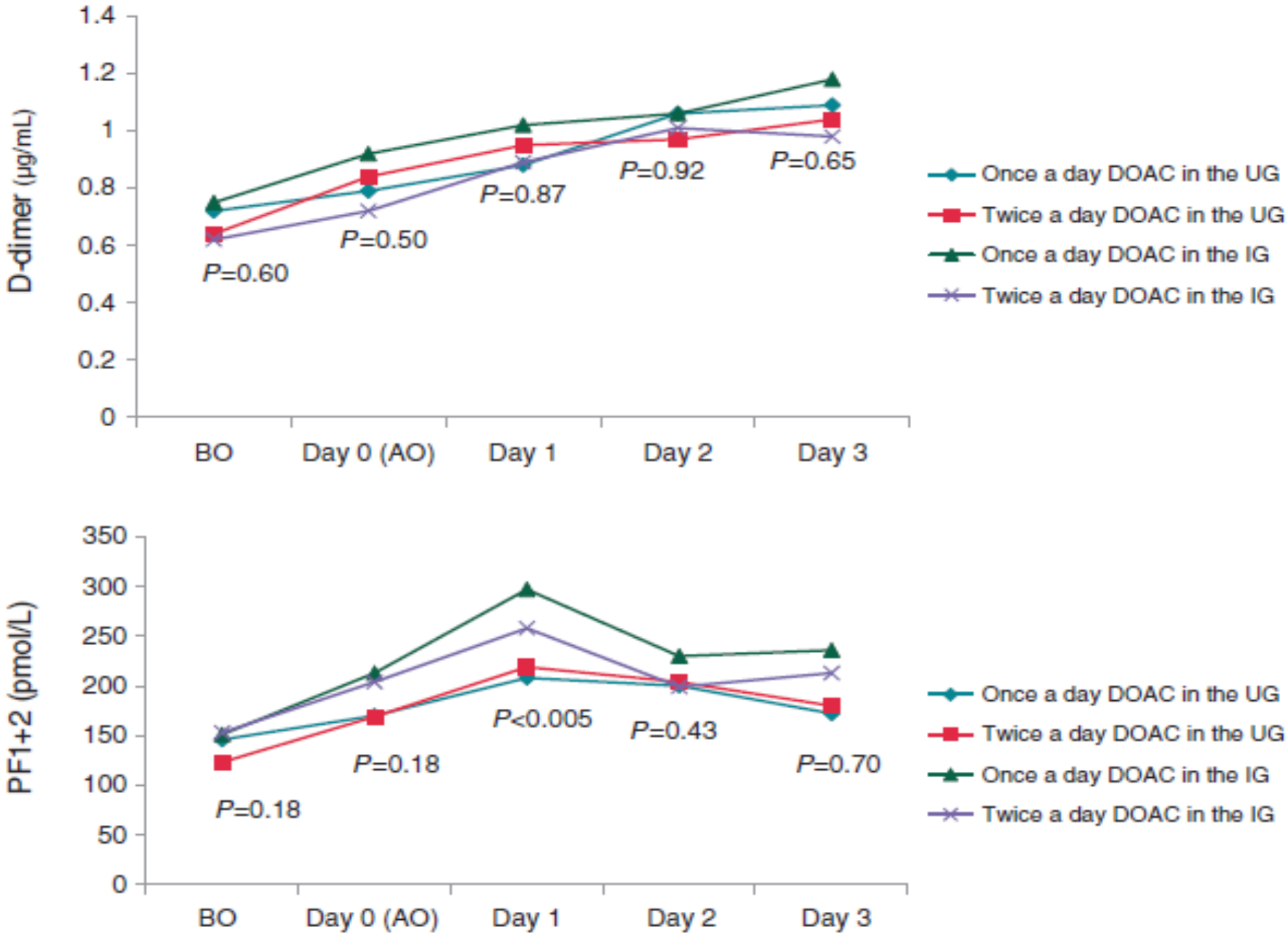
Amaç	**Sessiz İnme insidansı ve koagülasyon belirteçlerinin perioperatif trendlerini inceleyerek AF ablasyonunda kesintisiz NOAC stratejisinin kesintili stratejiye göre uygulanabilirliğini araştırmak.**
Tasarım	Prospektif Randomize
Dahil Edilme Kriterleri	Rivaroxaban, Edoxaban ve Apixaban kullanmakta olup, AF katater ablasyonu planlanan hastalar
Hasta Sayısı	Toplam 200 hasta Kesintili strateji Grubu=100 (62 Erkek 70±28 Yaş) Kesintisiz strateji Grubu=100 (64 Erkek 70±29 Yaş)
Primer Sonlanım	Sessiz inme oranları ve Koagüalsyon belirteçlerindeki artış


Day-2
MD
ND
Day-1
MD
ND
Operation day
MD
ND
Day +1
MD
ND
Day +2
MD
ND
UG
Once a day DOAC
Twice a day DOAC
IG
Once a day DOAC
Twice a day DOAC

	UG ($n = 100$)	IG ($n = 100$)	*P*-value
Major bleeding complications			
Cardiac tamponade	0 (0)	1 (1)	0.48
Minor bleeding complications			
Groin haematoma	4 (4)	6 (6)	0.75
False aneurysm	1 (1)	1 (1)	1.0
Arteriovenous shunt	1 (1)	1 (1)	1.0
Thrombo-embolic complications			
Stroke or TIA	0 (0)	1 (1)	0.48
Total complications	6 (6)	10 (10)	0 44


P<0.005
The incidence of SS (%)
20
16
12
8
4
0
UG
IG
P=1.0
P=0.42
The incidence of SS (%)
25
20
15
10
5
0
Once a day DOAC
Twice a day DOAC
Once a day DOAC
Twice a day DOAC
UG
IG


D-dimer (µg/mL)
1.2
1
0.8
0.6
0.4
0.2
0
P=0.85
P=0.85
P=0.87
P=0.25
P=0.27
BO
Day 0
Day +1
Day +2
Day +3
UG
IG
PF1+2 (pmol/L)
300
250
200
150
100
50
0
P=0.11
P<0.05
P<0.005
P=0.35
P=0.42
BO
Day 0
Day +1
Day +2
Day +3
UG
IG


D-dimer (µg/mL)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
P=0.60
P=0.50
P=0.87
P=0.92
P=0.65
BO
Day 0 (AO)
Day 1
Day 2
Day 3
Once a day DOAC in the UG
Twice a day DOAC in the UG
Once a day DOAC in the IG
Twice a day DOAC in the IG
PF1+2 (pmol/L)
350
300
250
200
150
100
50
0
P=0.18
P=0.18
P<0.005
P=0.43
P=0.70
BO
Day 0 (AO)
Day 1
Day 2
Day 3
Once a day DOAC in the UG
Twice a day DOAC in the UG
Once a day DOAC in the IG
Twice a day DOAC in the IG

SONUÇ

- Kesintili grupta sessiz inme insidansı kesintili gruba göre anlamlı yüksek bulundu.
- Ayrıca,kesintili grupta semptomatik iskemik inme/GİA veya Sessiz İnme günde tek doz ve iki doz NOAC alan hastalar arasında benzer bulundu.
- Kesintili grupta intraoperatif kardiyoversiyon ve AF ablasyon süresi sessiz inme görülmesi ile birliktelik gösterdi.

JACC: CLINICAL ELECTROPHYSIOLOGY VOL. ■, NO. ■, 2018

PUBLISHED BY ELSEVIER

Asymptomatic Cerebral Infarction During Catheter Ablation for Atrial Fibrillation

Comparing Uninterrupted Rivaroxaban and Warfarin (ASCERTAIN)

Takehiro Kimura, MD,[a] Shin Kashimura, MD,[a] Takahiko Nishiyama, MD,[a] Yoshinori Katsumata, MD,[a] Kohei Inagawa, MD,[b] Yukinori Ikegami, MD,[b] Nobuhiro Nishiyama, MD,[a] Kotaro Fukumoto, MD,[a] Yoko Tanimoto, MD,[b] Yoshiyasu Aizawa, MD,[a] Kojiro Tanimoto, MD,[b] Keiichi Fukuda, MD,[a] Seiji Takatsuki, MD[a]

ABSTRACT

OBJECTIVES This randomized study compared uninterrupted rivaroxaban therapy with warfarin therapy as prophylaxis against catheter ablation (CA)-induced asymptomatic cerebral infarction (ACI) and identified the risk factors of rivaroxaban.

BACKGROUND The reported incidence of ACI during CA for atrial fibrillation (AF) remains at 10% to 30%, and peri-procedural oral anticoagulation could affect this incidence.

Çalışmanın özellikleri

Amaç	**AF ablasyonuna bağlı gelişen Asemptomatik Serebral Enfarktüsü engellemek açısından ara verilmeden uygulanan rivaroksaban ve Warfarin tedavilerini karşılaştırmak.**
Tasarım	Prospektif Randomize kontrollü çalışma
Dahil Edilme Kriterleri	Sol atriyum çapı 55 mm ve daha küçük, AF ablasyonuna gidecek olan 20-80 yaş arası non valvüler AF hastaları
Hasta Sayısı	Toplam 127 hasta Rivaroksaban Grubu=64 (53 Erkek) Yaş 59 (52-65) Warfarin Grubu=63 (53 Erkek) Yaş 62 (53-67)
Primer Sonlanım	Asemptomatik Serebral İnfarktüs oranları

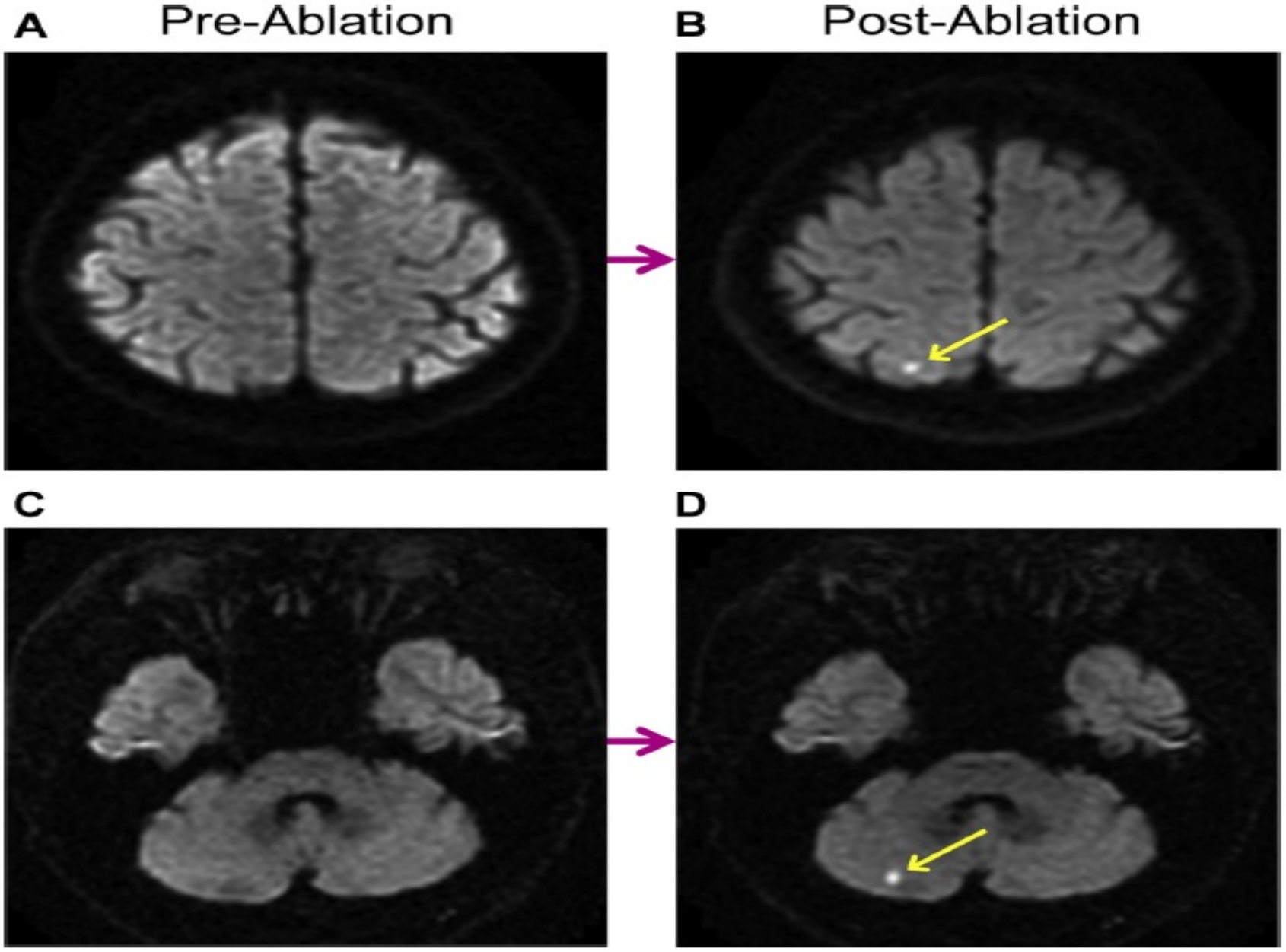
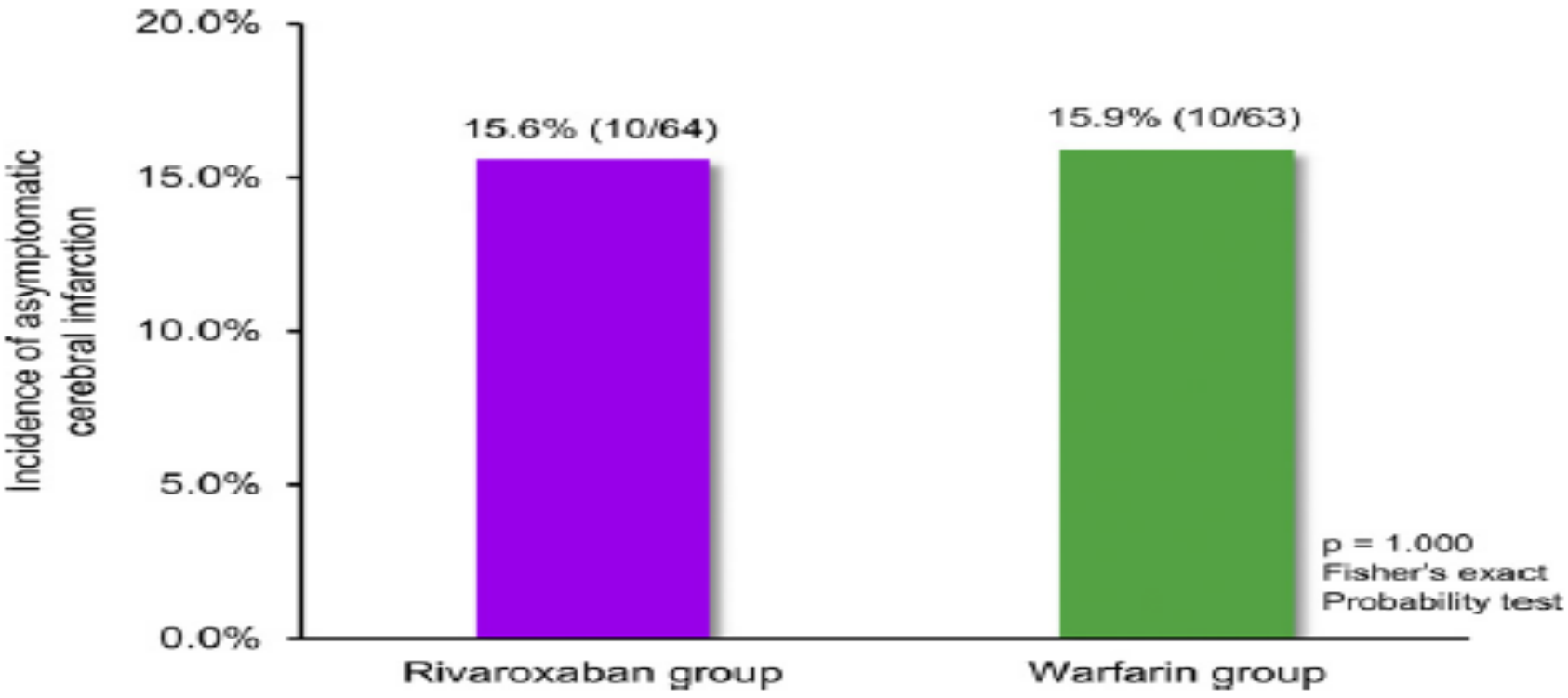

A
Pre-Ablation
B
Post-Ablation
C
D

FIGURE 4 ACI Incidence in the Rivaroxaban and Warfarin Groups



ACI incidence with uninterrupted rivaroxaban versus warfarin administration at 1 day after catheter ablation for atrial fibrillation. No significant intergroup differences were found. ACI = asymptomatic cerebral infarction.

FIGURE 5 **Distribution of ACI in the Rivaroxaban and Warfarin Groups**

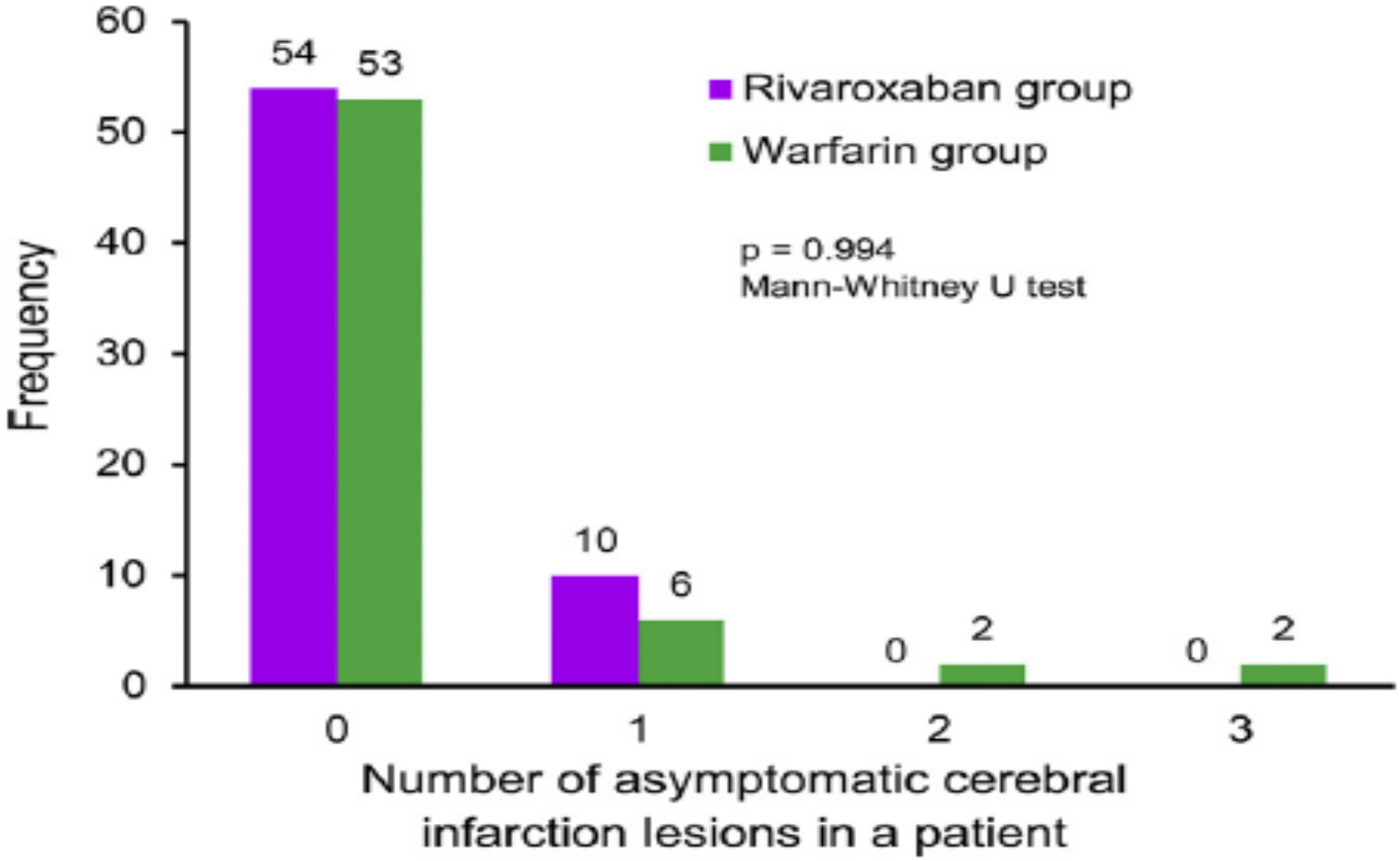


TABLE 2 Between-Group Comparison of Perioperative Complications

Parameter	Treatment group				p Value
	Rivaroxaban n = 64		Warfarin n = 63		
	n	%	n	%	
Thromboembolism	0	0.0	0	0.0	—
Major bleeding	2	3.1	1	1.6	1.000
Non-major bleeding	12	18.8	12	19.0	1.000
Presence/absence of CA-associated complications					0.059
Absence	60	93.8	52	82.5	
Presence	4	6.3	11	17.5	
Total	64	100.0	63	100.0	
Complications					
Puncture site hematoma	1	1.6	7	11.1	0.033
Puncture site re-hemorrhage	2	3.1	2	3.2	1.000
Pseudoaneurysm	1	1.6	0	0.0	1.000
Cardiac tamponade	1	1.6	0	0.0	1.000
Pericardial drainage	1	1.6	0	0.0	1.000
Phrenic nerve paralysis	0	0.0	2	3.2	0.244
Other	1	1.6	1	1.6	1.000
Others					
Acute pericarditis	0	0.0	1	1.6	
Pericarditis	1	1.6	0	0.0	
Presence/absence of treatment					1.000
Absence	62	96.9	62	98.4	
Presence	2	3.1	1	1.6	
Total	64	100.0	63	100.0	

Values are n (%). p Value: Fisher exact probability test.

SONUÇ

- AF katater ablasyonu esnasında ara verilmeden uygulanan Rivaroksaban ve Warfarin tedavileri arasında asemptomatik Serebral enfarktüs gelişim insidansı açısından anlamlı bir fark görülmedi.

- Tromboembolik olay gelişmedi, Majör ve Majör olmayan kanamalar açısından ise iki grup arasında fark izlenmedi.

Received: 11 September 2018 | Revised: 5 November 2018 | Accepted: 16 November 2018

DOI: 10.1002/clc.23120

WILEY CLINICAL CARDIOLOGY

REVIEW

Uninterrupted anticoagulation with non-vitamin K antagonist oral anticoagulants in atrial fibrillation catheter ablation: Lessons learned from randomized trials

Rhanderson Cardoso[1] | Stephan Willems[2] | Edward P. Gerstenfeld[3] | Atul Verma[4] | Richard Schilling[5] | Stefan H. Hohnloser[6] | Ken Okumura[7] | Matias Nordaby[8] | Marc A. Brouwer[9] | Hugh Calkins[1]

[1]Division of Cardiology, Johns Hopkins Medical Institutions, Baltimore, Maryland

[2]Department of Cardiology-Electrophysiology, University Heart Center Hamburg, Hamburg, Germany

Catheter ablation has been established as a rhythm control strategy in selected patients with atrial fibrillation (AF) who have failed or wish to avoid anti-arrhythmic drugs. Uninterrupted oral anticoagulation with vitamin K antagonists (VKAs) peri-ablation is associated with a lower risk

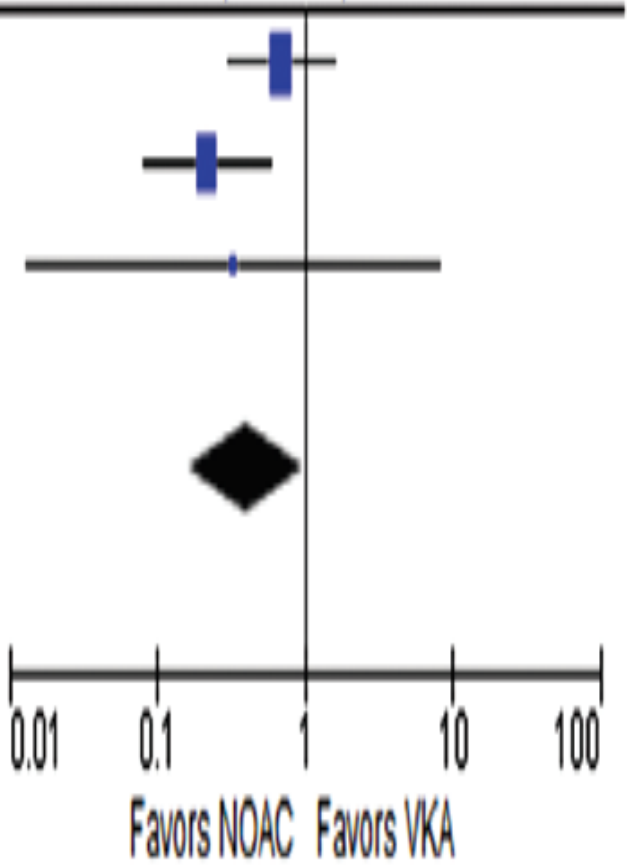
(A)

Major bleeding according to ISTH criteria

Study or Subgroup	NOAC Events	NOAC Total	VKA Events	VKA Total	Weight	Odds Ratio M-H, Random, 95% CI
AXAFA-AFNET 5 2018	10	318	14	315	50.1%	0.70 [0.31, 1.60]
RE-CIRCUIT 2017	5	317	22	318	42.6%	0.22 [0.08, 0.58]
VENTURE-AF 2015	0	123	1	121	7.2%	0.33 [0.01, 8.06]
Total (95% CI)		758		754	100.0%	0.40 [0.16, 0.99]
Total events	15		37			

Heterogeneity: Tau² = 0.25; Chi² = 3.28, df = 2 (P = 0.19); I² = 39%

Test for overall effect: Z = 1.99 (P = 0.05)



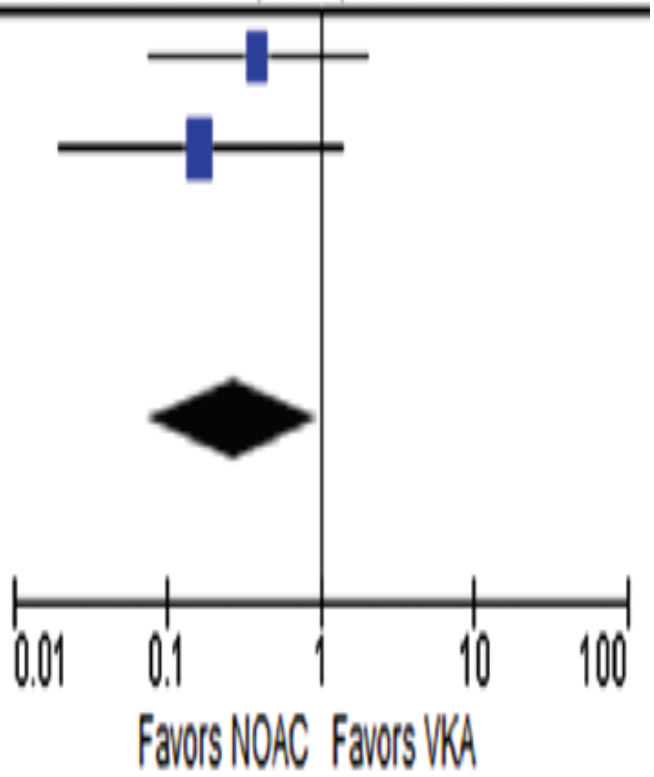
B)

Cardiac tamponade

Study or Subgroup	NOAC Events	NOAC Total	VKA Events	VKA Total	Weight	Odds Ratio M-H, Fixed, 95% CI
AXAFA-AFNET 5 2018	2	318	5	315	45.5%	0.39 [0.08, 2.04]
RE-CIRCUIT 2017	1	317	6	318	54.5%	0.16 [0.02, 1.37]
VENTURE-AF 2015	0	124	0	124		Not estimable
Total (95% CI)		**759**		**757**	**100.0%**	**0.27 [0.07, 0.97]**
Total events	3		11			

Heterogeneity: $Chi^2 = 0.41$, $df = 1$ ($P = 0.52$); $I^2 = 0\%$

Test for overall effect: $Z = 2.01$ ($P = 0.04$)

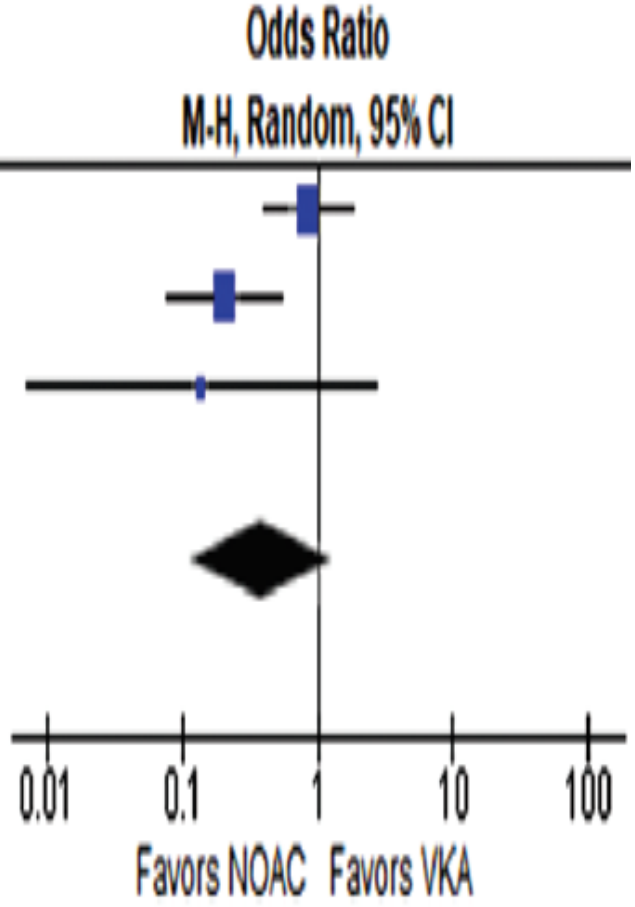


(C) **Composite of all-cause mortality, stroke or transient ischemic attack, and major bleeding**

Study or Subgroup	NOAC Events	NOAC Total	VKA Events	VKA Total	Weight	Odds Ratio M-H, Random, 95% CI
AXAFA-AFNET 5 2018	13	318	15	315	46.0%	0.85 [0.40, 1.82]
RE-CIRCUIT 2017	5	317	23	318	41.1%	0.21 [0.08, 0.55]
VENTURE-AF 2015	0	124	3	124	12.8%	0.14 [0.01, 2.73]
Total (95% CI)		**759**		**757**	**100.0%**	**0.38 [0.11, 1.27]**
Total events	18		41			

Heterogeneity: Tau² = 0.68; Chi² = 5.85, df = 2 (P = 0.05); I² = 66%

Test for overall effect: Z = 1.58 (P = 0.11)



SONUÇ

- Bu 3 çalışmada 1500’ den fazla hastadan elde edilen bilgiler ışığında ara verilmeden uygulanan NOAC tedavisi, VKA tedavisine kıyasla anlamlı olarak daha düşük majör kanamaya yol açtı. (%2 ye karşın %4. Olasılık oranı [OR] 0.40; %95 güven aralığı [CI] 0.16-0.99).
- Benzer şekilde kardiyak tamponad da NOAC grubunda daha düşüktü. (%0.4 ye karşın %1.5. Olasılık oranı [OR] 0.27; %95 güven aralığı [CI] 0.07-0.97).
- Tromboembolik olaylar iki grup arasında benzerdi.
- Tüm bu bulgular HRS / EHRA / ECAS / APHRS / SOLAECE 2017 kateter ve cerrahi ablasyon konusunda uzman konsensüs bildiriminde Clas I olarak tavsiye edilen AF ablasyonu esnasında kesintisiz NOAC stratejisini desteklemektedir.

ESC European Society of Cardiology

European Heart Journal (2018) **0**, 1–7
doi:10.1093/eurheartj/ehy870

CLINICAL RESEARCH
Atrial fibrillation

When is it appropriate to stop non-vitamin K antagonist oral anticoagulants before catheter ablation of atrial fibrillation? A multicentre prospective randomized study

Hee Tae Yu[1], Jaemin Shim[2], Junbeom Park[3], Tae-Hoon Kim[1], Jae-Sun Uhm[1], Jong-Youn Kim[1], Boyoung Joung[1], Moon-Hyoung Lee[1], Young-Hoon Kim[2], and Hui-Nam Pak[1]*

[1]Yonsei University Health System, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 03722, Republic of Korea; [2]Korea University Cardiovascular Center, 73 Inchon-ro, Seongbuk-gu, Seoul 02841, Republic of Korea; and [3]Ewha Womans University, 52 Ewhayeodae-gil, Seodaemun-gu, Seoul 03760, Republic of Korea

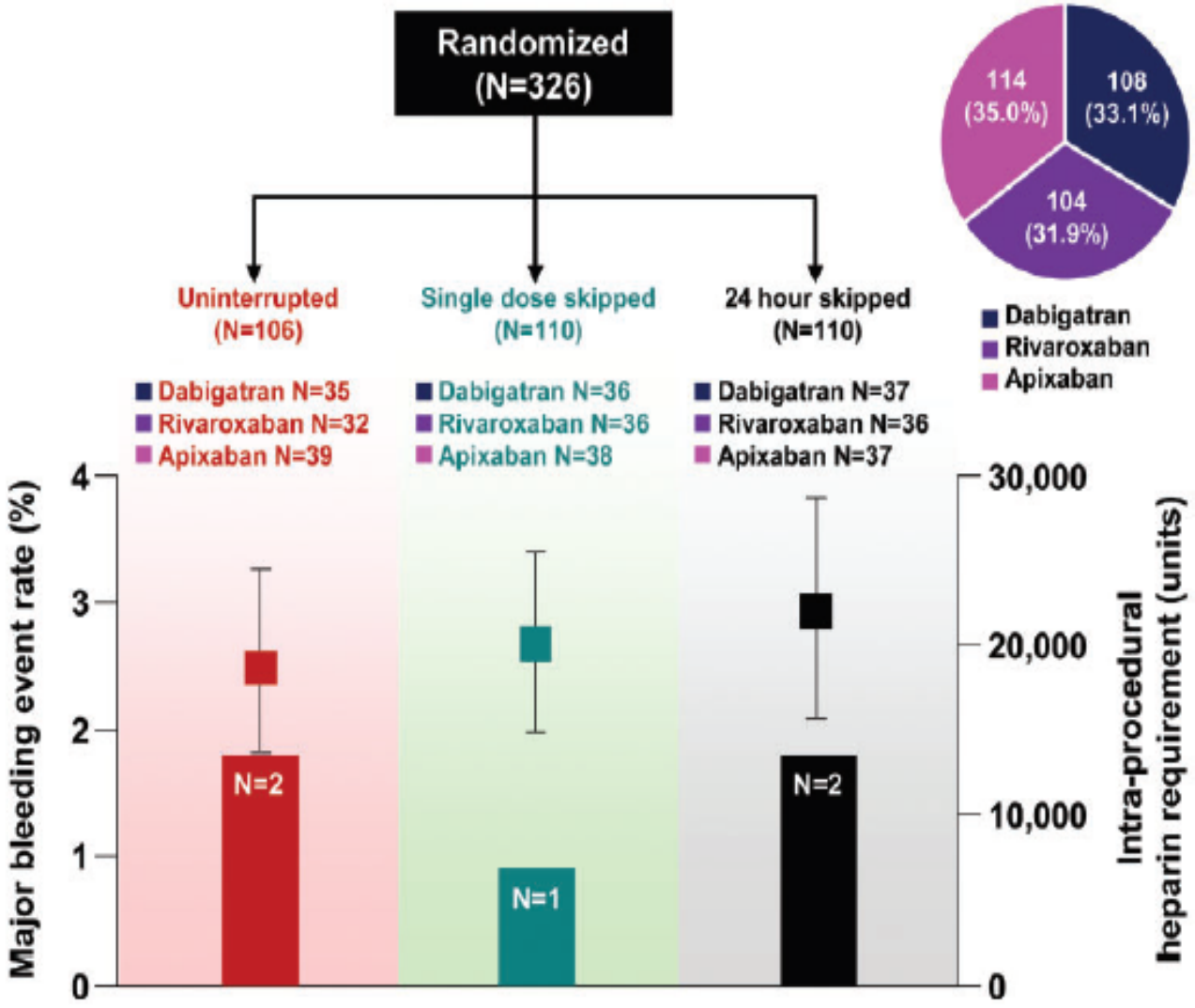
Received 3 July 2018; revised 8 October 2018; editorial decision 29 November 2018; accepted 29 November 2018

Table 1 Baseline characteristics

	Total ($n = 326$)	UI ($n = 106$)	SDS ($n = 110$)	24S ($n = 110$)
Age (years)	58.3 ± 11.3	58.6 ± 11.7	57.9 ± 11.1	58.4 ± 11.3
Male, *n* (%)	243 (74.5)	81 (76.4)	79 (71.8)	83 (75.5)
Paroxysmal AF, *n* (%)	202 (62.0)	67 (63.2)	74 (67.3)	61 (55.5)
AF duration (months)	47.2 ± 51.7	47.3 ± 49.8	53.1 ± 58.3	41.3 ± 45.9
BMI (kg/m^2)	25.3 ± 3.4	26.1 ± 3.7	24.7 ± 3.1	25.3 ± 3.3
Body weight (kg)	73.6 ± 18.4	73.9 ± 15.5	71.3 ± 17.8	75.6 ± 21.2
CrCl (mL/min)	93.2 ± 41.8	97.5 ± 54.1	90.9 ± 31.5	91.4 ± 37.0
NOAC type				
Dabigatran, *n* (%)	108 (33.1)	35 (33.0)	36 (32.7)	37 (33.6)
Rivaroxaban, *n* (%)	104 (31.9)	32 (30.2)	36 (32.7)	36 (32.7)
Apixaban, *n* (%)	114 (35.0)	39 (36.8)	38 (34.5)	37 (33.6)
NOAC dosing				
Underdosing[a], *n* (%)	56 (17.2)	21 (19.8)	16 (14.5)	19 (17.3)
Labelled use, *n* (%)	269 (82.5)	85 (80.2)	93 (84.5)	91 (82.7)
Overdosing[b], *n* (%)	1 (0.3)	0	1 (0.9)	0
Comorbidities				
Heart failure, *n* (%)	43 (13.2)	11 (10.4)	16 (14.5)	16 (14.5)
Hypertension, *n* (%)	140 (42.9)	45 (42.5)	45 (40.9)	50 (45.5)
Diabetes, *n* (%)	47 (14.4)	10 (9.4)	16 (14.5)	21 (19.1)
Stroke/TIA, *n* (%)	40 (12.3)	12 (11.3)	17 (15.5)	11 (10.0)
Vascular disease, *n* (%)	25 (7.7)	8 (7.6)	11 (10.0)	6 (5.5)
CHA_2DS_2-VASc score	1.7 ± 1.5	1.6 ± 1.4	1.7 ± 1.5	1.7 ± 1.4
Echocardiographic measures				
LA dimension (mm)	41.2 ± 6.7	41.0 ± 7.6	41.0 ± 6.0	41.6 ± 6.6
LA volume index (mL/m^2)	39.1 ± 14.7	39.4 ± 13.2	39.2 ± 16.3	38.8 ± 14.6
LVEDD (mm)	49.8 ± 4.6	49.8 ± 4.5	49.3 ± 4.5	50.3 ± 4.8
LV ejection fraction (%)	61.3 ± 9.5	61.2 ± 9.0	61.3 ± 10.3	61.3 ± 9.5
E/Em	9.8 ± 4.0	9.7 ± 4.3	10.1 ± 4.2	9.5 ± 3.5

Table 2 Procedure outcomes

	Total ($n = 326$)	UI ($n = 106$)	SDS ($n = 110$)	24S ($n = 110$)	*P*-value
Total procedure time (min)	190.9 ± 59.5	184.8 ± 56.4	190.2 ± 60.8	197.6 ± 60.9	0.318
Fluoroscopic time (min)	35.0 ± 15.4	33.0 ± 13.8	35.4 ± 12.6	36.7 ± 18.9	0.205
Ablation time (s)	4548.1 ± 1838.3	4421.5 ± 1751.1	4469.6 ± 2025.3	4748.7 ± 1720.0	0.367
Heparin dose (units)	20343.3 ± 6191.2	18740.4 ± 5726.4	20135.5 ± 5324.6	22092.6 ± 6974.0	<0.001
Activated clotting time (s)	347.5 ± 30.7	351.7 ± 36.5	347.5 ± 29.8	343.3 ± 24.6	0.139
Δ Haemoglobin (g/dL)	-1.77 ± 1.67	-1.50 ± 1.64	-1.84 ± 1.07	-1.97 ± 2.13	0.114
Complications, *n* (%)	13 (4.0)	2 (1.9)	5 (4.5)	6 (5.5)	0.381
Cardiac tamponade, *n* (%)	3 (0.9)	1 (0.9)	0	2 (1.8)	
Pericardial effusion, *n* (%)	2 (0.6)	1 (0.9)	1 (0.9)	0	
Arteriovenous fistula, *n* (%)	2 (0.6)	0	2 (1.8)	0	
Phrenic nerve damage, *n* (%)	1 (0.3)	0	0	1 (0.9)	
Sinus dysfunction, *n* (%)	4 (1.2)	0	1 (0.9)	3 (2.7)	
Complete AV block, *n* (%)	1 (0.3)	0	1 (0.9)	0	
Stroke, *n* (%)	0	0	0	0	



Take home figure In patients undergoing AF ablation, uninterrupted, single dose skipped, and 24-hour skipped NOACs exhibited a comparable safety, and the intra-procedural heparin requirement was higher in the 24S group.

Sonuç

- AF ablasyonuna giden hastalarda ara verilmeden uygulanan NOAC tedavisi ile tek doz ya da çift doz ara verilen NOAC tedavileri kullanılan NOAC tipinden bağımsız olarak karşılaştırılabilir etkinlik ve güvenilirlik sergiledi.