Atriyal Fibrilasyonu Tespit Etmek için Uzun Süreli EKG Monitorizasyonun Önemi? Bu Konuda Elimizdeki Teknik Nedir?

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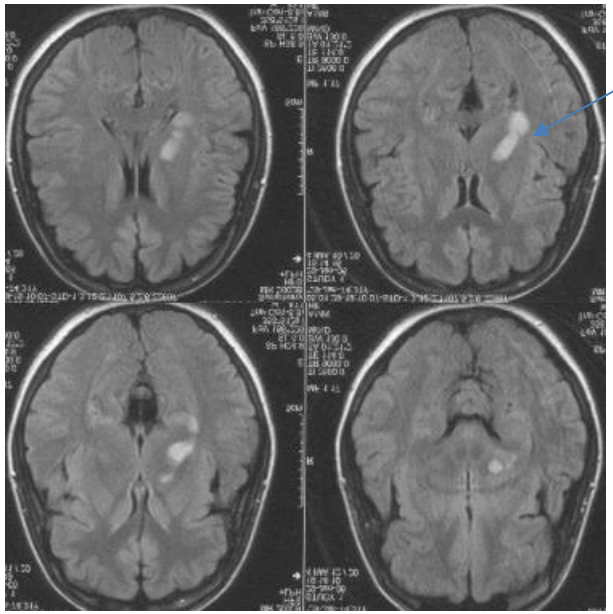
İnme

Nörokardiyolojik durum



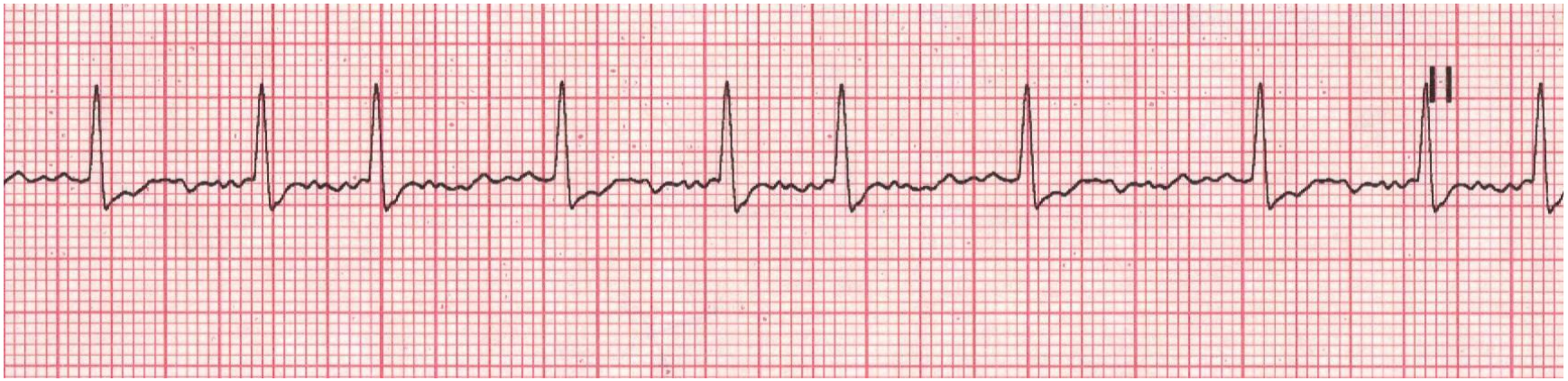
MR incelemesinde sol kapsüla interna arka bacağı, retrokapsüler bölge, posterolateral talamus , medial globus pallidus ve serebral pedünkülü tutan infarkt.

- **Kriptojenik inme % 30**
- Aterosklerotik Vasküler Hastalık
- Atriyal Fibrilasyon (Paroksismal-uzun süreli antikoagülasyon)
- İntraserebral hemoraji

Kriptojenik İnme

- MR veya CT
- 12-lead EKG
- 24-saat Holter
- TEE
- < 55 yaş ise protrombotik durum değerlendirmesi
- Baş-boyun bölgesi için CTA, MRA veya konv anjiyo

Kriptojenik İnme



Paroksismal Sessiz Atriyal Fibrilasyon

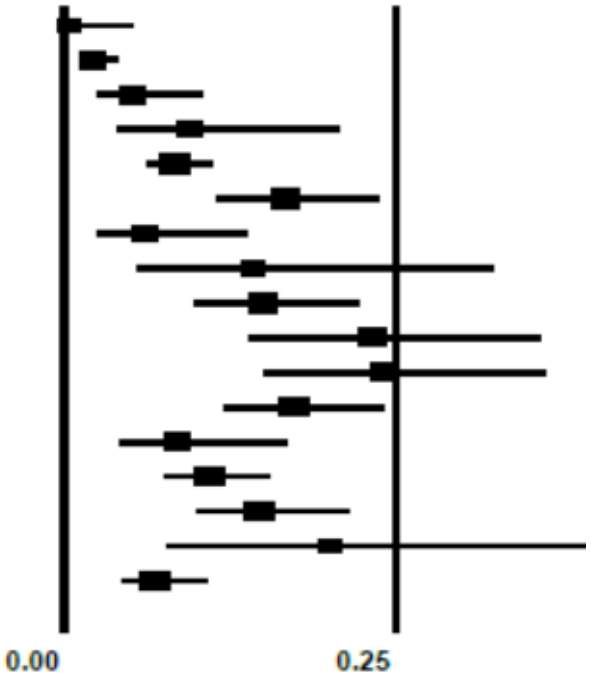
AF Sınıflama

AF pattern	Definition
First diagnosed AF	AF that has not been diagnosed before, irrespective of the duration of the arrhythmia or the presence and severity of AF-related symptoms.
Paroxysmal AF	Self-terminating, in most cases within 48 hours. Some AF paroxysms may continue for up to 7 days. AF episodes that are cardioverted within 7 days should be considered paroxysmal.
Persistent AF	AF that lasts longer than 7 days, including episodes that are terminated by cardioversion, either with drugs or by direct current cardioversion, after 7 days or more.
Long-standing persistent AF	Continuous AF lasting for ≥1 year when it is decided to adopt a rhythm control strategy.
Permanent AF	AF that is accepted by the patient (and physician). Hence, rhythm control interventions are, by definition, not pursued in patients with permanent AF. Should a rhythm control strategy be adopted, the arrhythmia would be re-classified as 'long-standing persistent AF'.

AF - İnme

Figure e-1 Proportion of ischemic stroke patients identified with NVAF, by study

Author, year	Class	Technique	Monitoring duration (days)
Douen 2007[e23]	III	HM	1.0
Schaer 2004[e26]	III	HM	1.0
Vandenbroucke 2004[e21]	III	HM	1.0
Lazzaro 2012[e22]	III	HM	1.0
Rizos 2012[e18]	III	inptTele	2.7
Douen 2008[e24]	III	sEKG	3.0
Schuchert 1999[e20]	III	HM	3.0
Barthelemy 2003[e28]	III	ELR	7.0
Wallmann 2007[e19]	III	sELR	21.0
Tayal 2008[e17]	II	MCOT	21.0
Bhatt 2011[e31]	III	MCOT	21.0
Miller 2013[e32]	III	MCOT	21.0
Gaillard 2010[e29]	III	phoneEKG	30.0
Flint 2012[e16]	II	ELR	30.0
Jabaudon 2004[e27]	III	sEKG, HM, ELR	30.0
Elijovich 2009[e30]	III	ELR	30.0
Doliwa 2012[e25]	III	HM	31.0

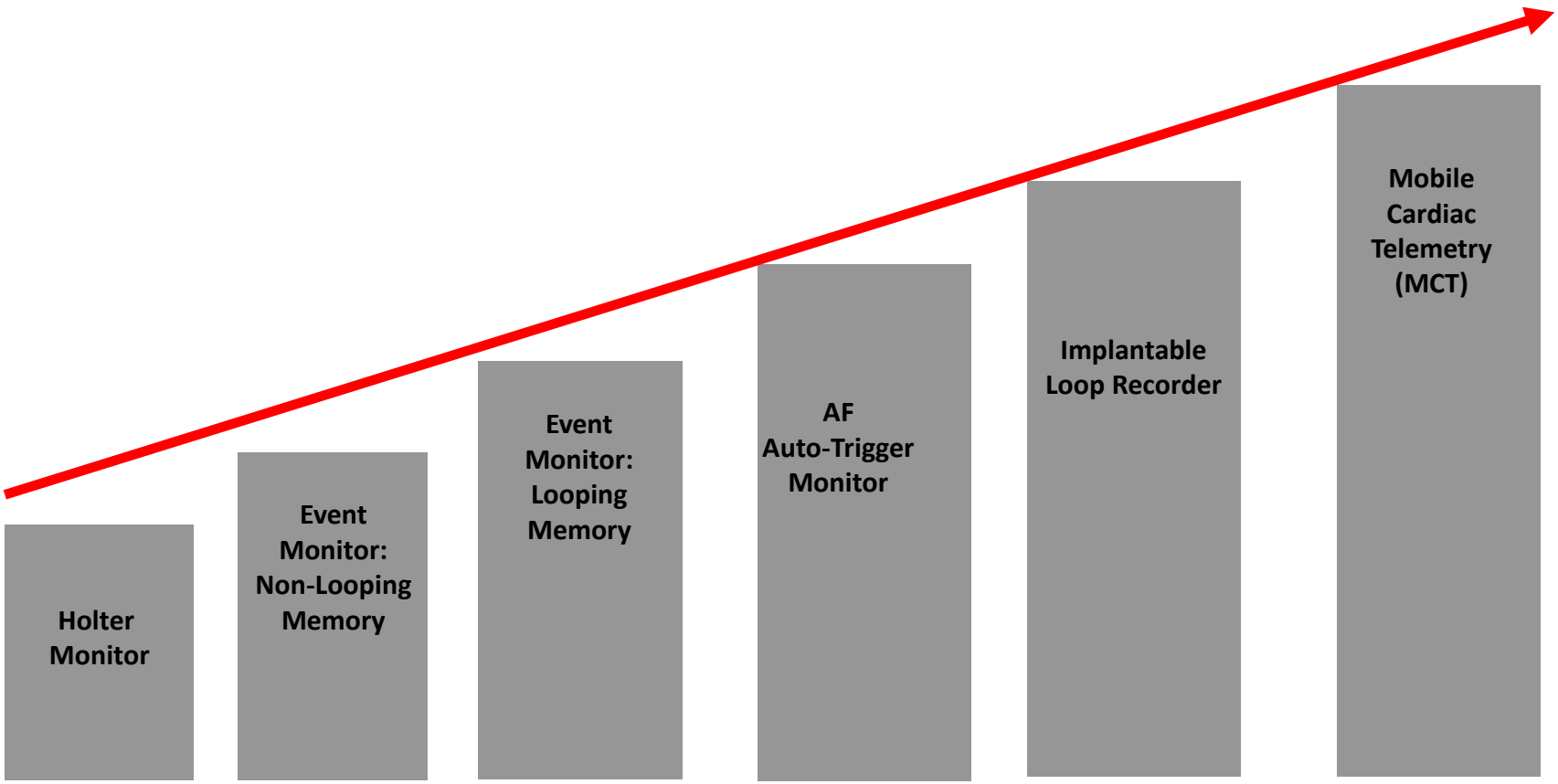


İlişki %30' a kadar çıkıyor

Sessiz AF

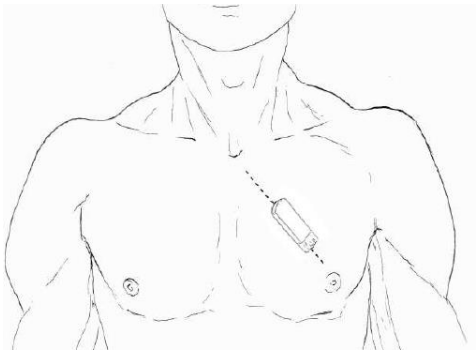
- Oldukça sık- Bazı serilerde-%90
- Sessiz AF- İnme Riski

Ambulatuar Kalp Ritm Monitorizasyonu

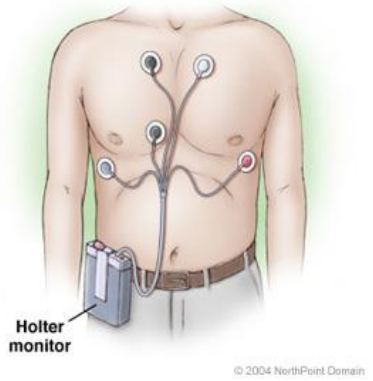


Kriptojenik inme-Paroksismal AF

CRYptogenic STroke and underlying AtriaL Fibrillation (CRYSTAL AF): Long-Term Follow-Up Results



Invaziv Loop Recorder



Konservatif

CRYSTAL AF

Dahil Edilme:

• ≥40 years of age

•Kripotojenik İnme (klinik TIA), MR CT ile infarkt, altta yatan mekanizma bulunamayan (AF dahil) **Bu tetkiklerden sonra**:

- 12-lead EKG
- Minimum 24-h EKG monitorizasyonu (Holter)
- Transözofajiyal ekokardiyografi (TEE)
- Boyun CT ya da MR anjiyo ile aterosklerotik hastalık dışlaması
- 55 yaşından büyük hastalarda hiperkoagülabilite taraması

Dışlama:

•AF - Atrial Flutter öyküsü

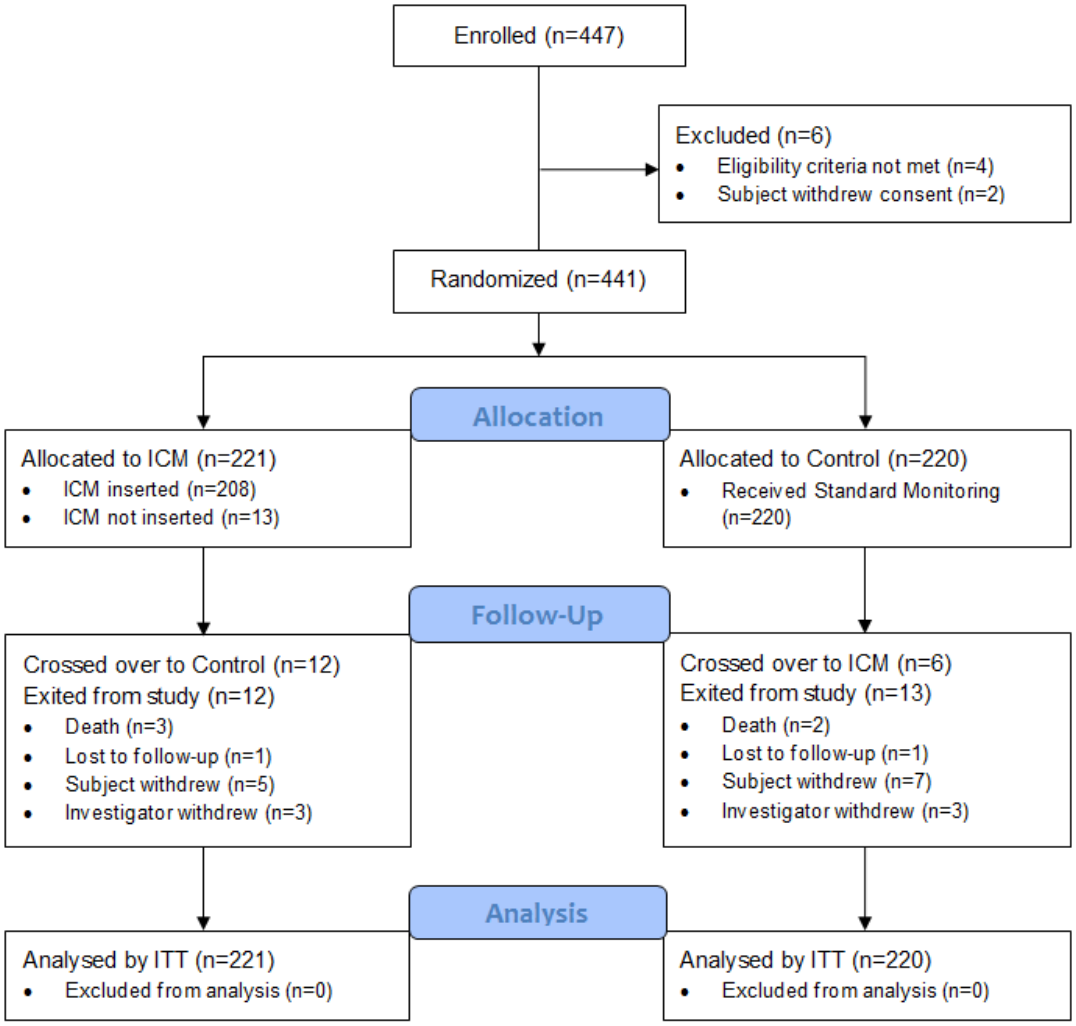
•Kalıcı sürekli antikoagülasyon Endikasyon ve Kontrendikasyonu

•Pacemaker – ICD Endikasyonu

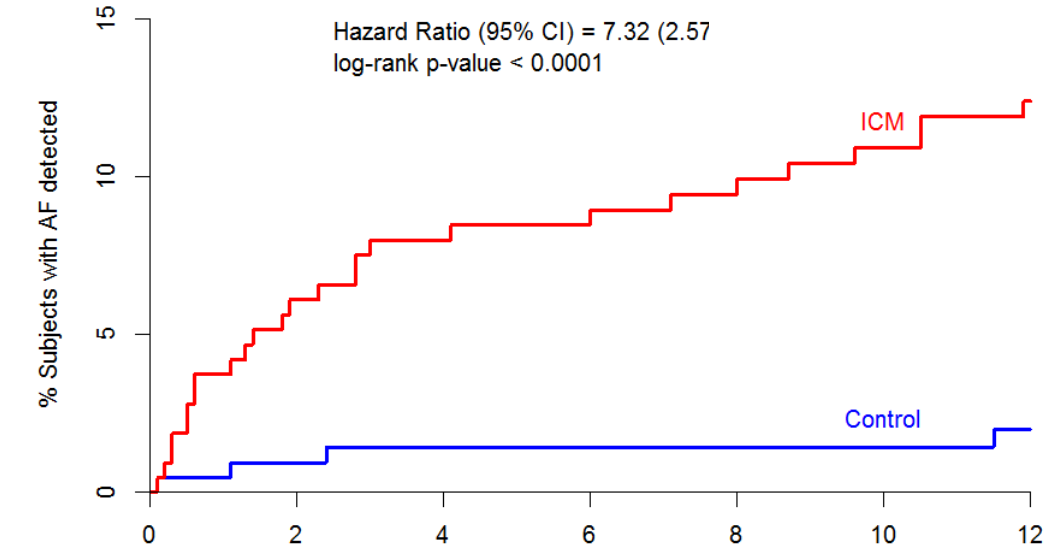
CRYSTAL AF

- Hastalar iki kola ayrılıyor :
  - 1 ay
  - 6 ay
  - 12 ay
- AF: 30 sn uzun irregüler p dalgasız ritim

CRYSTAL AF

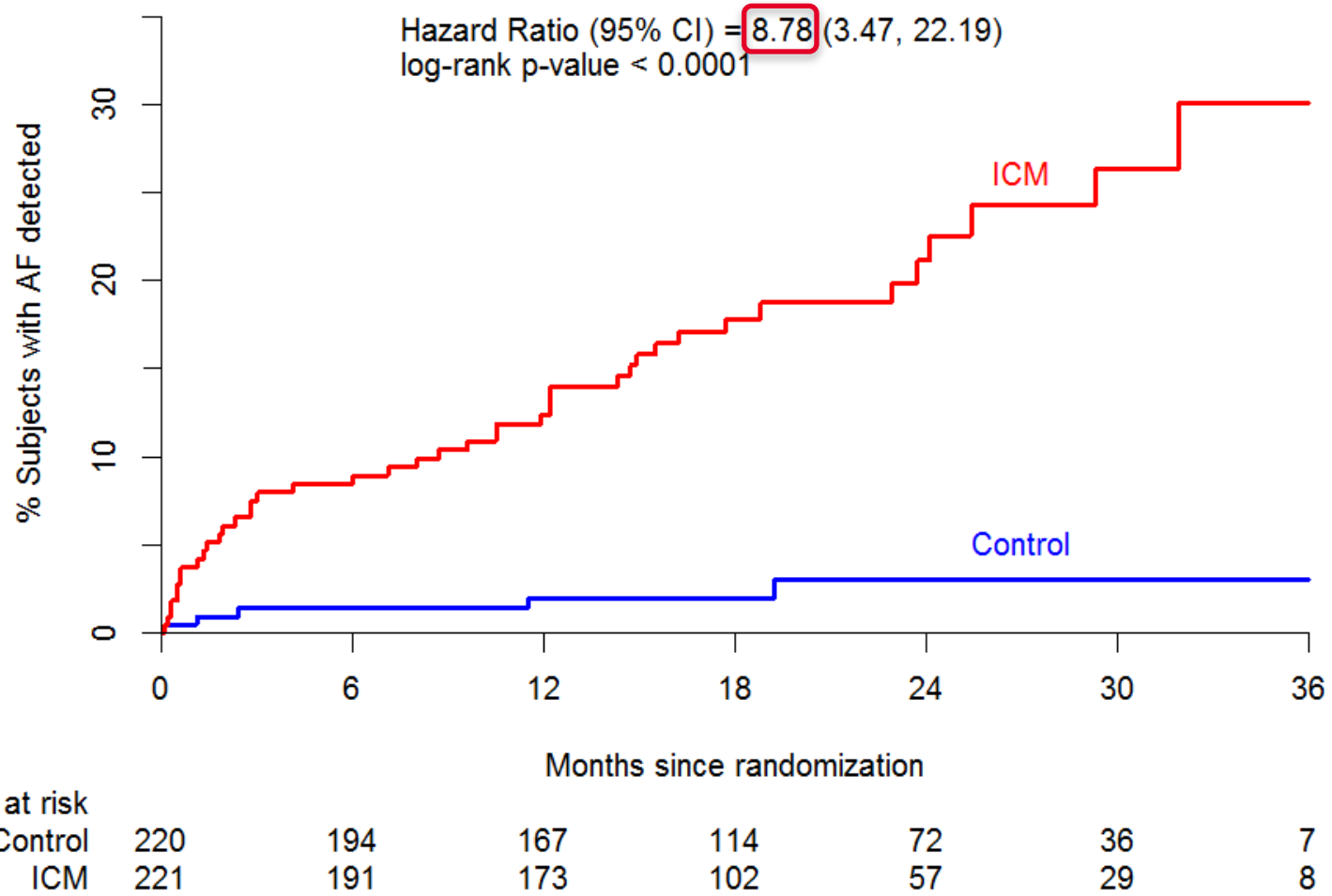

Enrolled (n=447)
Excluded (n=6)
• Eligibility criteria not met (n=4)
• Subject withdrew consent (n=2)
Randomized (n=441)
Allocation
Allocated to ICM (n=221)
• ICM inserted (n=208)
• ICM not inserted (n=13)
Allocated to Control (n=220)
• Received Standard Monitoring (n=220)
Follow-Up
Crossed over to Control (n=12)
Exited from study (n=12)
• Death (n=3)
• Lost to follow-up (n=1)
• Subject withdrew (n=5)
• Investigator withdrew (n=3)
Crossed over to ICM (n=6)
Exited from study (n=13)
• Death (n=2)
• Lost to follow-up (n=1)
• Subject withdrew (n=7)
• Investigator withdrew (n=3)
Analysis
Analysed by ITT (n=221)
• Excluded from analysis (n=0)
Analysed by ITT (n=220)
• Excluded from analysis (n=0)

CRYSTAL AF **12 Ay**



# at risk							
Control	220	200	197	194	184	184	167
ICM	221	198	194	191	186	182	173

CRYSTAL AF **36 Ay**



CRYSTAL AF
Sonuç

- AF tesbiti 36. Ayda
  - *ICM %30
  - *Kontrol gurubunda %3
- İlk AF epizodu %75 asemptomatik
- Uzun Süreli Sürekli Monitorizasyon- Kriptojenik İnme

Prolonged Ambulatory Cardiac Monitoring Improves the Detection and Treatment of Atrial Fibrillation in Patients with Cryptogenic Stroke: Primary Results from the EMBRACE Multicenter Randomized Trial

Background: Detecting atrial fibrillation (AF) in stroke/TIA patients can result in therapy to prevent recurrent strokes. However, standard short duration monitoring (24-48 h) for atrial fibrillation may not detect AF.

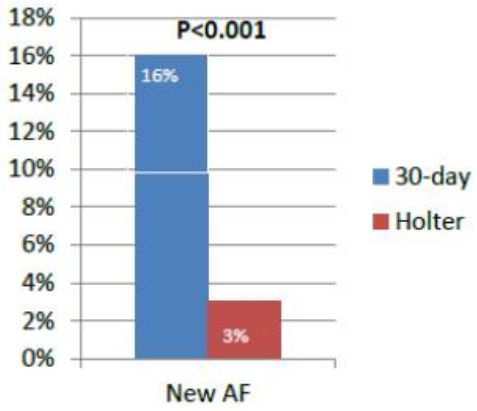
Purpose: This study is the first randomized trial to evaluate whether longer non-invasive ECG monitoring after stroke/TIA would produce beneficial results.

Methods: n=572 (age 73±9yrs;); recent ischemic stroke/TIA, no known AF; 16 stroke centers; Randomized to wear either an event-triggered cardiac monitor up to 30 days or a repeat 24 h Holter. AF events automatically recorded.

Primary Outcome: ≥1 episodes of AF of at least 30 seconds within 90 days of randomization

Secondary Outcomes: monitoring adherence ; anticoagulation status

Results: New AF detected among 16% of 30-day monitoring group, vs. 3% in the Holter group (p<0.001). In the 30 day group three quarters of AF events occurred within the first 2 weeks. 71% of all patients were anticoagulated; anticoagulant use at 90 days > 30 day group (49/280; 18%) vs. Holter group (28/279; 10%; p=0.01).



Conclusion: Paroxysmal AF is undiagnosed and untreated in many stroke/TIA patients ; in the post-stroke setting it is under-detected by the Holter monitor. Prolonged continuous monitoring for 30 days is "feasible, more effective, and leads to clinically meaningful changes in patient management. "

Subclinical Atrial Fibrillation and the Risk of Stroke

Jeff S. Healey, M.D., Stuart J. Connolly, M.D., Michael R. Gold, M.D., Carsten W. Israel, M.D., Isabelle C. Van Gelder, M.D., Alessandro Capucci, M.D., C.P. Lau, M.D., Eric Fain, M.D., Sean Yang, M.Sc., Christophe Bailleul, M.D., Carlos A. Morillo, M.D., Mark Carlson, M.D., Ellison Themeles, M.Sc., Elizabeth S. Kaufman, M.D., and Stefan H. Hohnloser, M.D., for the ASSERT Investigators*

- Pil veya ICD taşıyan 2580 olgu
- 65 yaş ve üstü
- AF öyküsü yok
- 2.5 yıl takip

ASSERT

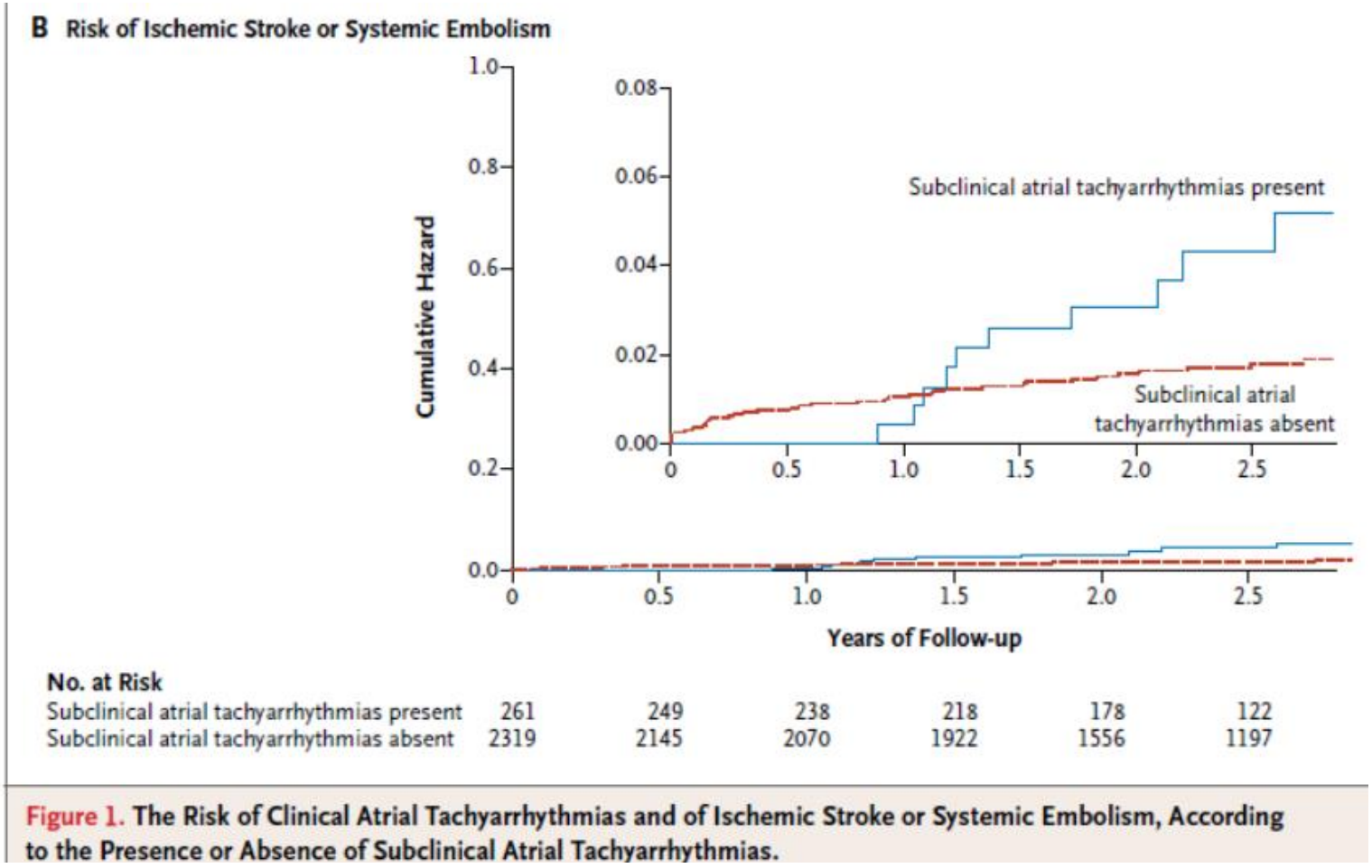


Figure 1. The Risk of Clinical Atrial Tachyarrhythmias and of Ischemic Stroke or Systemic Embolism, According to the Presence or Absence of Subclinical Atrial Tachyarrhythmias.

AF Süresi-İnme

AF epizod süresi	İnme/emboli sıklığı (%/yıl)
≤ 0.86 saat	1.23
0.87-3.63 saat	0
3.64-17.72 saat	1.18
> 17.72 saat	4.89

European Heart Journal
doi:10.1093/eurheartj/eht491

Device-detected atrial fibrillation and risk for stroke: an analysis of >10 000 patients from the SOS AF project (Stroke preventiOn Strategies based on Atrial Fibrillation information from implanted devices)

Objective The aim of this study was to assess the association between maximum daily atrial fibrillation (AF) burden and risk of ischaemic stroke.

Background Cardiac implanted electronic devices (CIEDs) enhance detection of AF, providing a comprehensive measure of AF burden.

Design, setting, and patients A pooled analysis of individual patient data from five prospective studies was performed. Patients without permanent AF, previously implanted with CIEDs, were included if they had at least 3 months of follow-up. A total of 10 016 patients (median age 70 years) met these criteria. The risk of ischaemic stroke associated with pre-specified cut-off points of AF burden (5 min, 1, 6, 12, and 23 h, respectively) was assessed.

Results During a median follow-up of 24 months, 43% of 10 016 patients experienced at least 1 day with at least 5 min of AF burden and for them the median time to the maximum AF burden was 6 months (inter-quartile range: 1.3–14). A Cox regression analysis adjusted for the $CHADS_2$ score and anticoagulants at baseline demonstrated that AF burden was an independent predictor of ischaemic stroke. Among the thresholds of AF burden that we evaluated, 1 h was associated with the highest hazard ratio (HR) for ischaemic stroke, i.e. 2.11 (95% CI: 1.22–3.64, $P = 0.008$).

Conclusions Device-detected AF burden is associated with an increased risk of ischaemic stroke in a relatively unselected population of CIEDs patients. This finding may add to the basis for timely and clinically appropriate decision-making on anticoagulation treatment.

Klavuzlar
Ne diyor?

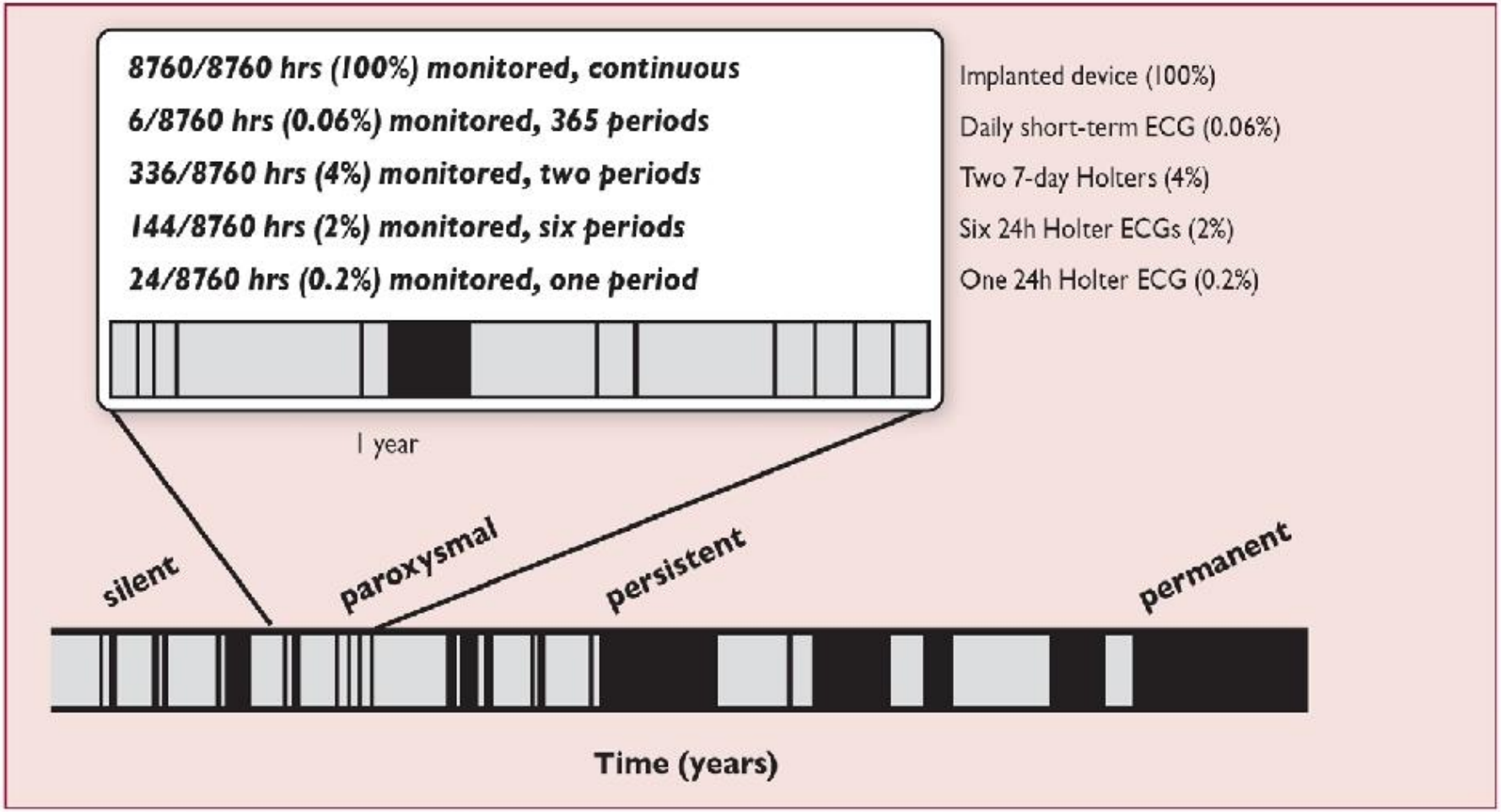
2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS

Cardiovascular morbidity and mortality associated with atrial fibrillation

Event	Association with AF
Death	Increased mortality, especially cardiovascular mortality due to sudden death, heart failure or stroke.
Stroke	20–30% of all strokes are due to AF. A growing number of patients with stroke are diagnosed with 'silent', paroxysmal AF.
Hospitalizations	10–40% of AF patients are hospitalized every year.
Quality of life	Quality of life is impaired in AF patients independent of other cardiovascular conditions.
Left ventricular dysfunction and heart failure	Left ventricular dysfunction is found in 20–30% of all AF patients. AF causes or aggravates LV dysfunction in many AF patients, while others have completely preserved LV function despite long-standing AF.
Cognitive decline and vascular dementia	Cognitive decline and vascular dementia can develop even in anticoagulated AF patients. Brain white matter lesions are more common in AF patients than in patients without AF.

European Heart Journal - doi:10.1093/eurheartj/ehw210

Diagnostic yield of different ECG screening techniques for paroxysmal or silent atrial fibrillation



European Heart Journal - doi:10.1093/eurheartj/ehw210

Screening for atrial fibrillation

Recommendations	Class	Level
Opportunistic screening for AF is recommended by pulse taking or ECG rhythm strip in patients >65 years of age.	I	B
In patients with TIA or ischaemic stroke, screening for AF is recommended by short-term ECG recording followed by continuous ECG monitoring for at least 72 hours.	I	B
It is recommended to interrogate pacemakers and ICDs on a regular basis for atrial high rate episodes (AHRE). Patients with AHRE should undergo further ECG monitoring to document AF before initiating AF therapy.	I	B
In stroke patients, additional ECG monitoring by long-term non-invasive ECG monitors or implanted loop recorders should be considered to document silent atrial fibrillation.	IIa	B
Systematic ECG screening may be considered to detect AF in patients aged >75 years, or those at high stroke risk.	IIb	B

European Heart Journal - doi:10.1093/eurheartj/ehw210

American Heart Association | American Stroke Association

Guidelines for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Walter N. Kernan, Bruce Ovbiagele, Henry R. Black, Dawn M. Bravata, Marc I. Chimowitz, Michael D. Ezekowitz, Margaret C. Fang, Marc Fisher, Karen L. Furie, Donald V. Heck, S. Claiborne (Clay) Johnston, Scott E. Kasner, Steven J. Kittner, Pamela H. Mitchell, Michael W. Rich, DeJuran Richardson, Lee H. Schwamm and John A. Wilson

Stroke. published online May 1, 2014;
Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 0039-2499. Online ISSN: 1524-4628

AF Recommendations

1. **For patients who have experienced an acute ischemic stroke or TIA with no other apparent cause, prolonged rhythm monitoring (≈30 days) for AF is reasonable within 6 months of the index event *(Class IIa; Level of Evidence C)*.** (New recommendation)

Stroke
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association | American Stroke Association

Prolonged Cardiac Monitoring for Detection of Paroxysmal Atrial Fibrillation After Cerebral Ischemia

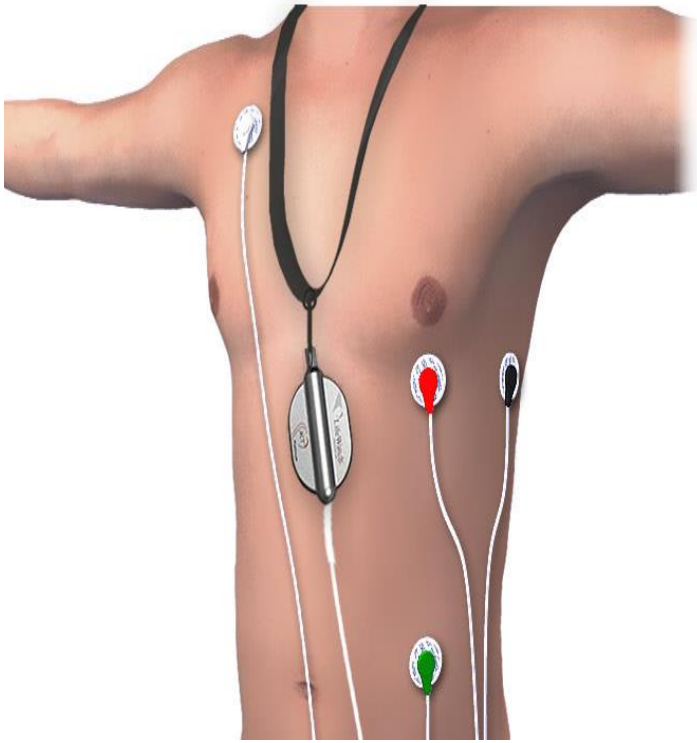
Alejandro A. Rabinstein

Stroke. 2014;45:1208-1214; originally published online March 11, 2014;

Table 1. Main Characteristics of Available Methods for Prolonged Ambulatory Cardiac Rhythm Monitoring

Device	Location	Duration	Minimal Threshold	Limitations
Holter	Skin surface	Usually 1–2 d	Few seconds	Short duration
External loop recorder	Skin surface	≤30 d	Few seconds	Requires patient action
Ambulatory telemetry	Skin surface	≤30 d	Few seconds	Patient compliance Skin irritation Cost
Implantable loop recorder	Subcutaneous	≤3 y	2 min	Invasiveness (minimal) Does not detect PAF<2 min Cost
Dual-chamber pacemaker and defibrillator	Intracardiac	Many years	Seconds	Only indicated for life-threatening arrhythmias

Mobil Kardiyak Telemetri 3 Kanallı (MCT 3L)



İnme Tarama Programı

MCT 3L – Veri Transferi

- Bu sistemin beraberinde bulunan hücresel bazlı bir monitör ile veri transferi ve kaydı yapılmaktadır. Bu sistem günler ve hatta haftalar boyunca EKG monitörizasyonunu mümkün kılmaktadır.

MCT 3L

*Atrial Fibrilasyon/ Atrial Flutter

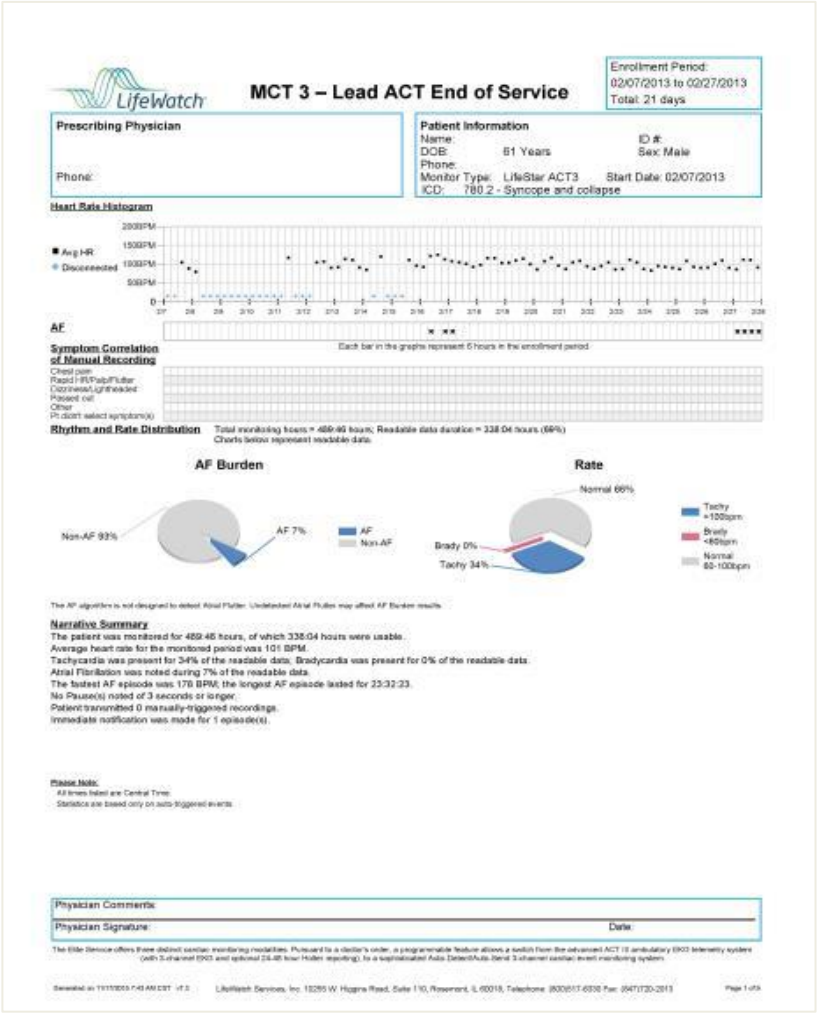
*Bradikardi (30 ve altı)

*Taşikardi (200 ve üzeri)

*Pause (3 saniye ve üzeri)

Mobil Kardiyak Telemetri 3 Kanallı (MCT 3L)

- Heart rate correlation with AFIB and manual symptoms
- Pie chart of rhythms by rate and AFIB Burden
- Heart Rate histogram
- Narrative Summary for ease of dictation



LifeWatch

MCT 3 – Lead ACT End of Service

Enrollment Period:
02/07/2013 to 02/27/2013
Total: 21 days

Prescribing Physician

Phone:

Patient Information

Name: ID #:
DOB: 61 Years Sex: Male
Phone:
Monitor Type: LifeStar ACT3 Start Date: 02/07/2013
ICD: 780.2 - Syncope and collapse

Heart Rate Histogram

Avg HR
Disconnected

AF

Each bar in the graphs represent 6 hours in the enrollment period.

Symptom Correlation of Manual Recording

Chest pain
Rapid / IR/Palp/Flutter
Dizziness/Lightheaded
Passed out
Other
Pt didn't select symptom(s)

Rhythm and Rate Distribution

Total monitoring hours = 469:46 hours; Readable data duration = 338:04 hours (69%)
Charts below represent readable data.

AF Burden

Non-AF 93%
AF 7%
AF
Non-AF

Rate

Normal 66%
Brady 0%
Tachy 34%
Tachy >100bpm
Brady <60bpm
Normal 60-100bpm

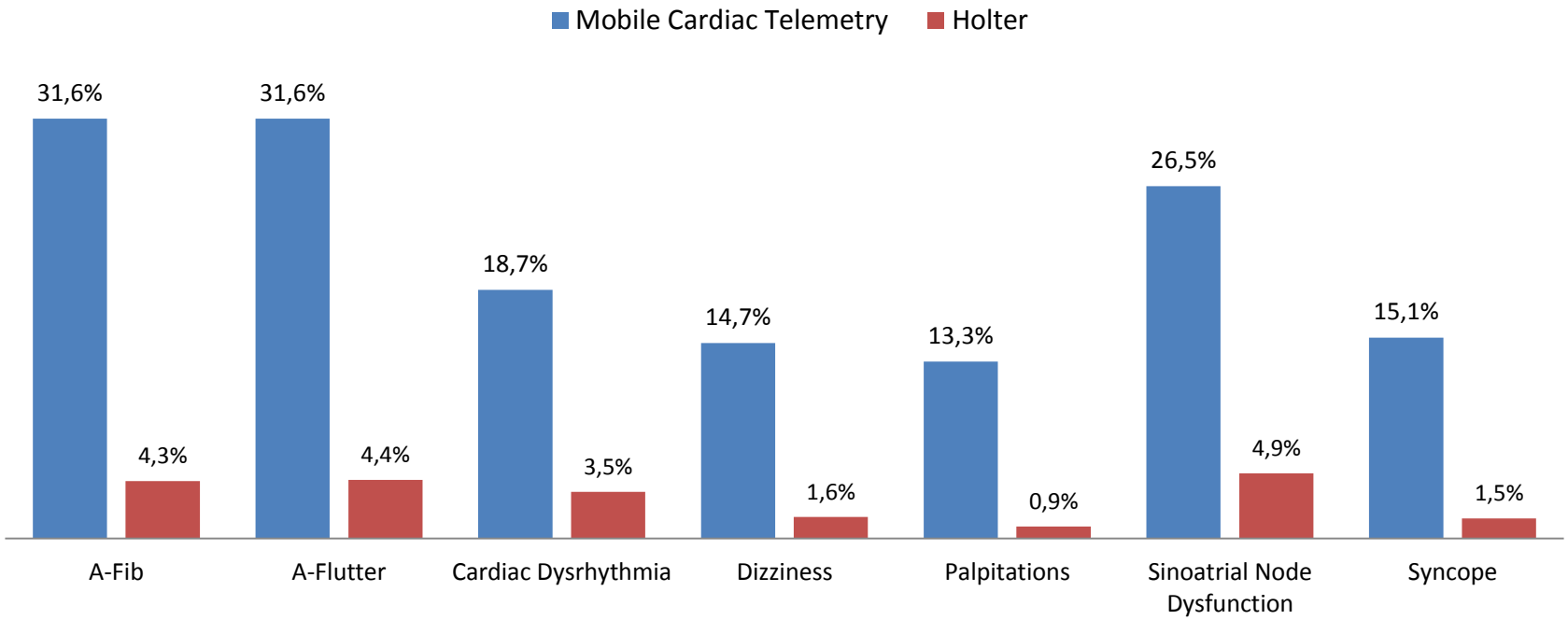
Narrative Summary

The patient was monitored for 469:46 hours, of which 338:04 hours were usable.
Average heart rate for the monitored period was 101 BPM.
Tachycardia was present for 34% of the readable data; Bradycardia was present for 0% of the readable data.
Atrial Fibrillation was noted during 7% of the readable data.
The fastest AF episode was 178 BPM; the longest AF episode lasted for 23:32:23.
No Pause(s) noted of 3 seconds or longer.
Patient transmitted 0 manually-triggered recordings.
Immediate notification was made for 1 episode(s).

Please Note:
All times listed are Central Time.
Statistics are based only on auto-triggered events.

Physician Comments:
Physician Signature: Date:

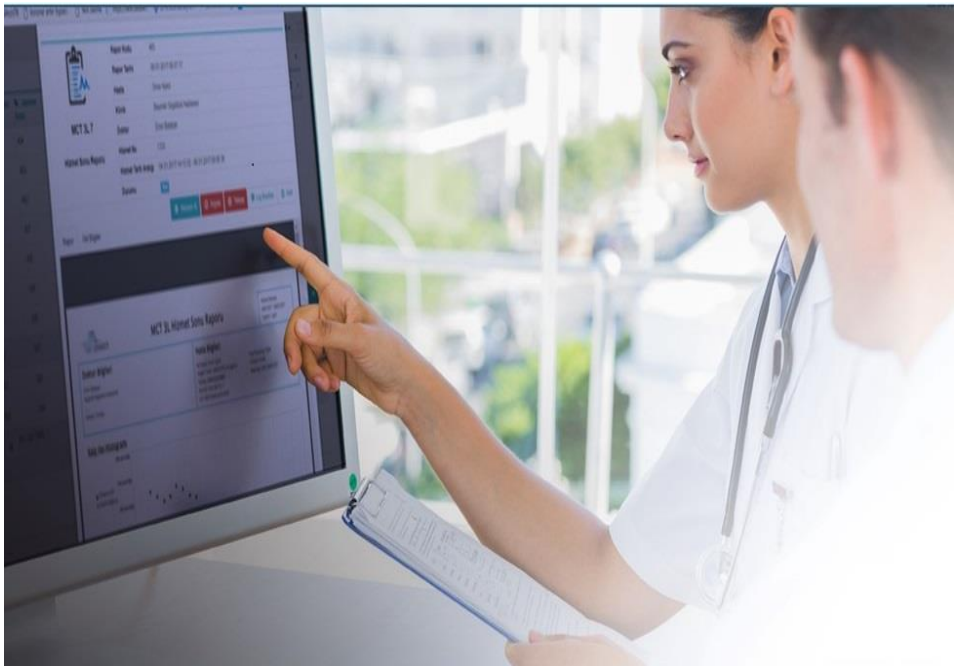
MCT Delivers Higher Diagnostic Yields Physician Notifications by Symptoms (~33,000 Patients)*



*LifeWatch Internal data

MCT 3L - Klinik Monitörizasyon

- MCT 3L bir aritmi oluştuğunda yakalamak veya göndermek için hastanın müdahalesini gerektirmez.
- MCT 3L Klinik İzlem Merkezi EKG eğitimi almış sağlık çalışanlarından oluşur ve 7/24 hizmet verir.
- MCT 3L, Atriyal Fibrilasyonu herhangi bir hızda da dahil olmak üzere anormal kalp ritimlerinin başlangıcını ve sonunu otomatik olarak yakalar.
- Gerçek zamanlı olarak değerlenme raporlama



Ad Soyad:	ZEHRA BERRİN İLİN	Olay Öncesi:	60 sn	Sayfa:	6
Kayıt No :	10628	Olay Sonrası:	30 sn	Rapor Tarihi:	05/04/2017 09:41
Sensör No :	0316667459	Olay tarihi:	05/04/2017 09:34		

MCT 3L Ek Kardiyogram **Kayıt Tarihi: 05/04/2017 09:35** 25 mm/sn, 16 mm/mV Manuel

Kayıt Tarihi: 05/04/2017 09:35 25 mm/sn, 16 mm/mV Manuel

MCT 3L OLAY 22/03/2017 14:48

BELİRTİLER:

AKTİVİTELER:

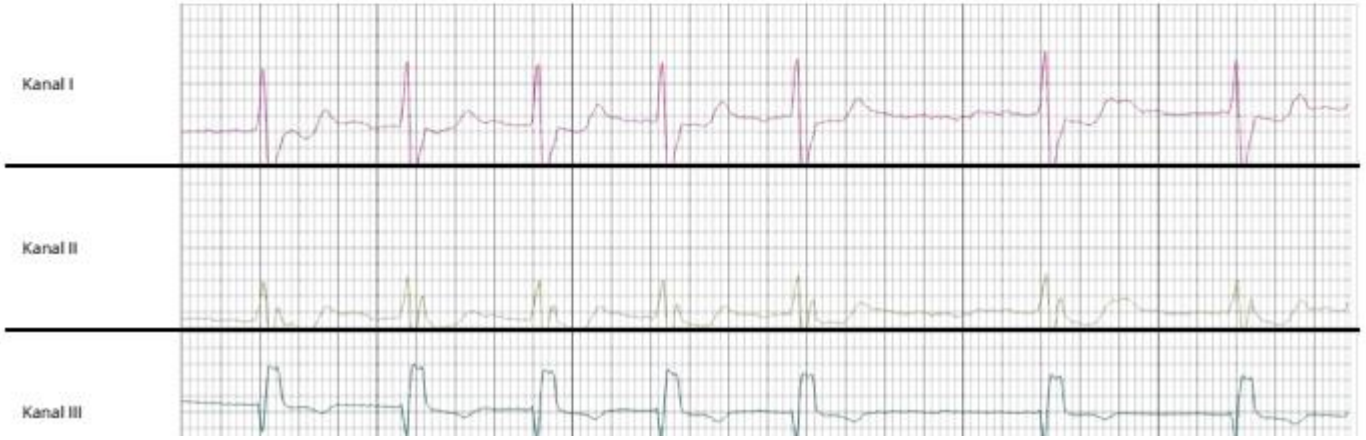
ÖN BULGULAR: Atrial Fibrilasyon

YORUMLAR: Empedans kontrolü görüldü.

OLAY KAYIT VERİSİ: Olay Öncesi Süre: 60 sn Olay Sonrası Süre: 30 sn

Örnek 1 **Kayıt Tarihi: 22/03/2017 14:48** 25 mm/sn, 16 mm/mV KH: 80 atım/dak Oto

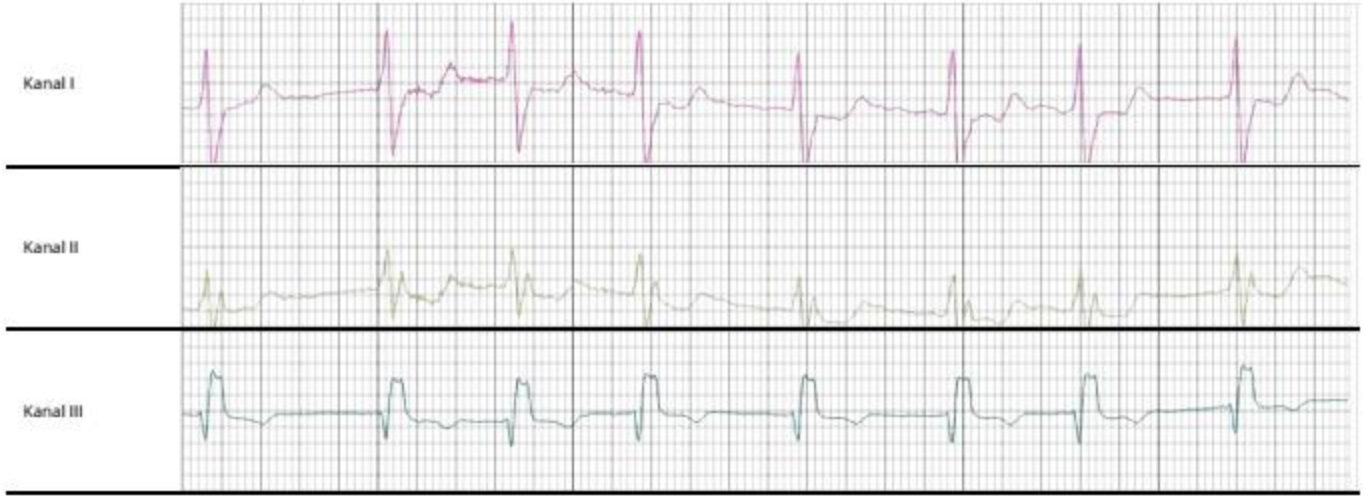
Örnek 2 **Kayıt Tarihi: 22/03/2017 14:49** 25 mm/sn, 16 mm/mV KH: 70 atım/dak Oto



Ad Soyad:	nazif vatansever	Olay Öncesi:	60 sn	Sayfa:	3
Kayıt No :	10569	Olay Sonrası	30 sn	Rapor Tarihi:	22/03/2017 15:10
Sensör No :	0316666408	Olay tarihi:	22/03/2017 14:48		

MCT 3L Ek Kardiyogram **Kayıt Tarihi: 22/03/2017 14:49** 25 mm/sn, 16 mm/mV Oto

Kayıt Tarihi: 22/03/2017 14:49 25 mm/sn, 16 mm/mV Oto




Teşekkür Ederim