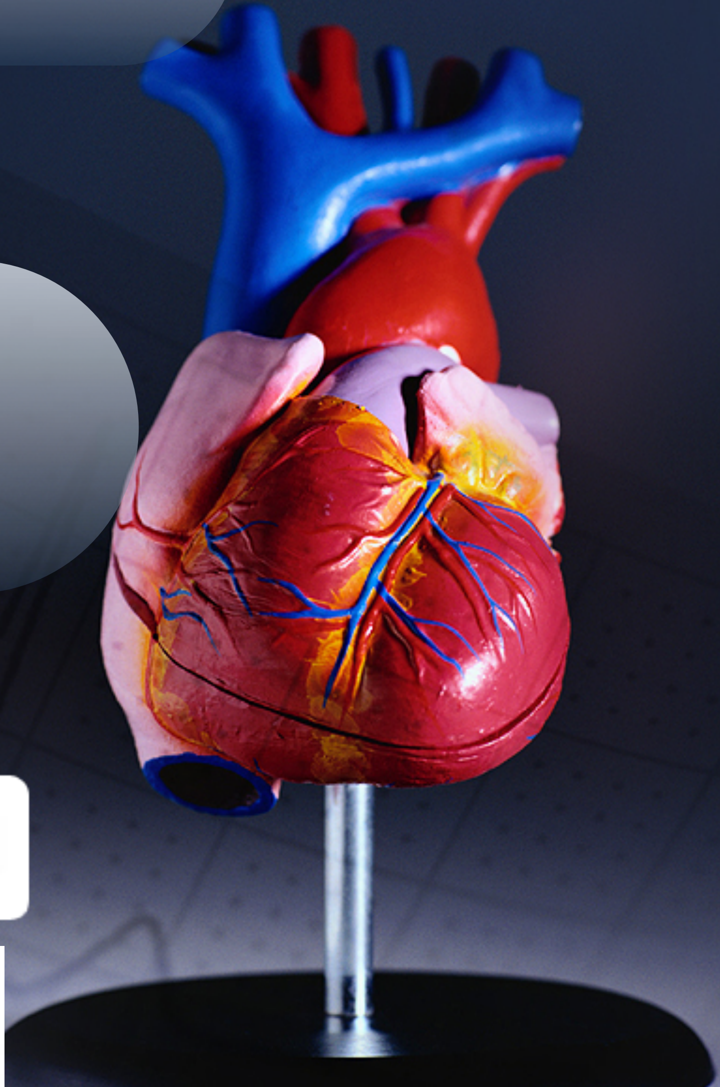
Utilité du monitoring ambulatoire dans la détection de FA

Bruno Benzaquen • MD FRCPC
Cardiologue



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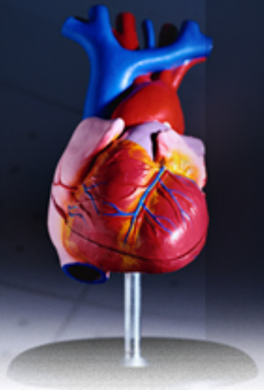
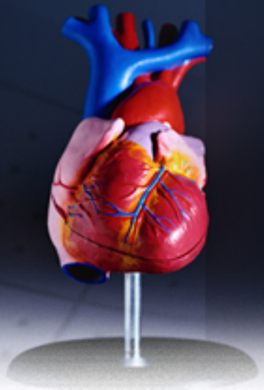


Divulgations 2015-2016

- BMS- Conférencier et Consultant
- Bayer- Consultant
- Medtronic- Conferencier

Objectifs

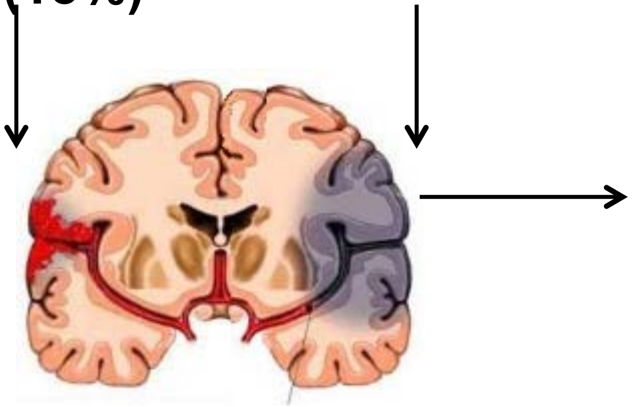


- Décrire l’importante relation entre FA et ACV cryptogénique
- Efficacité du monitoring et survol de quelques nouvelles technologies existantes
- Quant, comment et qui traiter?
- Questions

Le Défis des ACV Cryptogéniques

Rupture de vaisseau (15%)

Occlusion (85%)



Types des ACV ischémiques

•Atherothrombotique (25-30%)
ex. MVAS carotides

•Cardioembolique (20%)
ex.. FA, thrombus apex, Végétation

•Lacunaire/Petit Vaisseau (15-20%)
ex.. HTA, Diabète

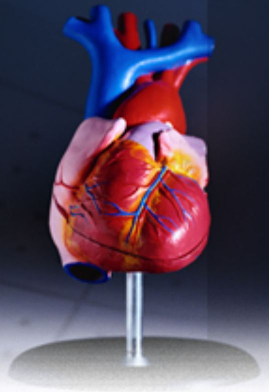
•Autre (5-10%) ex.. Vasculite

Cryptogénique (25-40%)

Adams HP Jr, Stroke. Jan 1993; 24; 35-41

ACV Cryptogénique

Pourquoi la FA est si importante



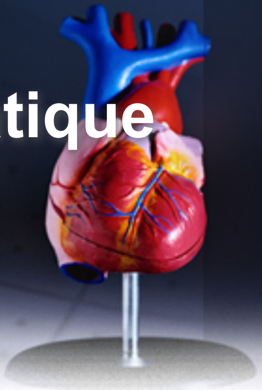
- 30-40% des ACV ischémiques sont classifiés comme cryptogénique, malgré un bilan extensif.
- 50% de ces patients peuvent souffrir d'une FA non-diagnostiquee (Donc 40% de la totalité des ACV ischémiques)
- La détection d'une FA chez ces patients changent entièrement le traitement, d'un antiplaquettaire a une ACO

[1] Adams HP Jr, *Stroke*. Jan 1993; 24; 35-41;
[2] Camm et al, *European Heart Journal* . 2012; 33, 2719-2747

Pourquoi le monitoring ambulatoire est-il important

- La FA est souvent asymptomatique
- La FA est souvent intermittente et imprévisible
- La durée (fardeau) de la FA est importante
- La FA intermittente et asymptomatique a des conséquences importantes de morbidité et de mortalité

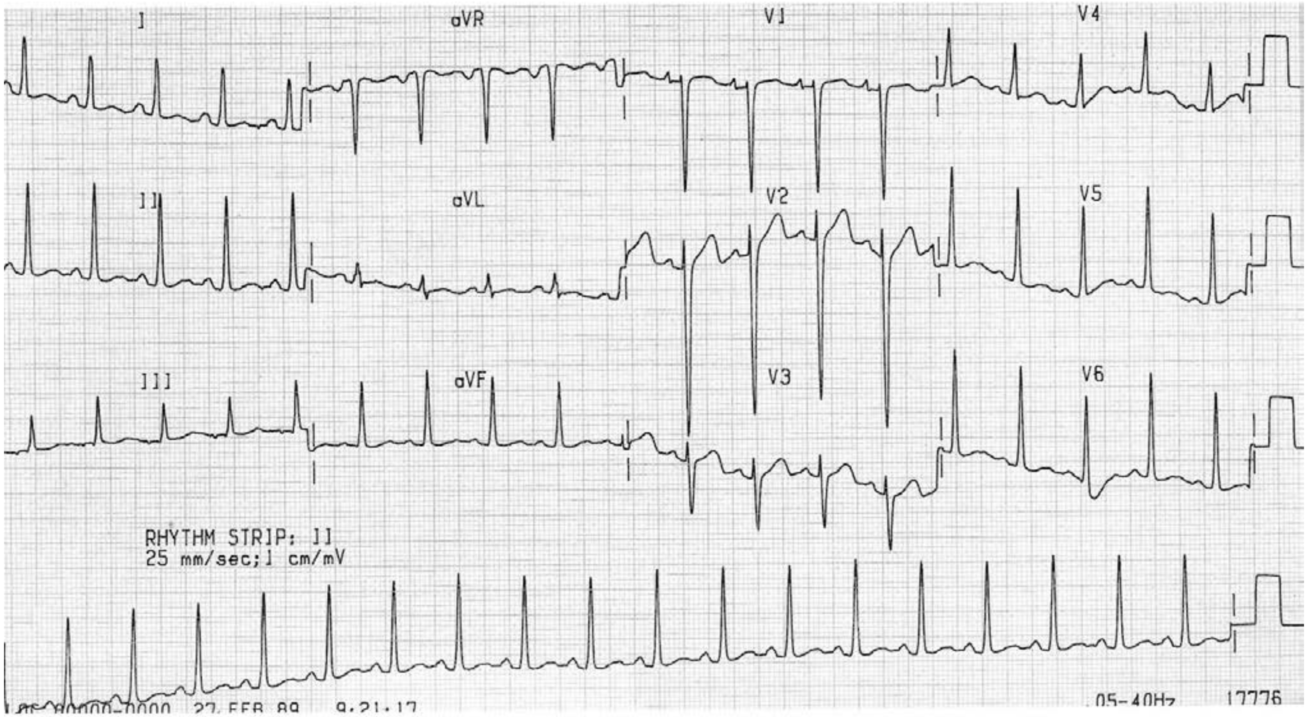
Outils diagnostics pour détecter la FA asymptomatique dans l’ACV cryptogénique



- ECG
- HOLTER
- MONITEURS EXTENES DE LONGUE DUREE
- MONITEUR IMPLANTABLE

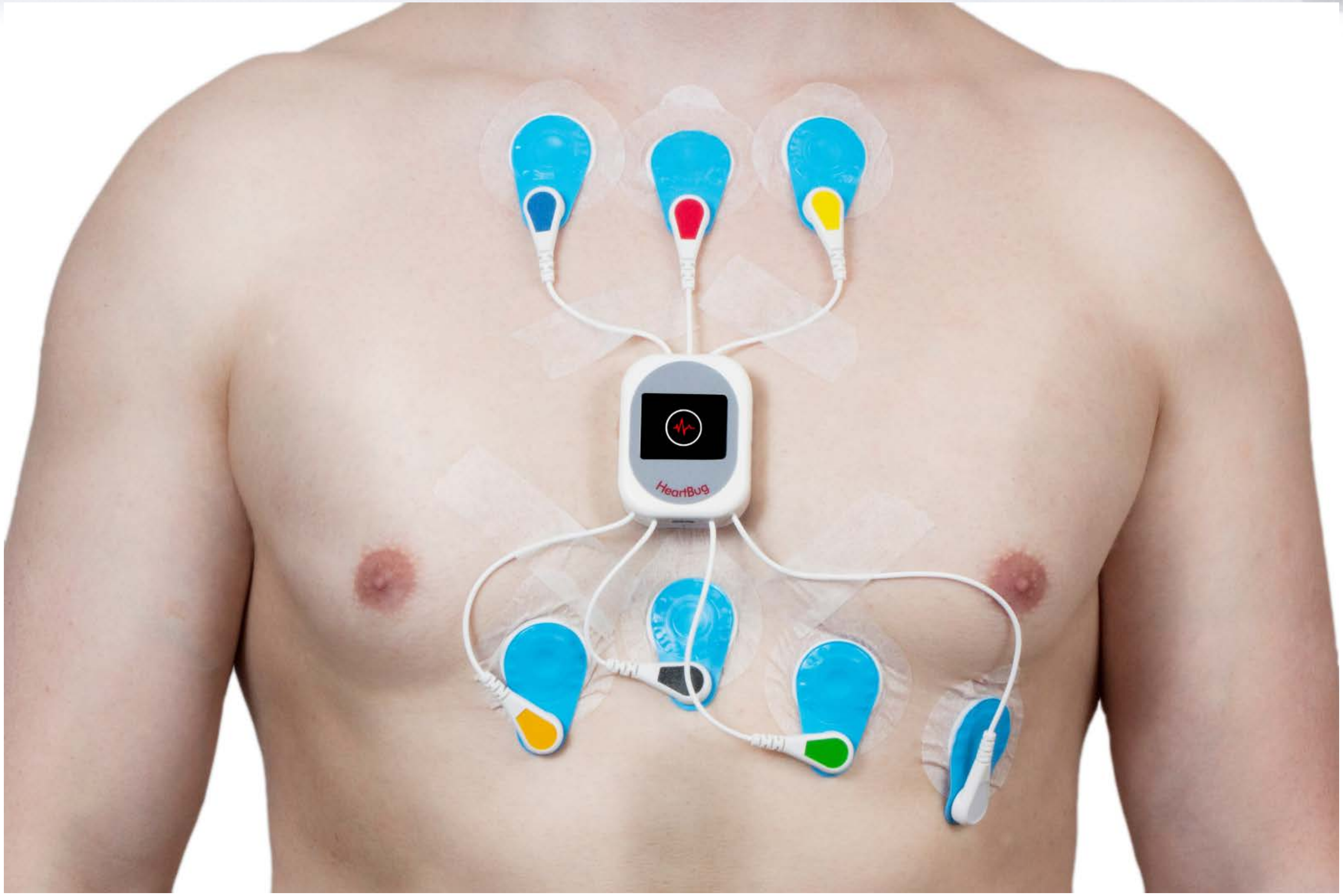
ECG

Rendement diagnostic estimé a 2%


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
RHYTHM STRIP: II
25 mm/sec;1 cm/mV
27 FEB 89
9:21:17
.05-40Hz
17776

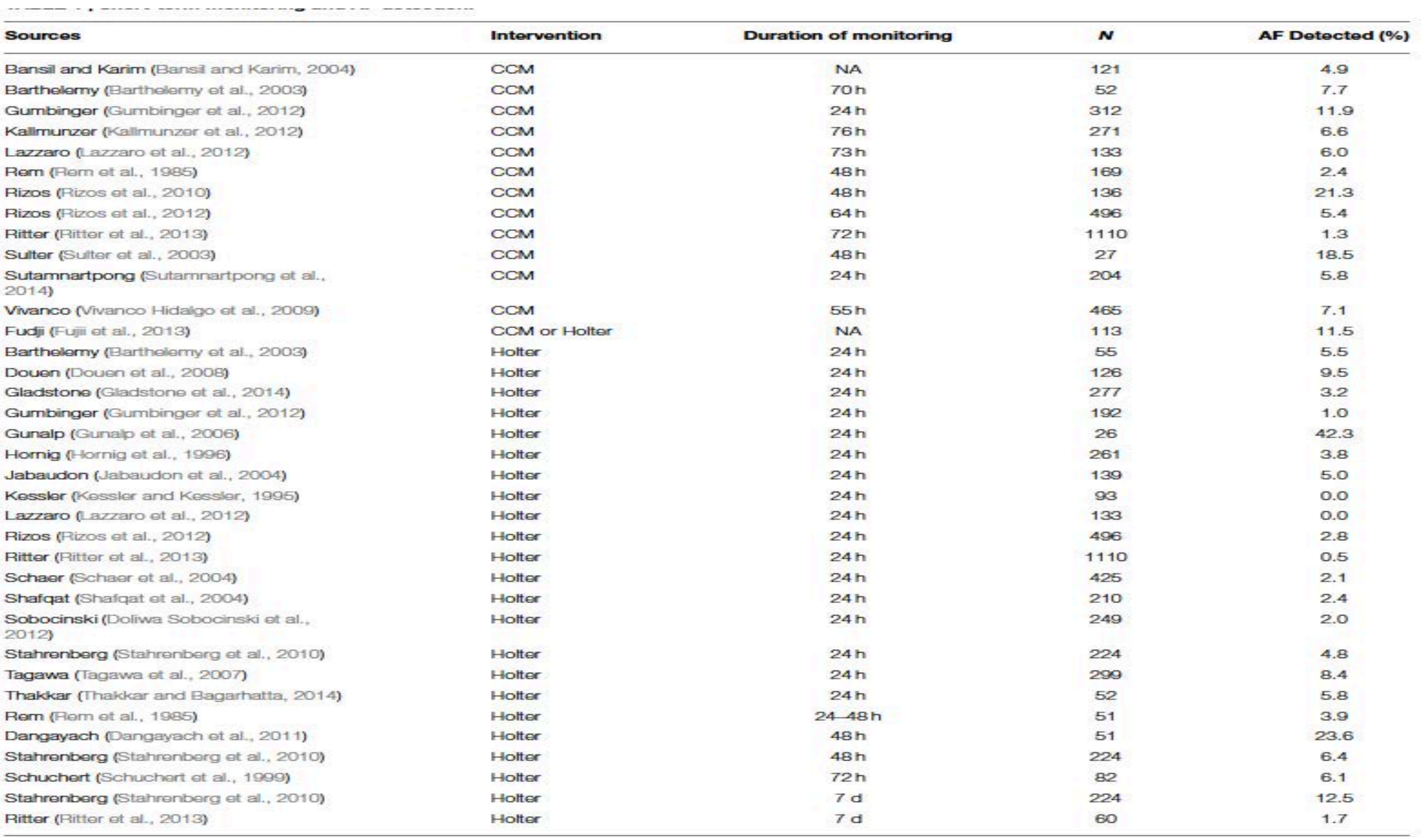
Bell C, Kapral M Can J Neurol Sci. 2000 Feb; 27(1):25-31.

HOLTER



HOLTER

Rendement diagnostique estimé a 4%



Sources	**Intervention**	**Duration of monitoring**	***N***	**AF Detected (%)**
Bansil and Karim (Bansil and Karim, 2004)	CCM	NA	121	4.9
Barthelemy (Barthelemy et al., 2003)	CCM	70 h	52	7.7
Gumbinger (Gumbinger et al., 2012)	CCM	24 h	312	11.9
Kallmunzer (Kallmunzer et al., 2012)	CCM	76 h	271	6.6
Lazzaro (Lazzaro et al., 2012)	CCM	73 h	133	6.0
Rem (Rem et al., 1985)	CCM	48 h	169	2.4
Rizos (Rizos et al., 2010)	CCM	48 h	136	21.3
Rizos (Rizos et al., 2012)	CCM	64 h	496	5.4
Ritter (Ritter et al., 2013)	CCM	72 h	1110	1.3
Sulter (Sulter et al., 2003)	CCM	48 h	27	18.5
Sutamnartpong (Sutamnartpong et al., 2014)	CCM	24 h	204	5.8
Vivanco (Vivanco Hidalgo et al., 2009)	CCM	55 h	465	7.1
Fudji (Fujii et al., 2013)	CCM or Holter	NA	113	11.5
Barthelemy (Barthelemy et al., 2003)	Holter	24 h	55	5.5
Douen (Douen et al., 2008)	Holter	24 h	126	9.5
Gladstone (Gladstone et al., 2014)	Holter	24 h	277	3.2
Gumbinger (Gumbinger et al., 2012)	Holter	24 h	192	1.0
Gunalp (Gunalp et al., 2006)	Holter	24 h	26	42.3
Hornig (Hornig et al., 1996)	Holter	24 h	261	3.8
Jabaudon (Jabaudon et al., 2004)	Holter	24 h	139	5.0
Kessler (Kessler and Kessler, 1995)	Holter	24 h	93	0.0
Lazzaro (Lazzaro et al., 2012)	Holter	24 h	133	0.0
Rizos (Rizos et al., 2012)	Holter	24 h	496	2.8
Ritter (Ritter et al., 2013)	Holter	24 h	1110	0.5
Schaer (Schaer et al., 2004)	Holter	24 h	425	2.1
Shafqat (Shafqat et al., 2004)	Holter	24 h	210	2.4
Sobocinski (Doliwa Sobocinski et al., 2012)	Holter	24 h	249	2.0
Stahrenberg (Stahrenberg et al., 2010)	Holter	24 h	224	4.8
Tagawa (Tagawa et al., 2007)	Holter	24 h	299	8.4
Thakkar (Thakkar and Bagarhatta, 2014)	Holter	24 h	52	5.8
Rem (Rem et al., 1985)	Holter	24–48 h	51	3.9
Dangayach (Dangayach et al., 2011)	Holter	48 h	51	23.6
Stahrenberg (Stahrenberg et al., 2010)	Holter	48 h	224	6.4
Schuchert (Schuchert et al., 1999)	Holter	72 h	82	6.1
Stahrenberg (Stahrenberg et al., 2010)	Holter	7 d	224	12.5
Ritter (Ritter et al., 2013)	Holter	7 d	60	1.7

MONITEURS EXTERNES DE LONGUE DUREE

La durée d'enregistrement varie de 7-30 jours

- 2 différentes sortes de technologies:
  - » Enregistrement déclenché par le patient symptomatique
  - » Enregistrement auto-déclenché/enregistrement continu par la machine selon un algorithme précis

vitaphone
loop
3300 BT
REC

MONITEURS EXTERNES DE LONGUE DUREE

vitaphone
loop
3300 BT
REC

1) Certains ne peuvent qu'enregistrer des données de 2.5-6 minutes si déclenchés par le patient (symptômes)

2) Certains gardent en mémoire tous les battements enregistrés et doivent être analysés par après.

3) Certains ont des logiciels qui "auto-detectent" les événements dont la FA

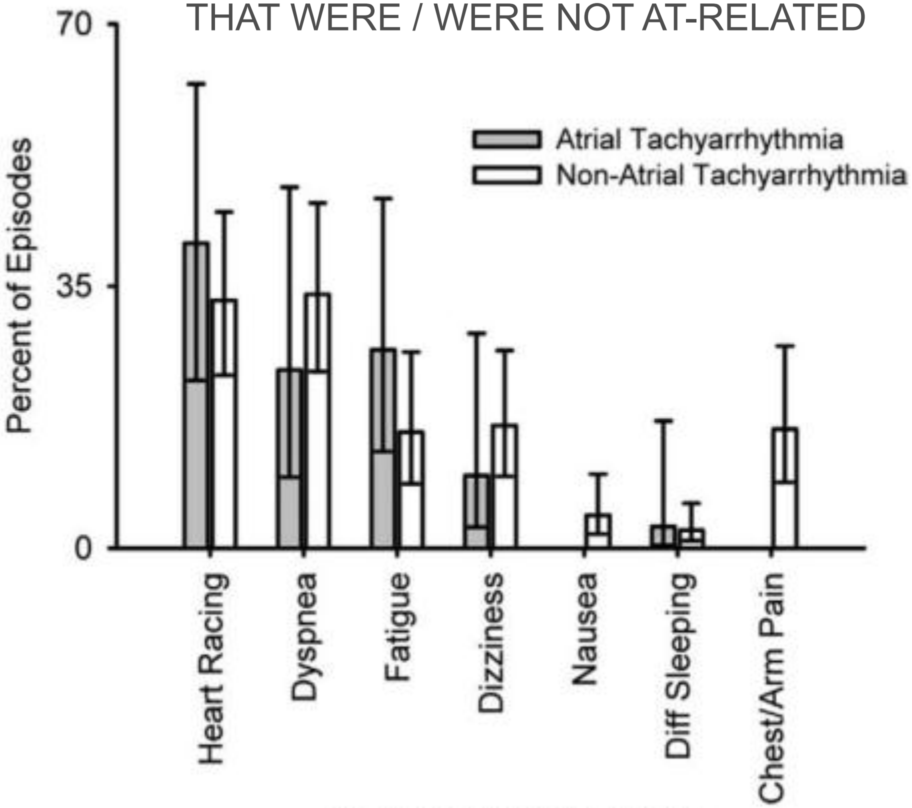
4) La capacité de la mémoire, les algorithmes de détection et la qualité des enregistrements varient selon les manufacturiers

Ne pas faire confiance au symptômes!
Faible corrélation entre les symptômes et la présence de FA

- **95% des épisodes de FA étaient asymptomatiques**
- 15% du temps corrélés avec FA
- 45% des patients rapportent des symptômes sans FA
- Autres études démontrent un ratio 12:1 de FA (asymptomatique: symptomatique)

SYMPTOMS REPORTED

THAT WERE / WERE NOT AT-RELATED



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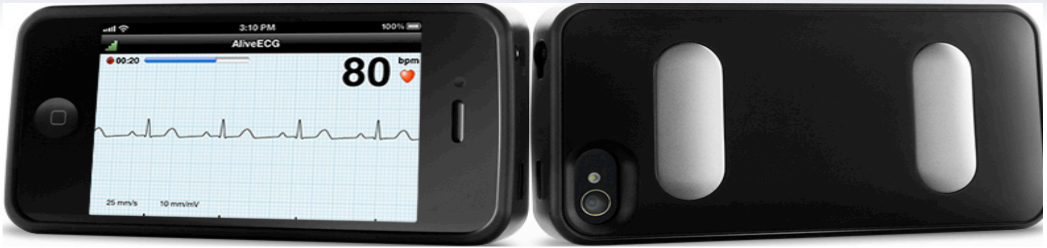
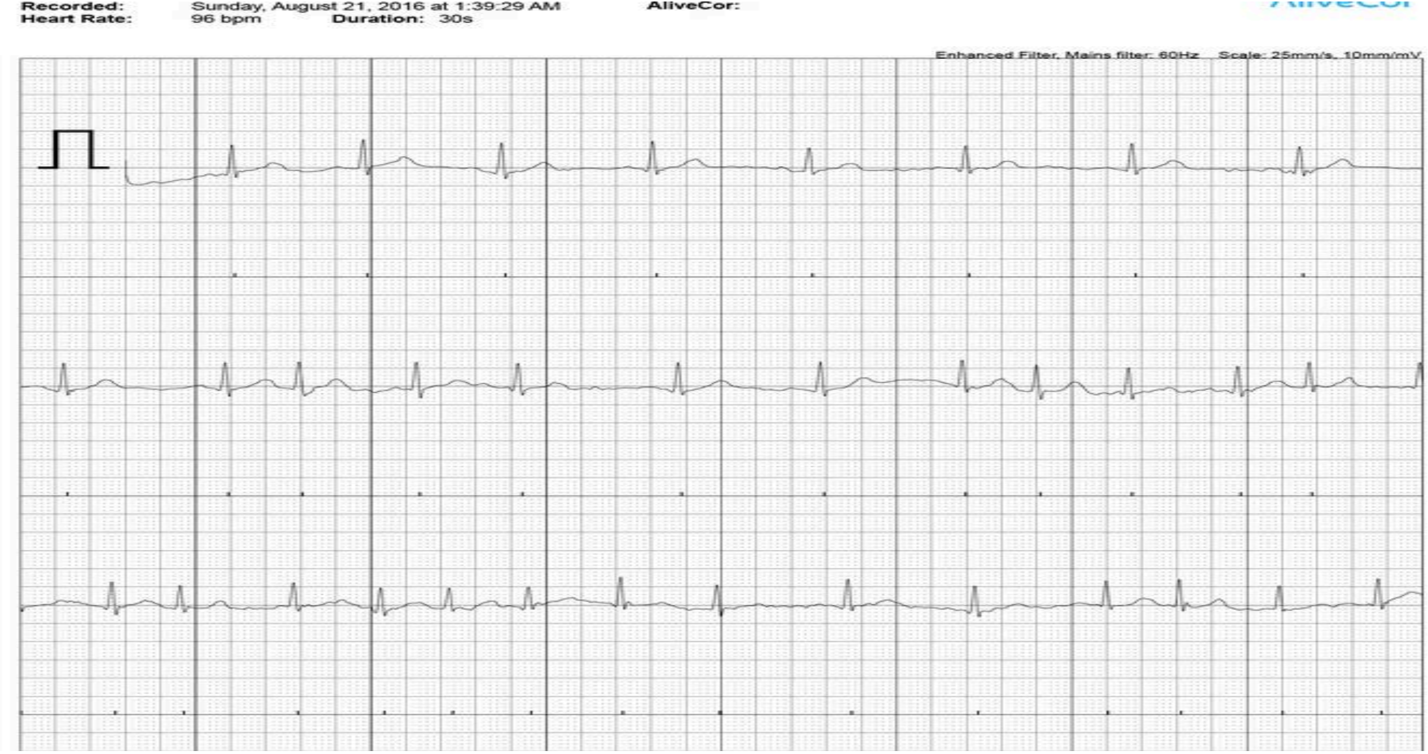
[1] Strickberger A. et al. Relationship between atrial tachyarrhythmias and symptoms. *Heart Rhythm.* 2005;2:125-131.

[2] Page RL, Wilkinson WE, Clair WK, et al. Asymptomatic arrhythmias in patients with symptomatic paroxysmal atrial fibrillation and paroxysmal supraventricular tachycardia. *Circulation*. 1994;89:224-227.

Alive Cor – Kardia Mobile

Monitoring discontinu-Depend des symptômes


3:10 PM
100%
AliveECG
00:20
80 bpm
25 mm/s
10 mm/mV

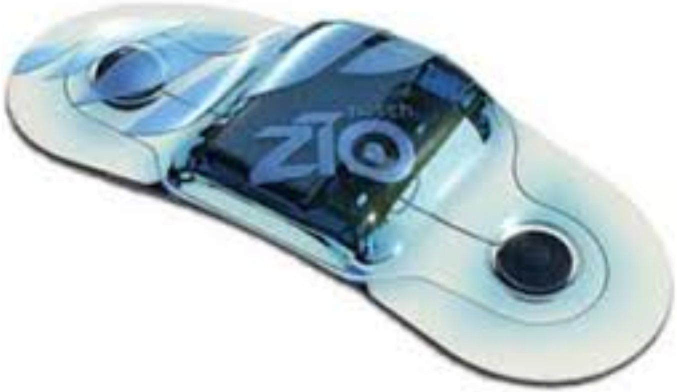


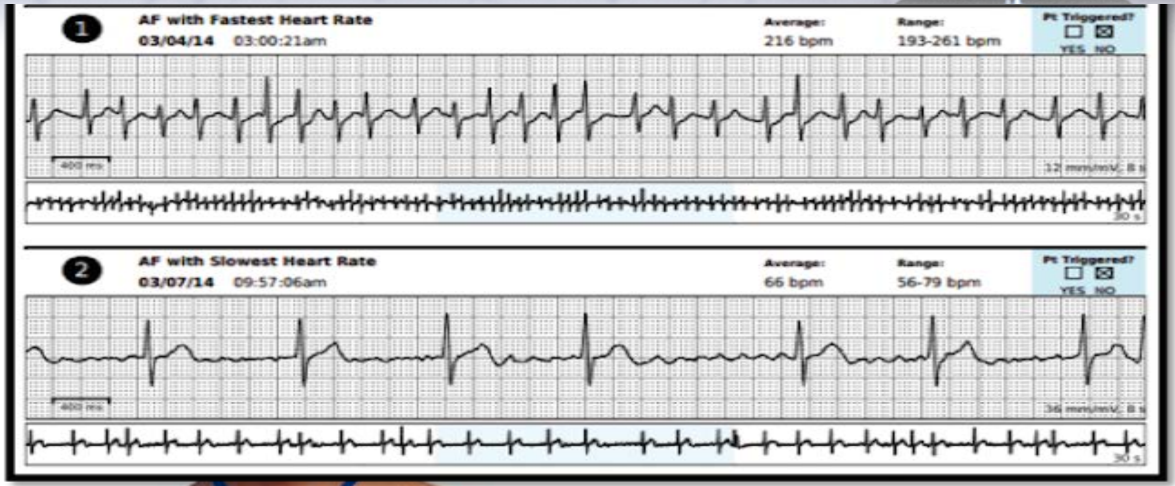
Recorded: Sunday, August 21, 2016 at 1:39:29 AM **AliveCor:**
Heart Rate: 96 bpm **Duration:** 30s

Enhanced Filter, Mains filter: 60Hz Scale: 25mm/s, 10mm/mV

Zio Patch- iRhythm Technologies

Monitoring continu de 14 jours



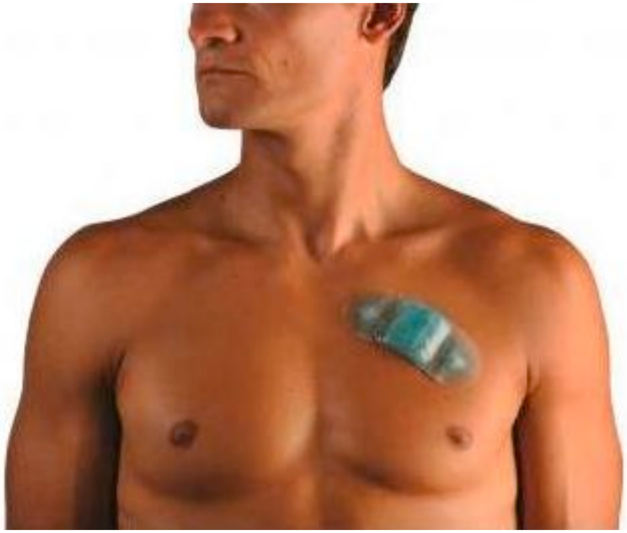


1 **AF with Fastest Heart Rate**
03/04/14 03:00:21am
Average: 216 bpm
Range: 193-261 bpm
Pt Triggered? ☐ YES ☒ NO

400 ms
12 mm/mV, 8 s
30 s

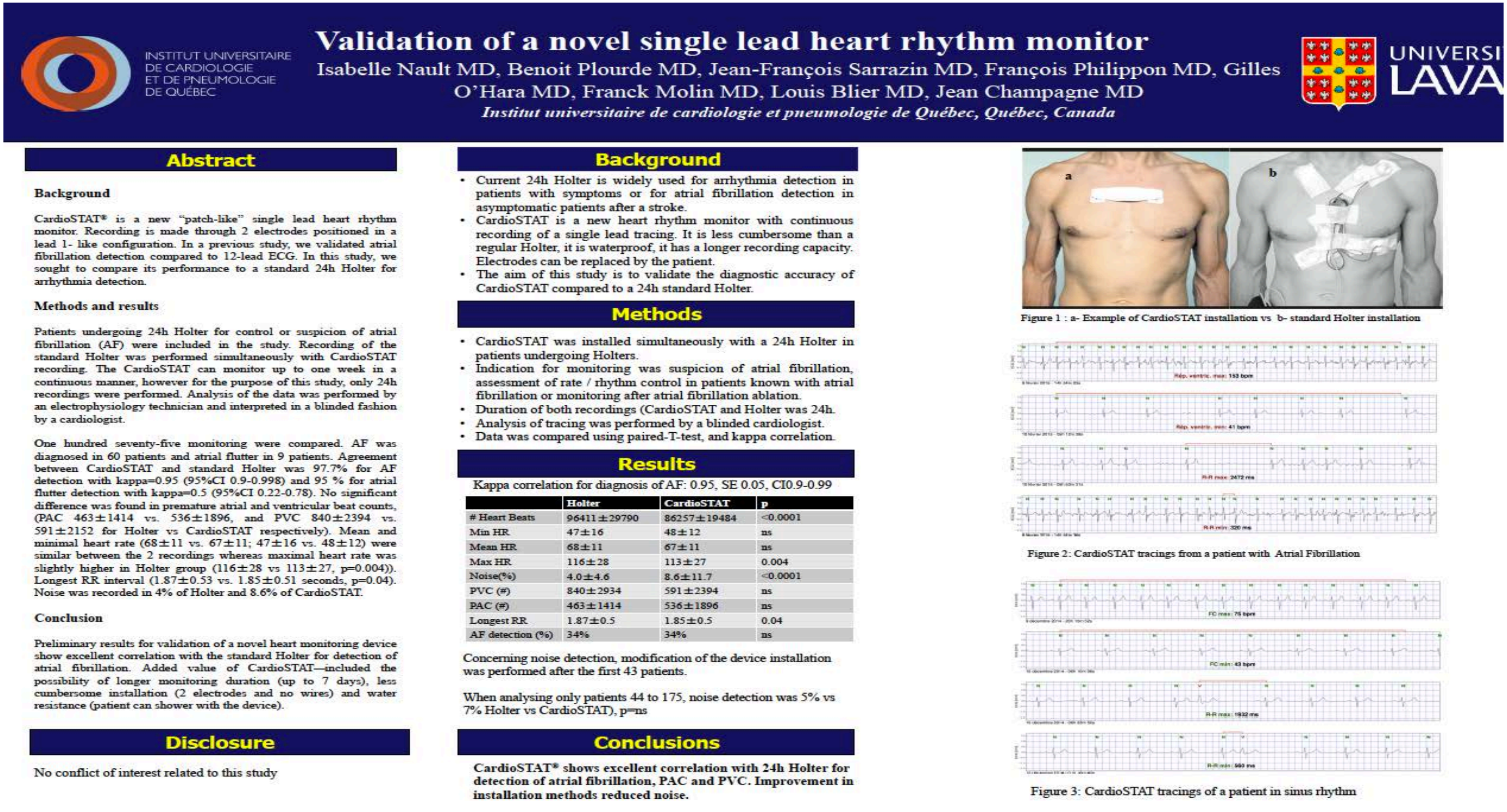
2 **AF with Slowest Heart Rate**
03/07/14 09:57:06am
Average: 66 bpm
Range: 56-79 bpm
Pt Triggered? ☐ YES ☒ NO

400 ms
36 mm/mV, 8 s
30 s



Cardio-Stat- Incentia

Utilisé au Québec- 7 jours de monitoring continu



INSTITUT UNIVERSITAIRE
DE CARDIOLOGIE
ET DE PNEUMOLOGIE
DE QUÉBEC

Validation of a novel single lead heart rhythm monitor

Isabelle Nault MD, Benoit Plourde MD, Jean-François Sarrazin MD, François Philippon MD, Gilles O'Hara MD, Franck Molin MD, Louis Blier MD, Jean Champagne MD
Institut universitaire de cardiologie et pneumologie de Québec, Québec, Canada

UNIVERSI
LAVA

Abstract

Background

CardioSTAT® is a new "patch-like" single lead heart rhythm monitor. Recording is made through 2 electrodes positioned in a lead 1- like configuration. In a previous study, we validated atrial fibrillation detection compared to 12-lead ECG. In this study, we sought to compare its performance to a standard 24h Holter for arrhythmia detection.

Methods and results

Patients undergoing 24h Holter for control or suspicion of atrial fibrillation (AF) were included in the study. Recording of the standard Holter was performed simultaneously with CardioSTAT recording. The CardioSTAT can monitor up to one week in a continuous manner, however for the purpose of this study, only 24h recordings were performed. Analysis of the data was performed by an electrophysiology technician and interpreted in a blinded fashion by a cardiologist.

One hundred seventy-five monitoring were compared. AF was diagnosed in 60 patients and atrial flutter in 9 patients. Agreement between CardioSTAT and standard Holter was 97.7% for AF detection with kappa=0.95 (95%CI 0.9-0.998) and 95 % for atrial flutter detection with kappa=0.5 (95%CI 0.22-0.78). No significant difference was found in premature atrial and ventricular beat counts, (PAC 463±1414 vs. 536±1896, and PVC 840±2394 vs. 591±2152 for Holter vs CardioSTAT respectively). Mean and minimal heart rate (68±11 vs. 67±11; 47±16 vs. 48±12) were similar between the 2 recordings whereas maximal heart rate was slightly higher in Holter group (116±28 vs 113±27, p=0.004)). Longest RR interval (1.87±0.53 vs. 1.85±0.51 seconds, p=0.04). Noise was recorded in 4% of Holter and 8.6% of CardioSTAT.

Conclusion

Preliminary results for validation of a novel heart monitoring device show excellent correlation with the standard Holter for detection of atrial fibrillation. Added value of CardioSTAT—included the possibility of longer monitoring duration (up to 7 days), less cumbersome installation (2 electrodes and no wires) and water resistance (patient can shower with the device).

Disclosure

No conflict of interest related to this study

Background

- Current 24h Holter is widely used for arrhythmia detection in patients with symptoms or for atrial fibrillation detection in asymptomatic patients after a stroke.
- CardioSTAT is a new heart rhythm monitor with continuous recording of a single lead tracing. It is less cumbersome than a regular Holter, it is waterproof, it has a longer recording capacity. Electrodes can be replaced by the patient.
- The aim of this study is to validate the diagnostic accuracy of CardioSTAT compared to a 24h standard Holter.

Methods

- CardioSTAT was installed simultaneously with a 24h Holter in patients undergoing Holters.
- Indication for monitoring was suspicion of atrial fibrillation, assessment of rate / rhythm control in patients known with atrial fibrillation or monitoring after atrial fibrillation ablation.
- Duration of both recordings (CardioSTAT and Holter was 24h.
- Analysis of tracing was performed by a blinded cardiologist.
- Data was compared using paired-T-test, and kappa correlation.

Results

Kappa correlation for diagnosis of AF: 0.95, SE 0.05, CI0.9-0.99

	Holter	CardioSTAT	p
# Heart Beats	96411±29790	86257±19484	<0.0001
Min HR	47±16	48±12	ns
Mean HR	68±11	67±11	ns
Max HR	116±28	113±27	0.004
Noise(%)	4.0±4.6	8.6±11.7	<0.0001
PVC (#)	840±2934	591±2394	ns
PAC (#)	463±1414	536±1896	ns
Longest RR	1.87±0.5	1.85±0.5	0.04
AF detection (%)	34%	34%	ns

Concerning noise detection, modification of the device installation was performed after the first 43 patients.

When analysing only patients 44 to 175, noise detection was 5% vs 7% Holter vs CardioSTAT), p=ns

Conclusions

CardioSTAT® shows excellent correlation with 24h Holter for detection of atrial fibrillation, PAC and PVC. Improvement in installation methods reduced noise.

Figure 1 : a- Example of CardioSTAT installation vs b- standard Holter installation

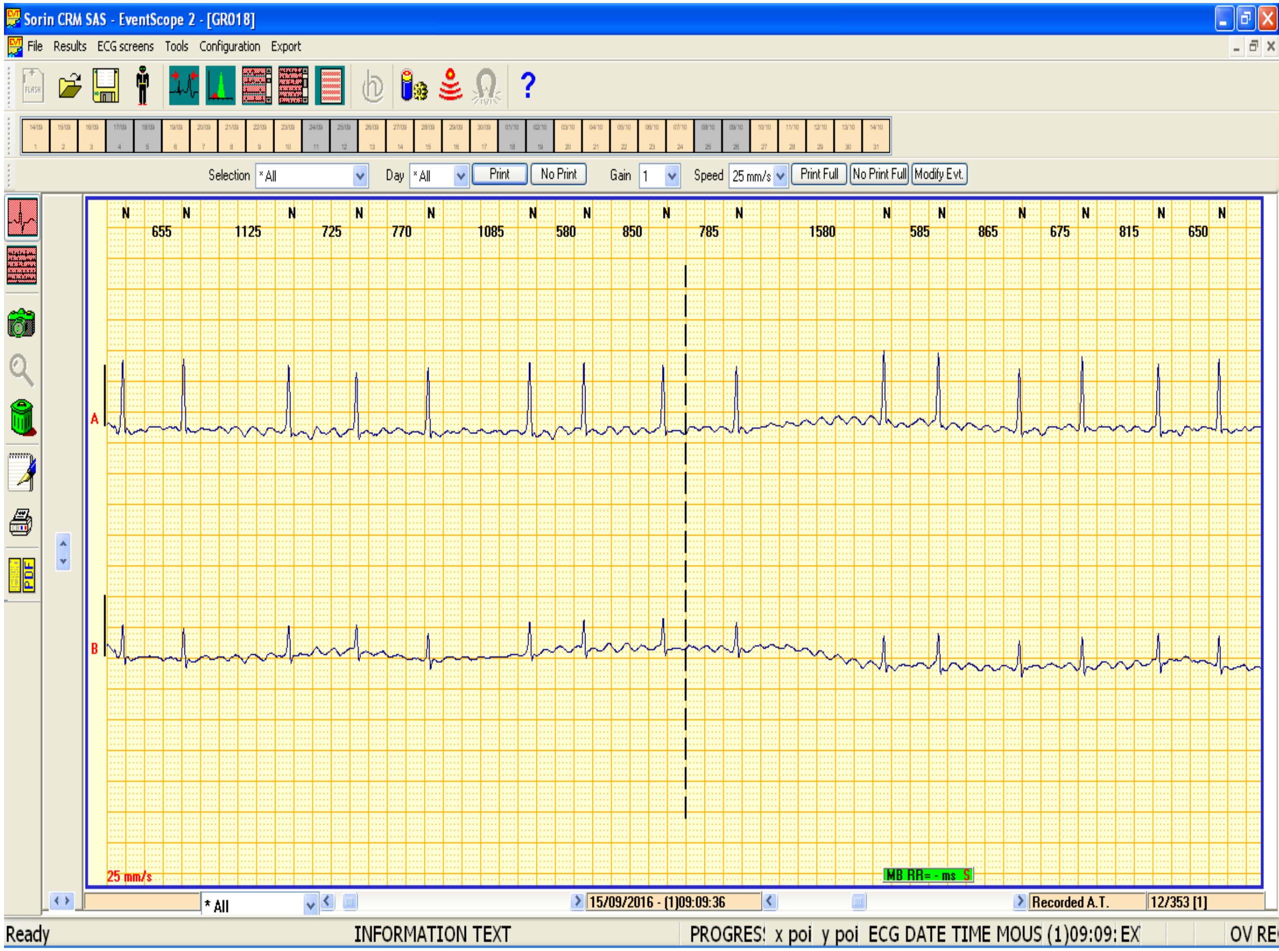
Figure 2: CardioSTAT tracings from a patient with Atrial Fibrillation

Figure 3: CardioSTAT tracings of a patient in sinus rhythm

Spider Flash-Livanova

Monitoring de longue durée- 30 Jours. Autodétection de FA

Send
SPIDERFLASH-t AFib
SORIN GROUP


Sorin CRM SAS - EventScope 2 - [GR018]
File
Results
ECG screens
Tools
Configuration
Export
FLASH
?
Print
No Print
Print Full
No Print Full
Modify Evt.
N
A
B
PDF

Selection * All

Day * All

Gain 1

Speed 25 mm/s

655 1125 725 770 1085 580 850 785 1580 585 865 675 815 650

25 mm/s

MB RR= - ms S

* All

15/09/2016 - (1)09:09:36

Recorded A.T.

12/353 [1]

Ready

INFORMATION TEXT

PROGRES! x poi y poi ECG DATE TIME MOUS (1)09:09: EX

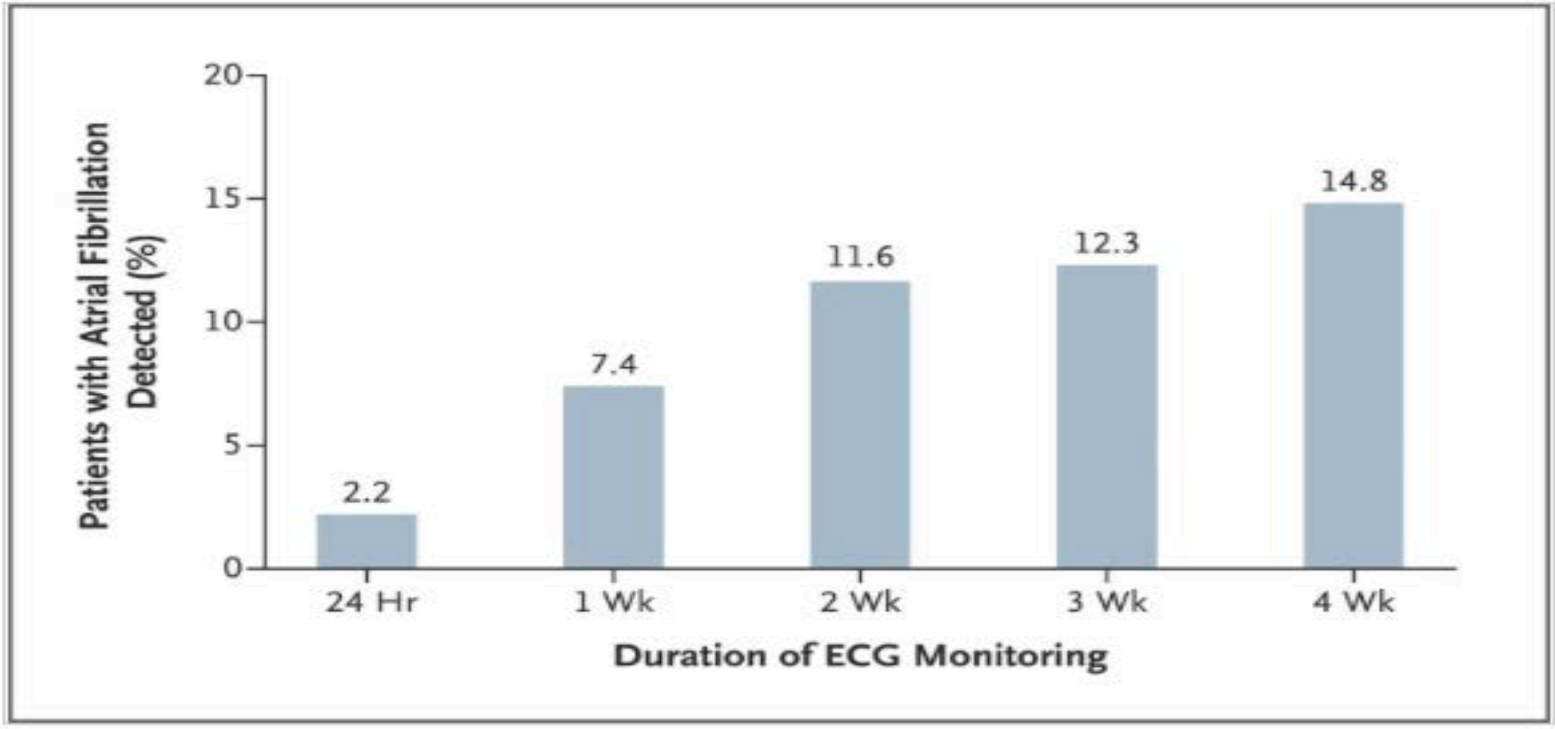
OV RE

The NEW ENGLAND JOURNAL of MEDICINE

Atrial Fibrillation in Patients with Cryptogenic Stroke

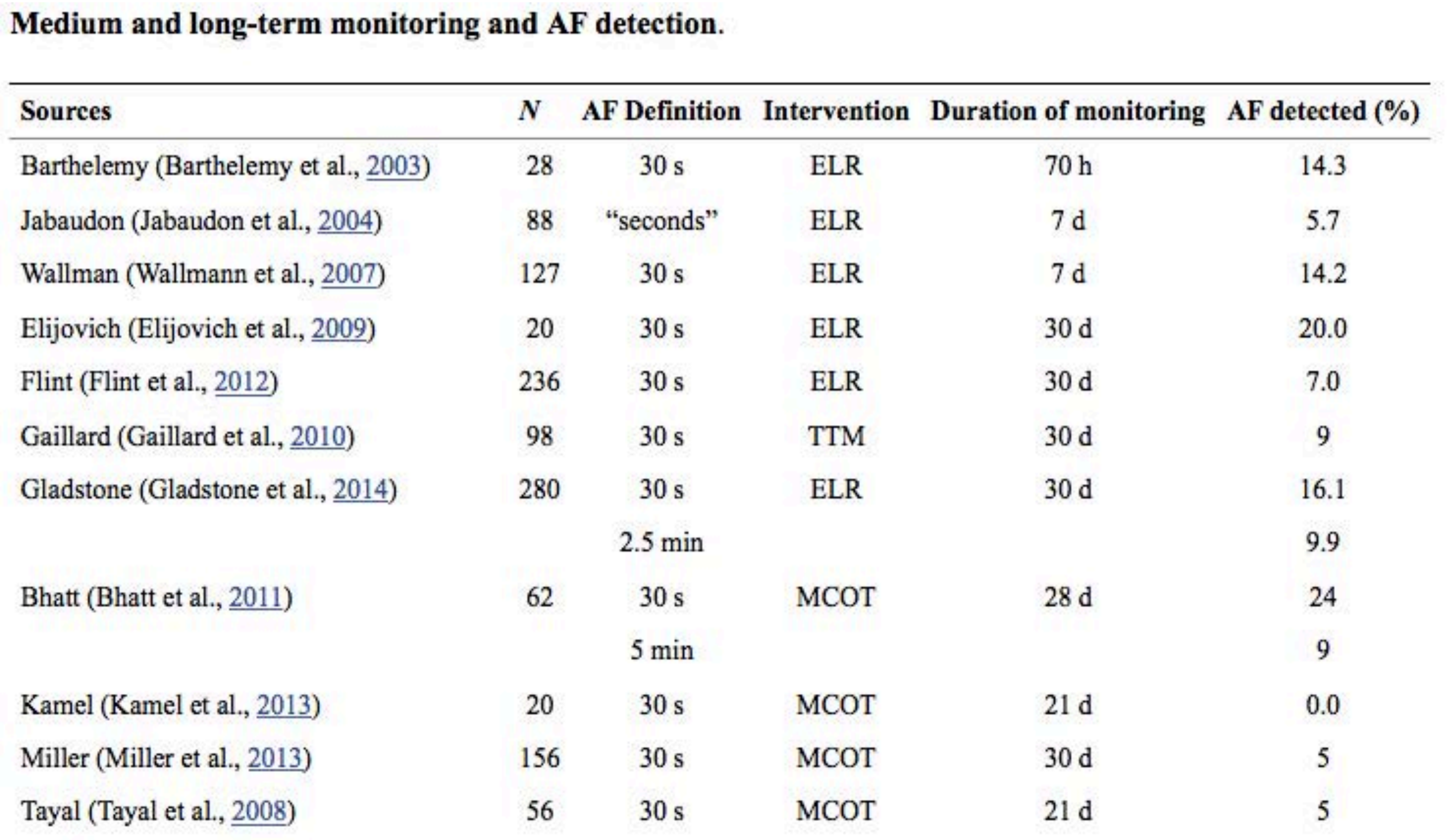
David J. Gladstone, M.D., Ph.D., Melanie Spring, M.D., Paul Dorian, M.D., Val Panzov, M.D., Kevin E. Thorpe, M.Math., Judith Hall, M.Sc., Haris Vaid, B.Sc., Martin O'Donnell, M.B., Ph.D., Andreas Laupacis, M.D., Robert Côté, M.D., Mukul Sharma, M.D., John A. Blakely, M.D., Ashfaq Shuaib, M.D., Vladimir Hachinski, M.D., D.Sc., Shelagh B. Coutts, M.B., Ch.B., M.D., Demetrios J. Sahlas, M.D., Phil Teal, M.D., Samuel Yip, M.D., J. David Spence, M.D., Brian Buck, M.D., Steve Verreault, M.D., Leanne K. Casaubon, M.D., Andrew Penn, M.D., Daniel Selchen, M.D., Albert Jin, M.D., David Howse, M.D., Manu Mehdiratta, M.D., Karl Boyle, M.B., B.Ch., Richard Aviv, M.B., Ch.B., Moira K. Kapral, M.D., and Muhammad Mamdani, Pharm.D., M.P.H., for the EMBRACE Investigators and Coordinators*

N Engl J Med 2014; 370:2467-2477 | June 26, 2014 | DOI: 10.1056/NEJMoa1311376



Moniteurs externes de longue durée

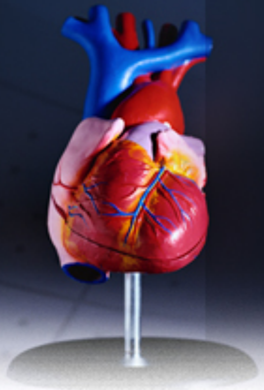
Rendement diagnostic estimé a 16-20% a 30 jours



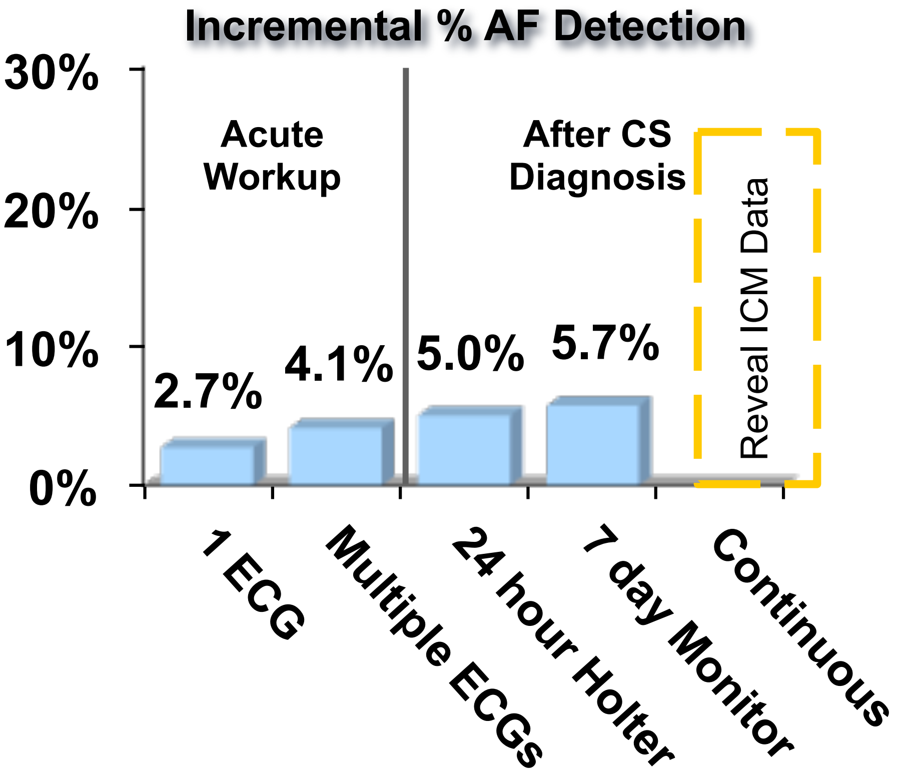
Medium and long-term monitoring and AF detection.

Sources	*N*	AF Definition	Intervention	Duration of monitoring	AF detected (%)
Barthelemy (Barthelemy et al., 2003)	28	30 s	ELR	70 h	14.3
Jabaudon (Jabaudon et al., 2004)	88	"seconds"	ELR	7 d	5.7
Wallman (Wallmann et al., 2007)	127	30 s	ELR	7 d	14.2
Elijovich (Elijovich et al., 2009)	20	30 s	ELR	30 d	20.0
Flint (Flint et al., 2012)	236	30 s	ELR	30 d	7.0
Gaillard (Gaillard et al., 2010)	98	30 s	TTM	30 d	9
Gladstone (Gladstone et al., 2014)	280	30 s	ELR	30 d	16.1
		2.5 min			9.9
Bhatt (Bhatt et al., 2011)	62	30 s	MCOT	28 d	24
		5 min			9
Kamel (Kamel et al., 2013)	20	30 s	MCOT	21 d	0.0
Miller (Miller et al., 2013)	156	30 s	MCOT	30 d	5
Tayal (Tayal et al., 2008)	56	30 s	MCOT	21 d	5

Valeur incrémentale de prolonger la durée de monitoring et la détection de FA



- N = 1491
- ACV aigu/ICT pas de FA connue
- ECG
- HOLTER de 24hr si ECG normal
- Moniteur externe de 7-14 jours si HOLTER normal



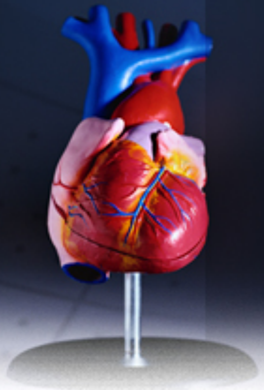
1. Jabaudon D. Et al. *Usefulness of Ambulatory 7-Day ECG Monitoring for the Detection of Atrial Fibrillation and Flutter After Acute Stroke and Transient Ischemic Attack* Stroke 2004;35:1647-1651.
2. Cotter, P.E., et al., *Incidence of atrial fibrillation detected by implantable loop recorders in unexplained stroke.* Neurology, 2013 Apr 23;80(17):1546-50
3. Ritter, M.A., et al., *Occult Atrial Fibrillation in Cryptogenic Stroke: Detection by 7-Day Electrocardiogram Versus Implantable Cardiac Monitors.* Stroke, 2013 May;44(5):1449-52.

Moniteur implantable- Reveal Linq (Medtronic)

Reveal LINQ

- Monitoring en continu pour une durée de 2-3 ans
- Programmable
- Compatible avec IRM
- Capabilité d'enregistrement déclenché par patient
- Capabilité d'auto-enregistrement épisodes de FA selon un algorithme préétabli.
- Transmission d'épisodes par Wireless

Reveal linq-Medtronic

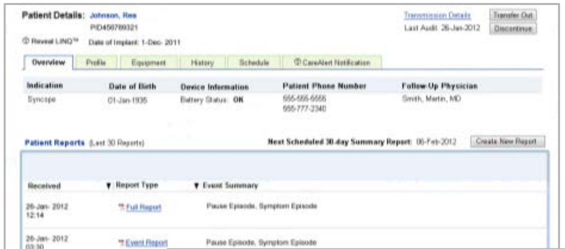


Wireless

Reveal LINQ™ ICM

MyCareLink™
Patient Monitor

Cellular



Patient Details: Johnson, Rex
PID456789321
Reveal LINQ™ Date of Implant: 1-Dec- 2011

Transmission Details
Last Audit: 26-Jan-2012

Transfer Out
Discontinue
Overview
Profile
Equipment
History
Schedule
CareAlert Notification

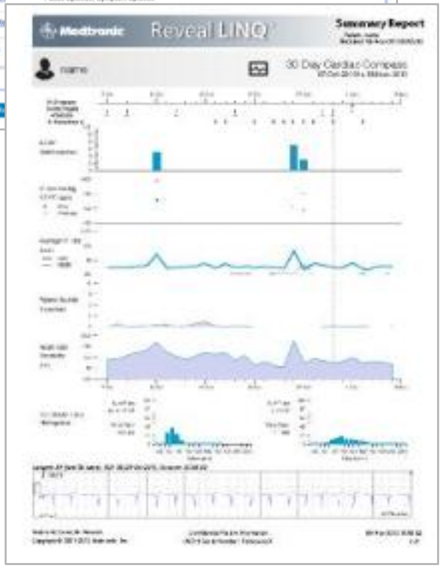
Indication	Date of Birth	Device Information	Patient Phone Number	Follow-Up Physician
Syncope	01-Jan-1935	Battery Status: **OK**	555-555-5555 555-777-2340	Smith, Martin, MD

Patient Reports (Last 30 Reports) **Next Scheduled 30-day Summary Report:** 06-Feb-2012

Create New Report

Received	Report Type	Event Summary
26-Jan- 2012 12:14	Full Report	Pause Episode, Symptom Episode
26-Jan- 2012 03:30	Event Report	Pause Episode, Symptom Episode
7-Jan- 2012 09:15	Summary Re	
6-Dec-2011 11:53	Full Report	

Contact Us
Important Medical Record Inf



Medtronic
Reveal LINQ
Summary Report
name
30 Day Cardiac Compass

Mobile
Alerts

Streamlined Reports

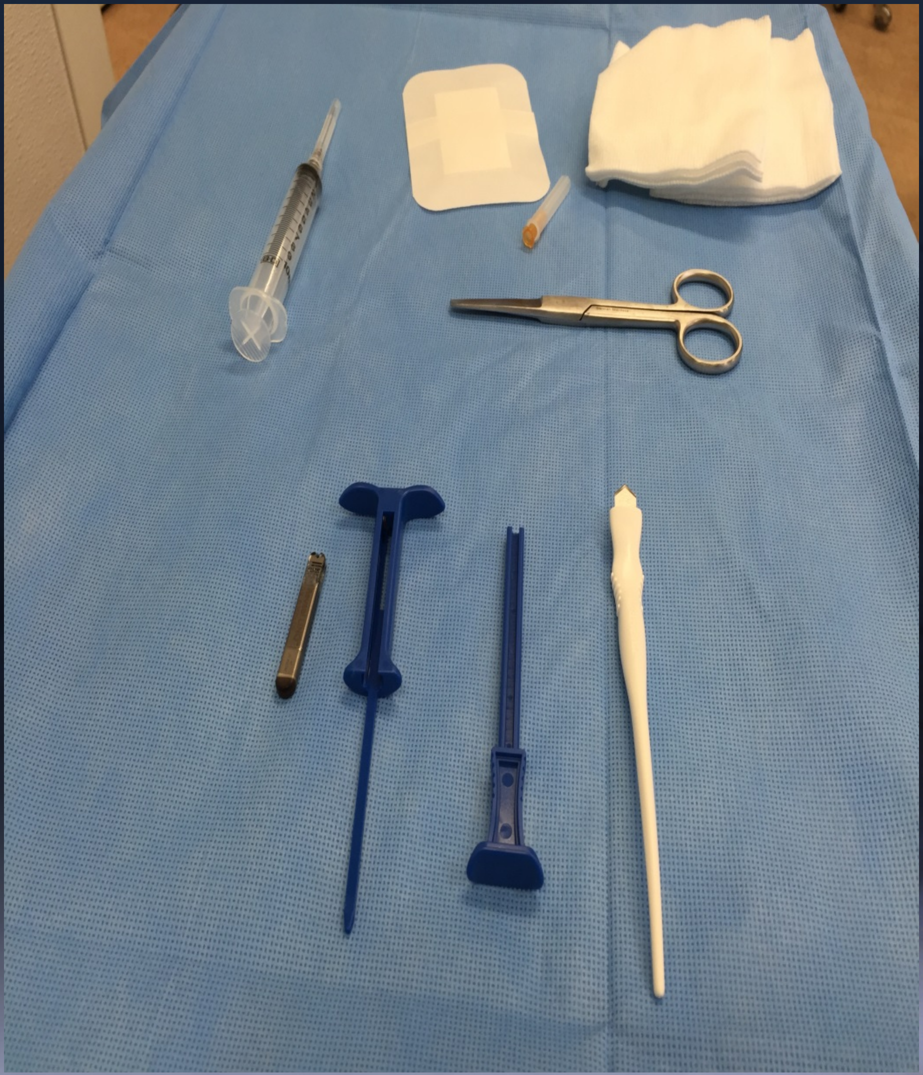
Simplified Insertion
Procedure

Medtronic
REVEAL

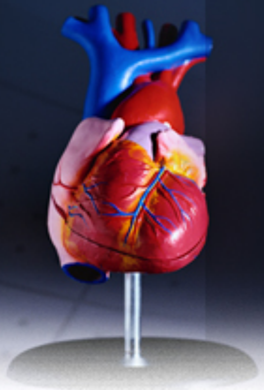
Patient
Assistant

All patient and clinical data are fictitious and for demonstration purposes only

Reveal-Linq

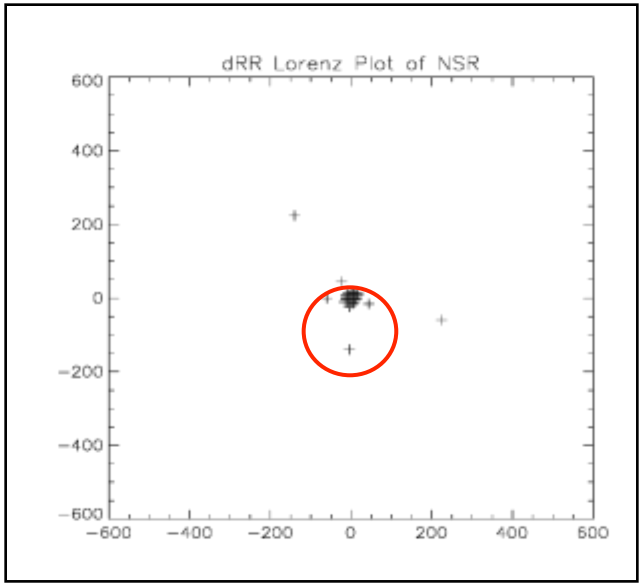


Minimally Invasive Outpatient Insertion Procedure - No Leads or Fluoroscopy



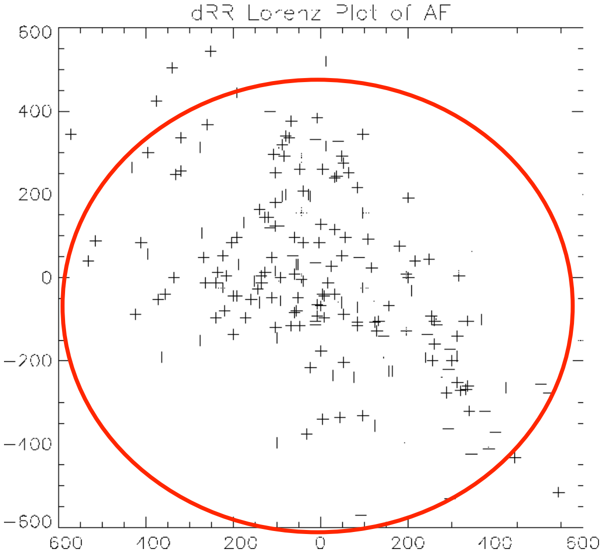
AF Monitoring with Reveal LINQ: Rhythm (ir-)regularity

Sinus rhythm



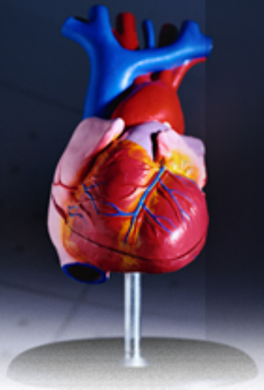
Normal variations

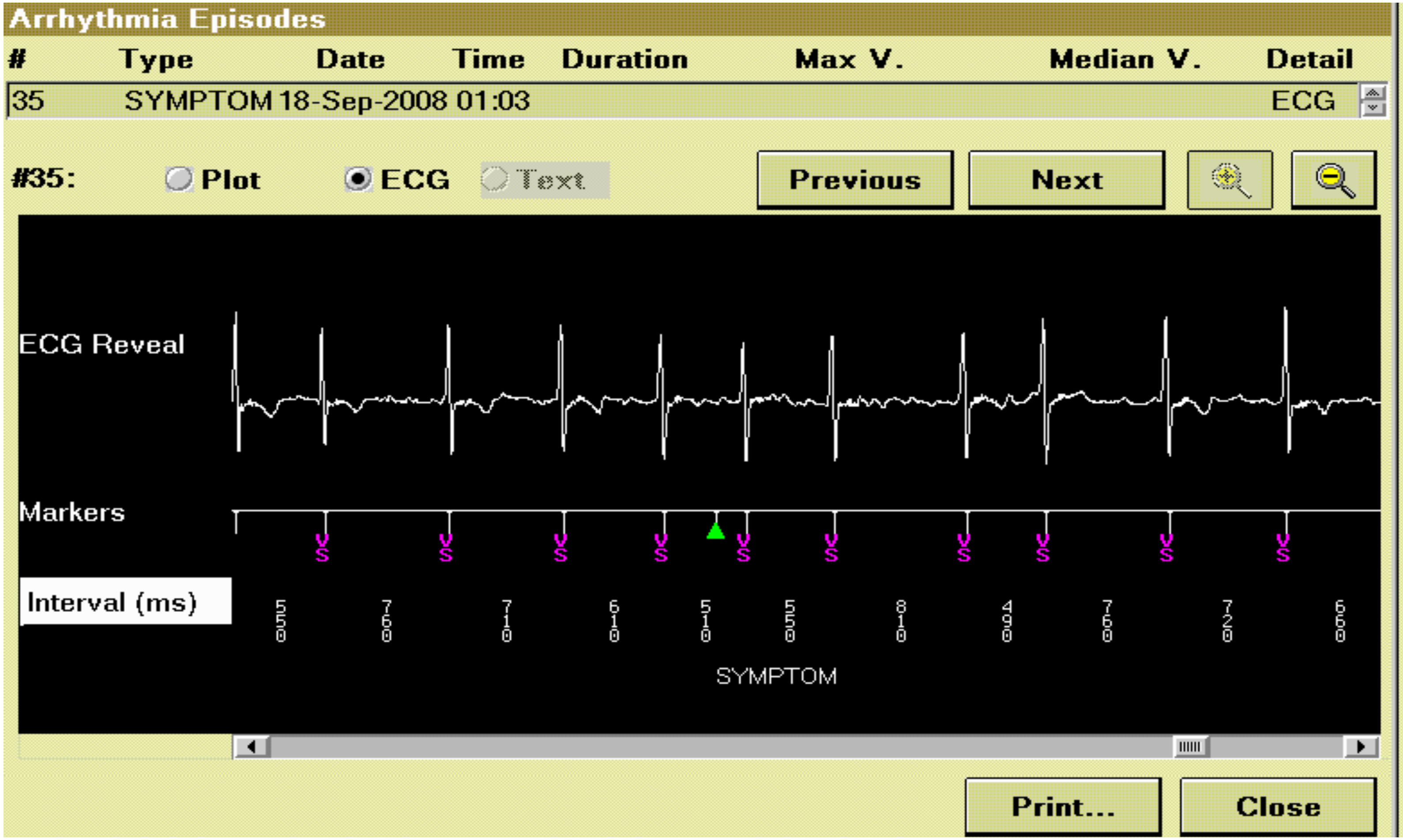
AF



Irregular irregularity

Reveal-Linq





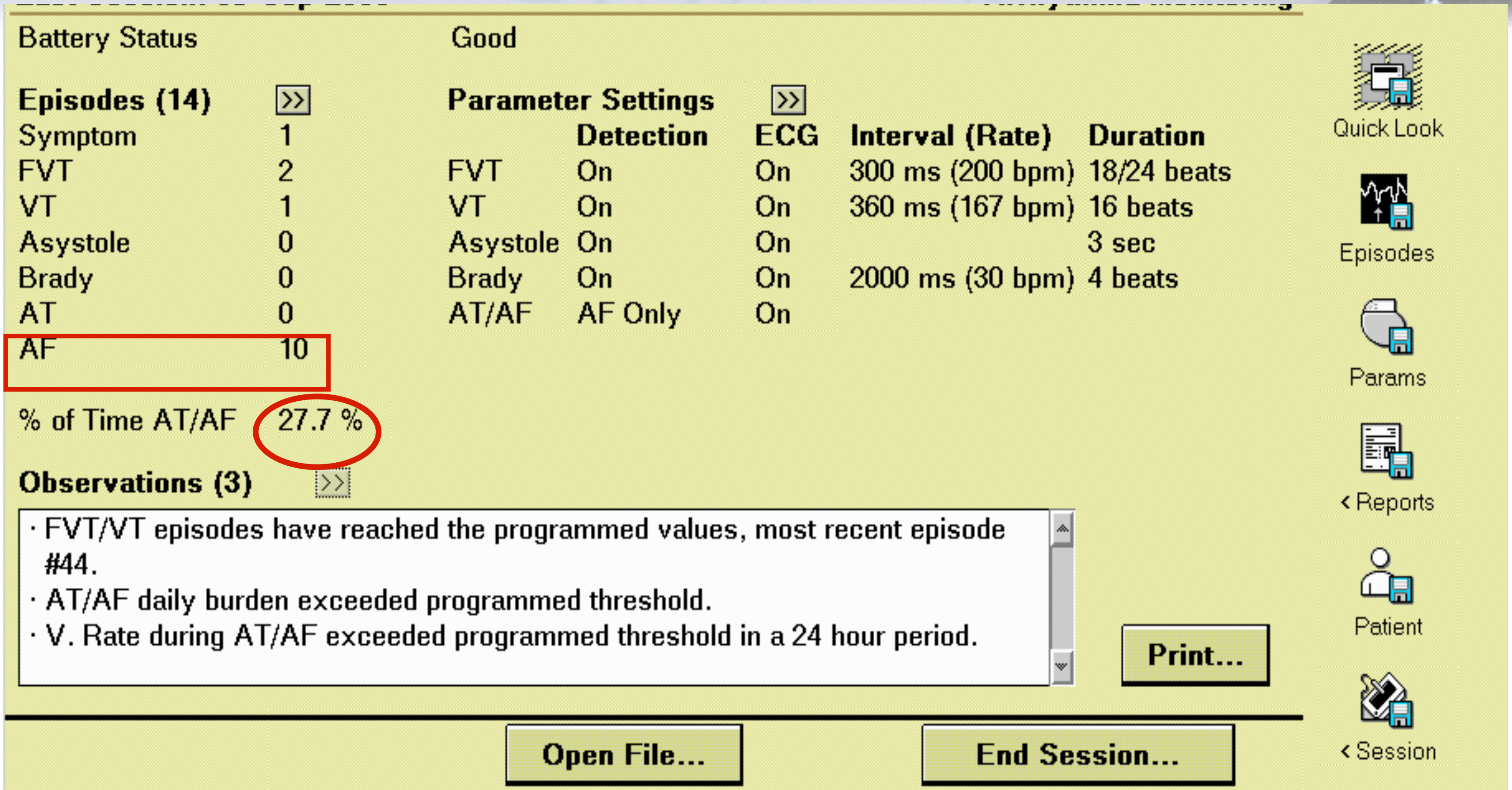
Arrhythmia Episodes

#	Type	Date	Time	Duration	Max V.	Median V.	Detail
35	SYMPTOM	18-Sep-2008	01:03				ECG

#35: ○ Plot ● ECG ○ Text

Previous
Next
ECG Reveal
Markers
VS
VS
VS
VS
VS
VS
VS
VS
VS
VS
Interval (ms)
550
760
710
610
510
550
810
490
760
720
660
SYMPTOM
Print...
Close

Reveal Linq- Fardeau de FA



Battery Status Good

Episodes (14)	
Symptom	1
FVT	2
VT	1
Asystole	0
Brady	0
AT	0
AF	10

% of Time AT/AF 27.7 %

Parameter Settings

	Detection	**ECG**	**Interval (Rate)**	**Duration**
FVT	On	On	300 ms (200 bpm)	18/24 beats
VT	On	On	360 ms (167 bpm)	16 beats
Asystole	On	On		3 sec
Brady	On	On	2000 ms (30 bpm)	4 beats
AT/AF	AF Only	On		

Observations (3)

- FVT/VT episodes have reached the programmed values, most recent episode #44.
- AT/AF daily burden exceeded programmed threshold.
- V. Rate during AT/AF exceeded programmed threshold in a 24 hour period.

Print...
Open File...
End Session...
Quick Look
Episodes
Params
< Reports
Patient
< Session

Landmark CRYSTAL AF Study:

CRYptogenic STroke And underLying Atrial Fibrillation

Objectives:

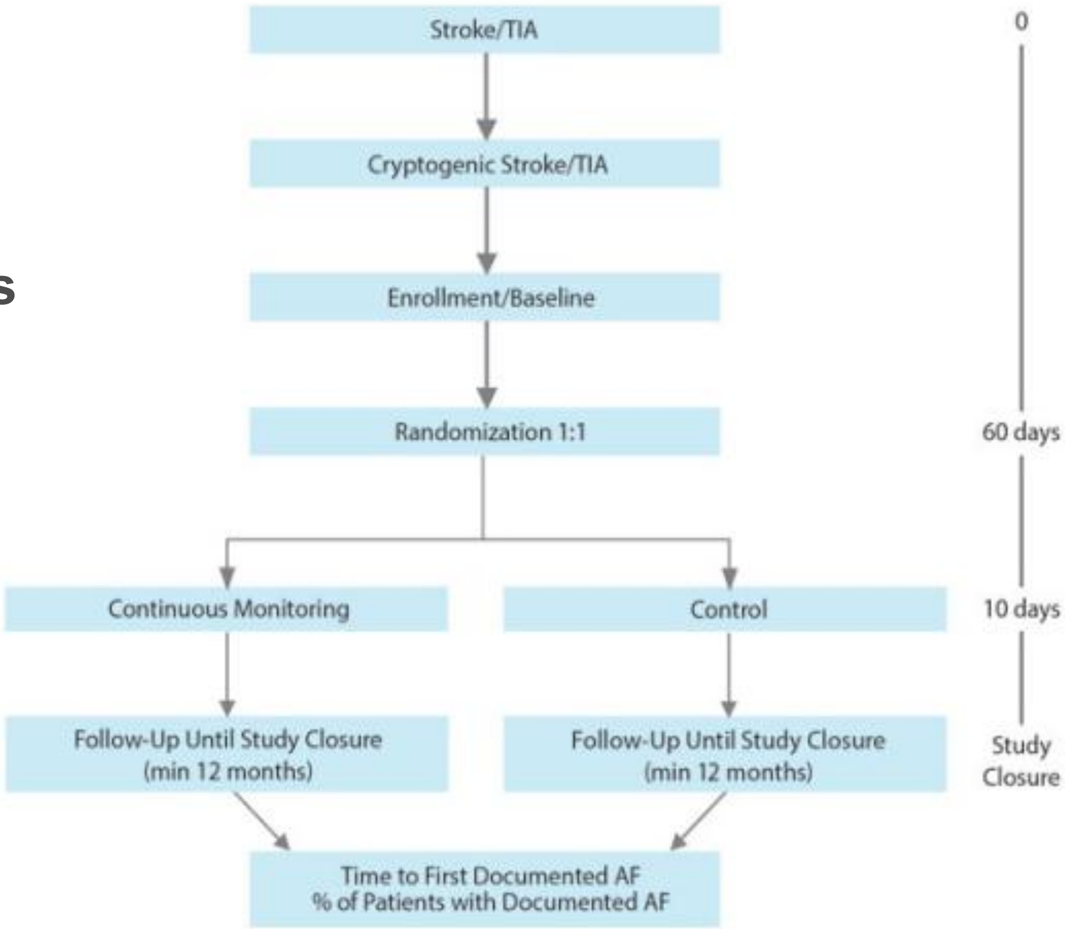
- Assess ICM vs. Standard Care for detection of AF in cryptogenic stroke patients
  - 6 month endpoint (primary)
  - 12 month endpoint (secondary)
- Determine proportion of patients with underlying AF
- Record actions taken after AF diagnosis

Sanna T, Diener HC, Passman RS, et al. Cryptogenic Stroke and Underlying Atrial Fibrillation (CRYSTAL AF). *N Engl J Med.* 2014; 370(26):2478-2486.

CRYSTAL AF Study Overview

- Patient had Cryptogenic stroke/TIA
- Randomized to SoC or ICM
- AF defined as ≥ 30 seconds

- Primary endpoint
  - AF detection at 6 months
- Secondary endpoints
  - AF detection at 12 months
  - AF duration
  - Symptom correlation
  - Physician actions



Stroke/TIA

Cryptogenic Stroke/TIA

Enrollment/Baseline

Randomization 1:1

Continuous Monitoring

Control

Follow-Up Until Study Closure (min 12 months)

Follow-Up Until Study Closure (min 12 months)

Time to First Documented AF
% of Patients with Documented AF

CRYSTAL AF Study

Patient Inclusion Criteria:

•≥40 years of age

•Cryptogenic stroke (or clinical TIA), with infarct seen on MRI or CT, within the previous 90 days; and no mechanism (including AF) determined after:

- **12-lead ECG**
- **24-hour ECG monitoring (e.g. Holter)**
- **Transesophageal echocardiography (TEE)**
- **CTA or MRA of head and neck to rule out arterial source**
- **Screening for hypercoagulable states in patients <55 years old**

Patient Exclusion Criteria:

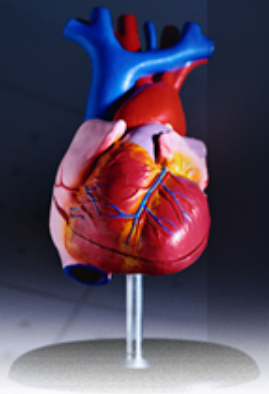
•History of AF or Atrial Flutter

•Permanent indication or contraindication for anticoagulation

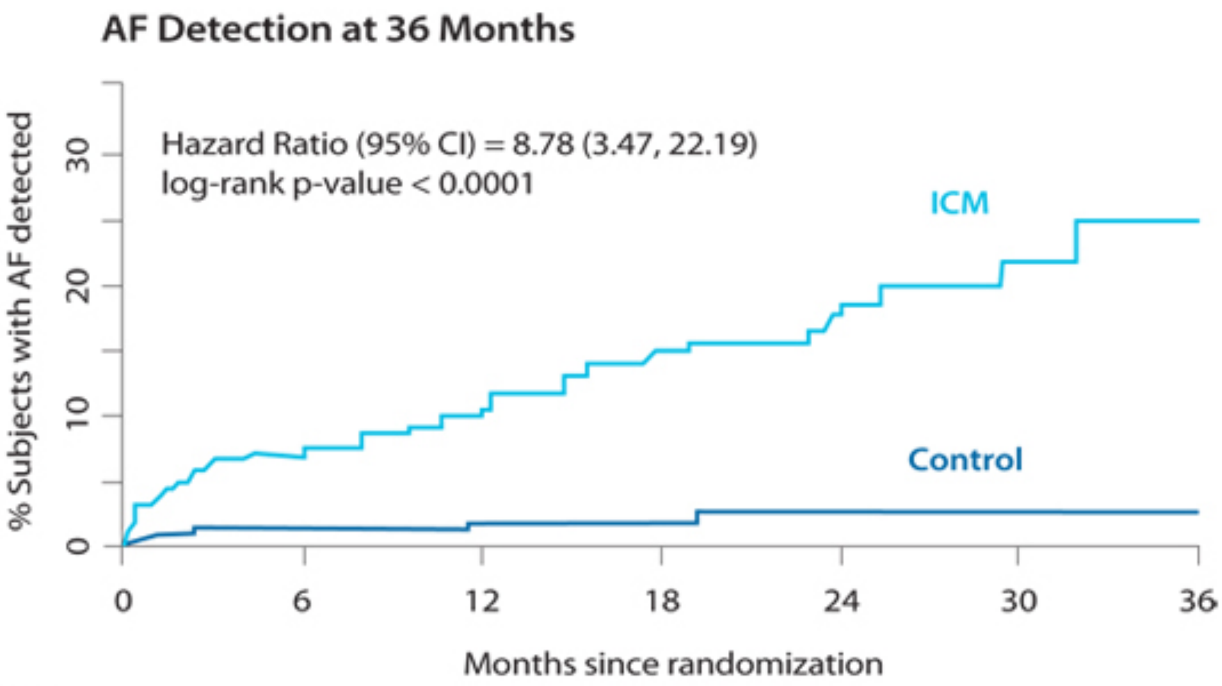
•Indication for pacemaker or ICD

CRYSTAL AF: At 36 months, 30% of patients in the ICM arm found to have AF[1]

8.8x more than standard follow-up arm



AF Detection at 36 Months



at Risk

	0	6	12	18	24	30	36
Control	220	194	167	114	72	36	7
ICM	221	191	173	102	57	29	8

Sanna T, Diener HC, Passman RS, et al. Cryptogenic Stroke and Underlying Atrial Fibrillation (CRYSTAL AF). *N Engl J Med.* 2014; 370(26):2478-2486.

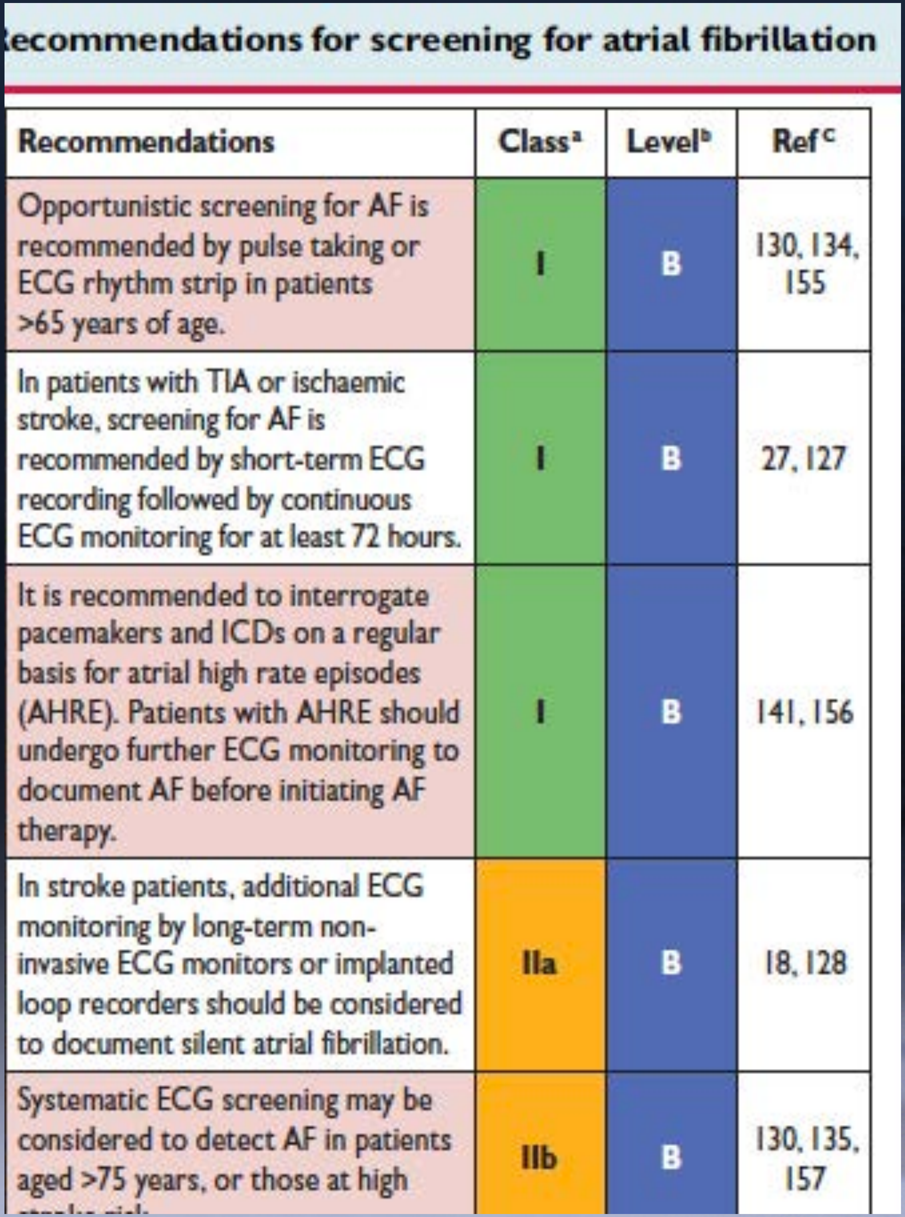
CRYSTAL AF Study Results

Reveal ICM superior to SoC for finding AF in patients with a cryptogenic stroke[1]

- Over **7x more** patients with AF at 12-months
- At 36 months, **30%** of patients in the Reveal ICM arm found to have AF
- Short-term monitoring not sufficient: median time to AF detection over 12 months was **84 days**
- At 12 months**, 97%** of patients with AF prescribed OAC

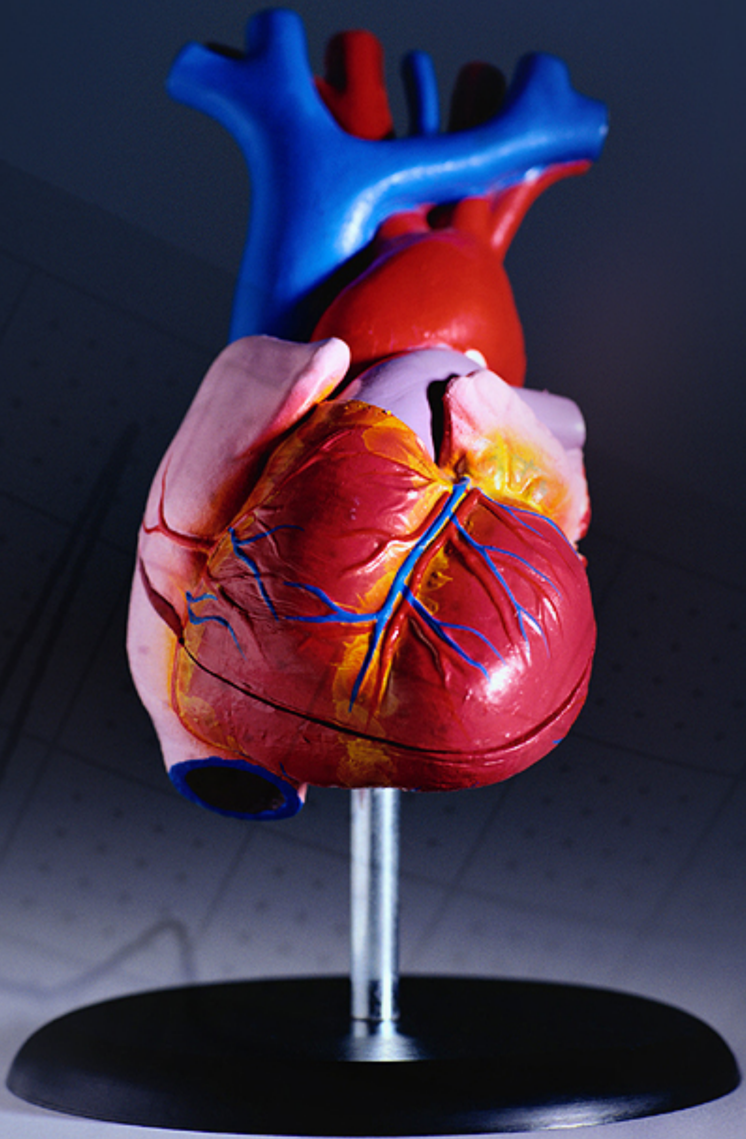
Sanna T, Diener HC, Passman RS, et al. Cryptogenic Stroke and Underlying Atrial Fibrillation (CRYSTAL AF). *N Engl J Med.* 2014; 370(26):2478-2486.

ESC-Directives de FA (2016)



ecommendations for screening for atrial fibrillation

Recommendations	Class[a]	Level[b]	Ref[c]
Opportunistic screening for AF is recommended by pulse taking or ECG rhythm strip in patients >65 years of age.	I	B	130, 134, 155
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	27, 127
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	141, 156
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	18, 128
Systematic ECG screening may be considered to detect AF in patients aged >75 years, or those at high	IIb	B	130, 135, 157



Qui et quand anticoaguler?

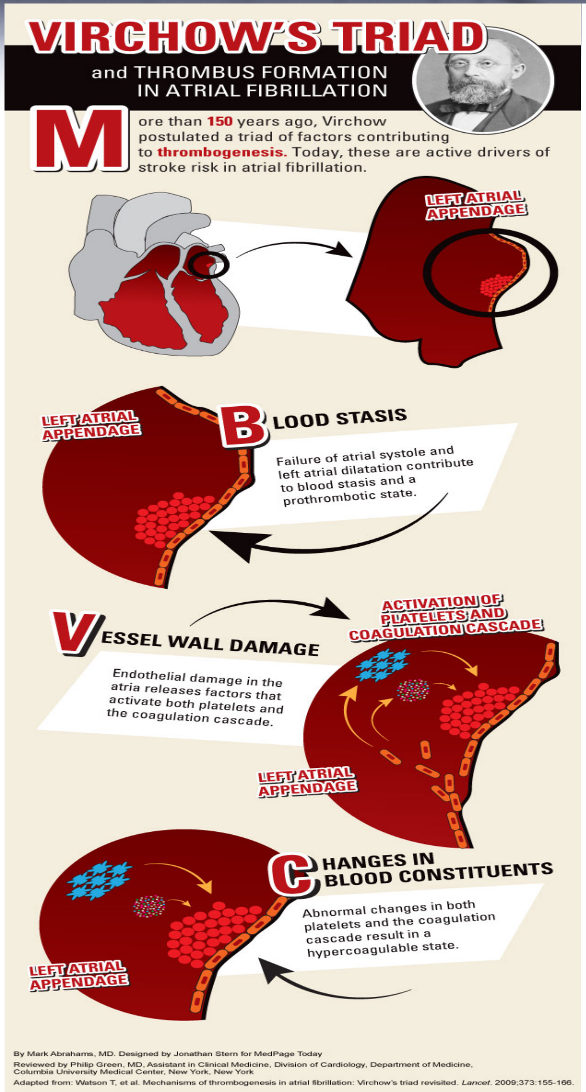
- Tout patient sans contre-indication qui a souffert un ACV/ICT cryptogénique?

- Les études sur le monitoring ont considéré la « FA » significative ayant des épisode de 30 sec ou plus.

- Quel est le fardeau de FA nécessaire pour vraiment augmenter les risques?

- Deux façons de voir les choses

Tirade de Virchow et Directives cliniques



VIRCHOW'S TRIAD

and THROMBUS FORMATION IN ATRIAL FIBRILLATION

More than **150** years ago, Virchow postulated a triad of factors contributing to **thrombogenesis**. Today, these are active drivers of stroke risk in atrial fibrillation.

BLOOD STASIS

Failure of atrial systole and left atrial dilatation contribute to blood stasis and a prothrombotic state.

VESSEL WALL DAMAGE

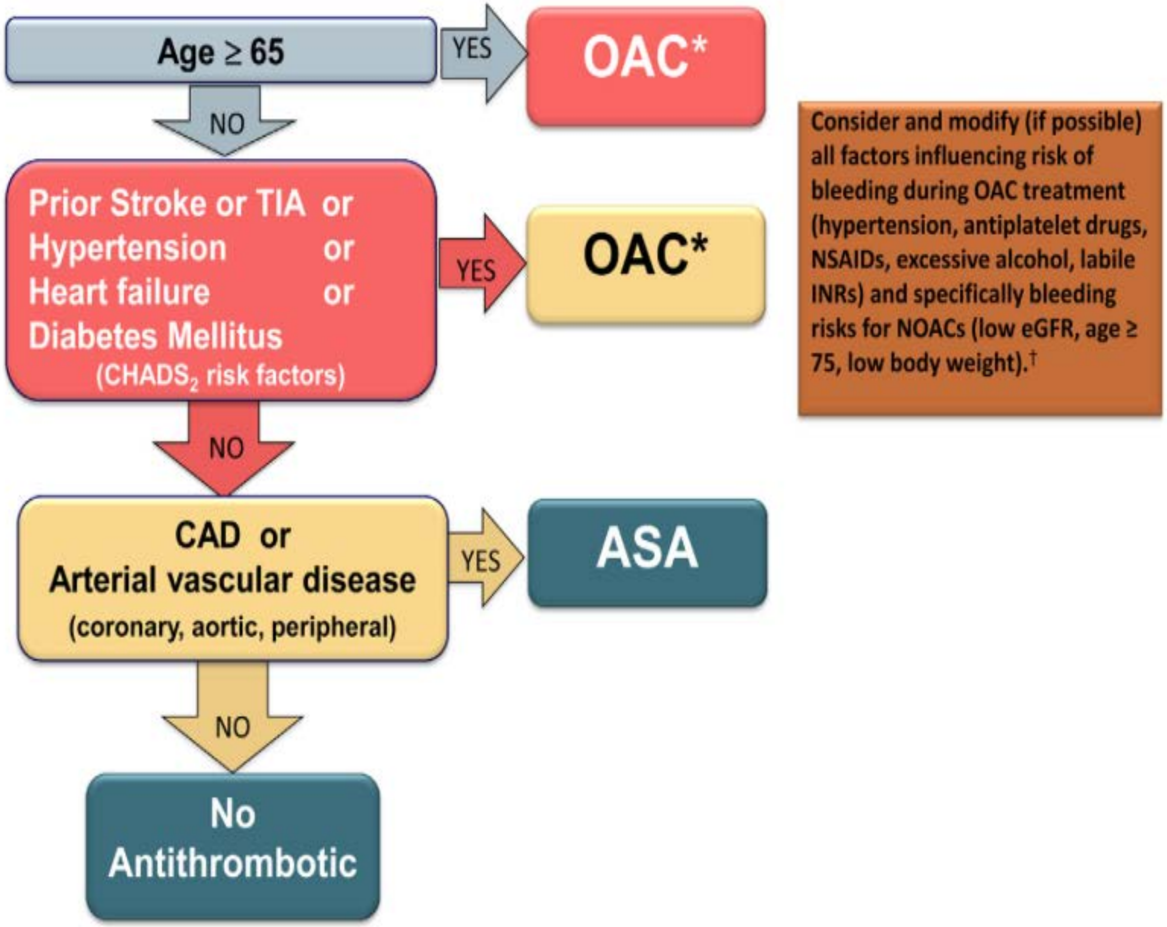
Endothelial damage in the atria releases factors that activate both platelets and the coagulation cascade.

CHANGES IN BLOOD CONSTITUENTS

Abnormal changes in both platelets and the coagulation cascade result in a hypercoagulable state.

By Mark Abrahams, MD. Designed by Jonathan Stern for MedPage Today
Reviewed by Philip Green, MD, Assistant in Clinical Medicine, Division of Cardiology, Department of Medicine, Columbia University Medical Center, New York, New York
Adapted from: Watson T, et al. Mechanisms of thrombogenesis in atrial fibrillation: Virchow's triad revisited. *Lancet*. 2009;373:155-166.

The "CCS Algorithm" for OAC Therapy in AF



Age ≥ 65

YES → OAC*

NO

Prior Stroke or TIA or
Hypertension or
Heart failure or
Diabetes Mellitus
($CHADS_2$ risk factors)

YES → OAC*

NO

CAD or
Arterial vascular disease
(coronary, aortic, peripheral)

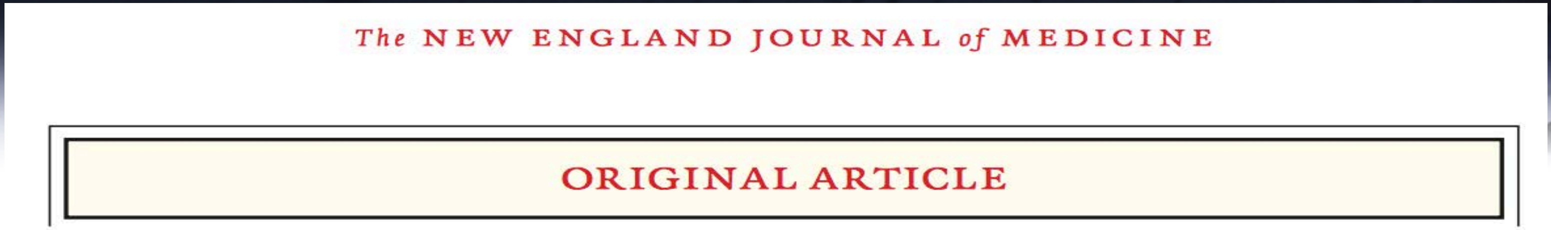
YES → ASA

NO

No Antithrombotic

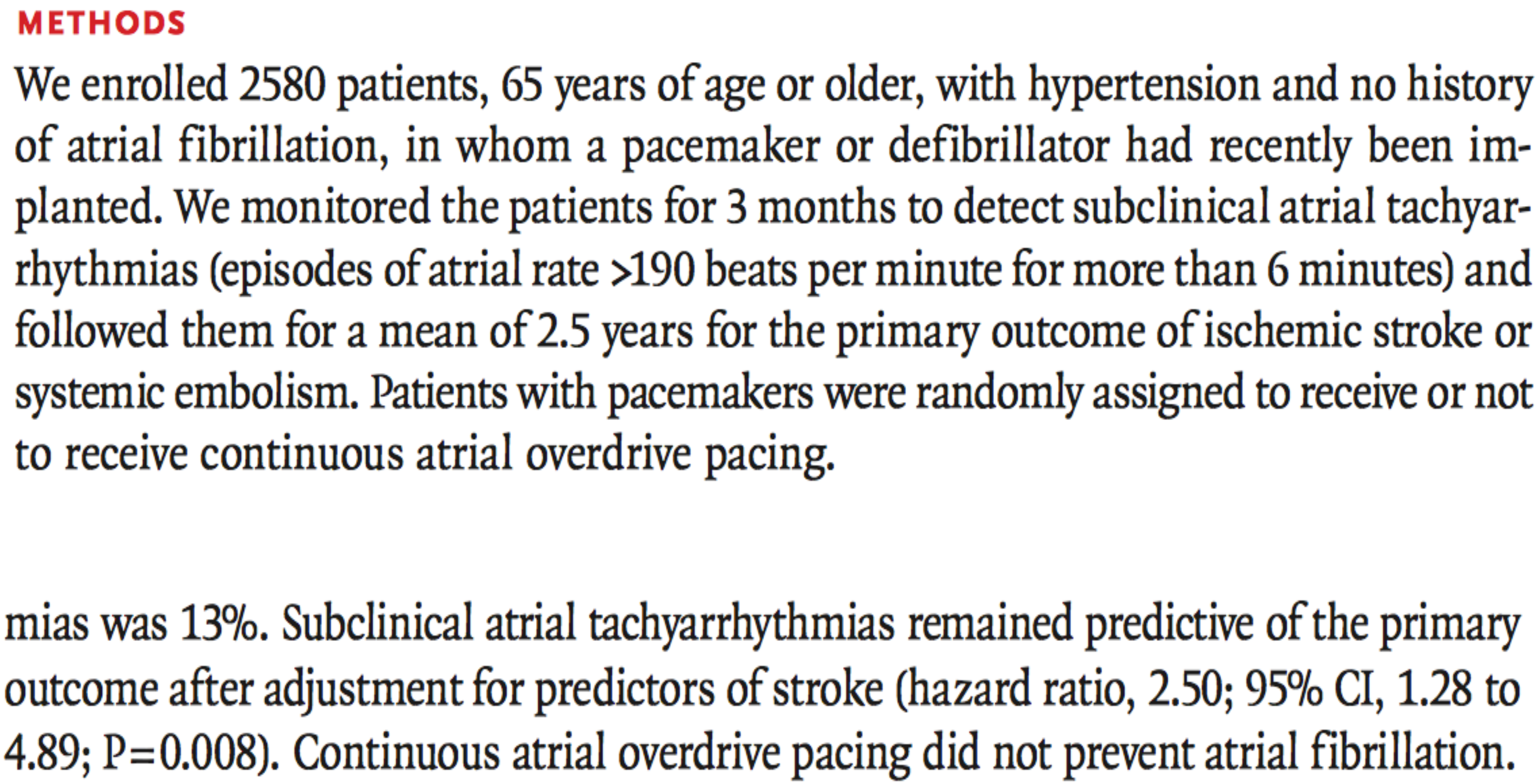
Consider and modify (if possible) all factors influencing risk of bleeding during OAC treatment (hypertension, antiplatelet drugs, NSAIDs, excessive alcohol, labile INRs) and specifically bleeding risks for NOACs (low eGFR, age ≥ 75, low body weight).†

Le Fardeau de FA importe-t-il? (ASSERT, nejm 2012)



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

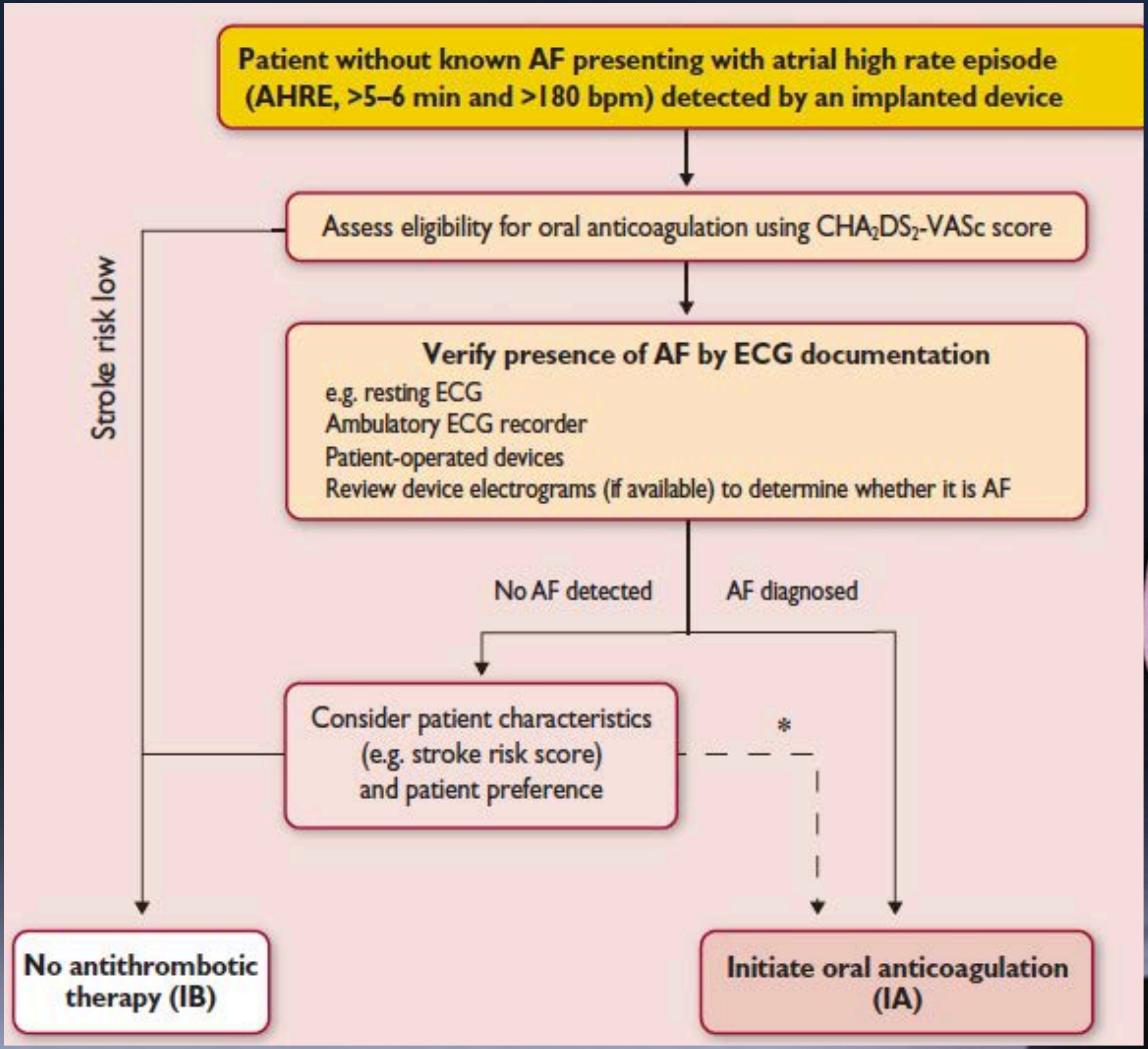


METHODS

We enrolled 2580 patients, 65 years of age or older, with hypertension and no history of atrial fibrillation, in whom a pacemaker or defibrillator had recently been implanted. We monitored the patients for 3 months to detect subclinical atrial tachyarrhythmias (episodes of atrial rate >190 beats per minute for more than 6 minutes) and followed them for a mean of 2.5 years for the primary outcome of ischemic stroke or systemic embolism. Patients with pacemakers were randomly assigned to receive or not to receive continuous atrial overdrive pacing.

mias was 13%. Subclinical atrial tachyarrhythmias remained predictive of the primary outcome after adjustment for predictors of stroke (hazard ratio, 2.50; 95% CI, 1.28 to 4.89; P=0.008). Continuous atrial overdrive pacing did not prevent atrial fibrillation.

ESC-Directives de FA (2016)



Patient without known AF presenting with atrial high rate episode (AHRE, >5–6 min and >180 bpm) detected by an implanted device

Assess eligibility for oral anticoagulation using CHA$_2$DS$_2$-VASc score

Verify presence of AF by ECG documentation

e.g. resting ECG
Ambulatory ECG recorder
Patient-operated devices
Review device electrograms (if available) to determine whether it is AF

No AF detected

AF diagnosed

Consider patient characteristics (e.g. stroke risk score) and patient preference

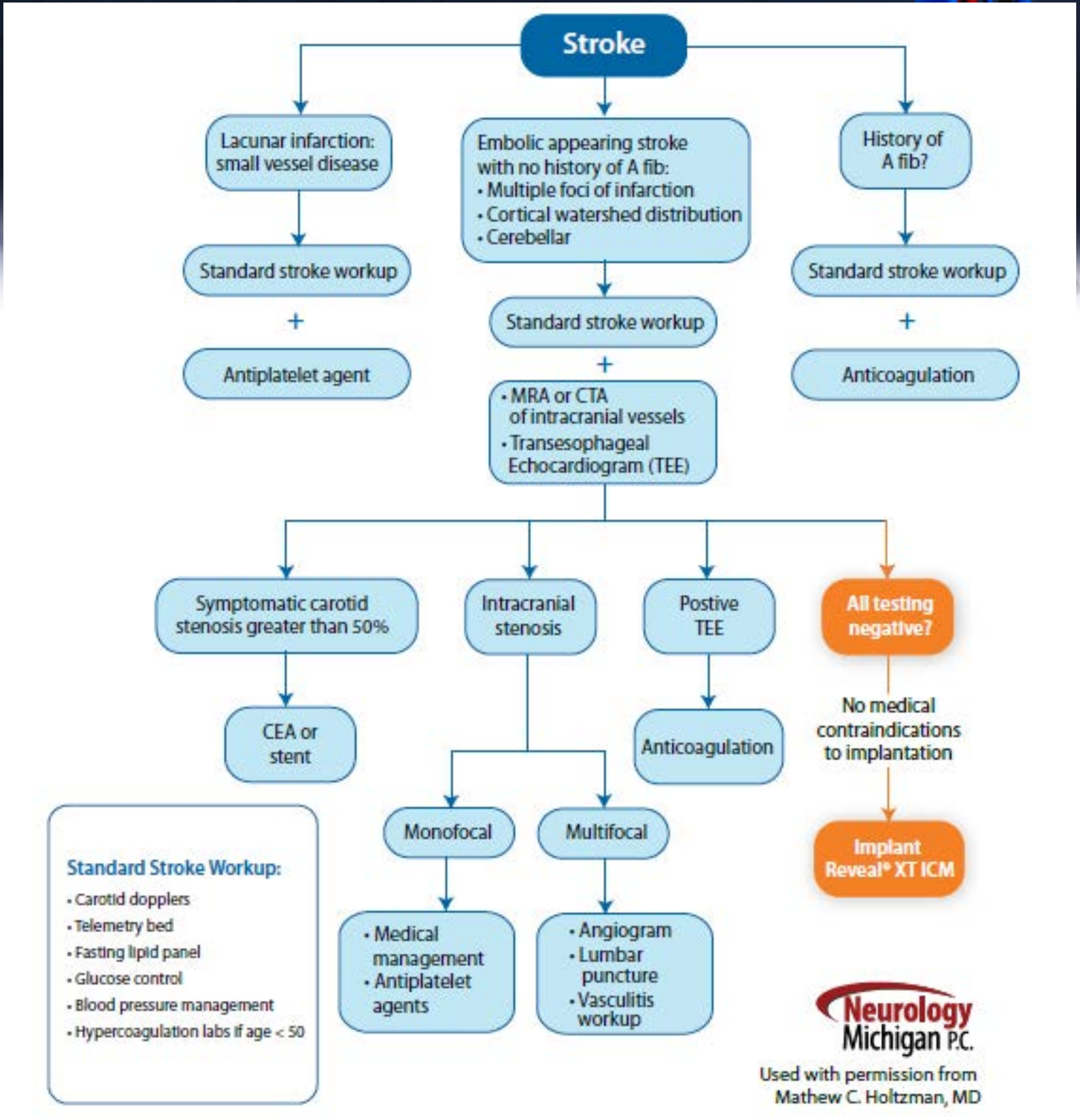
*

Stroke risk low

No antithrombotic therapy (IB)

Initiate oral anticoagulation (IA)

Stroke Algorithm



Stroke

Lacunar infarction: small vessel disease

Standard stroke workup

+

Antiplatelet agent

Embolic appearing stroke with no history of A fib:
- Multiple foci of infarction
- Cortical watershed distribution
- Cerebellar

Standard stroke workup

+

- MRA or CTA of intracranial vessels
- Transesophageal Echocardiogram (TEE)

Symptomatic carotid stenosis greater than 50%

CEA or stent

Intracranial stenosis

Monofocal

- Medical management
- Antiplatelet agents

Multifocal

- Angiogram
- Lumbar puncture
- Vasculitis workup

Postive TEE

Anticoagulation

All testing negative?

No medical contraindications to implantation

Implant Reveal® XT ICM

History of A fib?

Standard stroke workup

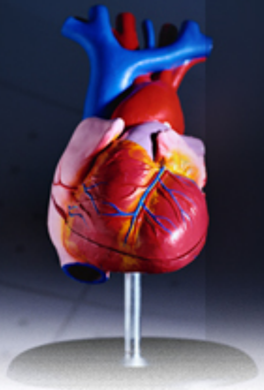
+

Anticoagulation

Standard Stroke Workup:
- Carotid dopplers
- Telemetry bed
- Fasting lipid panel
- Glucose control
- Blood pressure management
- Hypercoagulation labs if age < 50

Neurology Michigan P.C.

Used with permission from Mathew C. Holtzman, MD



Questions

- Dans l’ere des NACO, chez des patients bien choisis le risque de saignement est faible et les bénéfices supérieurs, devons nous anticoaguler tout les ACV cryptogéniques?
- Devons nous chercher la FA chez des patients avec des score CHADS2 élevés même sans antécédents d’ACV?
- Corrélation entre le fardeau FA/score CHADS pour mieux guider les traitement optimal.

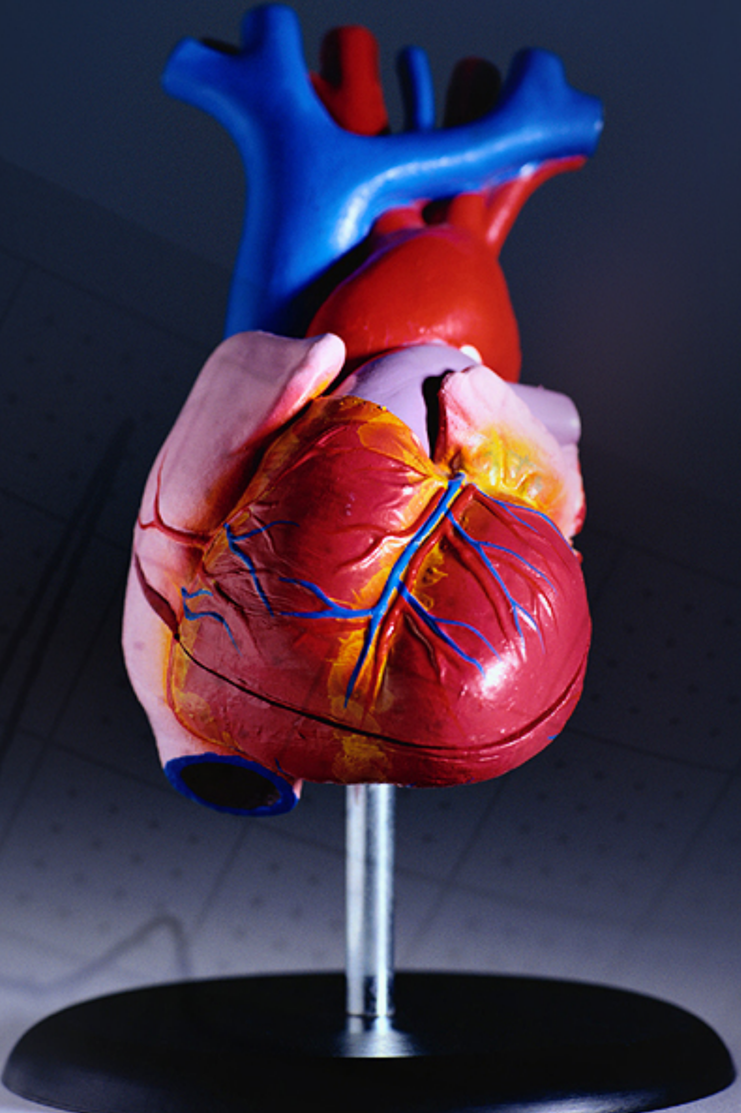
Conclusions

- La FA est responsable probablement de 20% des ACV ischémiques et de 40-50% des ACV cryptogéniques donc 40-50% de la totalité des ACV ischémiques avec des répercussions très importantes.

- Peu de rendement diagnostic des ECG, HOLTER, meilleur des Moniteurs a long terme (selon la technologie utilisée)

- Rendement supérieur des moniteurs implantables qui devraient être le gold-standard pour le diagnostique de FA.

- Il faut encore utiliser le jugement clinique pour individualiser le traitement et décider quand, qui et comment on anti coagule.

Questions?