Collège
National des
Cardiologues des
Hôpitaux

@CNCHcollege @CNCHcollege

le Duo Rythmologue / Neurologue = Optimisation du diagnostic des AVC cryptogéniques

Détection de la fibrillation auriculaire lors d'un AVC ischémique

Dr Socié Pierre
PH CH Chartres Rythmologue

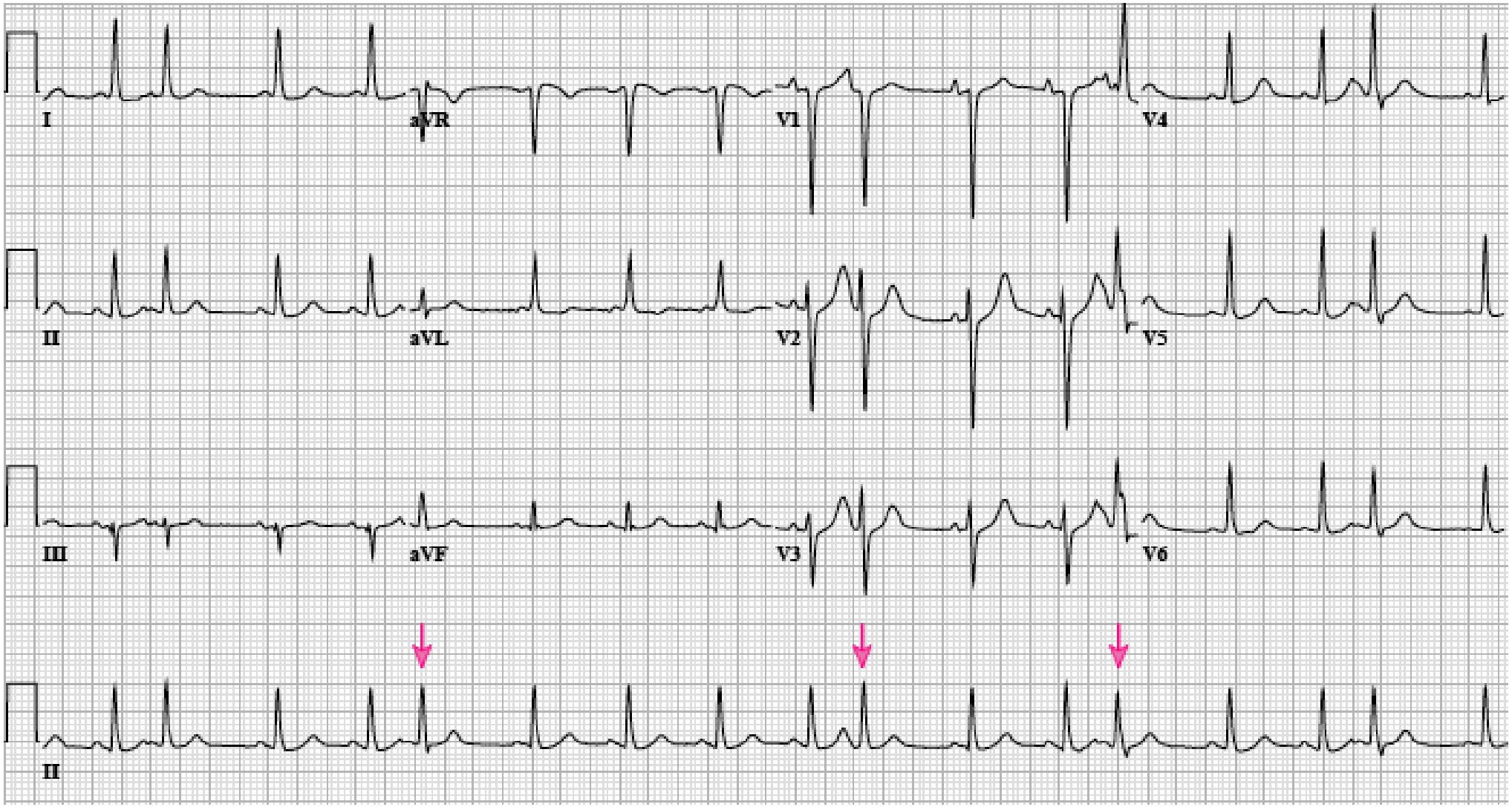
Avec le soutien institutionnel des laboratoires

Medtronic

Collège
National des
Cardiologues des
Hôpitaux

ESC guideline 2020

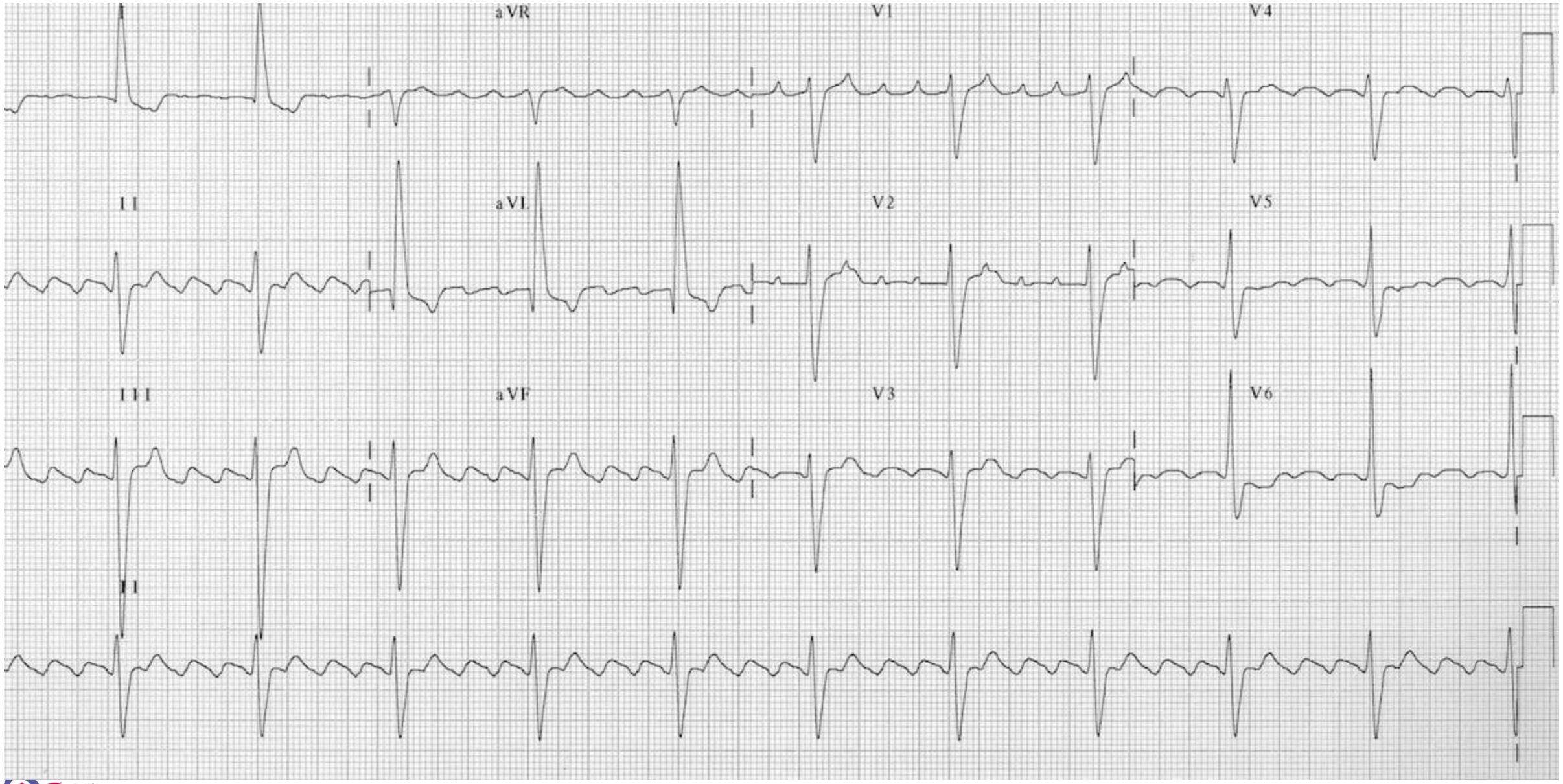
Recommendations	Class[a]	Level[b]
ECG documentation is required to establish the diagnosis of AF. • A standard 12-lead ECG recording or a single-lead ECG tracing of ≥30 s showing heart rhythm with no discernible repeating P waves and irregular RR intervals (when atrioventricular conduction is not impaired) is diagnostic of clinical AF.[6]	I	B



Collège National des Cardiologues des Hôpitaux

Dr Socié Pierre

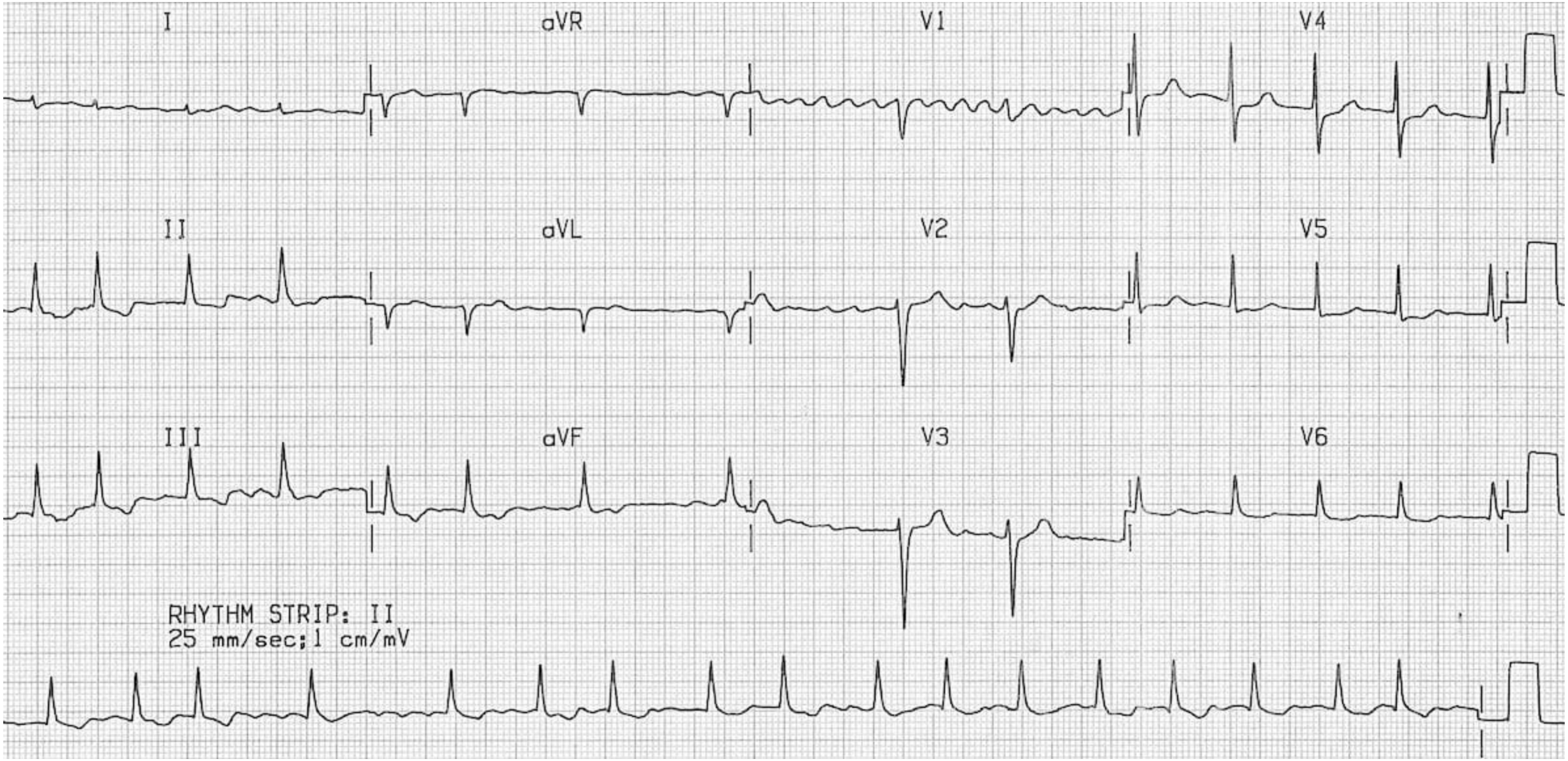
Détection de la fibrillation auriculaire lors d'un AVC ischémique



Collège National des Cardiologues des Hôpitaux

Dr Socié Pierre

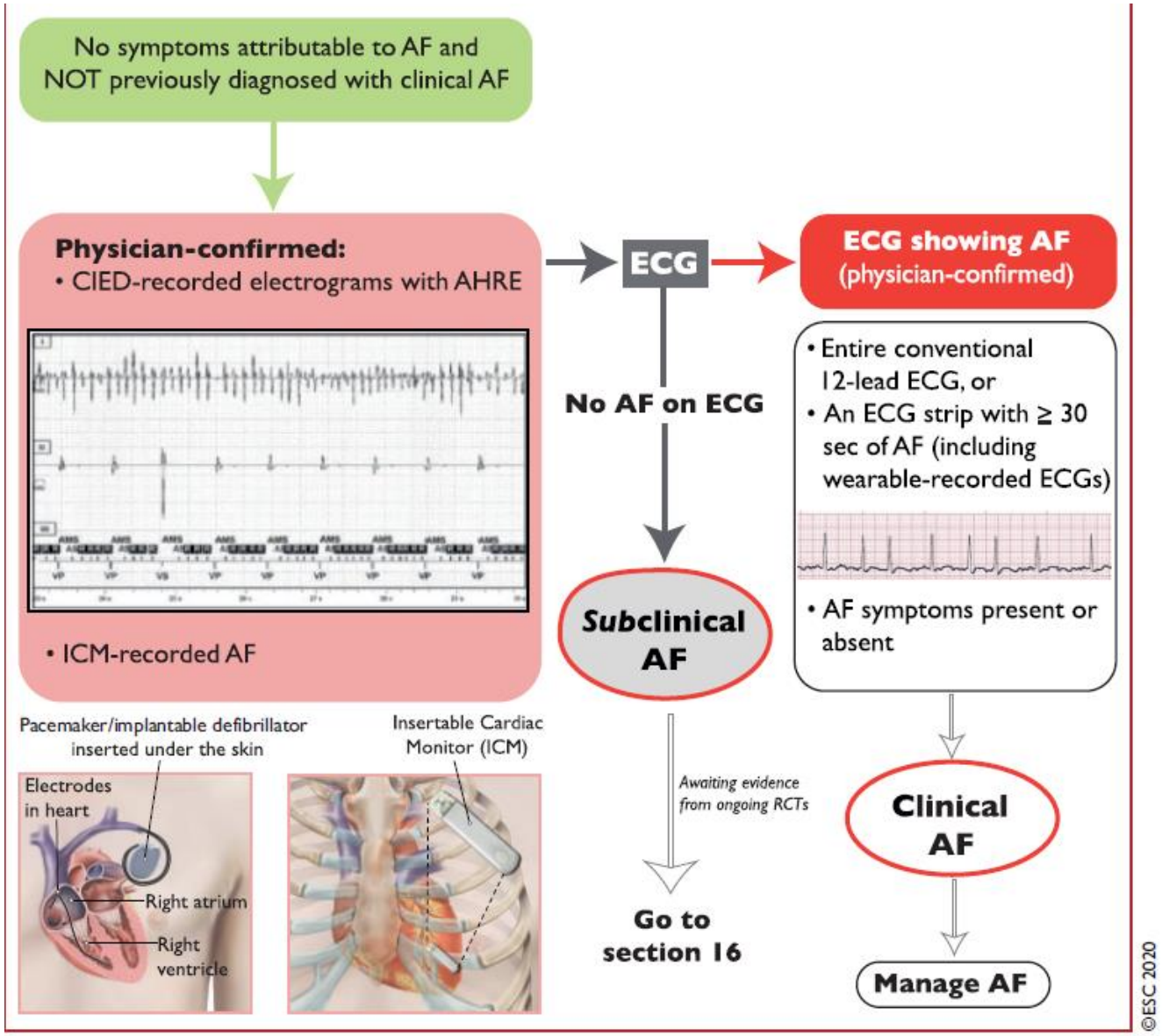
Détection de la fibrillation auriculaire lors d'un AVC ischémique



Collège National des Cardiologues des Hôpitaux

Dr Socié Pierre

Détection de la fibrillation auriculaire lors d'un AVC ischémique



Atrial high-rate episode AHRE

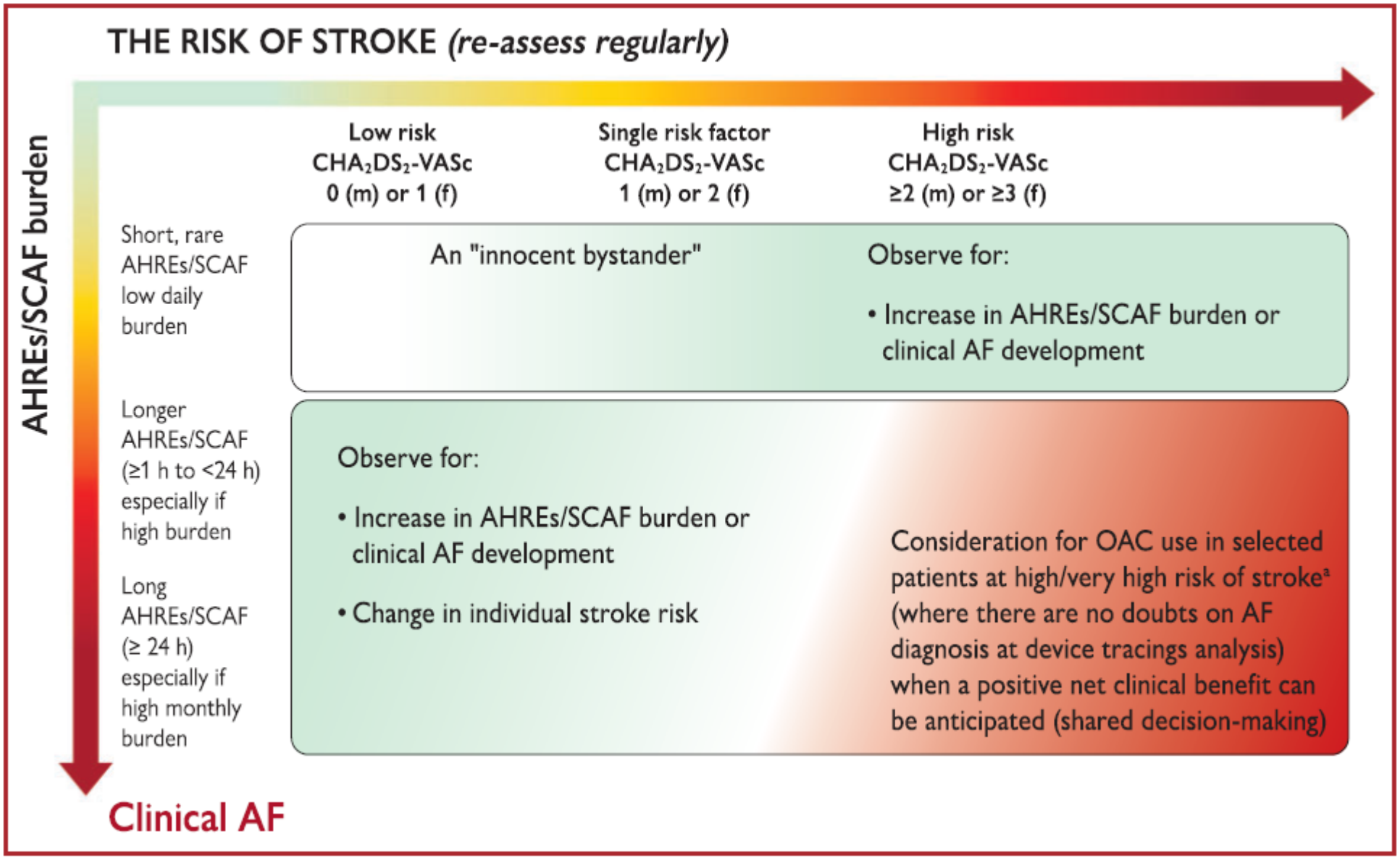
- Device-programmed rate criterion for AHRE is >_175 bpm, whereas there is no specific rate limit for subclinical AF.
- The criterion for AHRE duration is usually set at >_5 min (mainly to reduce the inclusion of artefacts), whereas a wide range of subclinical AF duration cutoffs (from 10 - 20 seconds to >24 hours) is reported in studies of the association of subclinical AF with thromboembolism.

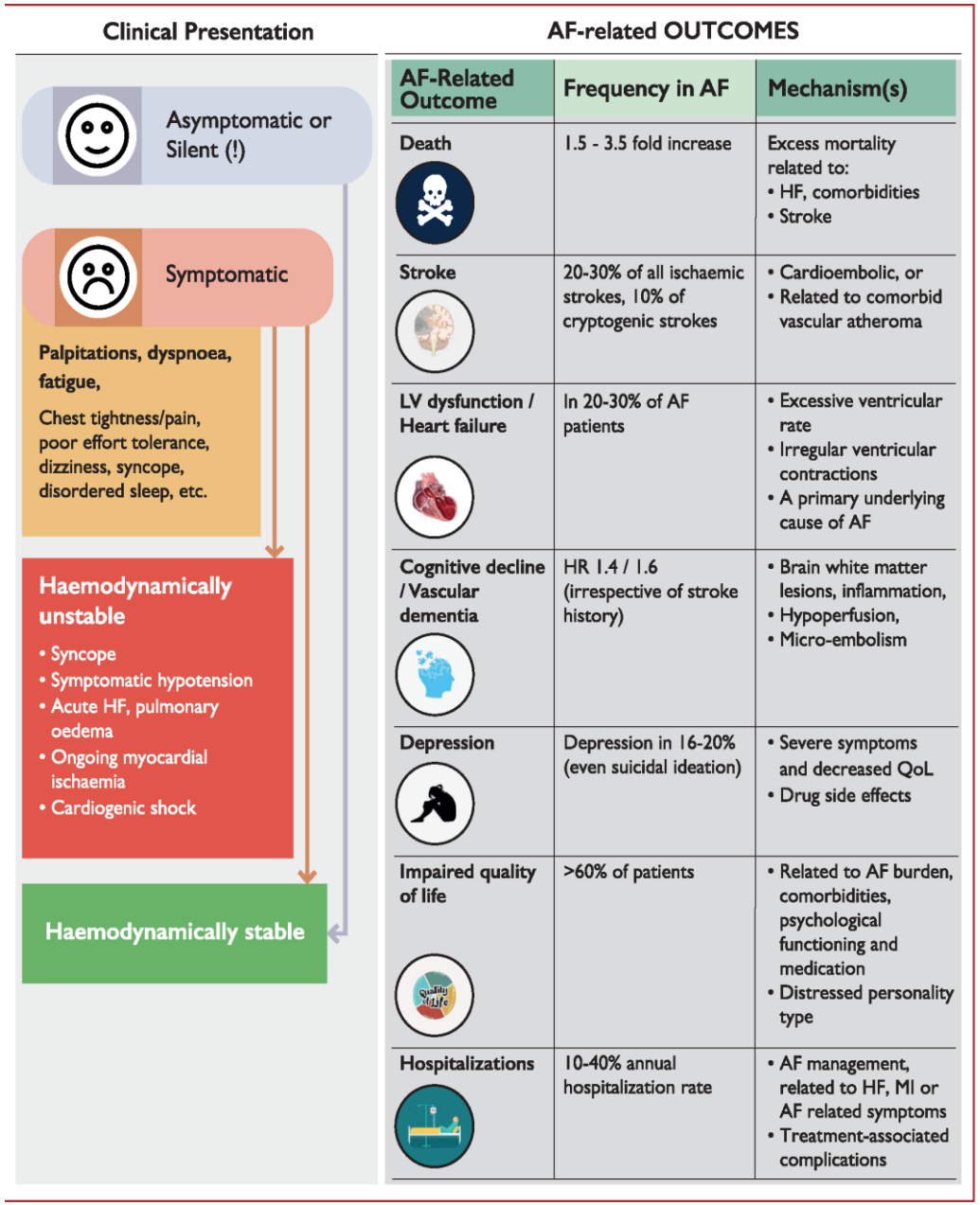
Six-month incidence of transition to higher AHRE burden[a]
(*n* = 6580, pooled from three prospective studies)[469]

	Baseline burden			
6-month progression	5 min to <1 h	1 h to <6 h	6 h to <12 h	12 h to <23 h
Transition to ≥1 h	33.5%			
Transition to ≥6 h	15.3%	42.2%		
Transition to ≥12 h	8.9%	27.5%	55.8%	
Transition to ≥23 h	5.1%	16.0%	40.6%	63.1%

Stroke rates[b] per AHRE burden and CHA_2DS_2VASc category
(*n* = 21 768 device patients not taking OAC)[1466]

	Baseline maximum daily burden		
CHA_2DS_2-VASc score	No AF	AF 6 min–23.5 h	AF >23.5 h
0	0.33%	0.52%	0.86%
1	0.62%	0.32%	0.50%
2	0.70%	0.62%	1.52%
3-4	0.83%	1.28%	1.77%
≥5	1.79%	2.21%	1.68%


THE RISK OF STROKE (re-assess regularly)
AHREs/SCAF burden
Low risk
CHA2DS2-VASc
0 (m) or 1 (f)
Single risk factor
CHA2DS2-VASc
1 (m) or 2 (f)
High risk
CHA2DS2-VASc
≥2 (m) or ≥3 (f)
Short, rare AHREs/SCAF low daily burden
An "innocent bystander"
Observe for:
• Increase in AHREs/SCAF burden or clinical AF development
Longer AHREs/SCAF (≥1 h to <24 h) especially if high burden
Long AHREs/SCAF (≥ 24 h) especially if high monthly burden
Observe for:
• Increase in AHREs/SCAF burden or clinical AF development
• Change in individual stroke risk
Consideration for OAC use in selected patients at high/very high risk of stroke[a] (where there are no doubts on AF diagnosis at device tracings analysis) when a positive net clinical benefit can be anticipated (shared decision-making)
Clinical AF
©ESC 2020

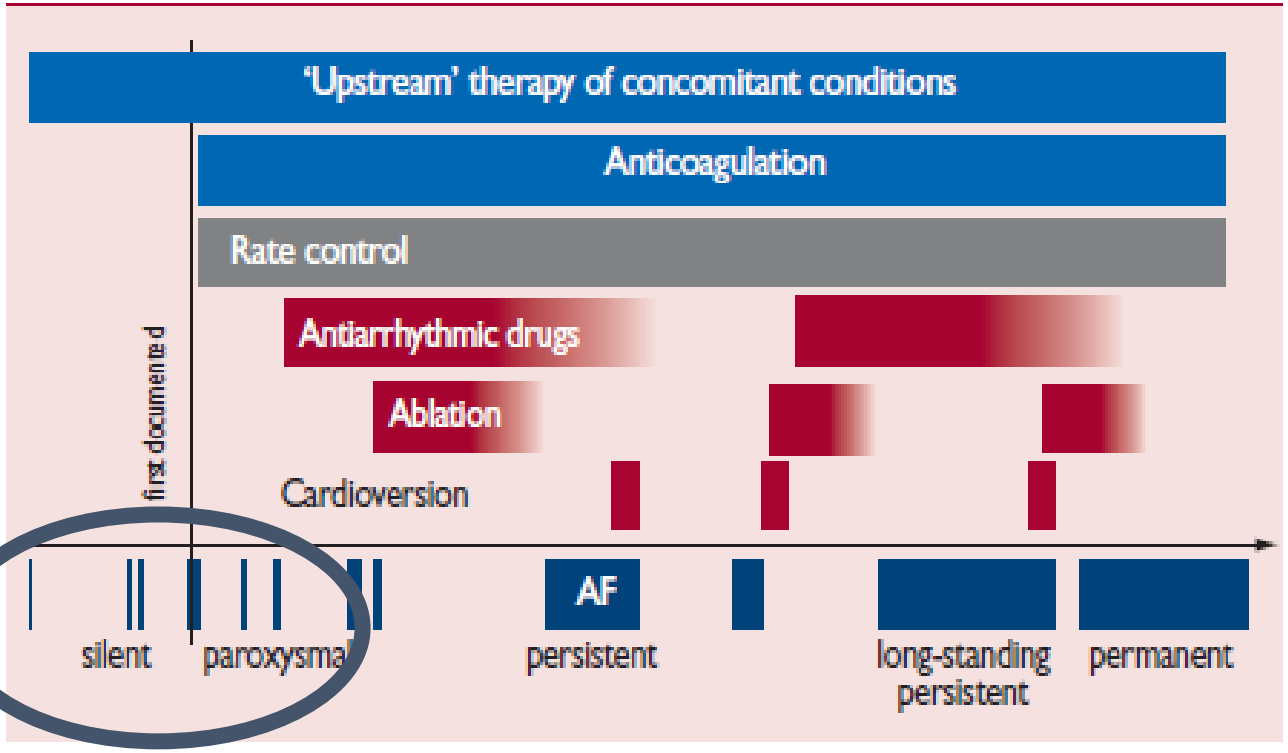


Collège National des Cardiologues des Hôpitaux

Dr Socié Pierre

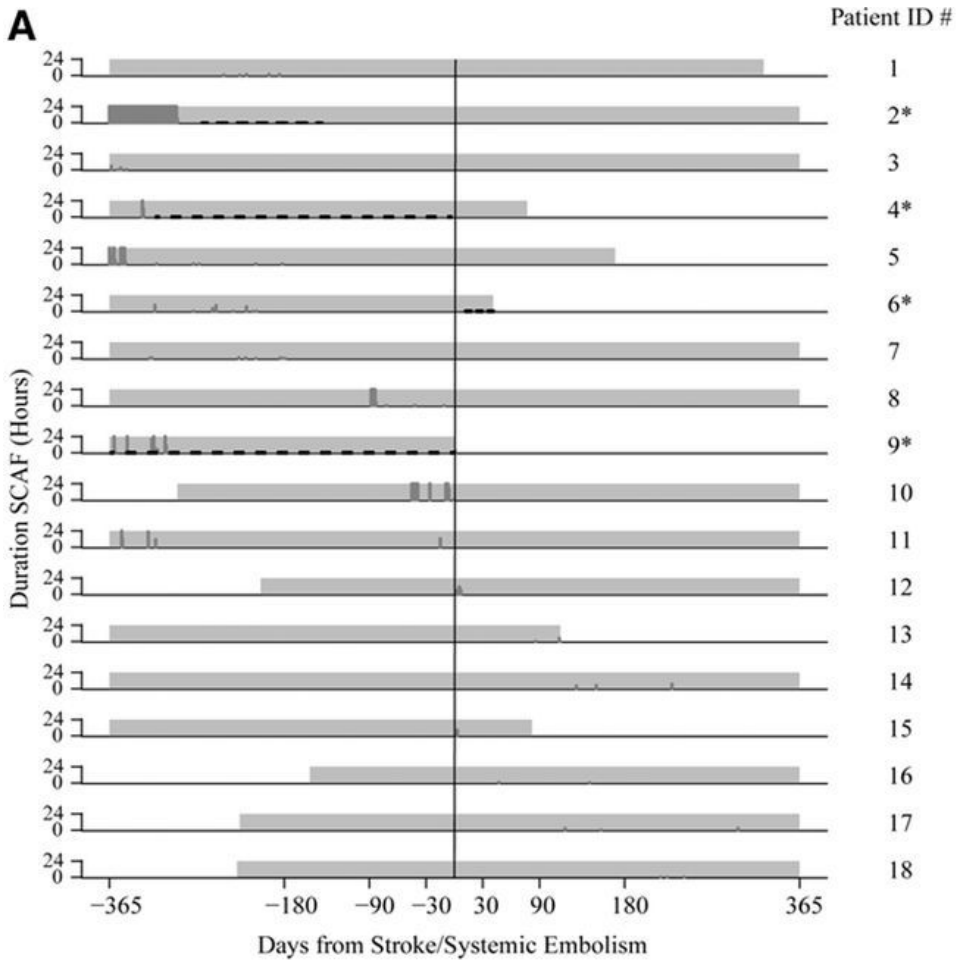
Détection de la fibrillation auriculaire lors d'un AVC ischémique

ESC guideline 2020



CHA_2DS_2-VASc score	Patients (n=7329)	Adjusted stroke rate (%/year)[b]
0	1	0%
1	422	1.3%
2	1230	2.2%
3	1730	3.2%
4	1718	4.0%
5	1159	6.7%
6	679	9.8%
7	294	9.6%
8	82	6.7%
9	14	15.2%

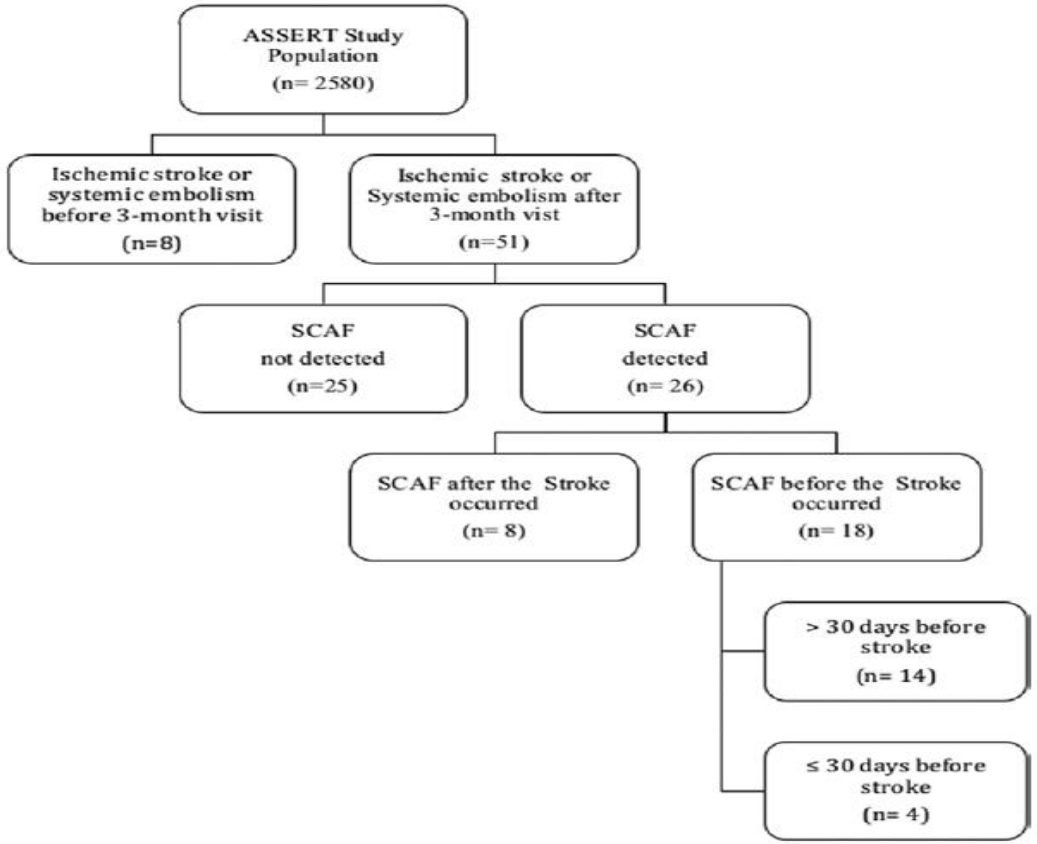
Relation FA/ AVC complexe



Arrhythmia/Electrophysiology

Temporal Relationship Between Subclinical Atrial Fibrillation and Embolic Events

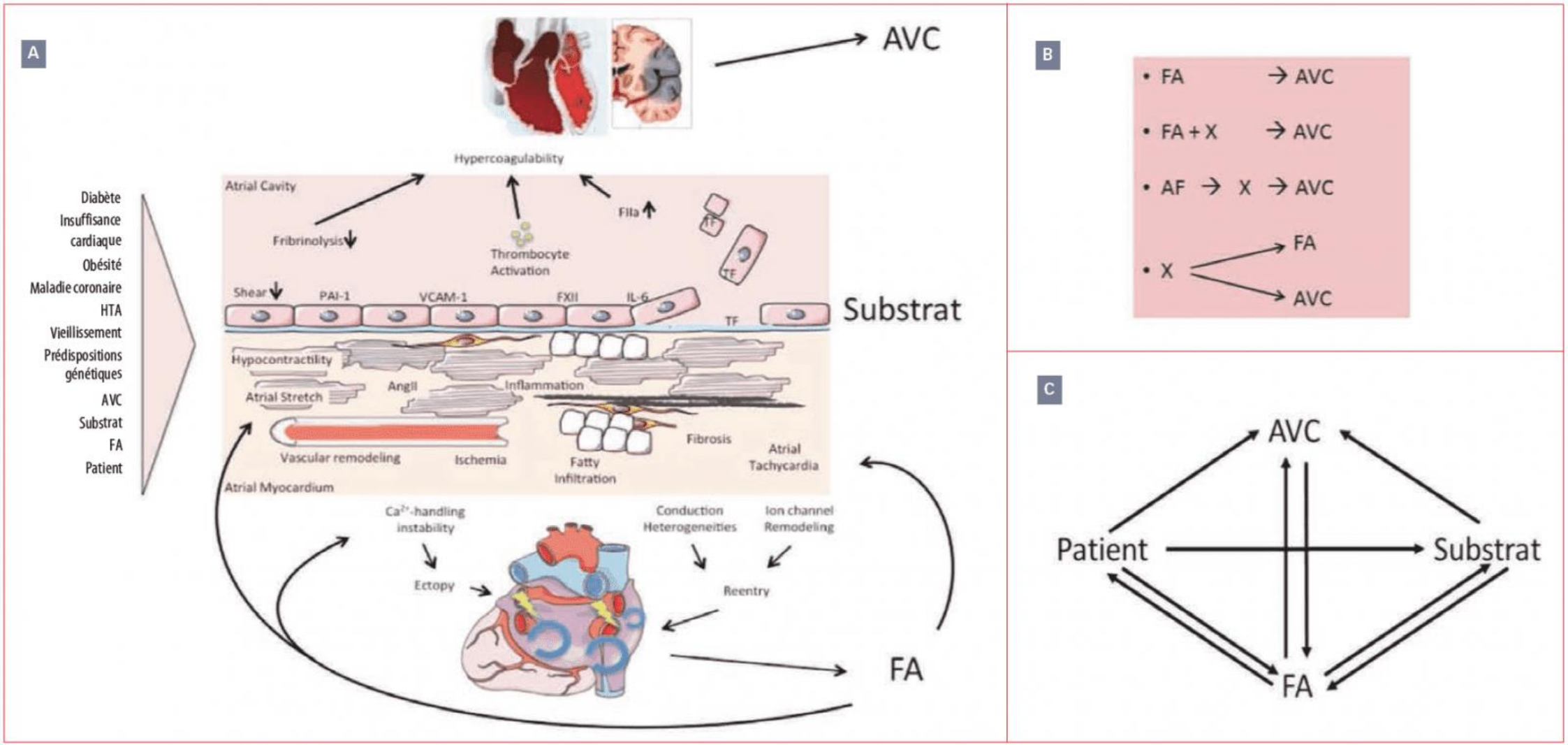
Michela Brambatti, MD; Stuart J. Connolly, MD; Michael R. Gold, MD; Carlos A. Morillo, MD; Alessandro Capucci, MD; Carmine Muto, MD; Chu P. Lau, MD; Isabelle C. Van Gelder, MD; Stefan H. Hohnloser, MD; Mark Carlson, MD; Eric Fain, MD; Juliet Nakamya, PhD; Georges H. Mairesse, MD; Marta Halytska, BSc; Wei Q. Deng, MSc; Carsten W. Israel, MD; Jeff S. Healey, MD; on behalf of the ASSERT Investigators



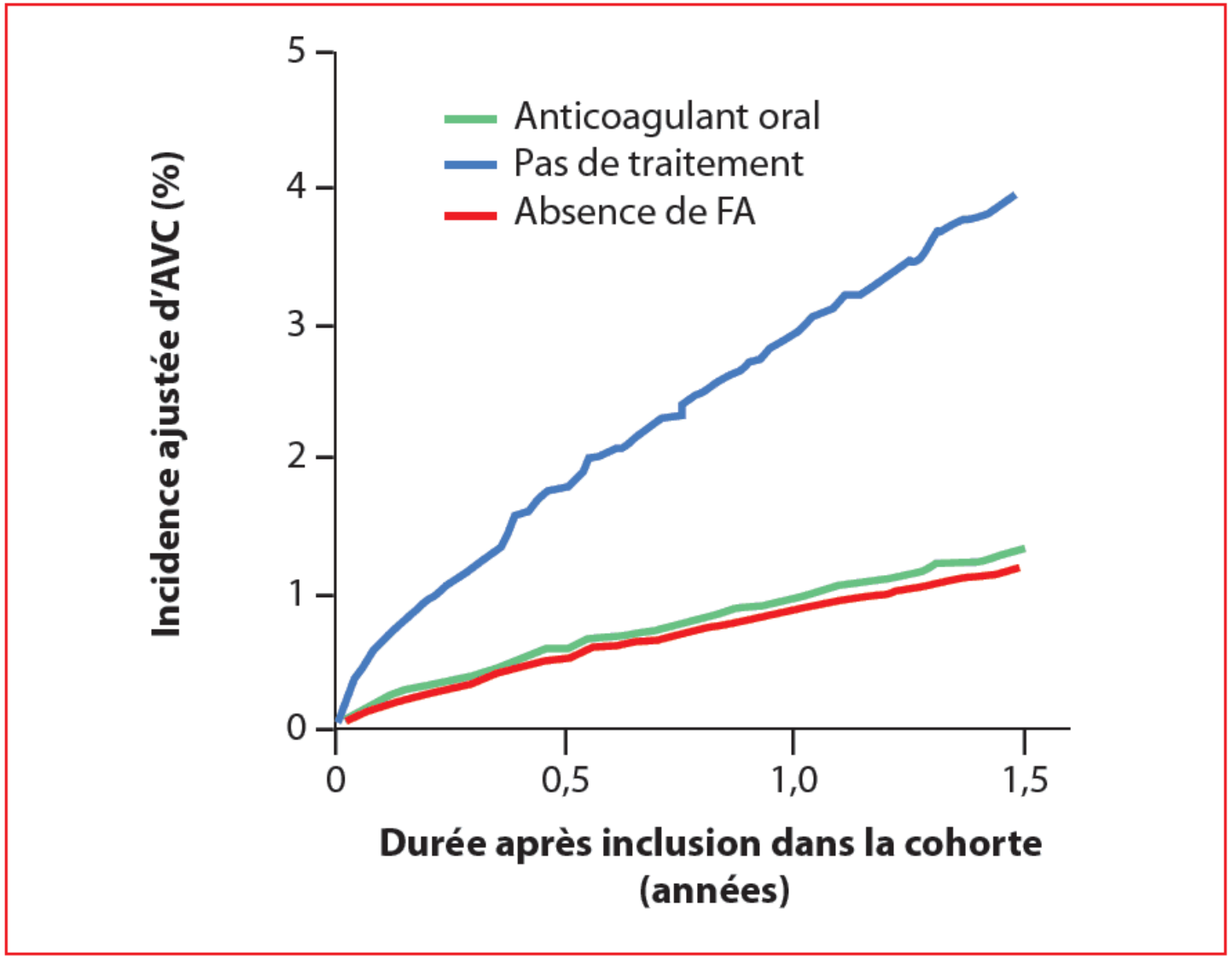
Collège National des Cardiologues des Hôpitaux

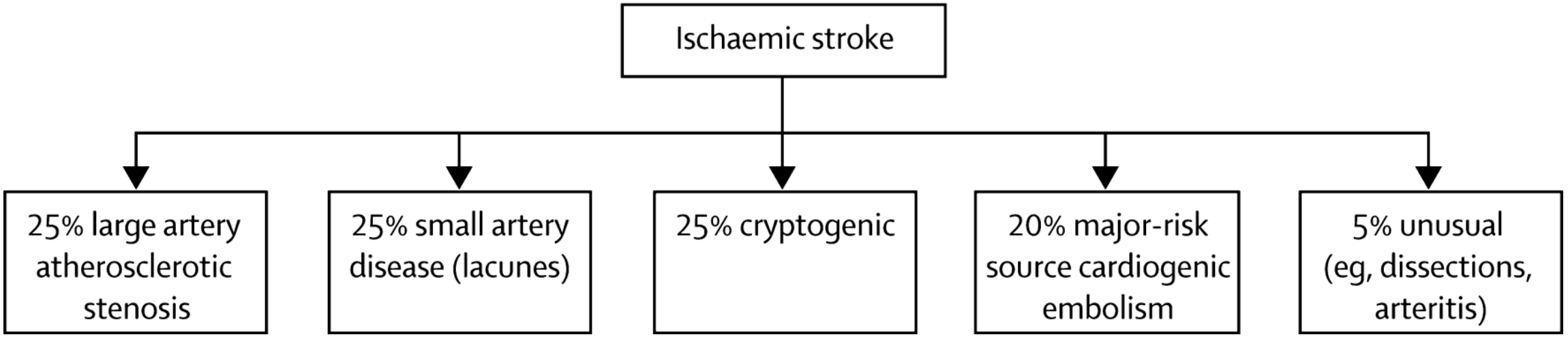
Dr Socié Pierre
Détection de la fibrillation auriculaire lors d'un AVC ischémique

Relation FA/ AVC complexe



Mais bon… les anticoagulants marchent bien !





Cryptogenic stroke patients have 3–6% risk of recurrent ischemic stroke

- The Lancet, neurology,Volume 13, Issue 4, April 2014, Pages 429-438
- Hart RG, Diener H, Coutts SB, Easton JD, Granger CB, O'Donnell MJ, et al. Embolic strokes of undetermined source: the case for a new clinical construct. Lancet Neurol.

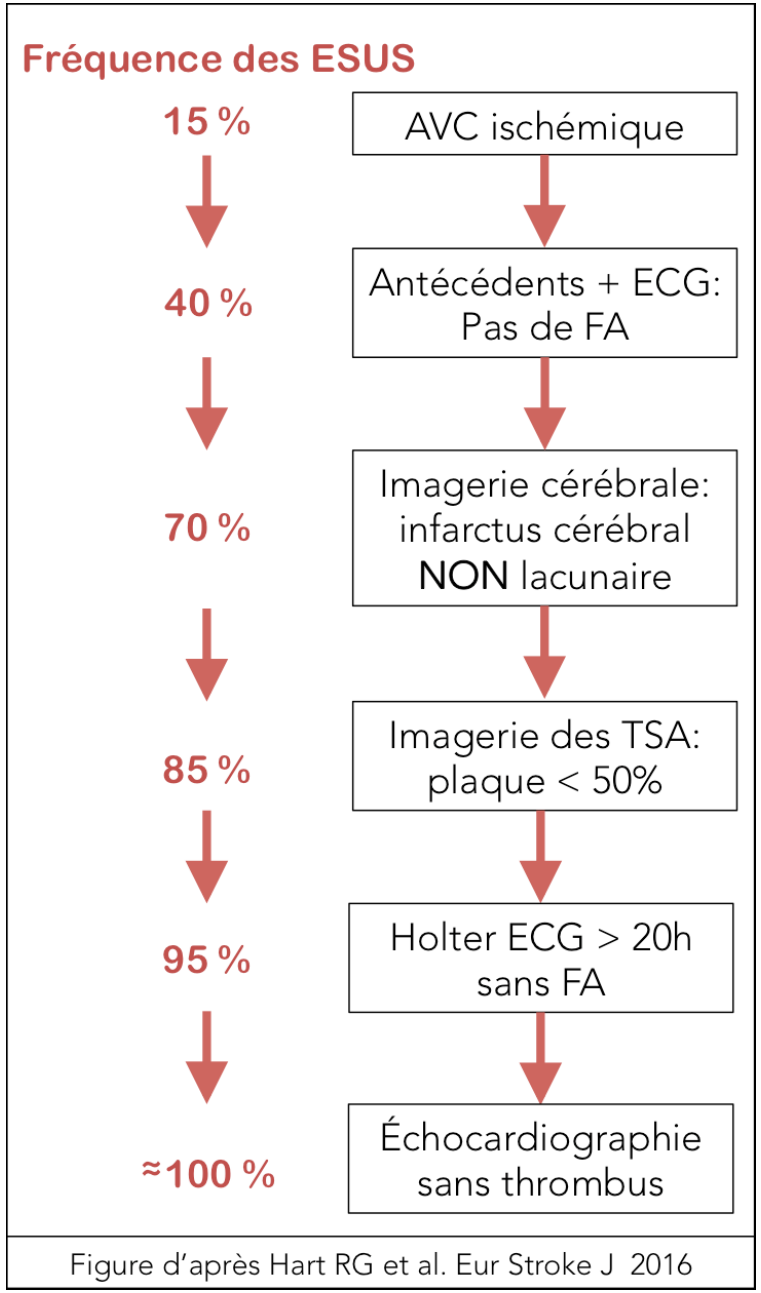


Figure d'après Hart RG et al. Eur Stroke J 2016

Il y a des AF a trouver

a first episode of AF is detected in 4–23,7% of unselected acute stroke patients without known AF at the time of stroke

1).Rizos T, Horstmann S, Dittgen F, Täger T, Jenetzky E, Heuschmann P, et al. Preexisting heart disease underlies newly diagnosed atrial fibrillation after acute ischemic stroke. Stroke. 2016;47:336–41. https://doi-org.proxy.insermbiblio.inist.fr/10.1161/STROKEAHA.115.011465.

2).Hellwig S, Grittner U, Audebert H, Endres M, Haeusler KG. Non-vitamin K-dependent oral anticoagulants have a positive impact on ischaemic stroke severity in patients with atrial fibrillation. Europace. 2018;20:569–74. https://doi-org.proxy.insermbiblio.inist.fr/10.1093/europace/eux087.

3).Grond M, Jauss M, Hamann G, Stark E, Veltkamp R, Nabavi D, et al. Improved detection of silent atrial fibrillation using 72-hour Holter ECG in patients with ischemic stroke: a prospective multicenter cohort study. Stroke. 2013;44:3357–64. https://doi-org.proxy.insermbiblio.inist.fr/10.1161/STROKEAHA.113.001884.

4)Sposato LA, Cipriano LE, Saposnik G, Ruíz Vargas E, Riccio PM, Hachinski V. Diagnosis of atrial fibrillation after stroke and transient ischaemic attack: a systematic review and meta-analysis. Lancet Neurol. 2015;14:377–87. https://doi-org.proxy.insermbiblio.inist.fr/10.1016/S1474-4422(15)70027-X.

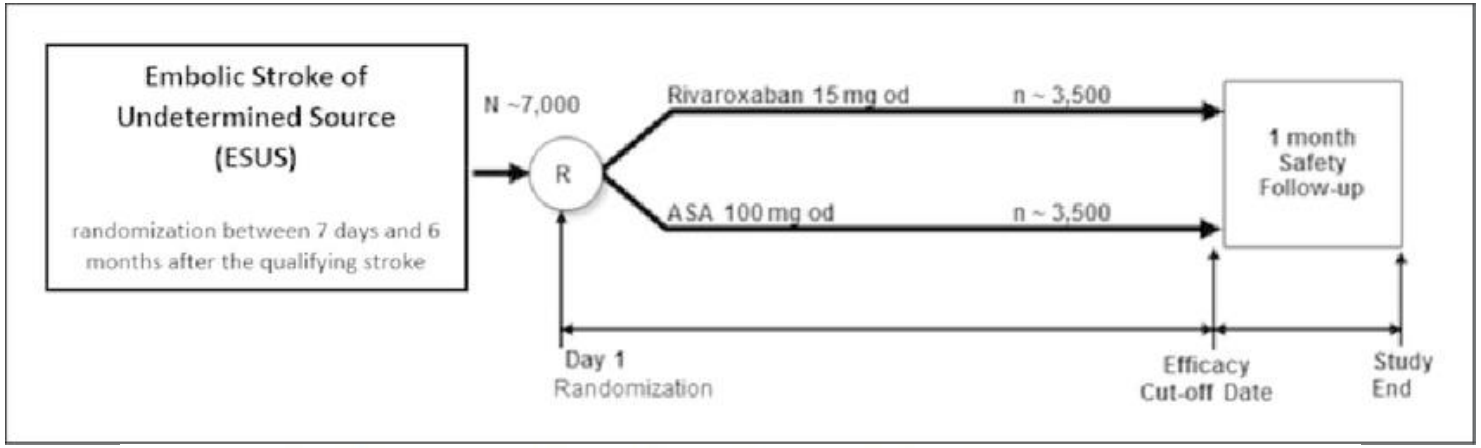
Et si on anti coagulait tout le monde ?

Based on the assumption that ESUS might be caused by so far undetected AF or other embolic sources, two large randomized secondary stroke prevention studies compared a non-vitamin K oral anticoagulant (NOAC) to acetylsalicylic acid, the present standard of care in patients with cryptogenic stroke or ESUS

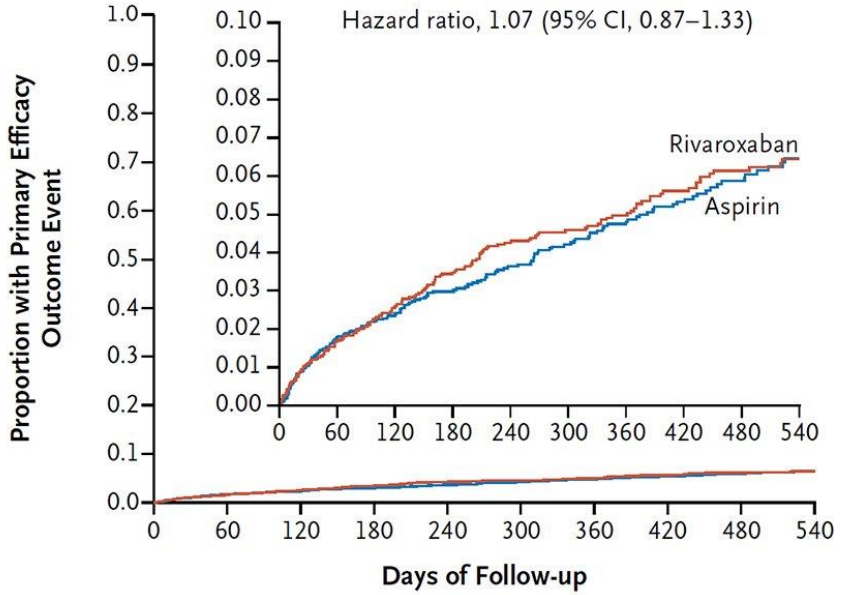
NAVIGATE ESUS

Rivaroxaban for Stroke Prevention after Embolic Stroke of Undetermined Source

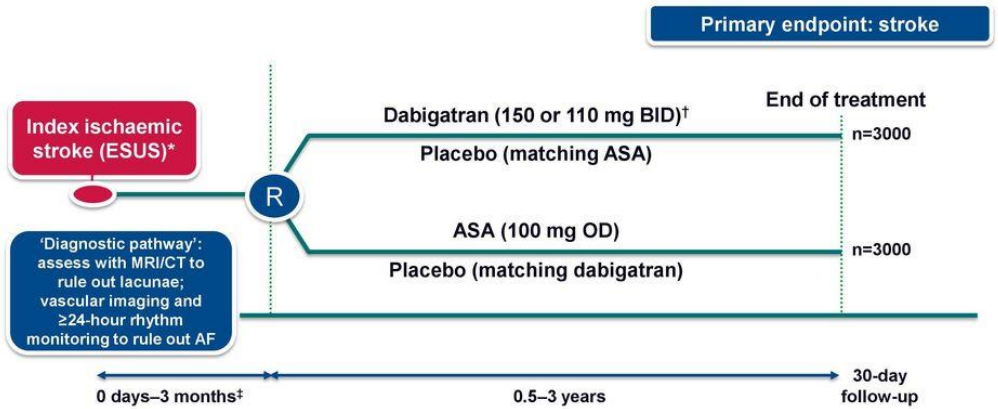
Robert G.et al.



Kaplan–Meier Curves for Time to Event in the Primary Efficacy Outcome



RE-SPECT ESUS™: design

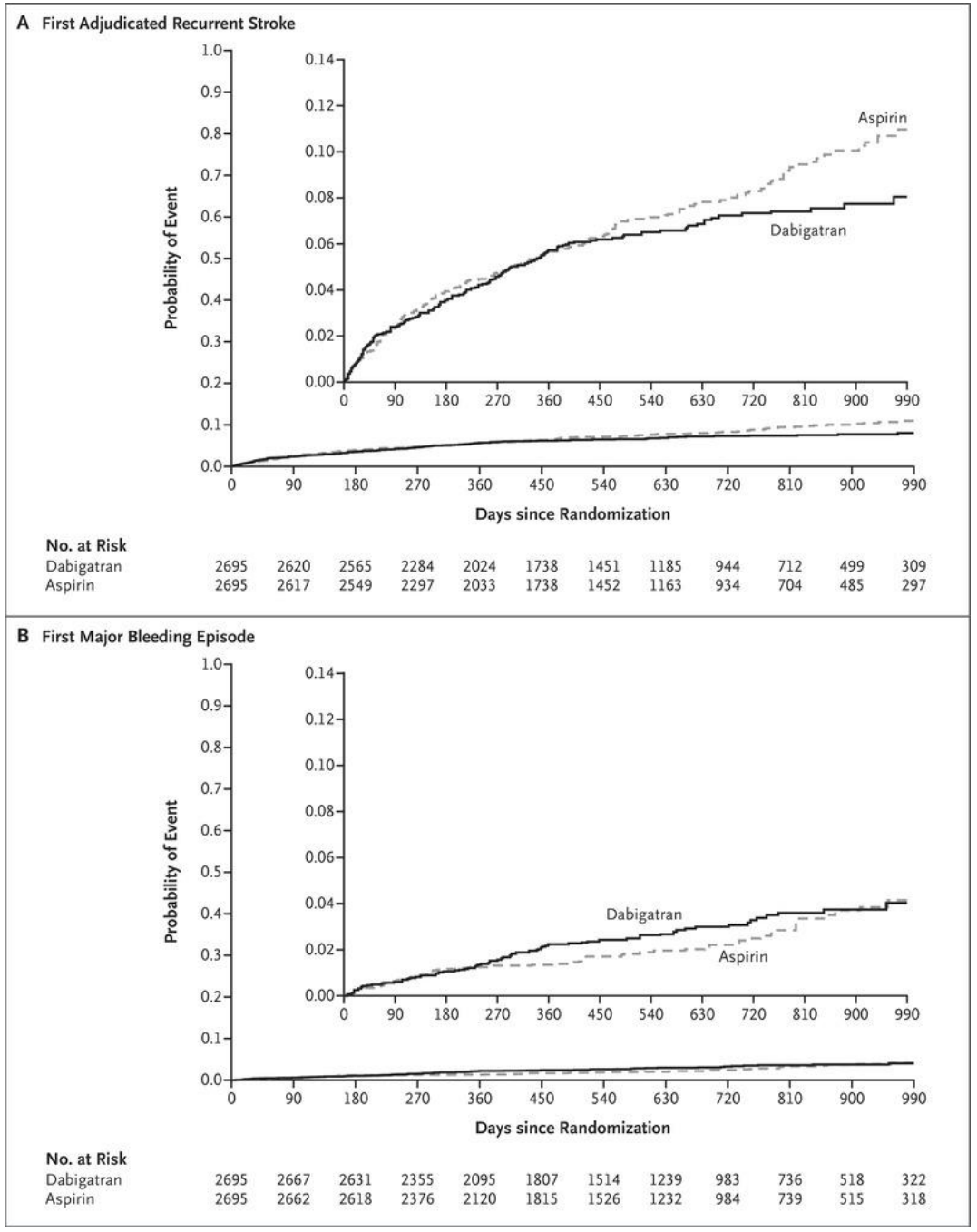


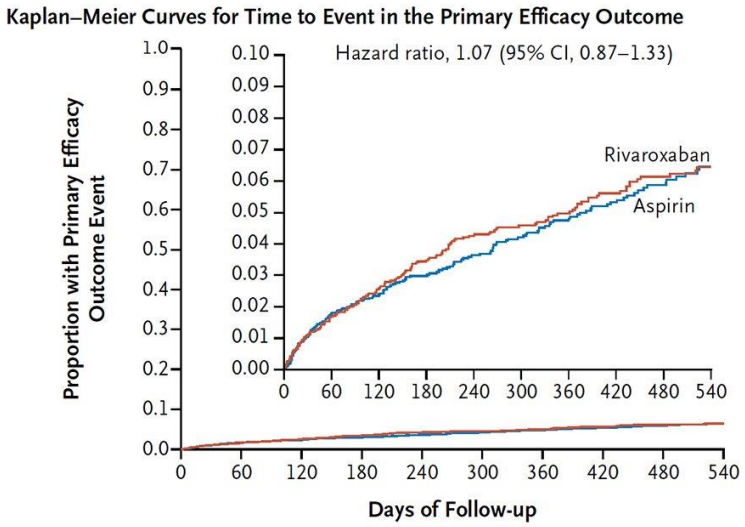
Inclusion criteria

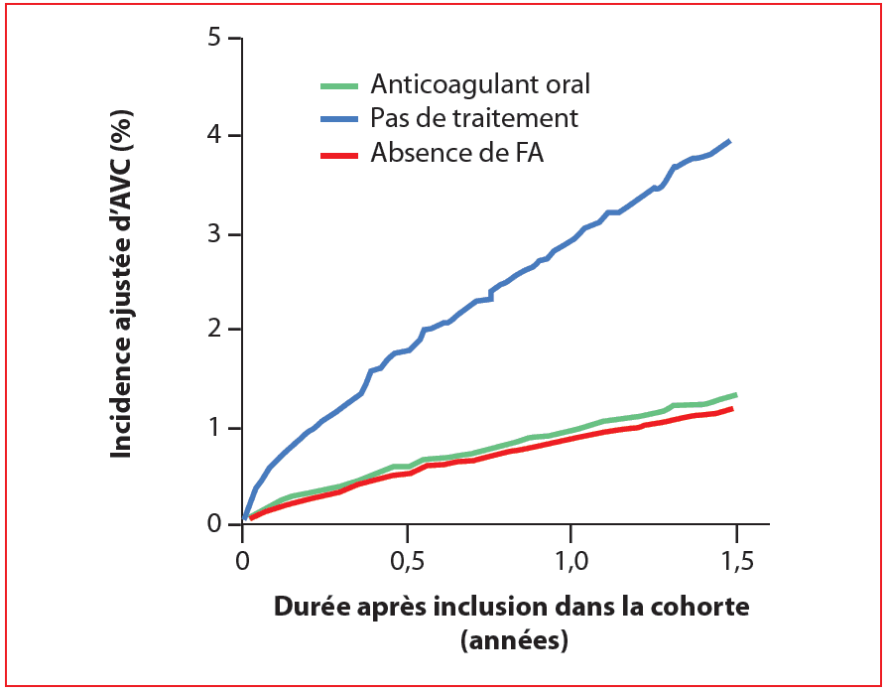
- ESUS within 3 months before randomization (6 months in patients ≥60 years + additional risk factors)
- No extra- or intra-cranial atherosclerosis with >50% luminal stenosis in artery supplying area of ischaemia
- No AF of >6 minutes' duration/24 hour period
- No major risk of cardioembolic source of embolism
- Age ≥60 years or 50–59 years with ≥1 risk factor for recurrent stroke
- Eligible for treatment with antithrombotic therapy (i.e. dabigatran etexilate or ASA)

ClinicalTrials.gov NCT02239120

Aug 2014

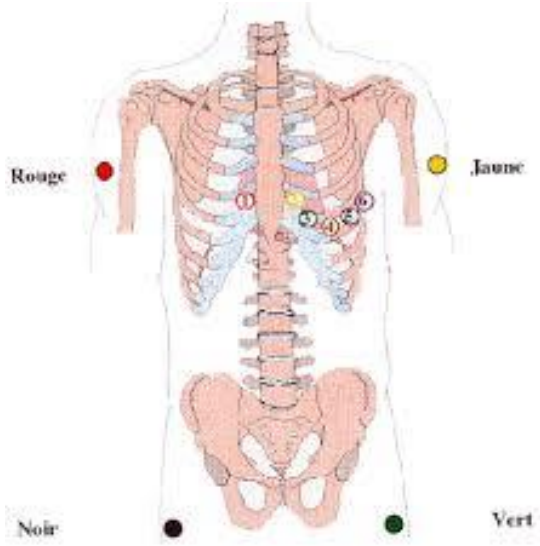



Kaplan–Meier Curves for Time to Event in the Primary Efficacy Outcome
Proportion with Primary Efficacy Outcome Event
Hazard ratio, 1.07 (95% CI, 0.87–1.33)
Rivaroxaban
Aspirin
Days of Follow-up


Anticoagulant oral
Pas de traitement
Absence de FA
Incidence ajustée d'AVC (%)
Durée après inclusion dans la cohorte (années)

1) Faire un ECG d’entrée

In patients with acute ischemic stroke or TIA, 12-lead resting ECG on hospital admission detects a first episode of AF in about **1.7–16%** of all patients



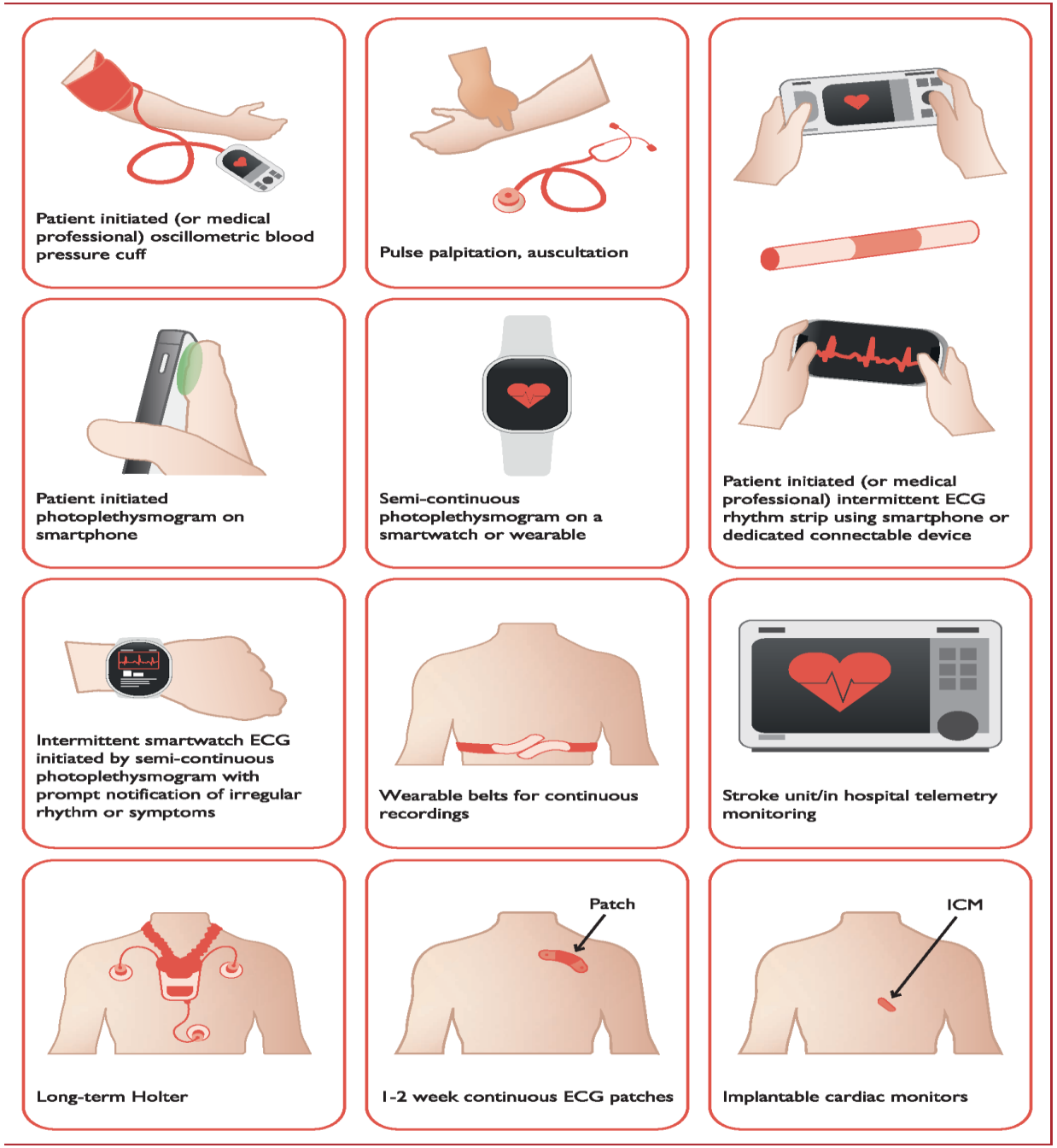
Sposato LA, Cipriano LE, Saposnik G, Ruíz Vargas E, Riccio PM, Hachinski V. Diagnosis of atrial fibrillation after stroke and transient ischaemic attack: a systematic review and meta-analysis. Lancet Neurol. 2015;14:377–87. https://doi-org.proxy.insermbiblio.inist.fr/10.1016/S1474-4422(15)70027-X.

2) Faire un Holter au moins de 24 h

Additional (monitor-based) ECG monitoring for 24 h detects a first episode of AF in about 0.2–13% of all patients, while ECG monitoring for 72 h detects a first episode of AF in about 2.3–11% of all patients with acute ischemic stroke. Within a week after stroke, 1.7–14% of all patients were diagnosed to have AF

Sposato LA, Cipriano LE, Saposnik G, Ruíz Vargas E, Riccio PM, Hachinski V. Diagnosis of atrial fibrillation after stroke and transient ischaemic attack: a systematic review and meta-analysis. Lancet Neurol. 2015;14:377–87. https://doi-org.proxy.insermbiblio.inist.fr/10.1016/S1474-4422(15)70027-X.

Et après ?


Patient initiated (or medical professional) oscillometric blood pressure cuff
Pulse palpitation, auscultation
Patient initiated photoplethysmogram on smartphone
Semi-continuous photoplethysmogram on a smartwatch or wearable
Patient initiated (or medical professional) intermittent ECG rhythm strip using smartphone or dedicated connectable device
Intermittent smartwatch ECG initiated by semi-continuous photoplethysmogram with prompt notification of irregular rhythm or symptoms
Wearable belts for continuous recordings
Stroke unit/in hospital telemetry monitoring
Long-term Holter
Patch
1-2 week continuous ECG patches
ICM
Implantable cardiac monitors
©ESC 2020

Guideline ?

US guideline recommends ECG monitoring for 30 days (Class IIa, Level C) in patients with a cryptogenic stroke within the last 6 months

The guidelines of the European Stroke Organization (ESO) recommend a long-term ECG registration in stroke patients with high suspicion of asymptomatic, paroxysmal AF. Specific information on the duration of ECG monitoring in the acute phase is not given

Recommendations for the search for AF in patients with cryptogenic stroke

Recommendations	Class[a]	Level[b]
In patients with acute ischaemic stroke or TIA and without previously known AF, monitoring for AF is recommended using a short-term ECG recording for at least the first 24 h, followed by continuous ECG monitoring for at least 72 h whenever possible.[1113–1116]	I	B
In selected[c] stroke patients without previously known AF, additional ECG monitoring using long-term non-invasive ECG monitors or insertable cardiac monitors should be considered, to detect AF.[1112]	IIa	B

ORIGINAL ARTICLE

Cryptogenic Stroke and Underlying Atrial Fibrillation

Tommaso Sanna, M.D., Hans-Christoph Diener, M.D., Ph.D., Rod S. Passman, M.D., M.S.C.E., Vincenzo Di Lazzaro, M.D., Richard A. Bernstein, M.D., Ph.D., Carlos A. Morillo, M.D., Marilyn Mollman Rymer, M.D., Vincent Thijs, M.D., Ph.D., Tyson Rogers, M.S., Frank Beckers, Ph.D., Kate Lindborg, Ph.D., and Johannes Brachmann, M.D. for the CRYSTAL AF Investigators*

CRYSTAL - AF

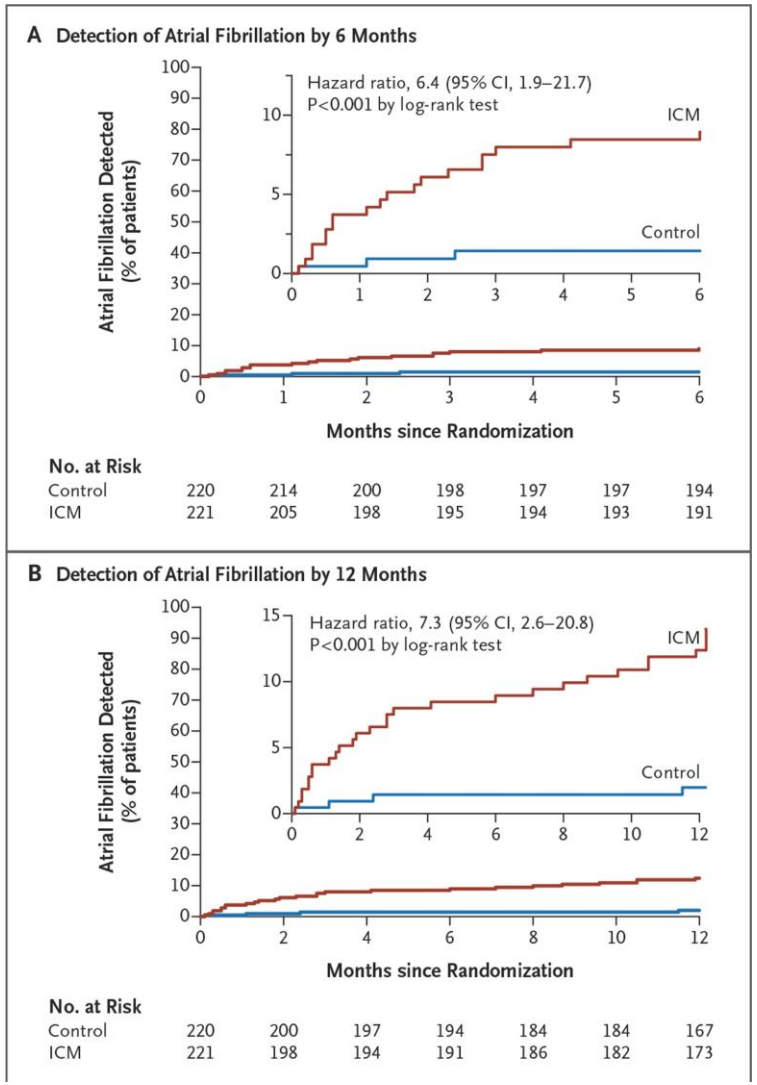
- **Inclusion**:
- •≥40 ans
- •AVC cryptogénique (ou AIT clinique) avec zone infarcie visible à l'IRM ou au CT dans les 90 jours précédents l'inclusion, et aucun diagnostic posé (incluant la FA) après:
- •ECG 12 dérivations
- •Surveillance ECG de 24h (ex : Holter)
- •Echocardiographie trans-œsophagienne
- •Imagerie cérébrale et cervicale pour exclure une cause vasculaire
- •Recherche de thrombophilie (hypercoagulabilité) chez les patients <55 ans

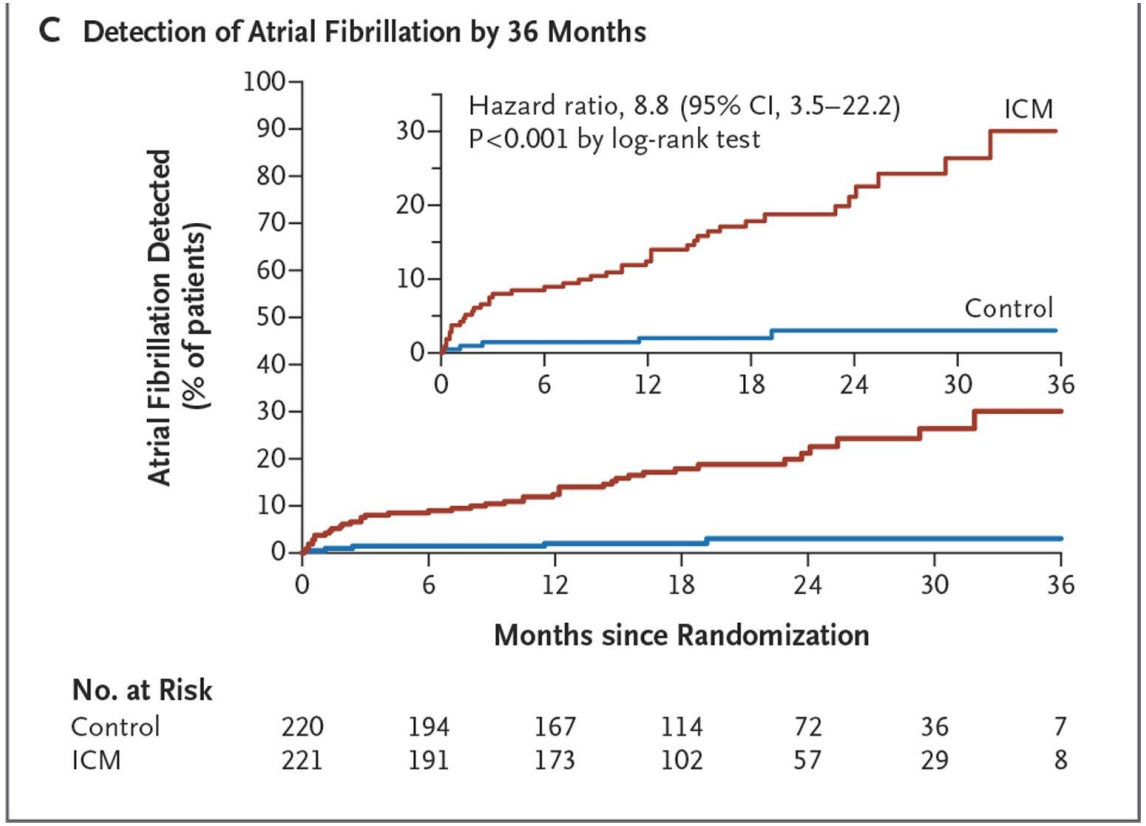
- **Exclusion**:
- •Antécédents de FA ou de flutter atrial
- •Indication ou contre indication d'anticoagulation

- **SUIVI DES PATIENTS**
- Les patients ont effectué des visites de contrôle à t0 + :
- –1 mois
- –6 mois
- –12 mois
- –Tous les 6 mois après la fin de l’étude

- La visite comprenait notamment:
- –Relevé des symptômes cardiaques
- –Modifications de traitement
- –Récurrence d’AVC ou d’AIT

Characteristic	Insertable Cardiac Monitor (N=221)	Control (N=220)	P Value
Age — yr	61.6±11.4	61.4±11.3	0.84
Sex — no. (%)			0.77
Male	142 (64.3)	138 (62.7)	
Female	79 (35.7)	82 (37.3)	
Race or ethnic group — no. (%)†			0.60
Asian	3 (1.4)	2 (0.9)	
Black	7 (3.2)	10 (4.5)	
Hispanic or Latino	2 (0.9)	2 (0.9)	
White	194 (87.8)	191 (86.8)	
Other	0	3 (1.4)	
Not available	15 (6.8)	12 (5.5)	
Geographic region — no. (%)			0.32
North America	83 (37.6)	72 (32.7)	
Europe	138 (62.4)	148 (67.3)	
Patent foramen ovale — no. (%)	52 (23.5)	46 (20.9)	0.57
Index event — no. (%)			0.87
Stroke	200 (90.5)	201 (91.4)	
TIA	21 (9.5)	19 (8.6)	
Prior stroke or TIA — no. (%)			
Stroke	37 (16.7)	28 (12.7)	0.28
TIA	22 (10.0)	27 (12.3)	0.45
Prior stroke or TIA — no. (%)			
Stroke	37 (16.7)	28 (12.7)	0.28
TIA	22 (10.0)	27 (12.3)	0.45
Score on modified Rankin scale — no. (%)‡			0.85
0–2	184 (83.3)	186 (84.5)	
>2	36 (16.3)	34 (15.5)	
Score on NIH Stroke Scale§	1.6±2.7	1.9±3.8	0.37
Hypertension — no. (%)	144 (65.2)	127 (57.7)	0.12
Diabetes — no. (%)	34 (15.4)	38 (17.3)	0.61
$CHADS_2$ score — no. (%)¶			0.17
2	69 (31.2)	81 (36.8)	
3	92 (41.6)	91 (41.4)	
4	50 (22.6)	34 (15.5)	
5	9 (4.1)	14 (6.4)	
6	1 (0.5)	0	
Hypercholesterolemia — no. (%)	125 (56.6)	128 (58.2)	0.77
Current smoker — no. (%)	43 (19.5)	44 (20.0)	0.91
Coronary artery disease — no. (%)	16 (7.2)	9 (4.1)	0.22
Use of antiplatelet agent — no. (%)	212 (95.9)	212 (96.4)	1.00





Collège National des Cardiologues des Hôpitaux

Dr Socié Pierre

Détection de la fibrillation auriculaire lors d'un AVC ischémique

Circulation

ORIGINAL RESEARCH ARTICLE

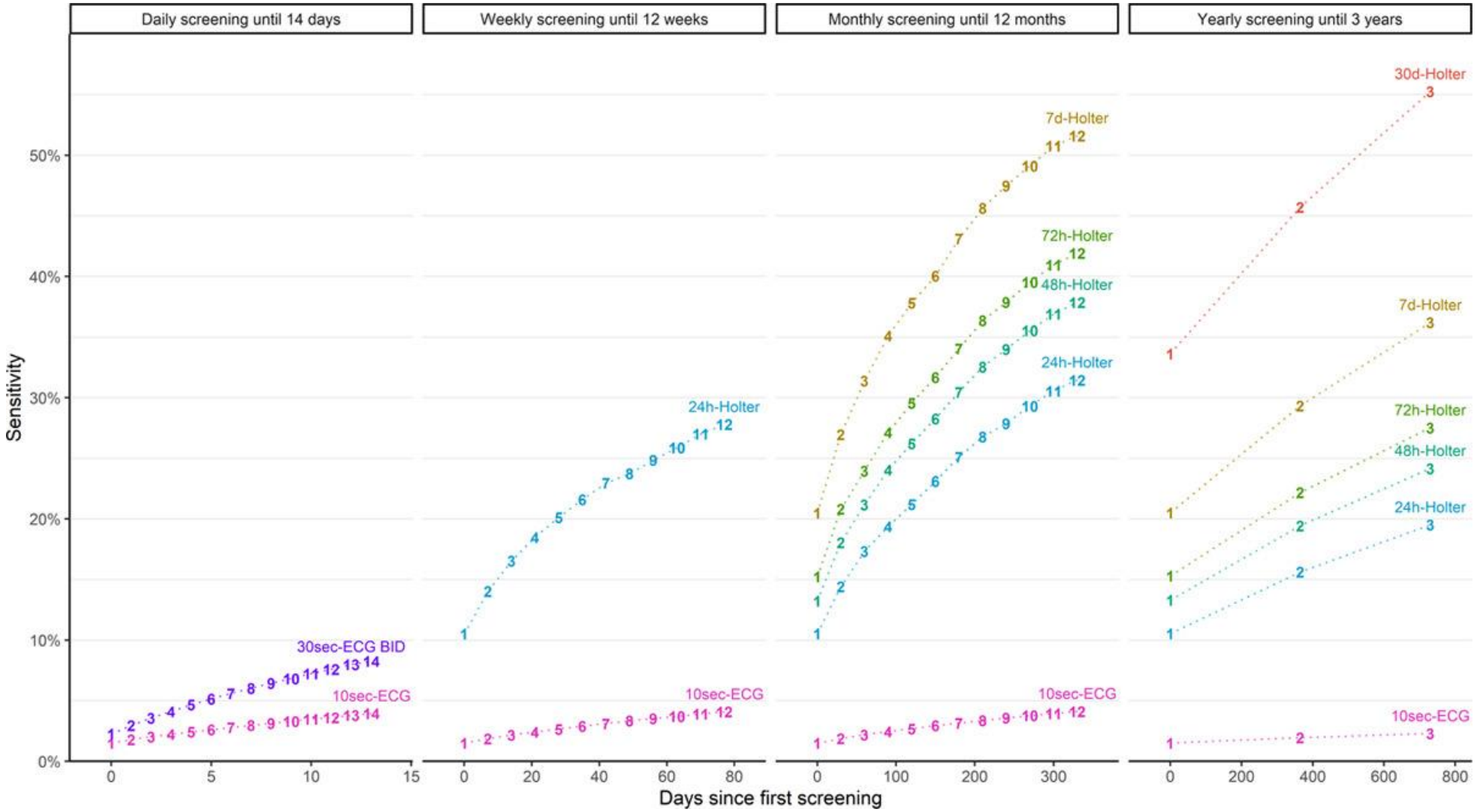
Comprehensive Evaluation of Rhythm Monitoring Strategies in Screening for Atrial Fibrillation

Insights From Patients at Risk Monitored Long Term With an Implantable Loop Recorder

Circulation, S.Z Diederichsen et. Al, Volume 141, Issue 19, 12 May 2020;, Pages 1510-1522

Table 1. Characteristics of the Study Participants According to Presence of AF in the Rhythm History

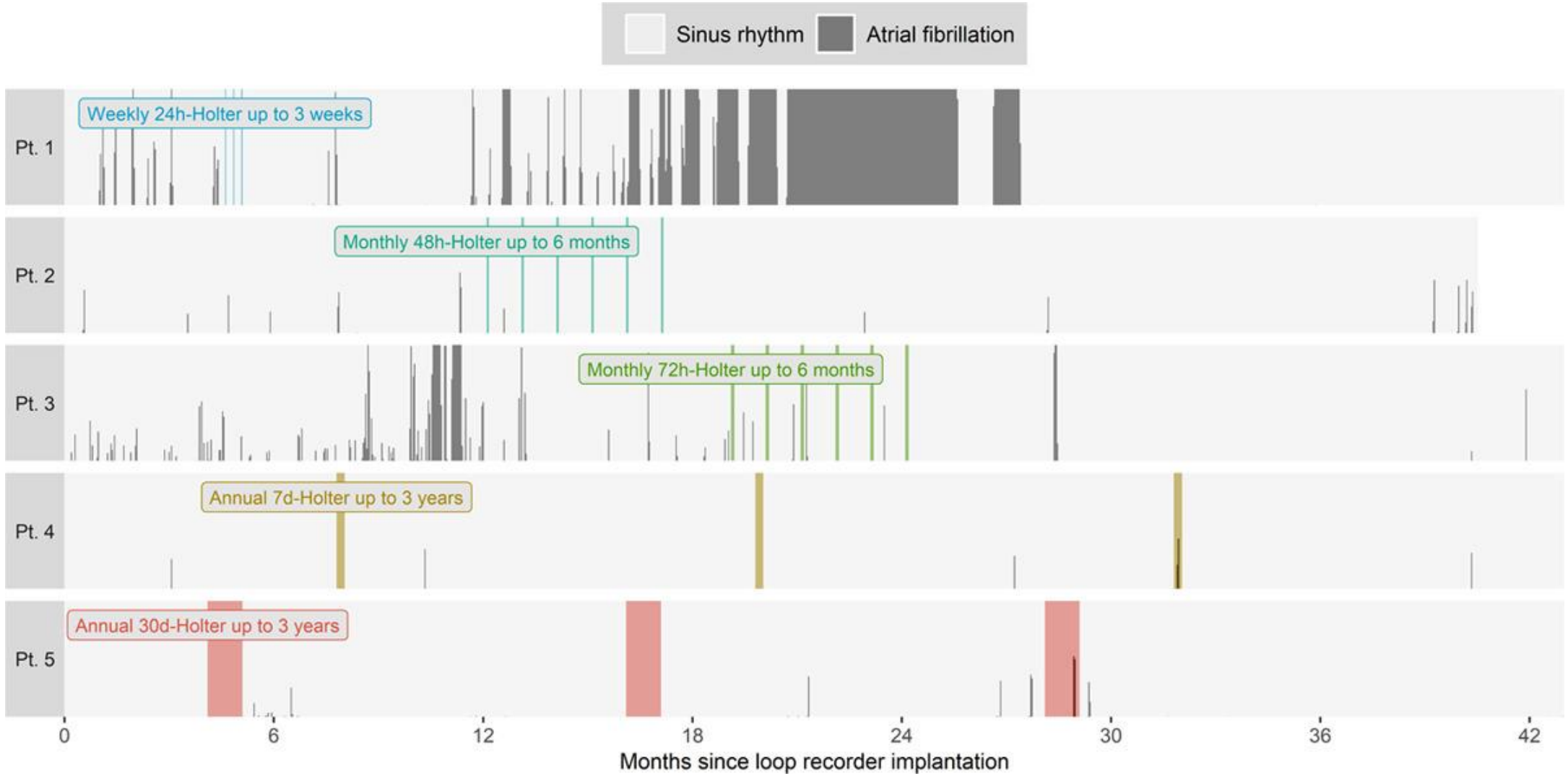
	AF Present (n=205)	AF Absent (n=385)	*P* Value
Male sex	121 (59.0)	216 (56.1)	0.6
Age, y	77.1±4.5	76.0±4.0	0.002
Age ≥75 y	124 (60.5)	183 (47.5)	0.004
$CHADS_2$ score	2.4 (1.1)	2.2 (1.1)	0.07
CHA_2DS_2VASc score	4.0 (1.2)	3.9 (1.2)	0.09
Heart failure	6 (2.9)	18 (4.7)	0.4
Hypertension	187 (91.2)	346 (89.9)	0.7
Diabetes mellitus	60 (29.3)	112 (29.1)	1.0
Previous stroke or TIA	47 (22.9)	83 (21.6)	0.5
Previous stroke	41 (20.0)	66 (17.1)	0.5
Previous TIA	21 (10.2)	46 (11.9)	0.6
Previous systemic embolism	17 (8.3)	25 (6.5)	0.5
Previous AMI	20 (9.8)	35 (9.1)	0.9
Previous CABG	14 (6.8)	25 (6.5)	1.0
Valvular heart disease	12 (5.9)	14 (3.6)	0.3
β-Blockers	48 (23.4)	93 (24.2)	0.9
Calcium channel blockers	82 (40.0)	125 (32.5)	0.08
Renin-angiotensin inhibitors	119 (58.0)	233 (60.5)	0.6
Lipid-lowering drugs	120 (58.5)	196 (50.9)	0.09
Diuretics	63 (30.7)	113 (29.4)	0.8
Platelet inhibitors	105 (51.2)	186 (48.3)	0.6
Glucose-lowering drugs	51 (24.9)	96 (24.9)	1.0
Body mass index, kg/m²	27.8±4.8	27.4±4.4	0.3
NT-proBNP, pmol/L	21 (12–33)	14 (8–26)	<0.0001
NT-proBNP ≥40 pmol/L	33 (17.6)	49 (14.5)	0.4



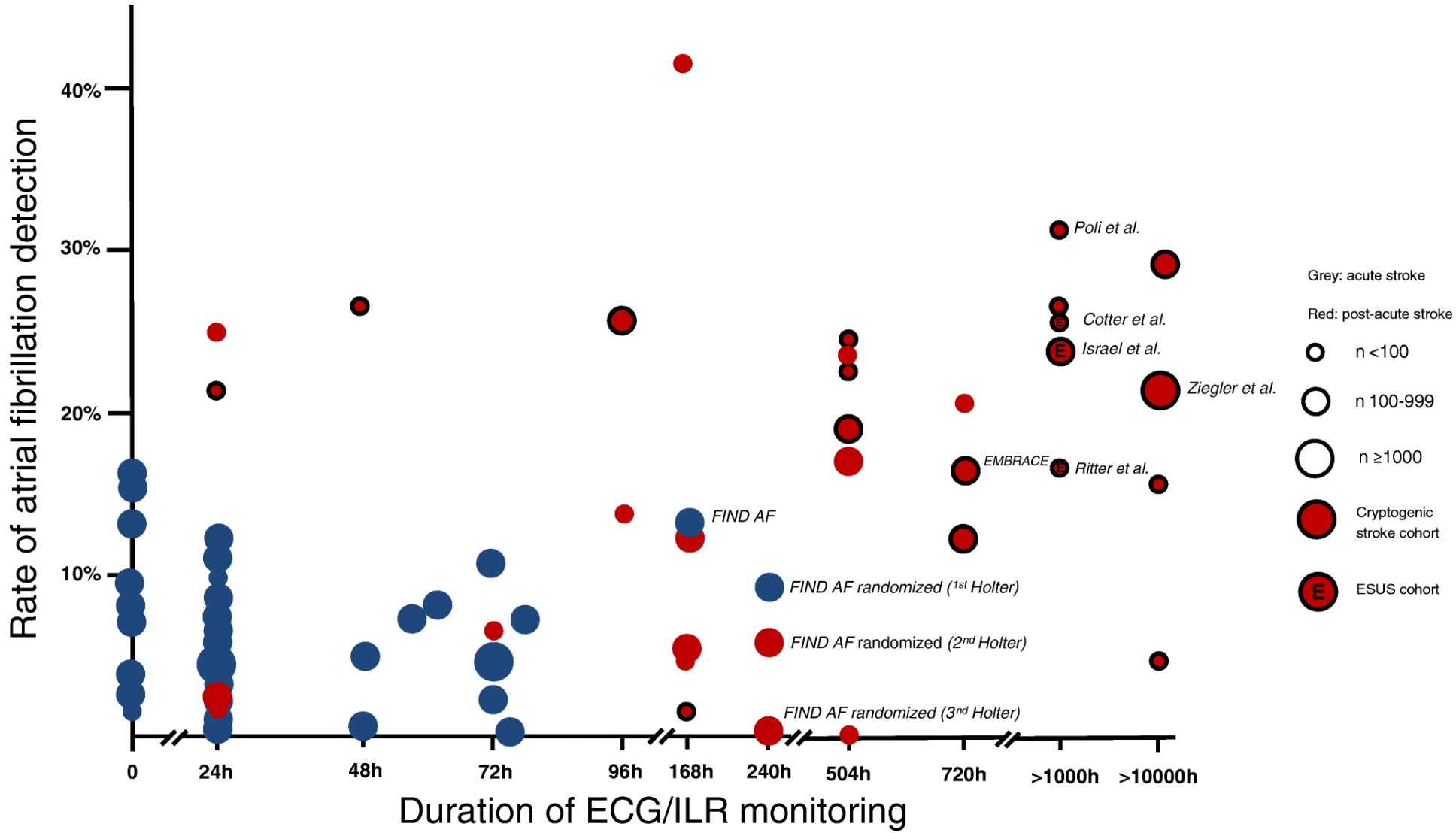
Circulation, S.Z Diederichsen et. Al, Volume 141, Issue 19, 12 May 2020;, Pages 1510-1522

CONCLUSIONS: In screening for AF among participants with stroke risk factors, the diagnostic yield increased with duration, dispersion, and number of screenings, although all strategies had low yield compared with the implantable loop recorder. The sensitivity was higher among participants who were older, were male, or had higher NT-proBNP.

REGISTRATION: URL: https://www.clinicaltrials.gov; Unique identifier: NCT02036450.



Circulation, S.Z Diederichsen et. Al, Volume 141, Issue 19, 12 May 2020;, Pages 1510-1522


Rate of atrial fibrillation detection
40%
30%
20%
10%
0
24h
48h
72h
96h
168h
240h
504h
720h
>1000h
>10000h
Duration of ECG/ILR monitoring
Poli et al.
Cotter et al.
Israel et al.
Ziegler et al.
EMBRACE
Ritter et al.
FIND AF
FIND AF randomized (1st Holter)
FIND AF randomized (2nd Holter)
FIND AF randomized (3nd Holter)
Grey: acute stroke
Red: post-acute stroke
n <100
n 100-999
n ≥1000
Cryptogenic stroke cohort
ESUS cohort

Patient à risque de retrouver de la AF ?

Age >65 years

CHA2DS2VASC score≥2

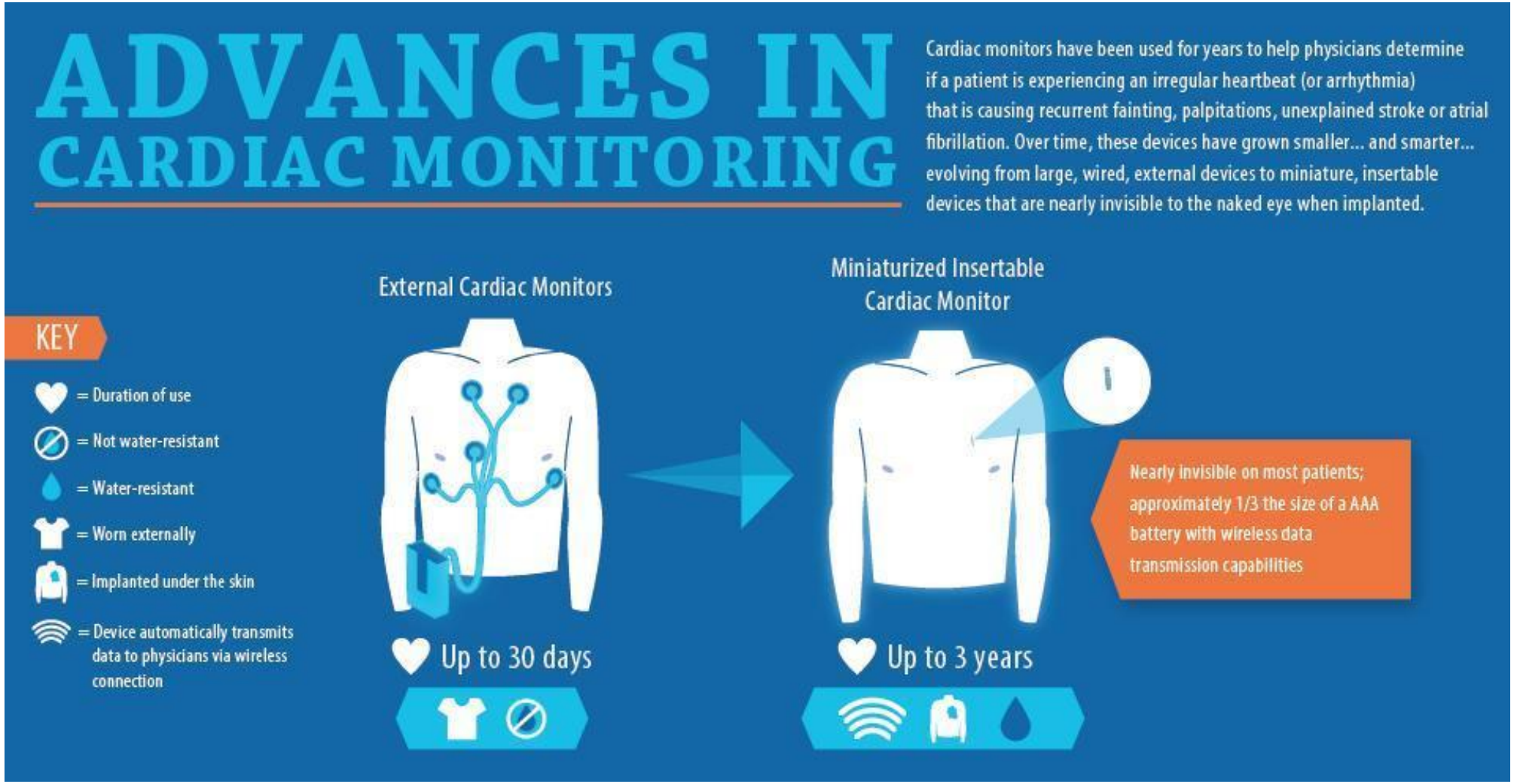
Ecg : multiple ESA (idem Holter 24h)? Pr long?

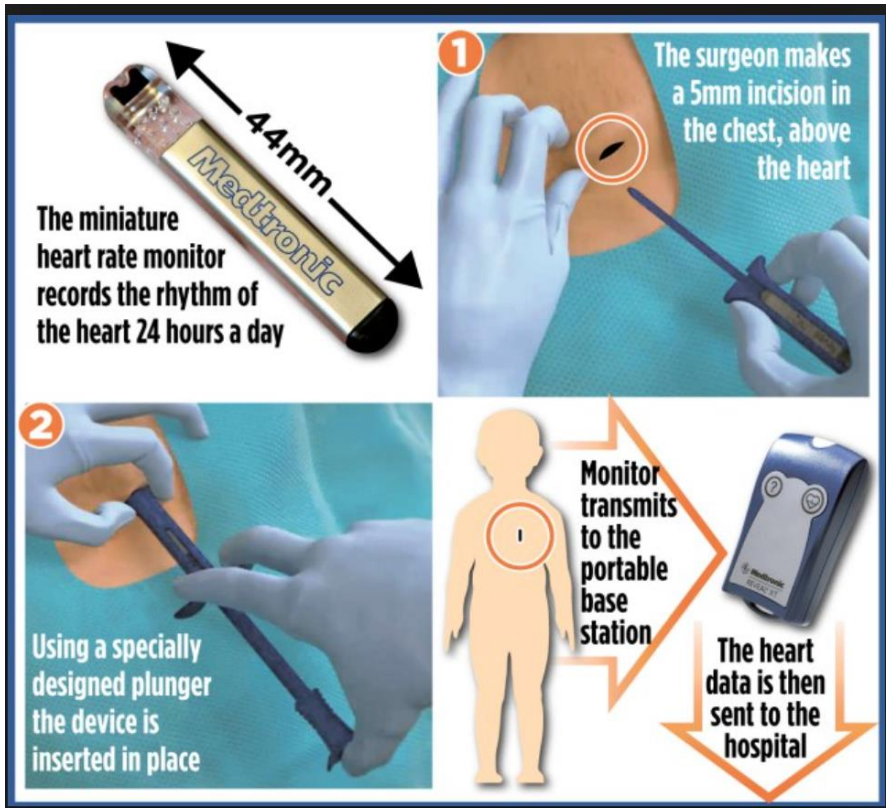
ETT : left atrial volume index in combination with atrial function, mitral valve stenosis, or left atrial enlargement

Biologie : Augmentation du BNP

Stroke (H Diener, Section Editor) Published: 08 August 2018 Detection of Atrial Fibrillation in Cryptogenic Stroke Karl Georg Haeusler, Serdar Tütüncü & Renate B. Schnabel
J Atr Fibrillation. 2018 Oct 31;11(3):2078. doi: 10.4022/jafib.2078. eCollection 2018 Oct-Nov.
Incidence and Predictive Factors of Hidden Atrial Fibrillation Detected by Implantable Loop Recorder After an Embolic Stroke of Undetermined Source.
Víctor CU
Circulation. 2020 May 12;141(19):1510-1522. doi: 10.1161/CIRCULATIONAHA.119.044407. Epub 2020 Mar 2.
Comprehensive Evaluation of Rhythm Monitoring Strategies in Screening for Atrial Fibrillation: Insights From Patients at Risk Monitored Long Term With an Implantable Loop Recorder.
Diederichsen SZ

Matériel simplifié et remboursé





Collège National des Cardiologues des Hôpitaux

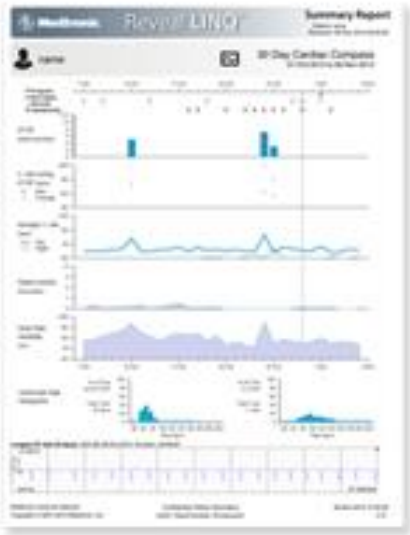
Dr Socié Pierre

Détection de la fibrillation auriculaire lors d'un AVC ischémique

Reveal LINQ™
ICM

Reveal LINQ™
Insertion Tool

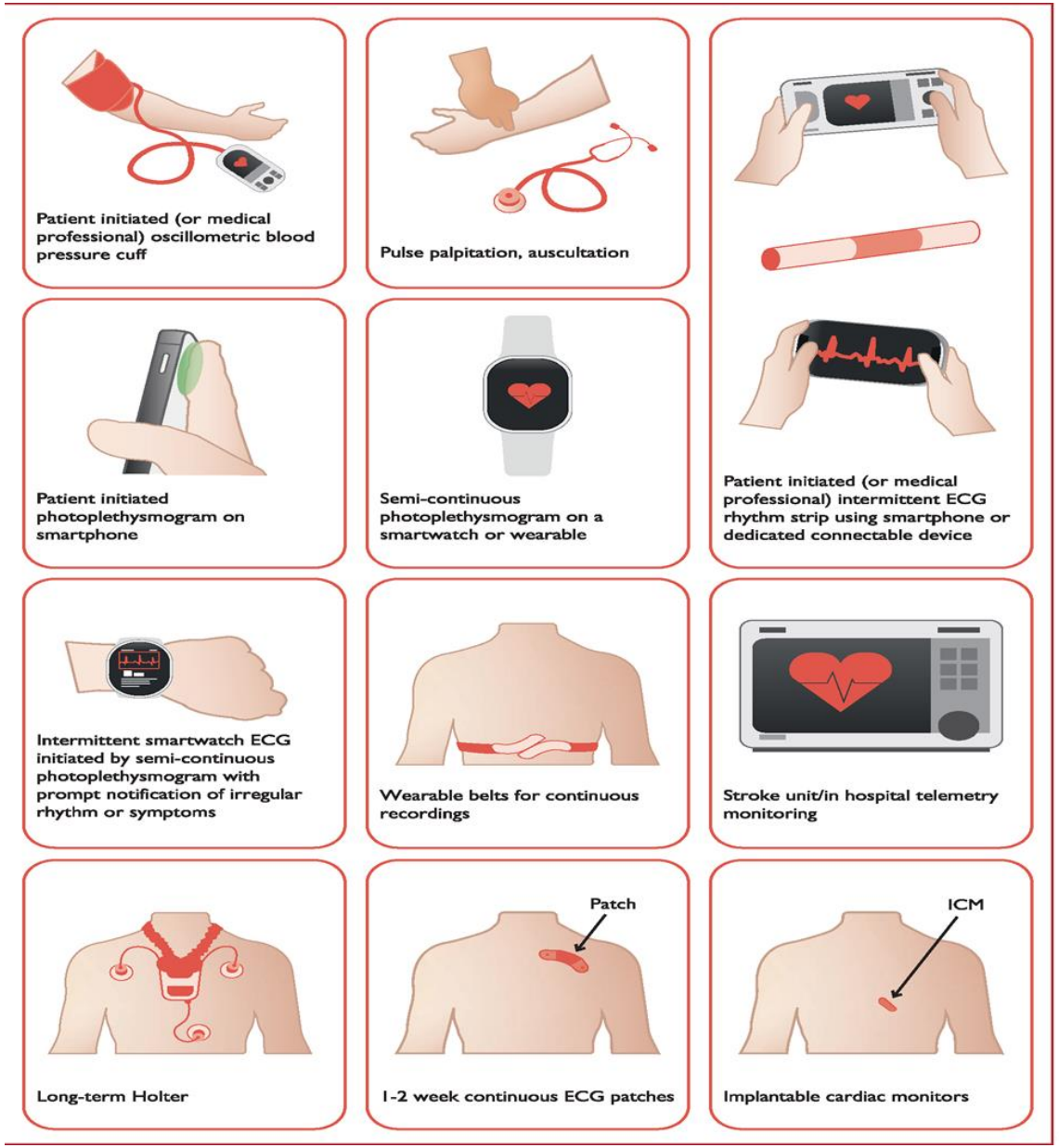
MyCareLink™
Patient Monitor



Simplified Reports

Conclusion

1) Relation complexe FA/AVC
2) Bilan initial RIGOUREUX +++++
3) Discussion neuro/cardio+++++
4) La FA dans l' ESUS :
   - Durée
   - Dispersion
   - Répétition



Collège
National des
Cardiologues des
Hôpitaux

Suivez le CNCH sur le Social Média!

#CNCHcongres

@CNCHcollege

@CNCHcollege

Si vous voulez devenir Ambassadeur social média CNCH adressez-nous un email à cnch@sfcardio.fr