RHYTHM 2015

Arrhythmias & Heart Failure: New Insights & Technological Advances

Palais du Pharo, Marseille, France May 28-30, 2015

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le holter longue durée dans les AVC cryptogéniques

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Guidelines for the management of atrial fibrillation

The Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC)

An irregular pulse should always raise the suspicion of AF, but an ECG recording is necessary to diagnose AF. Any arrhythmia that has the ECG characteristics of AF and lasts sufficiently long for a 12-lead ECG to be recorded, or at least 30 s on a rhythm strip, should be considered as AF.[3,31] The heart rate in AF can be calculated from a standard 12-lead ECG by multiplying the number of

Guidelines, European Heart Rhythm Association. ACC:AHA/ESC 2006. Circulation. 2006; 114; e257-e354

holter ECG recommandé pour détecter FAP

Available non-continuous ECG methods include scheduled or symptom-activated standard ECGs, Holter (24 h to 7 days) monitoring and transtelephonic recordings, patient- and automatically activated devices, and external loop recorders. If AF is present at the time of recording, use of the standard 12-lead ECG is sufficient to confirm the diagnosis. In paroxysmal AF, prolonged non-continuous recording will facilitate AF detection. It has been estimated that 7 day Holter ECG recording or daily and symptom-activated event recordings may document the arrhythmia in ~70% of AF patients, and that their negative predictive value for the absence of AF is between 30 and 50%.[3] In stroke survivors, a step-wise addition of five daily short-term ECGs, one 24 h Holter ECG, and another 7 day Holter ECG will each increase the detection rate of AF by a similar extent.[34]

Guidelines, European Heart Rhythm Association. ACC:AHA/ESC 2006. Circulation. 2006; 114; e257-e354

Stroke
JOURNAL OF THE AMERICAN HEART 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

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AF

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

Differents Devices

The longer you monitor the patient, the more likely you are to detect AF.

Its depend also the type of monitoring device

(patient-trigger record, autotriggered device, both)

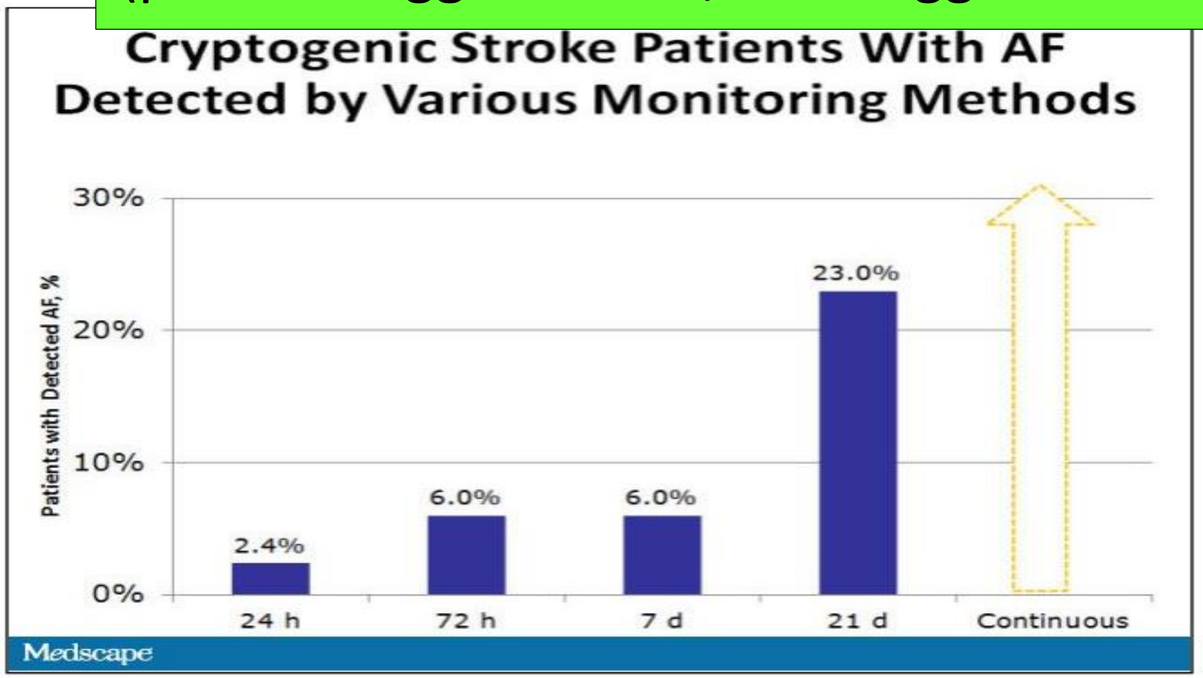


Figure 2. Yield of various external monitors for the detection of AF following cryptogenic stroke. AF = atrial fibrillation.

Pr DW Kriger, Pr RD Passman. Medscape nov2013

- Non invasive device
  - ✓ ECG
  - ✓ 48 h Telemetry
  - ✓ 24h holter ECG
  - ✓ Loop-recording monitors
    - with memory (R test)
    - without memory (cardiatel®)
  - ✓ MCOT

- Invasive
  - ✓ Implantable cardiac monitor reveal xt®.

Différents dispositifs non implantables pour détecter la FAP

- ECG, Cardiatel (enregistrement d'un ecg par un appareil spécial qui transmet à un centre cardiatel de lecture)
- Holter ECG de 24h-48h: enregistrement continu de ECG
- Holter longue durée jusqu'à 4 sem: enregistrement continu
- R test, loop recorder, ZIO patch: enregistrement événementiel uniquement, enregistrement de boucles de qq min, déclenché par le patient et par des critères de tachycardie…transmission ecg par téléphone, tracé par mail au cardio directement…
- Cardionet MCOT: 3 éléctrodes, boitier, événementiel, ECG transmis à un centre d'analyse spécial

Litterature

	N	Device	Duration of PAF	% PAF detected	Risk Factor
Tayal et al , ***Neurology 2008***	56	MCOT 21 d	**<30s** **>30s**	**26%** **5,3%**	Age, Diabetes
Elijovich L et al, ***J Stroke Cerebrovasc Dis 2009***	20	MCOT 30 d	**>30s**	**20%**	
Bhatt et al, ***Stroke Res Treat 2011***	62	MCOT 28 d	**>30s**	**24%**	Multiples infarcts
Miller et al, **J Neurol Sci, 2013**	156	MCOT 30 d	**<30s** **>30 s**	**17%** **6%**	Female, PACs*, LVEF < 55%**

**PACs: Premature atrial complex ;*
***LVEF : Left Ventricular Ejection Fraction*

Detection of Paroxysmal Atrial Fibrillation by 30-Day Event Monitoring in Cryptogenic Ischemic Stroke

The Stroke and Monitoring for PAF in Real Time (SMART) Registry

Alexander C. Flint, MD, PhD; Nader M. Banki, MD; Xiushui Ren, MD;
Vivek A. Rao, MD; Alan S. Go, MD

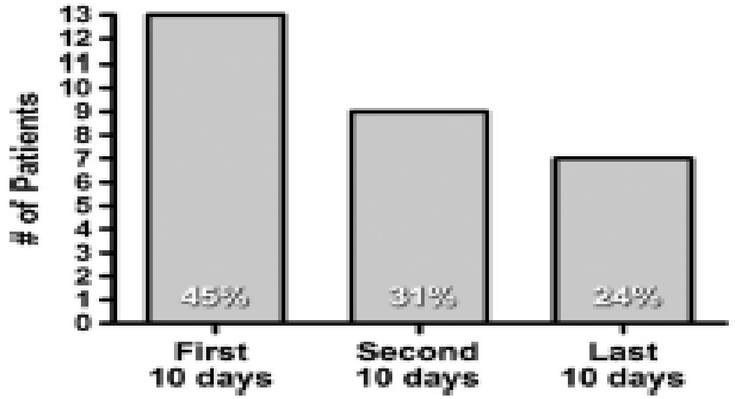
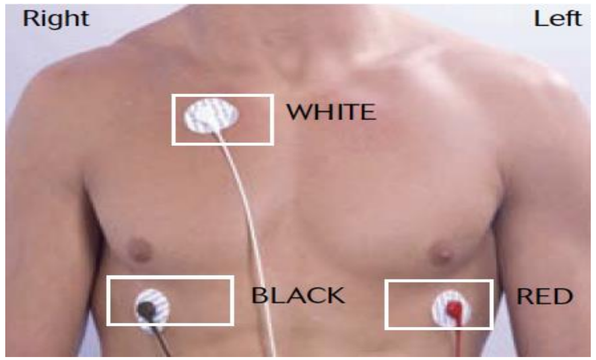


Figure. Time to first PAF detection. Distribution of first PAF events stratified by 10-day epochs (first, second, and last). Percentage of total first PAF events in each bin is shown overlying the graph. PAF indicates paroxysmal atrial fibrillation.

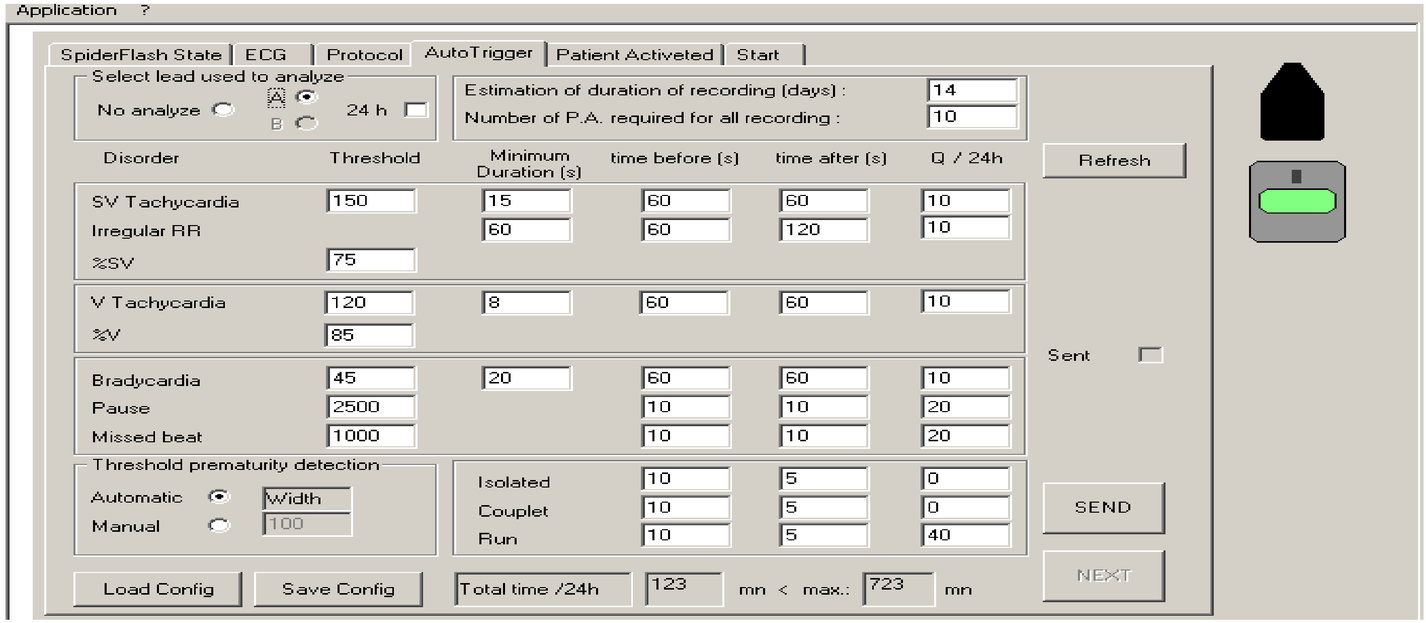
FAP: 6,7% (monitoring pdt 24j)

cardioPAL SAVI: loop recorder, holter événementiel, pas de tracé continu, smartphone, centre de lecture



Stroke. 2012;43:2788-2790.

R test, ZIO patch



Inconvénients

- peut louper des événements car faut bien paramétrer l appareil
- manque début ou fin de l épisode,
- difficile d'estimer la durée de l épisode d arythmie

Les ancêtres du holter ECG: 1949

Mr Norman Holter

60 min d'enregistrement

ELA: HOLTER RECORDERS & EVENTS RECORDERS

2448

2 ECG tracks
(Tape AM)

1983

Synesis

3 digital ECG tracks
PCMCIA card
Hook-Up

First Digital recorder / flash

1995

Syneflash

3 digital ECG tracks
Graphic Int.

ECG 1000Hz/ 2,5µV

First Holter with graphic display

1998

Syneflash MMC

same as Syneflash
+ MMC card
wide band pass

2001

Spiderview

1 to 4 days Holter
1 to 8 tracks
Extensions
1000Hz/1µV
very light
Low Man.Cost

2002

Spiderflash-t

7 to 40 days
I.R. Com.
With PC
1 to2tracks
Extensions
1000Hz/10µV
Ultra light
Low Man.Cost

Event recorder

2005

1990 1995 2000 2005

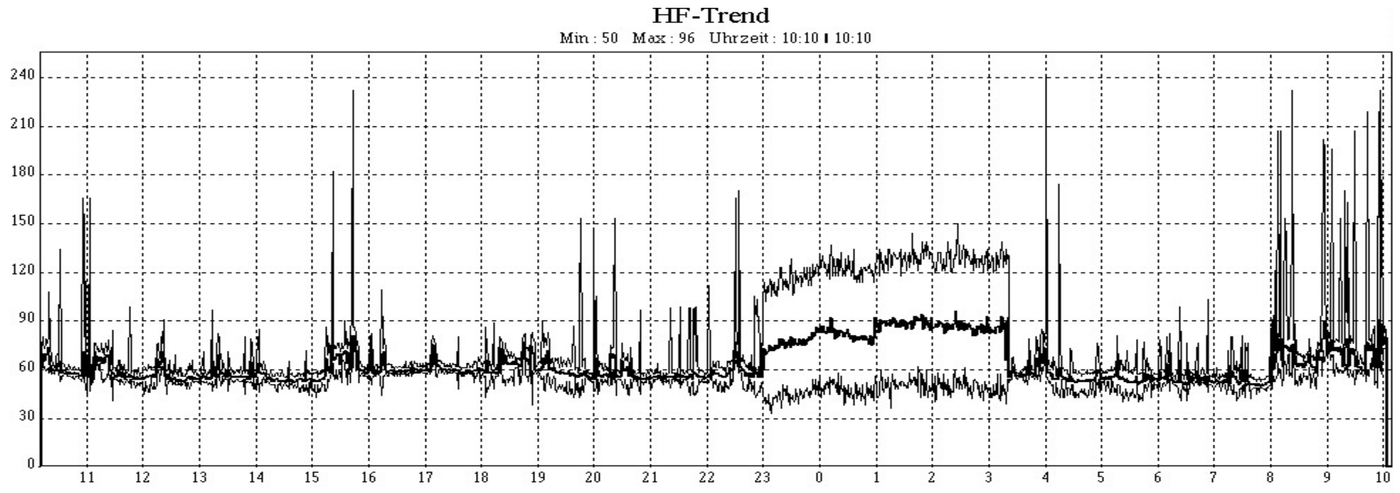
spider flash: holter ECG longue durée

- Enregistrement :
- jusqu'à 40 jours de tous les intervalles RR avec une pile lithium
- jusqu'à 15 jours de tous les intervalles RR avec une pile alcaline
- Jusqu'à 25 heures d'échantillons ECG 2 dérivations

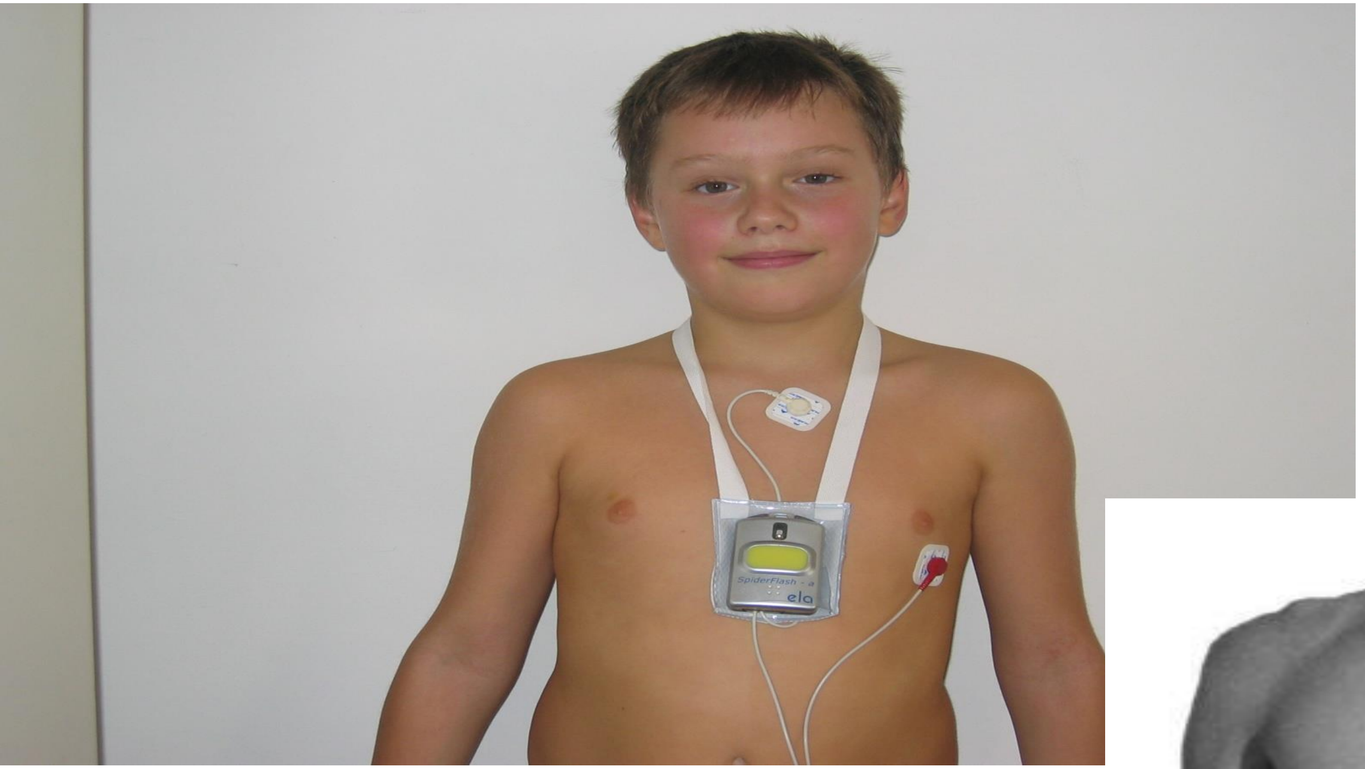
Durée maximale pré-événement : 7 min 30 s

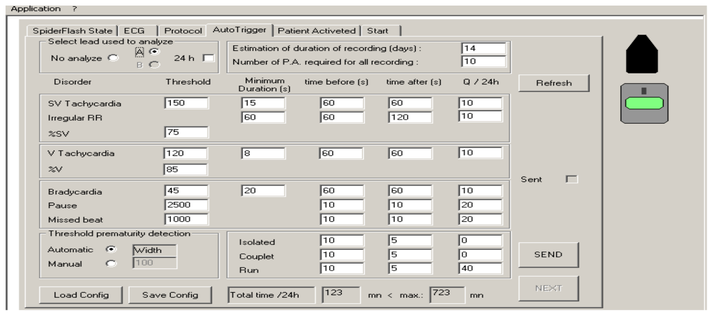
Durée maximale post-événement : 15 min

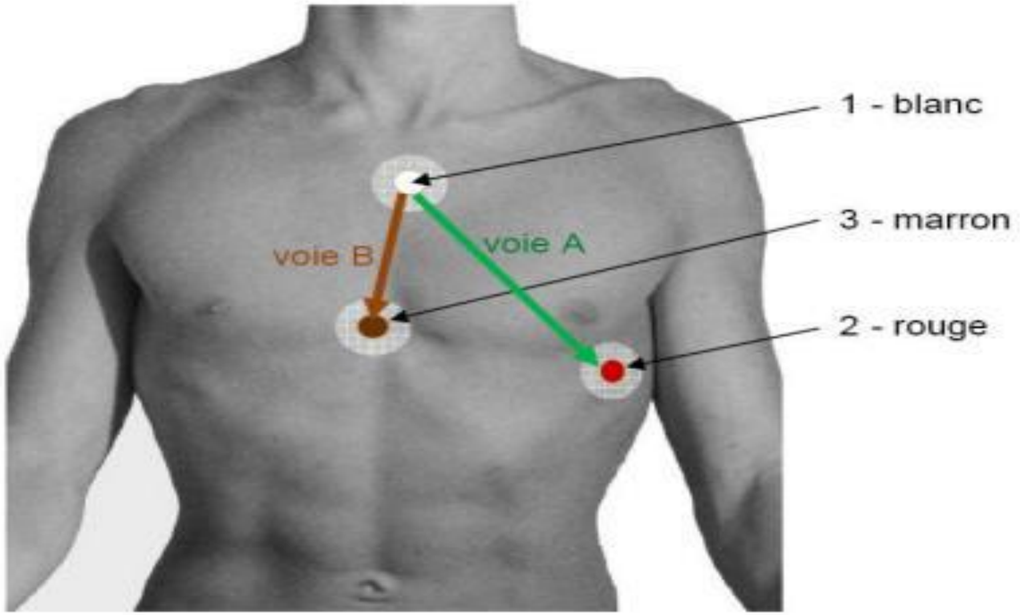
- Dynamique d'entrée : ± 16 mV
- Fréquence d'échantillonnage : 200 Hz
- Résolution : 10 µV
- Alimentation : 1 pile AAA alcaline ou lithium
- Communication : Modulation audio
- Type de média : Carte mémoire SD 256 Mo ou 1 Go
- Câble ECG :
  - 1 dérivation / 2 brins : RC031
  - 2 dérivations / 3 brins : RC032
- Poids : 50 g sans la pile 64 g avec la pile
- Dimensions : 75 x 50 x 19.5 mm



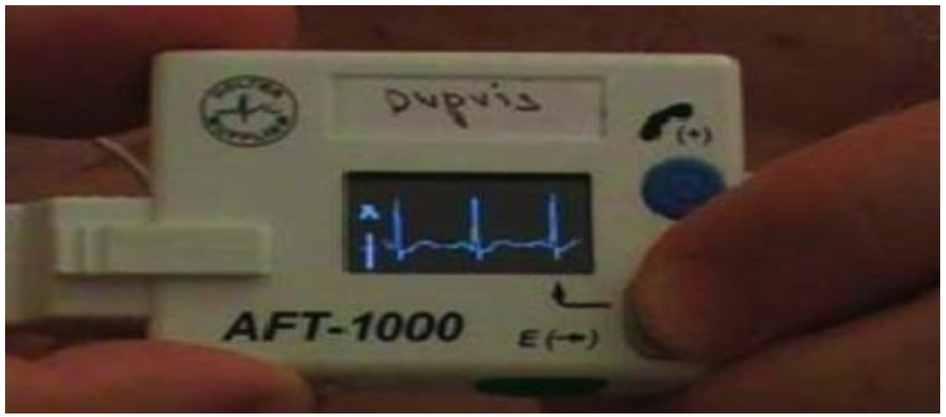
holter ECG longue durée

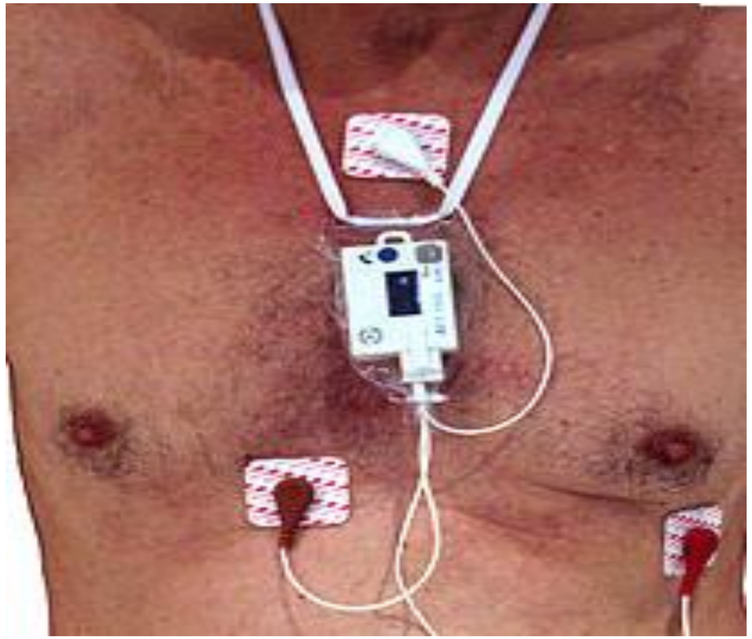






AFT 1000:holter 24h à 25j en continu



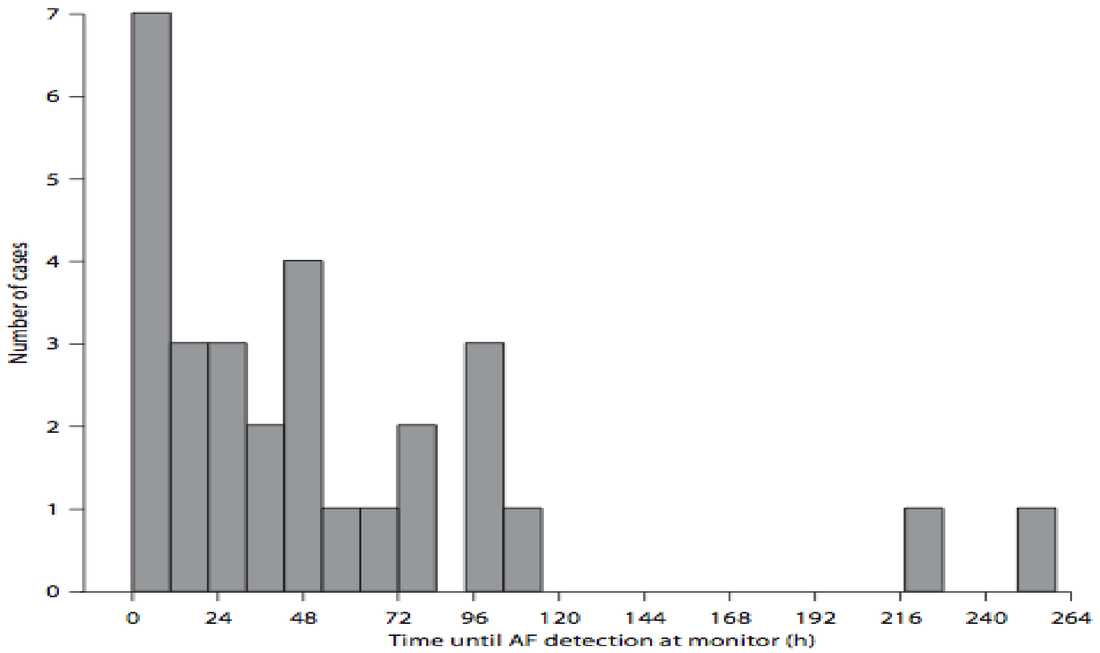


HOLTER ECG COURTE ET LONGUE DURÉE

quand faire holter ECG

- le plus prêt possible de l'épisode d'avc
- dans les 72h: FAP= 17,5% par holter ECG 24H

Douen AG. Stroke. 2008; 39: 480-482



enregistrer ECG dans les 72H par holter ECG longue durée ou par scope en continu ds les unités intensives de neurologie

Rizos T. Cerebrovasc Dis 2010; 30: 410-417

Etude personnelle du HLD 21J et AVC cryptogénique (service CHR Versailles, prof PICO)

Objectives

- Evaluate the detection rate of paroxysmal atrial fibrillation (PAF) in patients with cryptogenic brain infarct or TIA using 21 days long duration ECG holter

- Determine risk factors of PAF detection

Results

171 patients: 144 Brain infarct (84%); 27 TIA (16%)

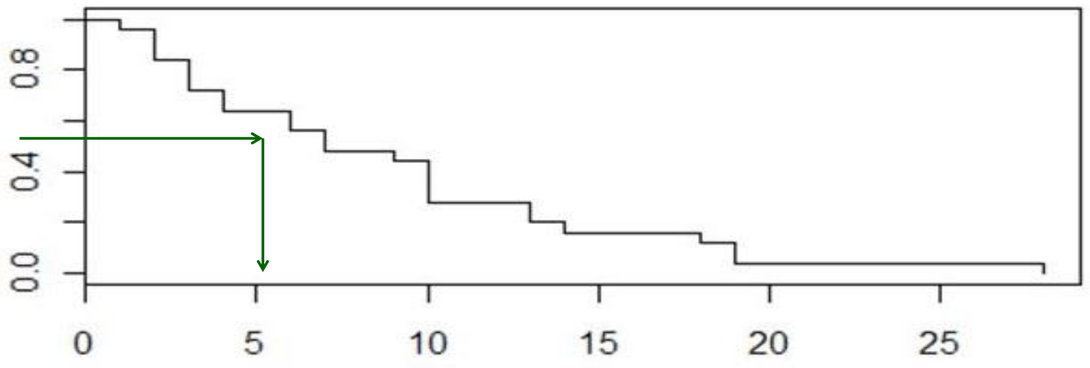
- Mean age 63,2 years ; 63 % Men; 40 % of HTN ; 10 % of Diabetes
- NIHSS arrival (BI)= 2,2 ± 3,6 (Almost minor stroke)
- Brain imaging : all had CT or Brain MRI.
- 144 patients (84%) with exploitable Brain MRI data
- Cardiovascular Work up :
  - ✓ 100% ECG
  - ✓ 72% 48h telemetry
  - ✓ TTE 100%; TEE: 88%

Results

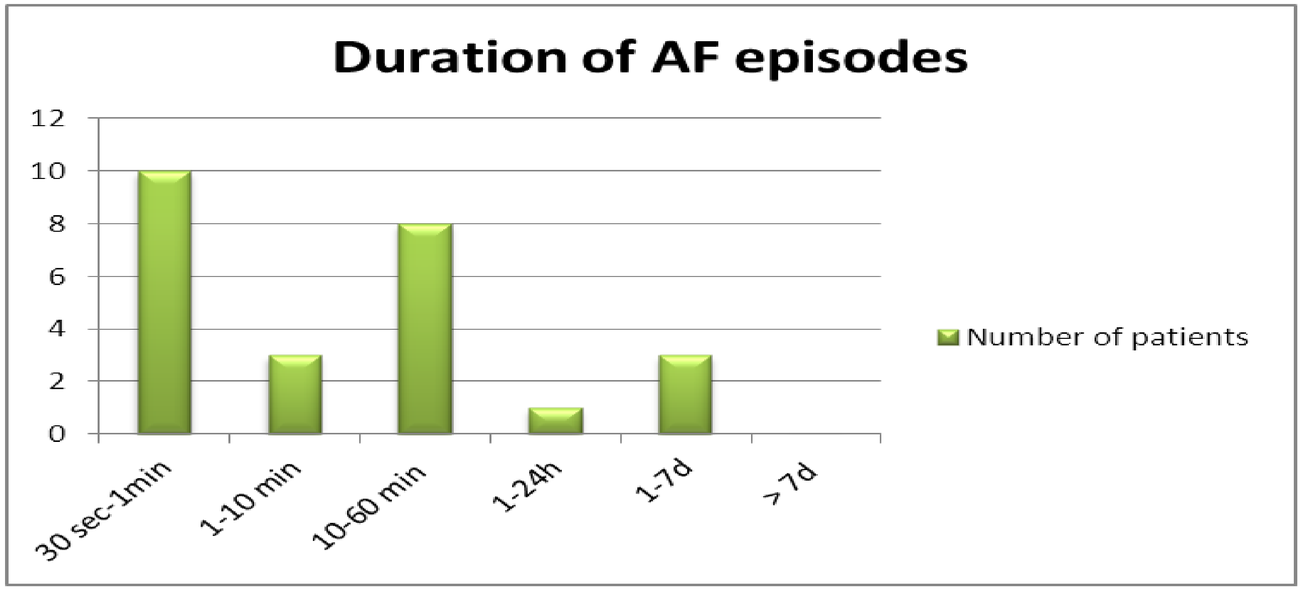
Detection rate of AF lasting > 30 sec *(Guidelines AHA 2006)*

= 26 patients (15,2 %)

Median delay between HLD initiation and first PAF episode detected = 7 days



Mean number of PAF episodes/patient = 1.2± 1.1



conclusion

- H24h n est plus le gold standard, ne pas arrêter le bilan cardio si H24h négatif
- HLD 21j est le meilleur moyen de dépister la FAP et c'est non invasif en plus
- Pb: faut bcp d'appareils de HLD car durée de 1 à 3 semaines
- bcp de patience pour l'interprétation (long et bcp artéfacts)
- coût des appareils cher et organisation+++