



How much stroke of unknown cause is really due to atrial fibrillation?

- I don't know.
- By the end of this lecture...
- You also won't know
- We will all know within a year.

Occult Atrial Fibrillation

- Occult AF=AF that eluded detection during the initial stroke evaluation
- Paroxysmal AF that is "difficult" to detect and is only detectable with moderate or long term continuous monitoring
- Episodes may be extremely brief—how brief an episode counts as "ATRIAL FIBRILLATION" is not clear
- AF=atrial fibrillation that requires anticoagulation in a high risk patient
- af= atrial fibrillation that is of uncertain clinical significance

Cryptogenic Stroke

- Ischemic stroke of unknown cause
- Generally treated with anti-platelet agents
- Finding ATRIAL FIBRILLATION in these patients changes treatment and possibly clarify mechanism
- By definition: finding **af**: **might** clarify mechanism, **might** change treatment

Cryptogenic Stroke: Diagnosis of exclusion

- Patients may have stroke risk factors, but...
- No plausible mechanism identified after
 - TTE, TEE, (Cardiac MRI)
 - CTA, MRA, catheter angiogram of head and neck arteries
 - Coagulation testing
 - ECG monitoring
 - Other testing as appropriate

• **Anti-platelet agents**

Continuous monitoring allows detection of otherwise un-findable AF (=Occult AF, af)



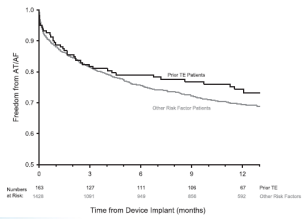
Newly Detected AF in Patients with Prior Thromboembolic Events

- TRENDS study
- 1600 patients with pacemaker or AICD that can detect AF
- No known AF
- No anticoagulation
- No anti-arhythmic



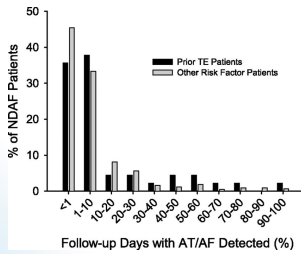
Ziegler et al: Stroke (online) Dec 31, 2009

High incidence of Occult AF

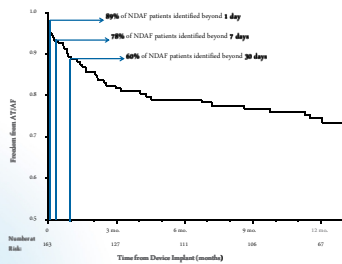


After 1 year, 30% of these patients had atrial fibrillation!

AF only occurred one day out of 10 or less in most patients



Most of the af occurred AFTER one month of monitoring



Ziegler P, et al. Stroke. 2010;41

Does af=AF?

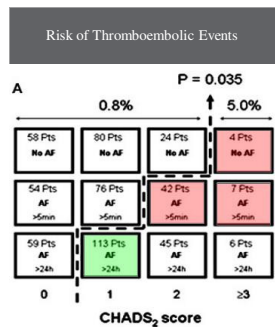
- ASSERT trial: patients with pacemakers or AICD
- 3 months of monitoring for occult AF
- Occult, brief subclinical af (really "atrial tachycardia") increased risk at 2 years of
 - ATRIAL FIBRILLATION
 - STROKE
- This suggests that af=AF and raises risk of stroke

How Much AF Do You Need To Have A Stroke?

Author	Duration	HR
Capucci; JACC 2005;46:1913	24 Hrs	3.1
Glutzer; Circ Arrhythmia 2009; (5) 474	5 Hrs	2.2
MOST; Glutzer; Circ 2003;107:1614	5 minutes	2.0

AF and Stroke: Its more than just duration

- Analysis of 568 patients with a pacemaker and a history of AF, with patients broken into three groups
- In some patients, any amount of atrial fibrillation is safe.
- In some patients, no atrial fibrillation is safe.



1. Botto G, et al. Presence and Duration of Atrial Fibrillation Detected by Continuous Monitoring: Crucial Implications for the Risk of Thromboembolic Events. J Cardiovasc Electrophysiol. 2009; 20(3):231-234, March 2009

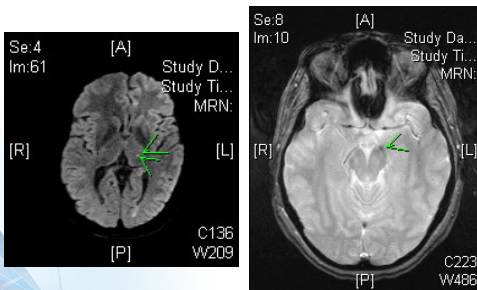
Stroke Prevention in Afib: A Neurologist's Perspective

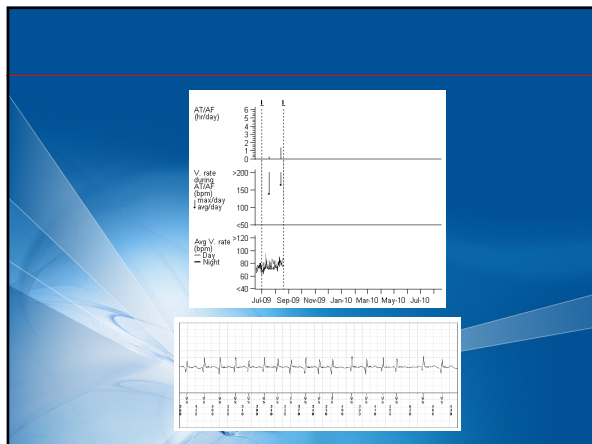
Richard Bernstein, MD, PhD

Continuous monitoring: uncovering AF in cryptogenic stroke

- 56 year old female, no risk factors
- Left thalamic infarct with thrombus in PCA
- Negative work-up
 - Normal TTE and TEE
 - Normal cMRA h/n
 - No AF on several days of telemetry
- Implanted with Reveal XT

Small stroke, but thrombus suggested embolism

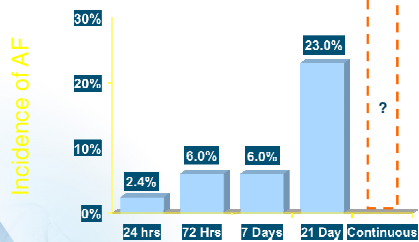




AF Burden In Cryptogenic Stroke

Author	# Patients	Duration	Definition of AF
Shafiqat	210	24 Hour	?
Schuchert	82	72 Hours	> 60 seconds
Jabaudon	88	7 days	?
Tayal	56	21 days	Any

Cryptogenic Stroke Patients with AF Detected by Various Monitoring Methods



CRYptogenic Stroke and underlying Atrial Fibrillation ("CRYSTAL AF")

Purpose

- To compare the continuous monitoring by Reveal XT to standard of care (SOC) in subjects after diagnosis of cryptogenic stroke/ TIA.
- Assess the incidence of AF in these subjects and aims to demonstrate the benefit of timely AF detection for patient care.

Scope:

- Prospective, randomized, multi-center, global, post-market study
- Approximately 450 subjects in Europe, US, & Canada

Stroke. J. Amer. Heart Assoc. 2016;35:e111-117. doi:10.1161/STROKEAHA.115.121111

CRYSTAL-AF

- Determine the incidence of Occult AF in cryptogenic stroke
- Determine if continuous monitoring is better than standard monitoring for detecting Occult AF.
- By looking at stroke recurrence: Is af =AF?
- Clinical, radiographic, and echocardiographic predictors of Occult AF.
- Medical economics and modeling of strokes prevented [based on assumptions about the relationship of af to AF]

SURPRISE study

- 43 patients with "Cryptogenic stroke" (non-standard definition, incomplete unspecified evaluation)
- REVEAL-XT implanted
- 8 patients (18.7%) had AF, all were anticoagulated
- ++AF patients were older, higher vCHADS2 score
- Mean time to AF detection: 133 days!!

Christensen, Krieger et al; Presented, International Stroke Conference 2012

Occult AF: in non-cryptogenic stroke

Finding AF in non-cryptogenic stroke has the same treatment implications as in cryptogenic stroke
For example: Stroke from carotid stenosis + occult AF = CEA + long term anticoagulation

Long term monitoring in non-cryptogenic stroke may be as important (and as high yield) as in cryptogenic stroke...next study.

Open questions: Occult AF and Stroke

- Is there a threshold of AF below which anticoagulation is not needed?
- How much ecg-AF is "Atrial Fibrillation" in the classic sense?
- Does minimal occult AF matter require anticoagulation?
- Does the burden or the length of AF episodes matter, if so which matters more?
-etc

CRYSTAL-AF

- Results expected in mid-2013

Occult Atrial Fibrillation and Cryptogenic Stroke

Neurology Perspective
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