ADVANCES IN CARDIAC ARRHYTHMIAS
and
GREAT INNOVATIONS IN CARDIOLOGY
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Atrial fibrillation: why it's important to make opportunities diagnosis in single chamber ICD patients

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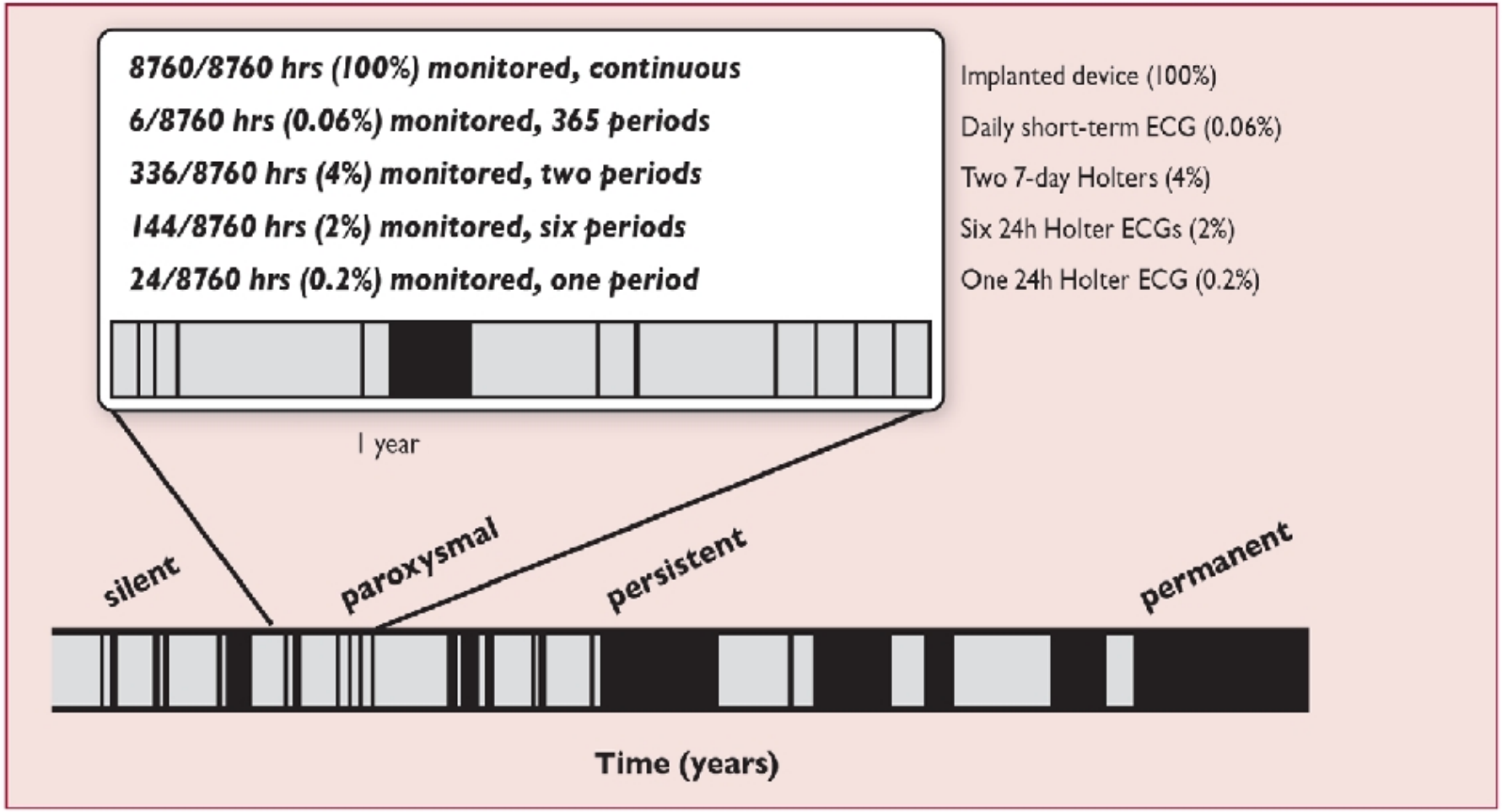
- Conflict of interest: consulting fees from Medtronic and Boston Scientific

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



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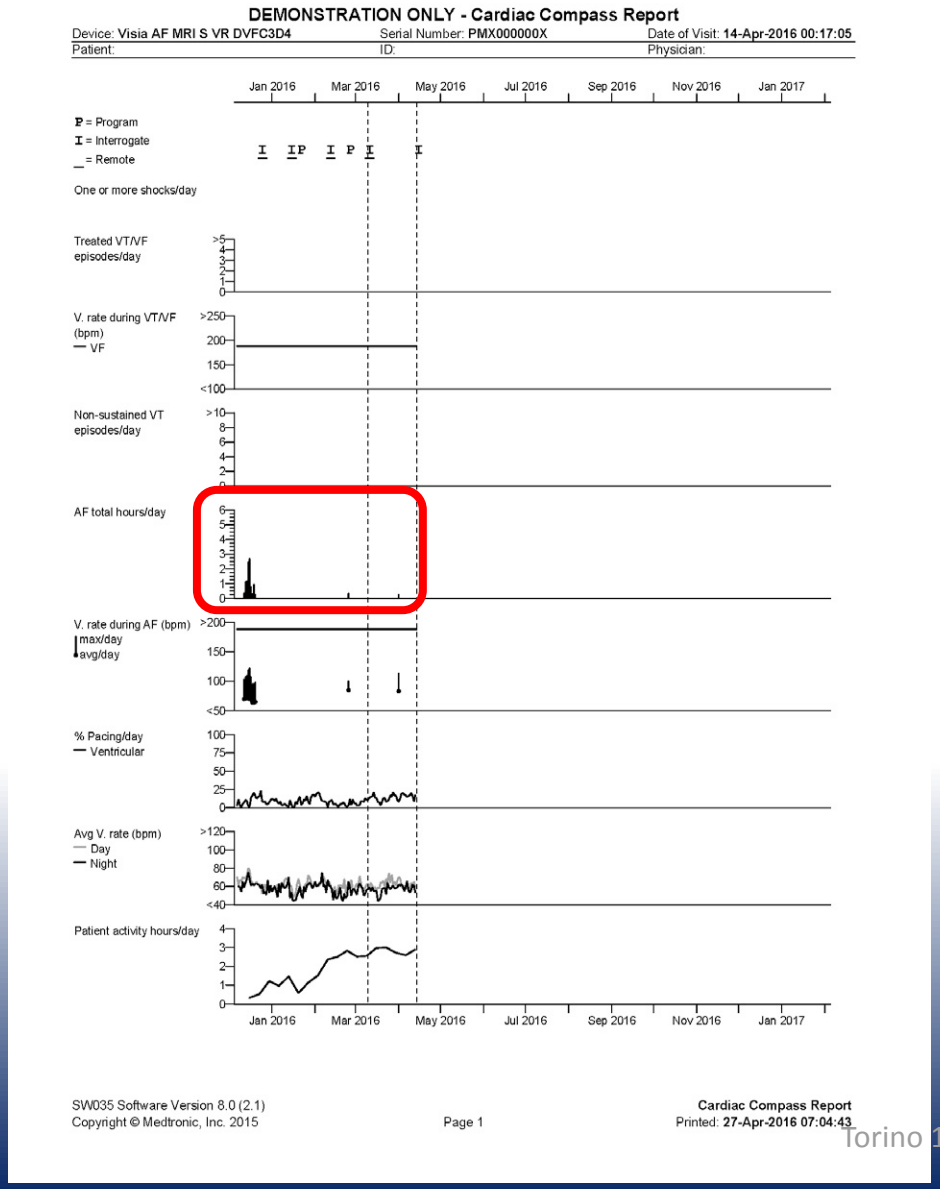
Cardiac Compass



- 72 year old male patient with DCM, dilated left atrium and frequent PVCs
- November 2015: Patient in emergency room for dyspnea at rest. ECHO shows EF 16%, moderate MI. ECG shows sinus tachycardia with frequent bigeminy. NYHA III.
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- February 25, 2016: AF episode (20 minutes) detected.

Subclinical AF (SCAF) recorded by implanted pacemaker and cardioverter defibrillators and the risk of development of clinical AF and stroke

	n	Mean Age (years)	FU Months	Prior AF (%)	Duration	Clinical AF (RR)	Prior TE (%)	Prior OAC (%)	$CHADS_2$	TE (RR)	TE (%/Year)	SCAF (+) Annual TE %	SCAF (-) Annual TE %
MOST[1]	312	74	27	60	> 5 min	5.9	20	24	-	2.8	1.6	2.20	0.60
Capucci[2]	725	71	22	100	> 1 day	-	1.80	32	1.8	3.1	1.20	-	-
Botto[3]	568	70	12	100	> 1 day	-	1.40	25.20	~ 1.0	5.3	2.50	3.60	0.60
Trends[4]	2486	71	17	20	≥ 5.5 h/day	-	13.40	20.80	2.2	2.2	1.20	2.40	1.10
ASSERT[5]	2580	76	34	0	> 6 min	5.6	12.10	18	~ 1.2	2.5	0.89	1.78	0.69

Modified from Chu-Pak Lau et al. Europace 2015; 17: ii40-ii47

[1] Glotzer TV et al. Circulation 2003; 107: 1614-9

[2] Capucci A et al. J Am Coll Cardiol 2005; 46: 1913-20

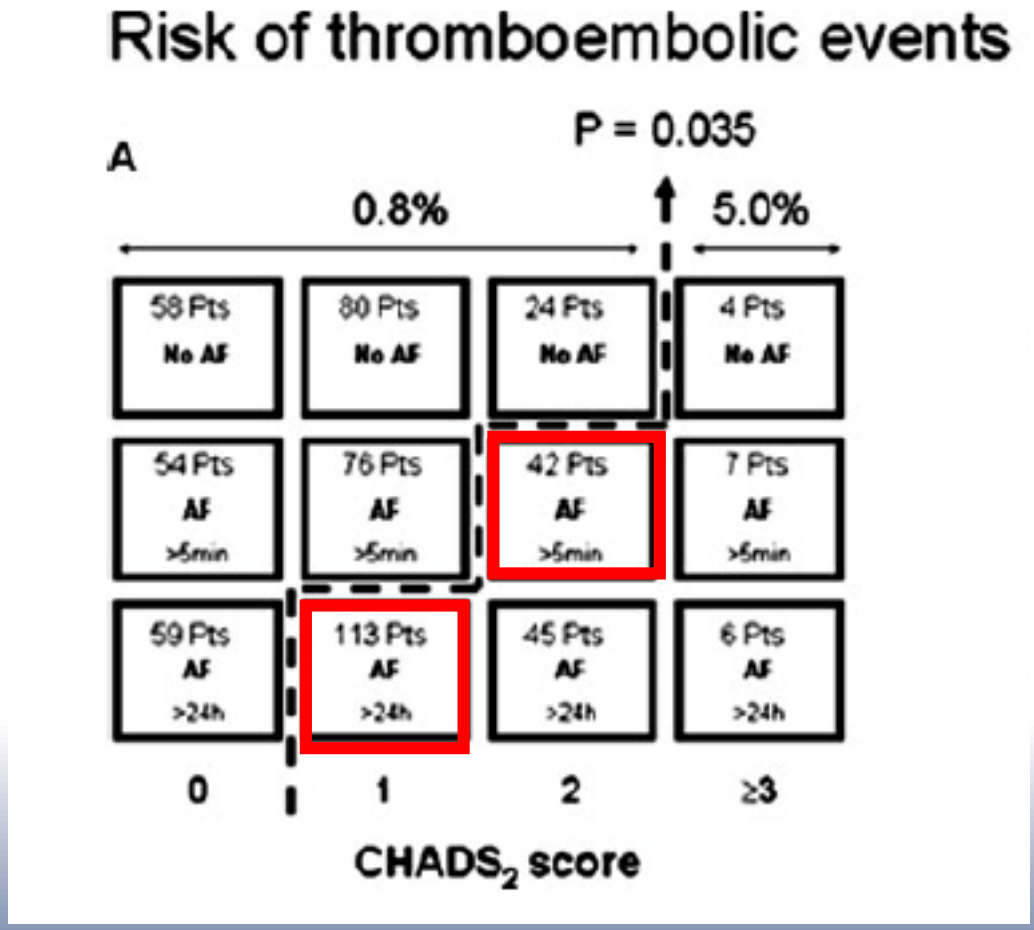
[3] Botto GL et al. J Cardiovasc Electrophysiol 2009; 20: 241-8

[4] Glotzer TV et al. Circ Arrhythm Electrphysiol 2009; 2: 474-80

[5] Healey JS et al. N Engl J Med 2012; 366: 120-9

SCAF duration and $CHADS_2$ scores in relation to TE

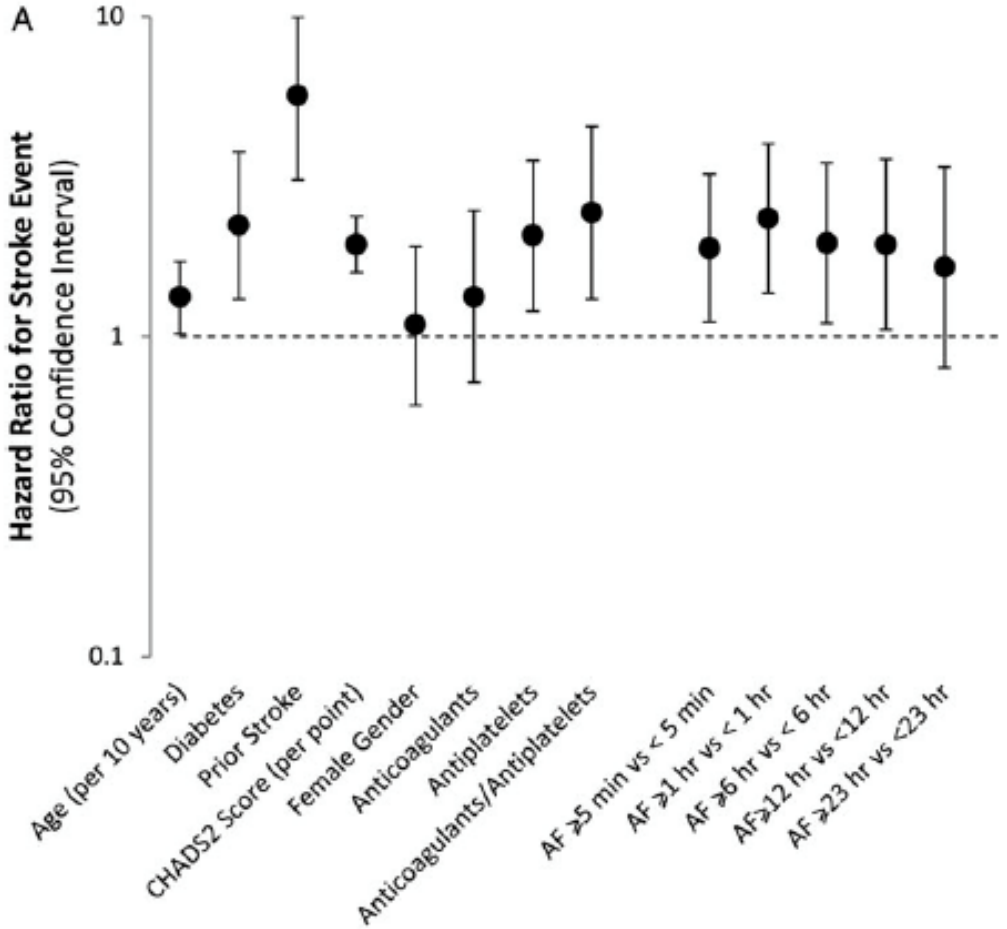
- At a $CHADS_2$ score of 1, only AF > 24 h would increase the annual stroke rate to 5 % compared with 0.8 % for SCAF lasting shorter
- At a $CHADS_2$ score of 2, any SCAF > 5 min resulted in a 5 % stroke rate



Botto GL et al J Cardiovasc Electrophysiol 2009; 20: 241-8

SCAF duration and $CHADS_2$ scores in relation to TE

- Pooled analysis over 10000 patients
- Comparison of the duration of CIED recorded SCAF and stroke risk
- The hazard ratio of SCAF > 5 min progressively increase stroke risk going to a plateau when SCAF duration reached 24 h



Boriani G et al Eur Heart J 2014; 35: 508-16

Annual stroke (and other thrombo-embolic)risk (in %) at different CHADS2 scores compared with the reported risk in patients with clinical AF

	$CHADS_2$		
	<2	2	>2
SCAF detected	0.56%	1.29%	3.78%
SCAF not detected	0.28%	0.70%	0.97%
Clinical AF in reference population	2.8%	4.0%	>5.8%

Chu-Pak Lau et al. Europace 2015; 17: ii40-ii47

How Common is New Onset Atrial Fibrillation in Single Chamber ICD Patients? Sub-analysis From the PainFree SST Study

Incidence rates at 24 months in each device type

Episode length	CRT-D	DC ICD	SC ICD*	P-value
≥ 6 minutes	28.0 %	23.4 %	20.5 %	0.26
≥ 7 days	9.5 %	5.1 %	4.4 %	0.06
≥ 30 days	6.5 %	2.5 %	1.5 %	0.04
AT/AF-related Complication**	44.9 %	30.3 %	29.8 %	0.09

* SC ICD was estimated by propensity score weighting of DC ICD patients.

** after first AT/AF episode

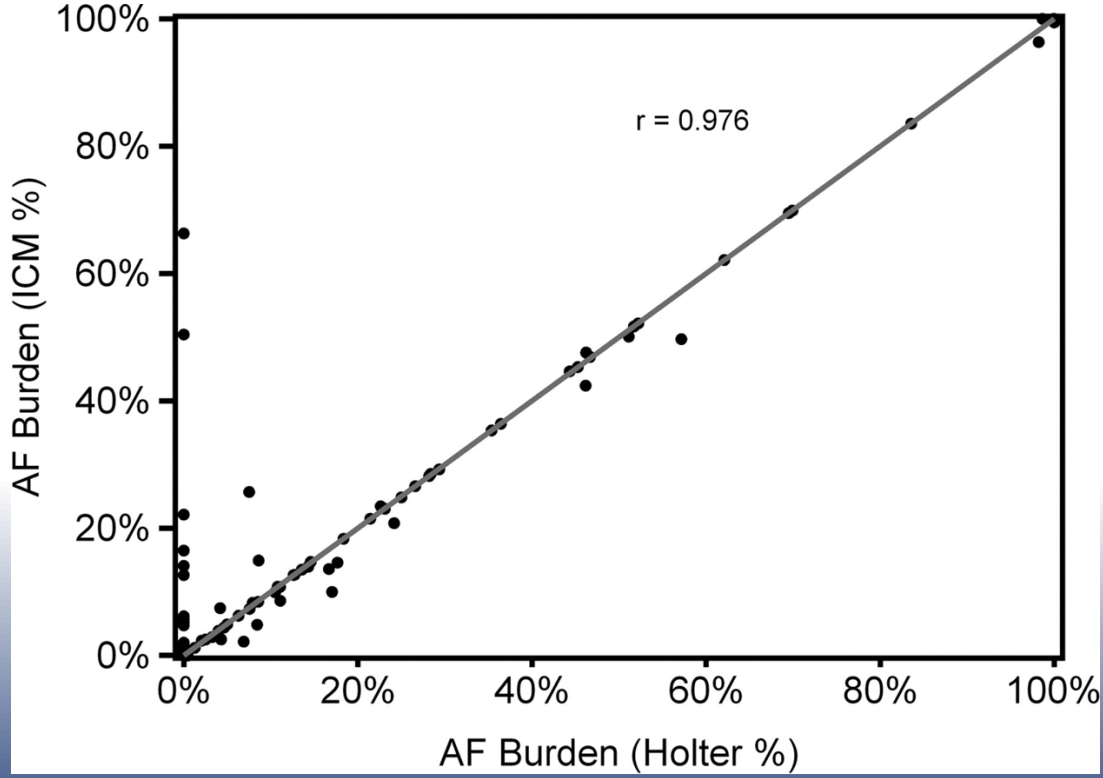
Schloss E et al. Circ 2015; 132: Abstract 17946

Performance of a leadless ICM in detecting and quantifying AF: results of XPECT trial

In patients with high AF burden the REVEAL XT showed a:

- Sensitivity 96.1%
- Specificity 85.4%
- PPV 79.3%
- NPV 97.4%
- Accurancy 98.5%

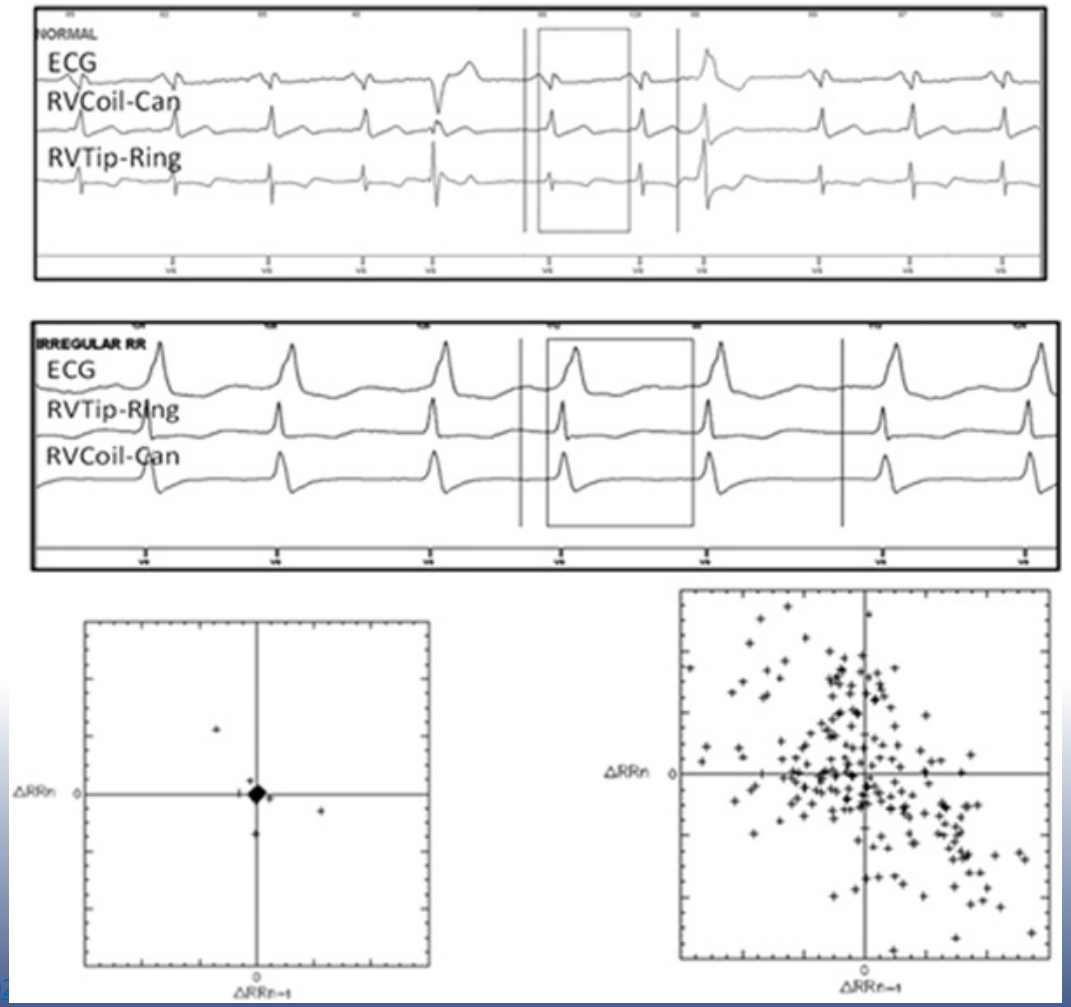
AF burden measured by the ICM compared with AF burden calculated from the core laboratory-annotated Holter recording for all patients



Hindricks G. et al. Circ Arrhythm Electrophysiol. 2010;3:141-147

Performance of Atrial Fibrillation Detection in a New Single-Chamber ICD

Every 2 minutes the algorithm uses a Lorenz Plot to analyze RR intervals sensed from a near-field EGM (RVtip to RVring or RVtip to RVcoil) and calculates an AF evidence score.



Pacing and Clinical Electrophysiology
21 SEP 2016 DOI: 10.1111/pace.12918
http://onlinelibrary.wiley.com/doi/10.1111/pace.12918/full#pace12918-fig-0002

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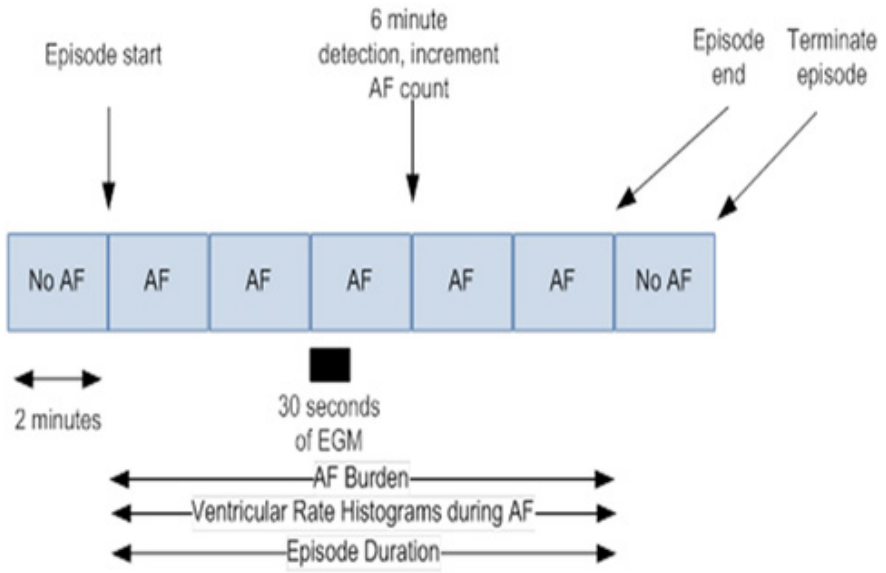

Gross duration sensitivity was 95.0% for AF episodes of at least 6 minutes duration with gross duration specificity of 99.6%.

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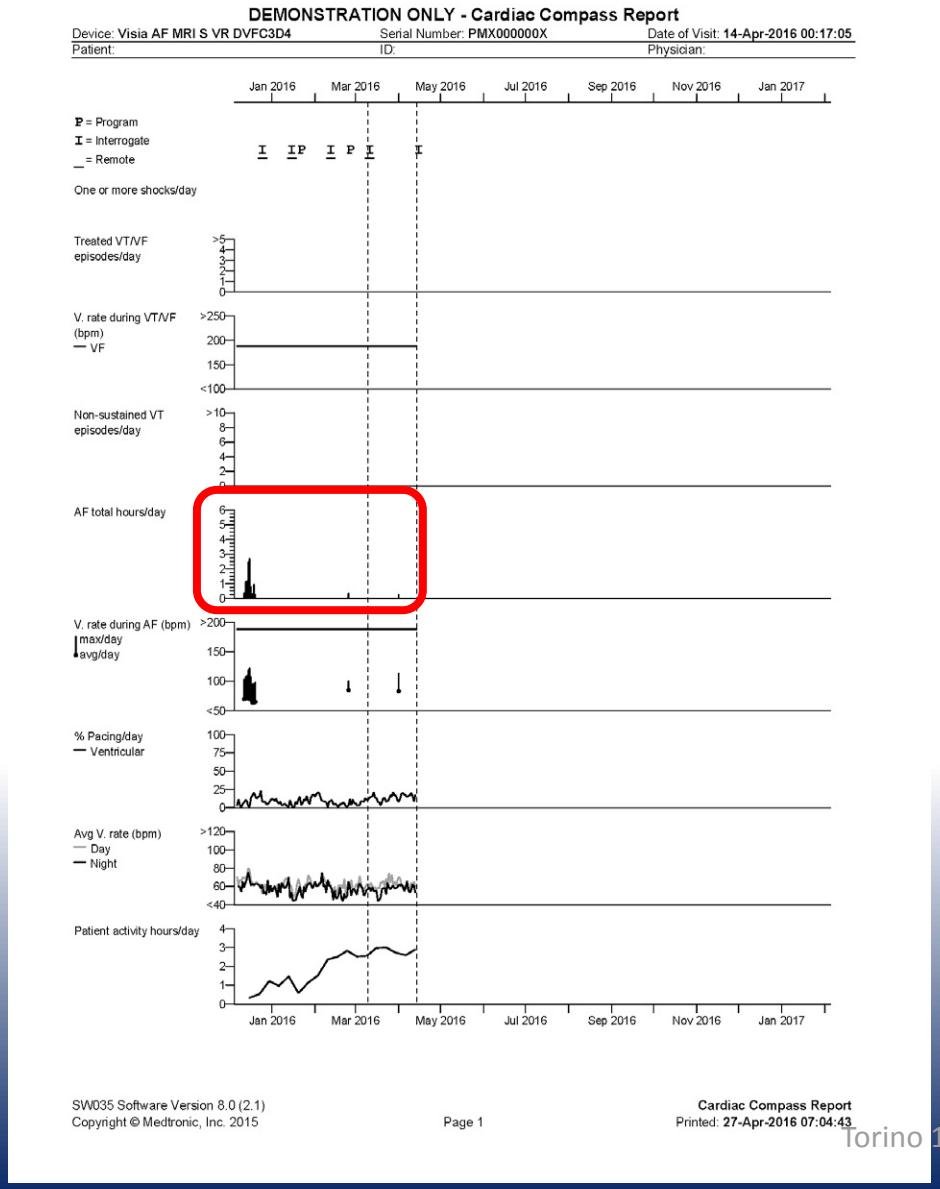

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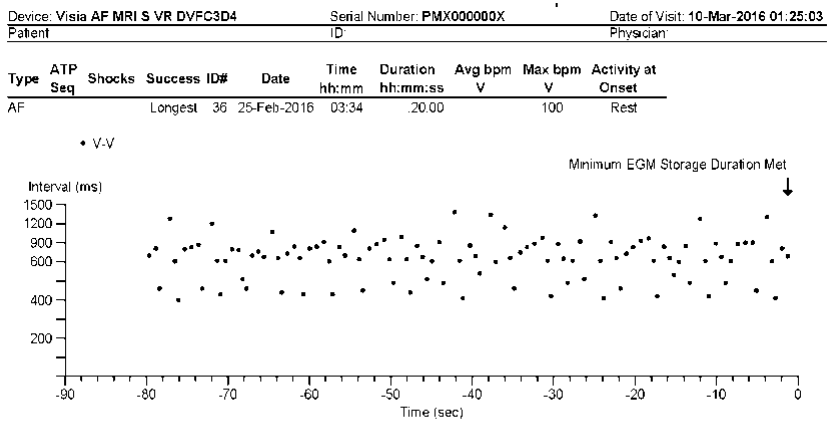
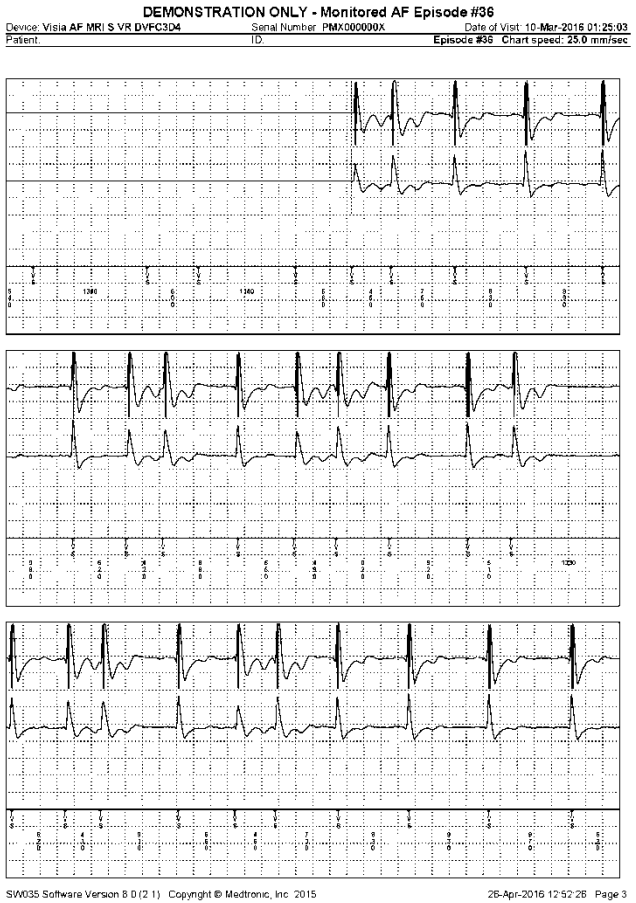
Interval Plot & EGM





Dr. Pecora, Poliambulanza Hospital file

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

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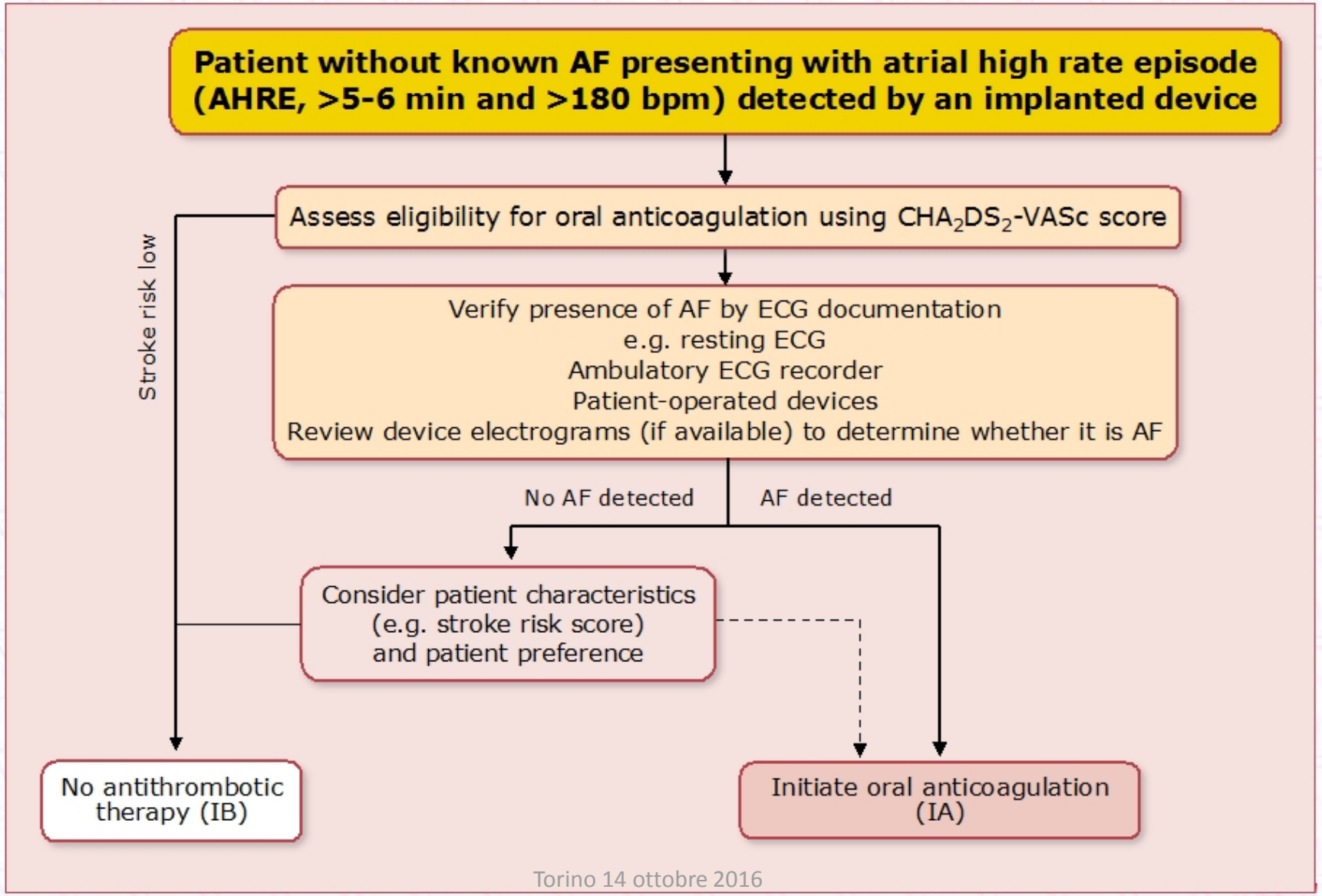
Management of atrial high rate episodes detected by an implanted device



www.escardio.org/guidelines
European Heart Journal - doi:10.1093/eurheartj/ehw210
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Conclusions

- The main goal of anticoagulation in AF is the prevention of stroke
- Once AF is detected, regardless of the mechanism of detection, anticoagulation should be initiated if indicated on the basis of the CHA_2DS_2VASc score
- Device diagnostic from CIEDs provide a unique opportunity for early intervention and prevention of stroke


The true delight is in the finding out rather than in the knowing
Isaac Asimov
Torino 14 ottobre 2016