

Cardioversion for AF

Network Learning Event 2010

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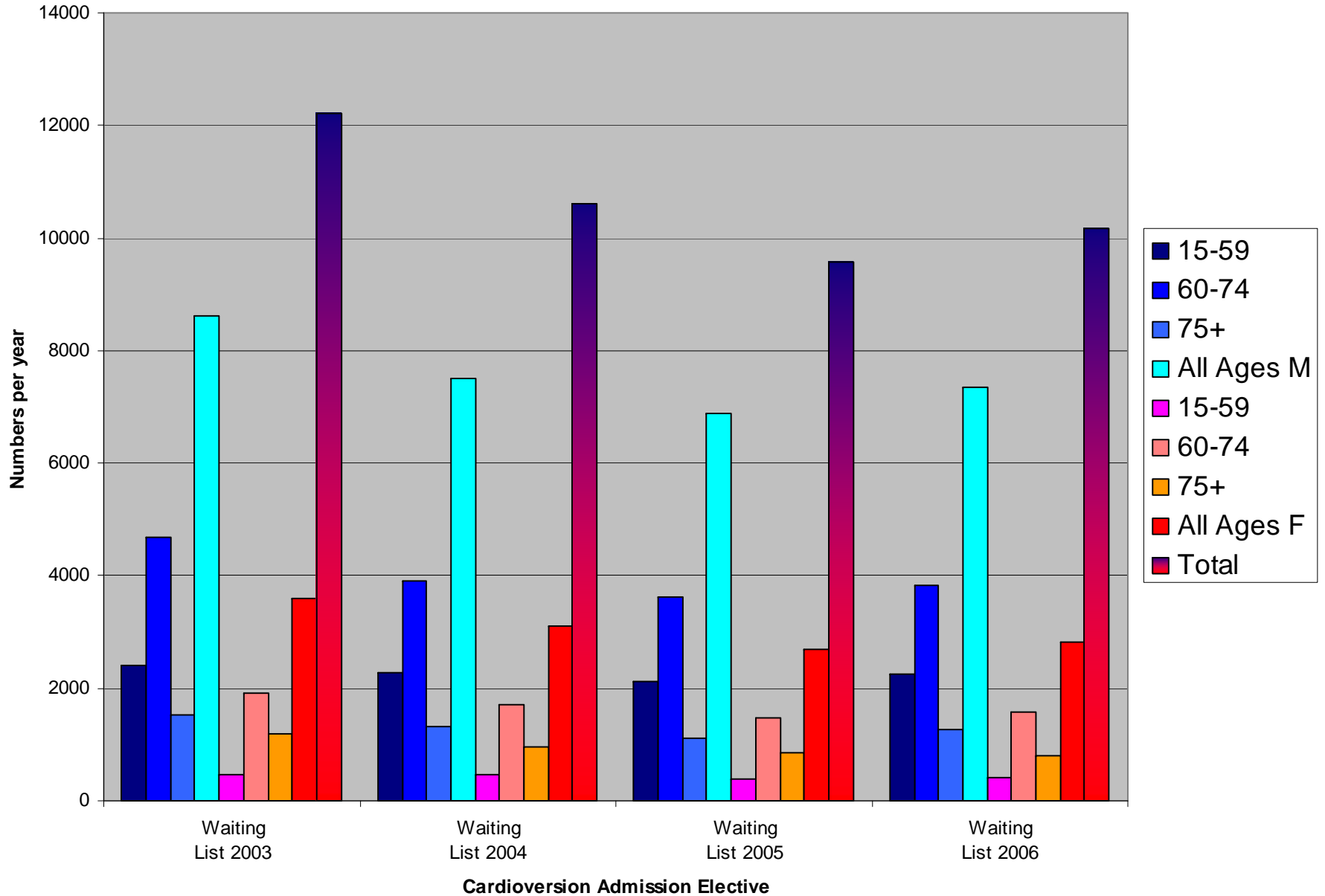
Strategies for Clinical Topic Presentation

General Disease Overview & Epidemiology	Case Studies	Clinical Trials	Current Practice & Registries
Guidelines	Debate issues	Technological Innovations	Decision Analysis Modelling

HES Data

- 2.2 Million Hospital Attendances 08/09
- External Cardioversions captured: 2 ???
- 279,000 cardiology A&E attendances
- 362,000 ECGs in A&E

DC Cardioversion Trends Over Time HES -X501



Atrial fibrillation

June 2006





Who is suitable for Cardioversion? NICE recommendations 2006

- **Heart Rate Control**

- Patients over 65
- Patients with coronary heart disease
- Patients unsuitable for cardioversion
- Patients who can't take antiarrhythmic drugs
- No Symptoms
- Without cardiac failure

- **Cardioversion**

- Presenting for the first time with lone AF – unknown cause
- Younger patients
- Patients with Symptoms
- Patients with AF secondary to another cause eg. Infection, Thyroid abnormality, post surgery
- With cardiac failure



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National Collaborating Centre for Chronic Conditions, 2006

Cardioversion is unsuitable for people with:

- Contraindications to anticoagulation
- Structural heart disease that makes long-term maintenance of sinus rhythm unlikely
- A long duration of AF (usually more than 12 months)
- A history of multiple failed attempts and/or relapses, even with concomitant use of antiarrhythmic drugs
- An ongoing but reversible cause of AF (e.g. hyperthyroidism)
- Digoxin toxicity, hypokalemia etc.

Cardioversion Advice

- Before cardioversion, the person should be anticoagulated for at least 3 weeks **(C)**.
- If cardioversion cannot be postponed for 3 weeks, heparin should be given and cardioversion performed **(D)**.
- If cardioversion is to be carried out and AF onset was within 48 hours previously, either pharmacological or electrical cardioversion is suitable **(B)**.
- If AF has lasted for more than 48 hours, electrical cardioversion is preferred **(D, GPP)**.

Cardioversion Advice

- For people undergoing elective electrical cardioversion, use of an antiarrhythmic drug for at least 4 weeks beforehand may be considered if there is concern about the likelihood of successful cardioversion (e.g. previous failure to cardiovert or early recurrence of AF).
- Following successful cardioversion, anticoagulation should be continued for at least 4 weeks (as it takes this long for atrial contractile function to return to normal) **(D, GPP)**. However, if AF has lasted less than 48 hours prior to cardioversion, anticoagulation following successful restoration of sinus rhythm is not required (unless indicated by stroke risk) **(D, GPP)**.
- Anticoagulation should be continued long term in people with AF who have undergone cardioversion where there is a high risk of AF recurrence or if indicated by the person's [risk of stroke](#) **(D, GPP)**.

Recommendations for Direct-current Cardioversion of Atrial Fibrillation

Class I

1. When a rapid ventricular response does not respond promptly to pharmacological measures for patients with AF with **ongoing myocardial ischemia, symptomatic hypotension, angina, or HF, immediate R-wave synchronized direct-current cardioversion is recommended. (Level of Evidence: C)**
2. Immediate direct-current cardioversion is recommended for patient with **AF involving preexcitation when very rapid tachycardia or hemodynamic instability occurs. (Level of Evidence: B)**
3. Cardioversion is recommended in patients without hemodynamic instability when symptoms of AF are unacceptable to the patient. In case of early relapse of AF after cardioversion, **repeated direct-current cardioversion attempts may be made following administration of antiarrhythmic medication. (Level of Evidence: C)**

ACC/AHA/ESC Practice Guidelines, Fuster et al. JACC 2006; 48: e149-246

Suggested actions

Liaise with your local cardiac network – benefit from shared learning and support. For example, some areas have established a primary care rapid access arrhythmia clinic and the provision of an arrhythmia care co-ordinator or an arrhythmia nurse specialist

Provide awareness raising and education sessions for healthcare professionals – don't forget to include out-of-hours services

Develop, promote and disseminate quality patient information and decision aids for clinicians

First Cardioversion

- **1947 Claude Beck**
pioneering cardiovascular surgeon in Cleveland, successfully defibrillates a human heart during cardiac surgery. The patient was a 14 year old boy

His prototype defibrillator followed experiments on defibrillation in animals performed by Carl J. Wiggers,



Hospital Setting Day case

Nurse, Anaesthetist, ODA, [Cardiologist]

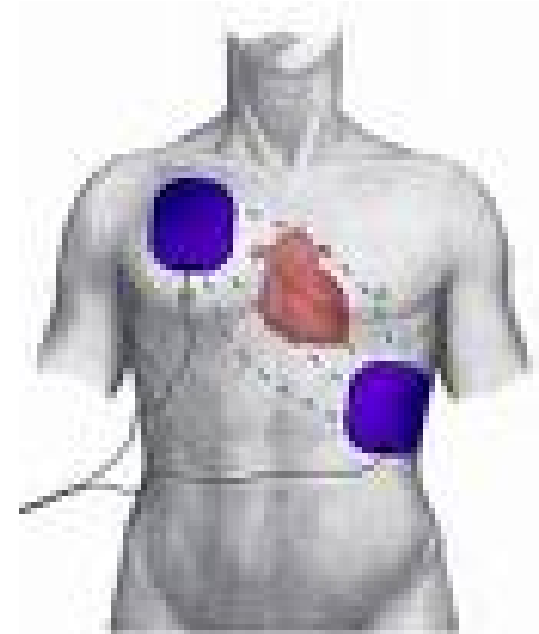
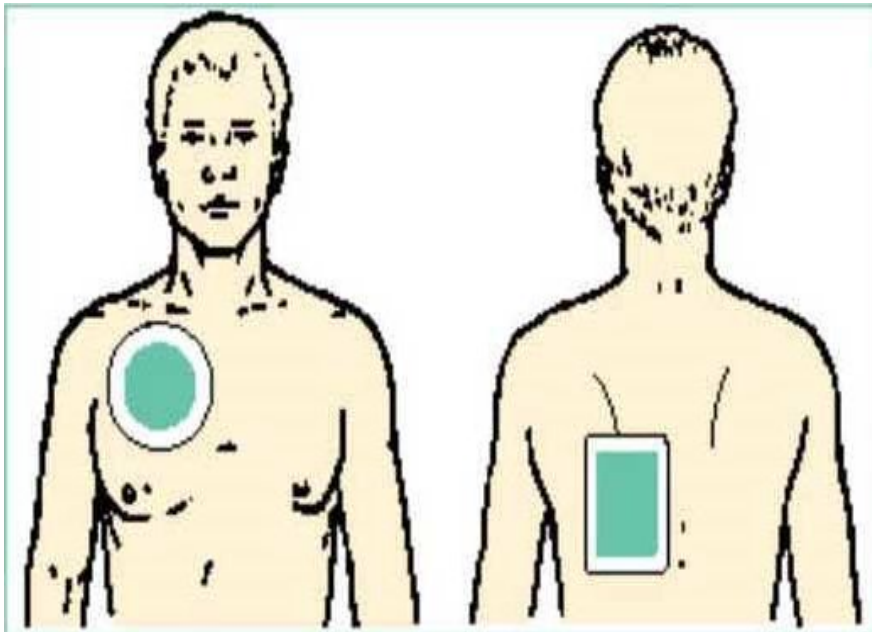
Warfarin levels prevent stroke

TOE

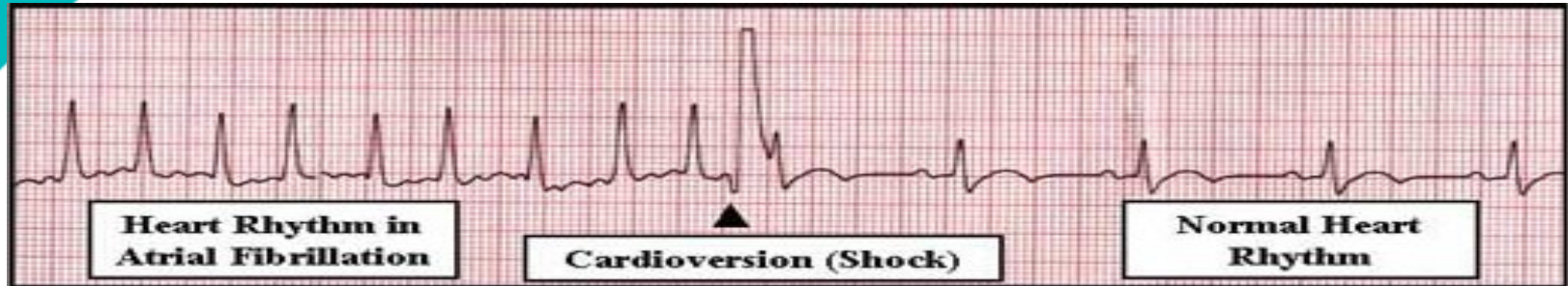
GA or Sedation

Fast 6 hours

Paddle Position



Result



Synchronised, biphasic

Amount of Joules 200J and higher

Success [on the day] 99.4% locally

National 75 – 100%

Minor skin burn – common

Arrhythmia – slow heart rate

Clot Event 1 in 100

Anaesthetic Effect

Do NOT drive 24 hours

No important decisions 24 hours

How effective is it ?

50% recurrence within a year

Increased risk of recurrence with repeat procedures

Follow Up

- Often none
- NICE : 6 weeks & 1 year
- Symptoms? Consider Ablation

Management:

electric cardioversion-3

- Risks and complications:
 1. Embolism : 1-7 % of patients without prophylactic anticoagulation
 2. Arrhythmias:- usually benign arrhythmias, subside spontaneously
 - VT. VF - associated with hypokalemia or digoxin intoxication
 - Underlying sinus node dysfunction
 3. Myocardial injury: has not been confirmed and is probably not clinically significant

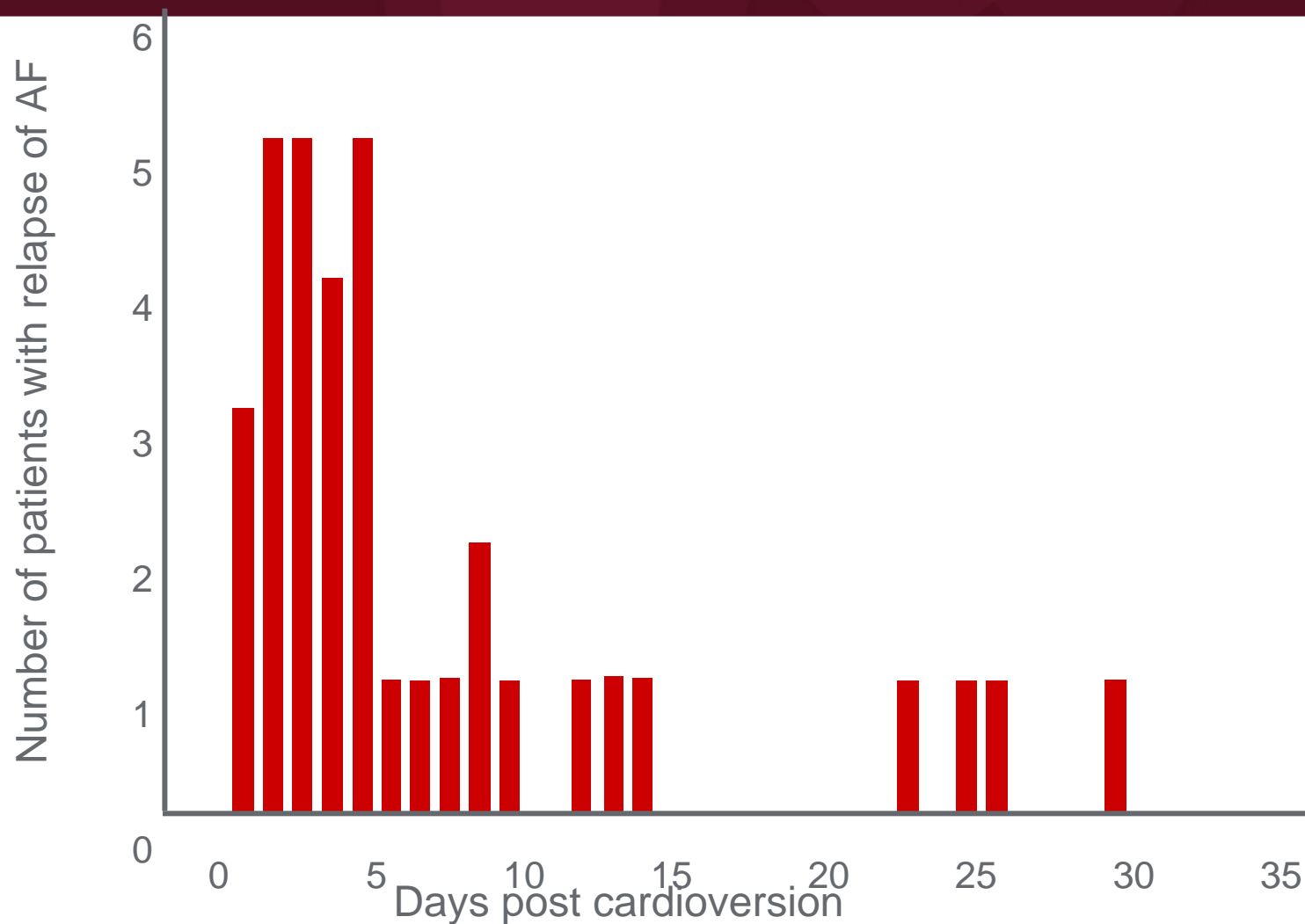
Clinical Outcomes of TEE-guided vs. Conventional-treatment Cardioversion of A. Fib

Variable	TEE Guided (n= 619)	Conventional Treatment (n=603)
Successful Cardioversion (%)	80.3	79.9
Time to Cardioversion (d)	3.0 \pm 5.6*	30.6 \pm 10.6
Embolic Events (%)	5 (0.8%)	3 (0.5%)
Hemorrhagic events (%)	18 (2.9%)*	33 (5.5%)
Death (%)	15 (2.4%)	6 (1.0%)
SR at 8 wks (%)	52.7	50.4

**significant*

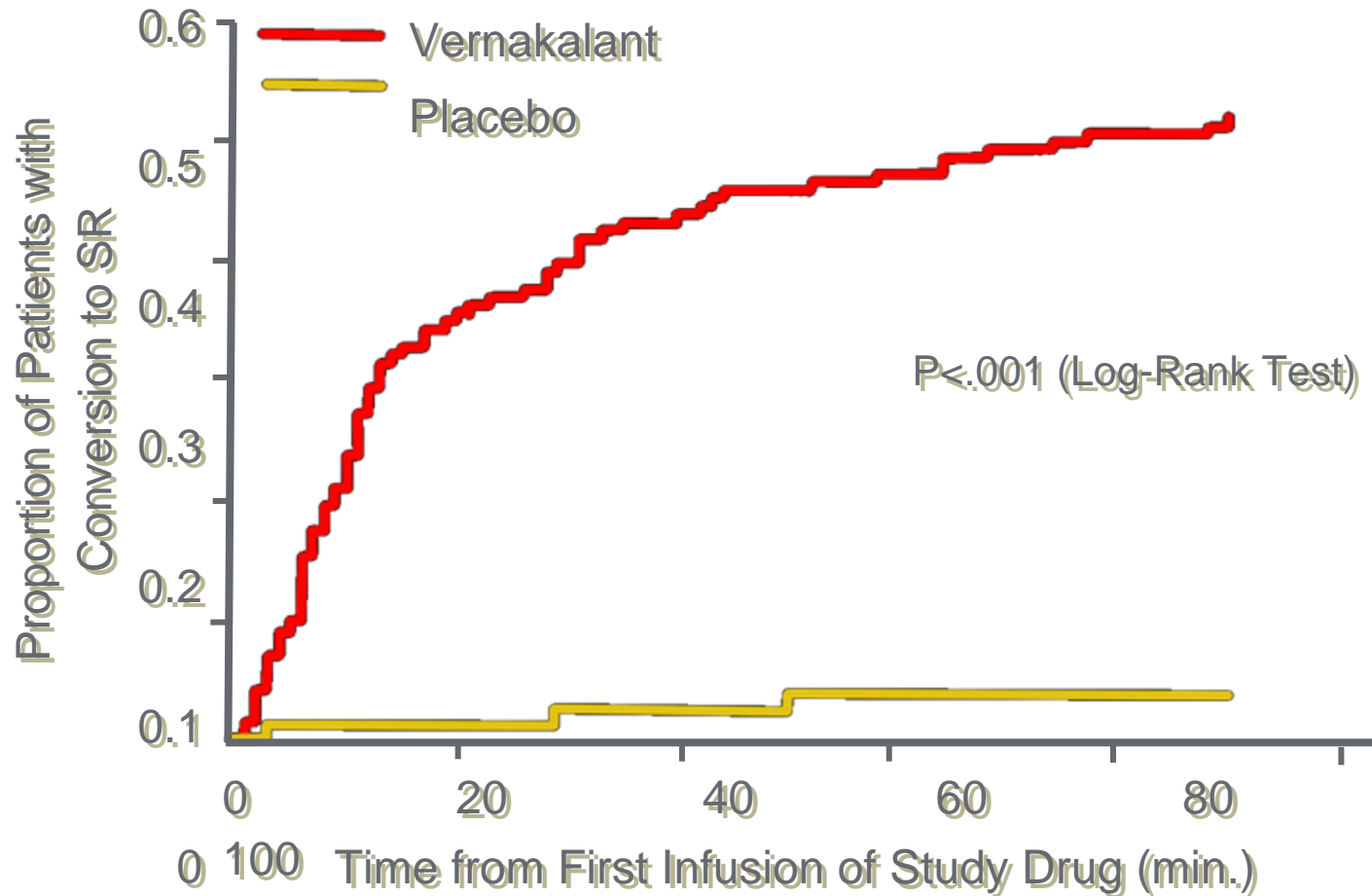
Klein AL, N Engl J Med 2001; 344: 1411-20

Daily Incidence of AF Relapse After Electrical Cardioversion



Tieleman RG et al. *J Am Coll Cardiol* 1998; 31: 167-73

Cumulative Success Rates of Conversion to Sinus Rhythm Over Time with Vernakalant vs. Placebo



Roy D Circulation 2008; 117:1518-1525

“Pill-in-the-Pocket” Approach to Cardiovert A. Fib

Alboni P et al. *N Engl J Med* 2004; 351: 2384-91

**268 patients treated
in hospital**

58 patients excluded
- 3 patients (1%) met
echocardiographic
exclusion criteria
- 41 patients (15%)
had drug inefficacy
- 14 patients (5%) had
adverse effects

**210 patients enrolled for
out-of-hospital treatment**

**4 patients (2%) lost to
follow-up**

**41 patients (20%) had no
recurrence**

**165 patients (79%) had
recurrences**

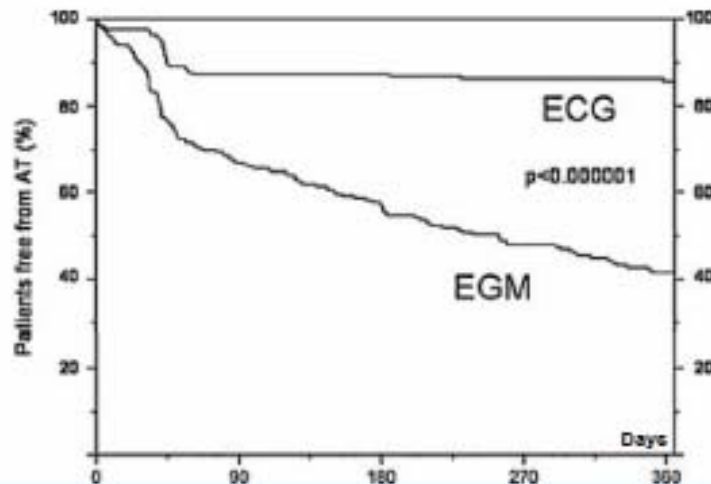
Cardioversion: ECG and Symptoms

- Comparison of perceived rhythm with rhythm on ECG
 - 356 persistent AF pts. one week after successful cardioversion:
- **Only 28% of pts. in AF felt they were in AF**

Rhythm on ECG	Perceived heart rhythm		
	SR (n = 160)	AF (n = 59)	Unsure (n = 137)
SR (n = 222)	130*	21	71
AF (n = 134)	30	38‡	66

Pacemakers: Diagnostics and Symptoms

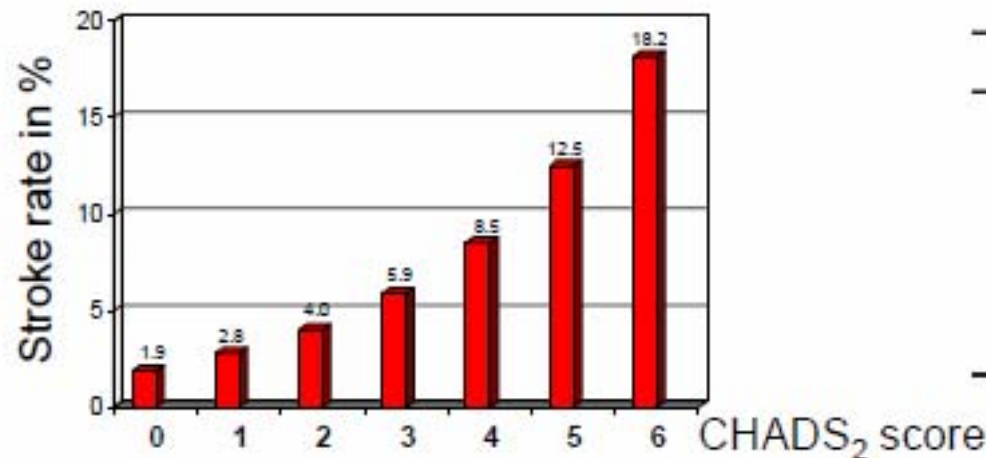
- **Correlation between symptoms and EGMs**
 - 254 pts. with a DDD pacemaker
 - 79% of pts. with AT on EGM were free of symptoms
 - 60% of pts. without AT on EGM had symptoms
 - **AT documentation in 15% (ECG) and 54% (EGM)**



Stroke – Secondary Prevention

- After an ischemic stroke or TIA of unknown cause Aspirin is recommended¹
- Oral anticoagulation reduces all stroke risk in AF patients by 80%²
 - So, if AF is detected in a patient with Cryptogenic Stroke, OAC is the preferred therapy

CHADS₂ risk score for stroke in AF patients



CHADS ₂ Risk Criteria	Score
Prior stroke or TIA	2
Age >75 y	1
Hypertension	1
Diabetes mellitus	1
Heart failure	1

TABLE 13. Antithrombotic Therapy for Patients With Atrial Fibrillation

Risk Category	Recommended Therapy
No risk factors	Aspirin, 81 to 325 mg daily
One moderate-risk factor	Aspirin, 81 to 325 mg daily, or warfarin (INR 2.0 to 3.0, target 2.5)
Any high-risk factor or more than 1 moderate-risk factor	Warfarin (INR 2.0 to 3.0, target 2.5)*

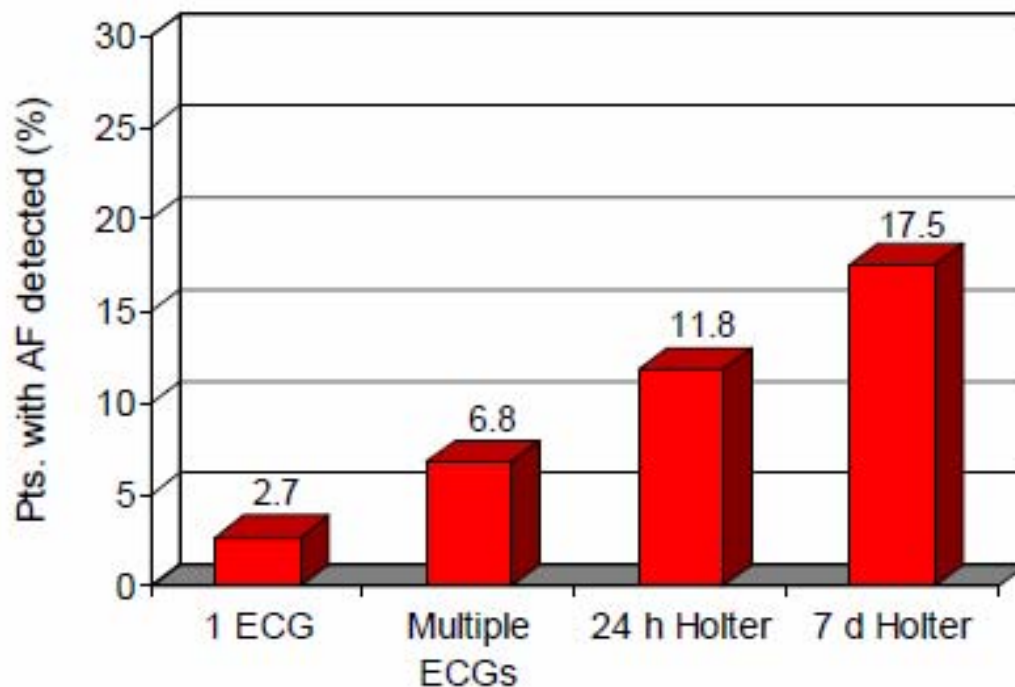
Current Monitoring Options

Technology	Storage	Continuous	Electrodes	Comments
Symptoms	None	Yes	None	Only symptomatic events
ECG	< 1 minute	Yes	10 on skin	
Holter	24 – 48 hours	Yes	3 on skin	
Event recorder	7 – 28 days	No	3 on skin	Only symptomatic events
Transtelephonic ECG monitoring	Minutes/ day	No	On skin	Discontinuous
External loop recorder	7 – 28 days	Yes	On wrist or 2-3 on skin	
Mobile cardiac outpatient monitoring	Continuous, (<28 days)	Yes	3 on skin	Direct transmission
Insertable loop recorder	Continuous	Yes	Under skin	Implanted
Pacemaker, ICD	Continuous	Yes	Implanted	Implanted, PM/ICD pt.

How to detect AF?



- More intensive monitoring results in more AF detection



**Rivaroxaban (Xarelto)
for stroke prevention in atrial
fibrillation**

August 2009



This technology summary is based on information available at the time of research and a limited literature search. It is not intended to be a definitive statement on the safety, efficacy or effectiveness of the health technology covered and should not be used for commercial purposes.

The National Horizon Scanning Centre Research Programme is part of the
National Institute for Health Research

Trials of Antithrombotic Therapy in AF – Where Do We Stand Now?

Daniel E. Singer, M.D.

Massachusetts General Hospital

Harvard Medical School

Stroke Prevention in AF: The Future

1. More new antithrombotics:
 - oral direct thrombin and Xa inhibitors, others
 - Irbesartan (ACTIVE-I)
2. “Rx” of LAA: surgery, catheter approach
3. True cure of AF:
 - initiator: ablation/isolation of PV
 - substrate: “maze” procedure
4. Preventing AF



Who is suitable for Cardioversion?

NICE recommendations 2006 DEBATE

- **Heart Rate Control**

- Patients over 65 ACTIVITY LEVEL
- Patients with coronary heart disease
?POST REVASC & CABG
- Patients unsuitable for cardioversion
DEVICES ? ABLATIONS
- Patients who can't take antiarrhythmic drugs
NEW DRUGS
- No Symptoms
- Without cardiac failure

- **Cardioversion**

- Presenting for the first time with lone AF –
unknown cause CONFIRM LONE
- Younger patients STRUCTURAL
DISEASE
- Patients with Symptoms AFTER RATE
CONTROL?
- Patients with AF secondary to another cause
eg. Infection, Thyroid abnormality, post
surgery OFTEN REVERT
- With cardiac failure RECENT NEGATIVE
TRIALS

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General Disease Overview & Epidemiology	Case Studies	Clinical Trials	Current Practice & Registries
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