Congresso Nazionale SIMEU. Orino 6-8 Novembre 2014
7 novembre SALA LISBONA: 11.30 – 12.15

TORNIAMO A SCUOLA

Fibrillazione atriale: quale terapia per quale paziente

A.Conti

Medicina d'Urgenza

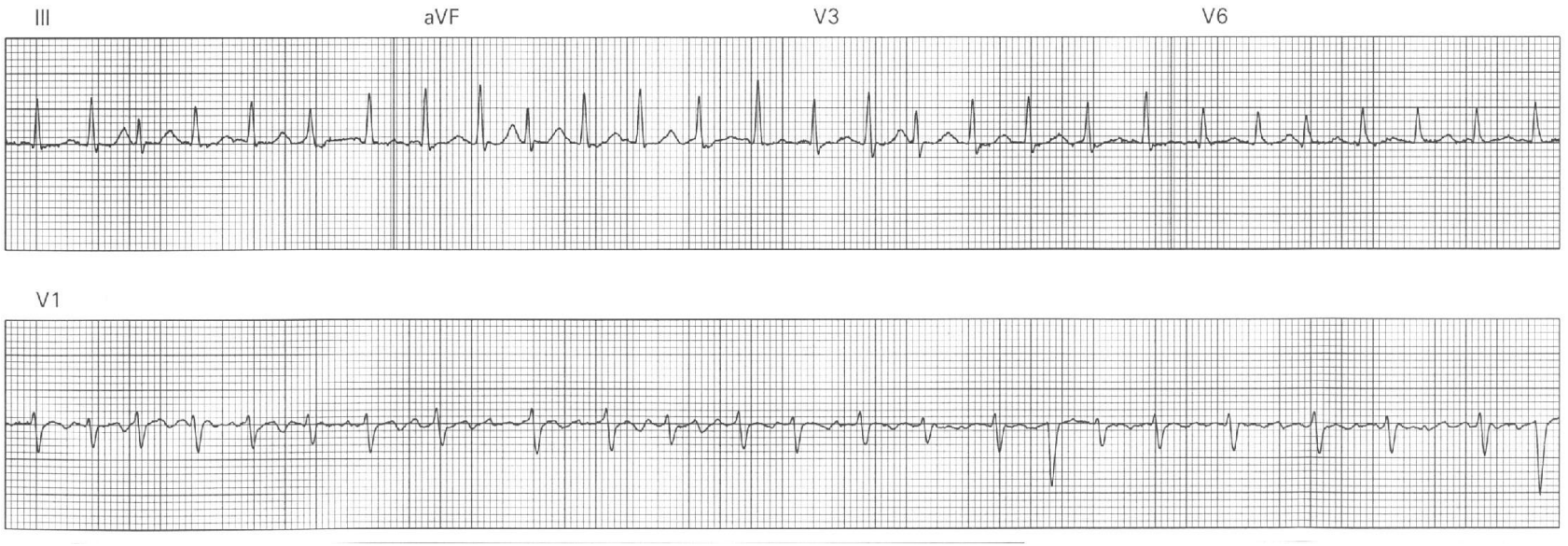
Ospedale Careggi, AOUC, Firenze

Evaluation and Initial Treatment of Supraventricular Tachycardia

- A 68-year-old woman presents to the emergency department with the sole symptom of "a racing heart," which began abruptly while she was eating dinner.
- She reports having had prior episodes of palpitations that resolved spontaneously.
- In the emergency room, her blood pressure is 124/60 mm Hg.
- How should this case be managed?

CASE # X

MS. Link, N Engl J Med, 2012


III
aVF
V3
V6
V1

Evaluation and Initial Treatment of Supraventricular Tachycardia

- A 68-year-old woman presents to the emergency department with the sole symptom of "a racing heart," which began abruptly while she was eating dinner.
- She reports having had prior episodes of palpitations that resolved spontaneously.
- In the emergency room, her blood pressure is 124/60 mm Hg.
- How should this case be managed?

- CASE # X
- **This patient has an irregular narrow-complex tachycardia, with HR 150 b/min, with a sudden onset, as assessed on the basis of the history.**
- **Possibilities include atrial fibrillation…**

and multifocal atrial or irregular high heart rate flutter?.

MS. Link, N Engl J Med, 2012

Recommendations

- The narrow QRS complex rules out ventricular tachycardia; the irregular response rules out supraventricular tachycardia.
- The heart rate of 150 beats per minute is consistent with atrial fibrillation.
- Furthermore, the suddenness of the onset of symptoms and the absence of clear P waves suggest atrial fibrillation.
- **…evaluation, diagnostic strategy and**
- **…treatment……**

MS. Link, N Engl J Med, 2012

Recommendations

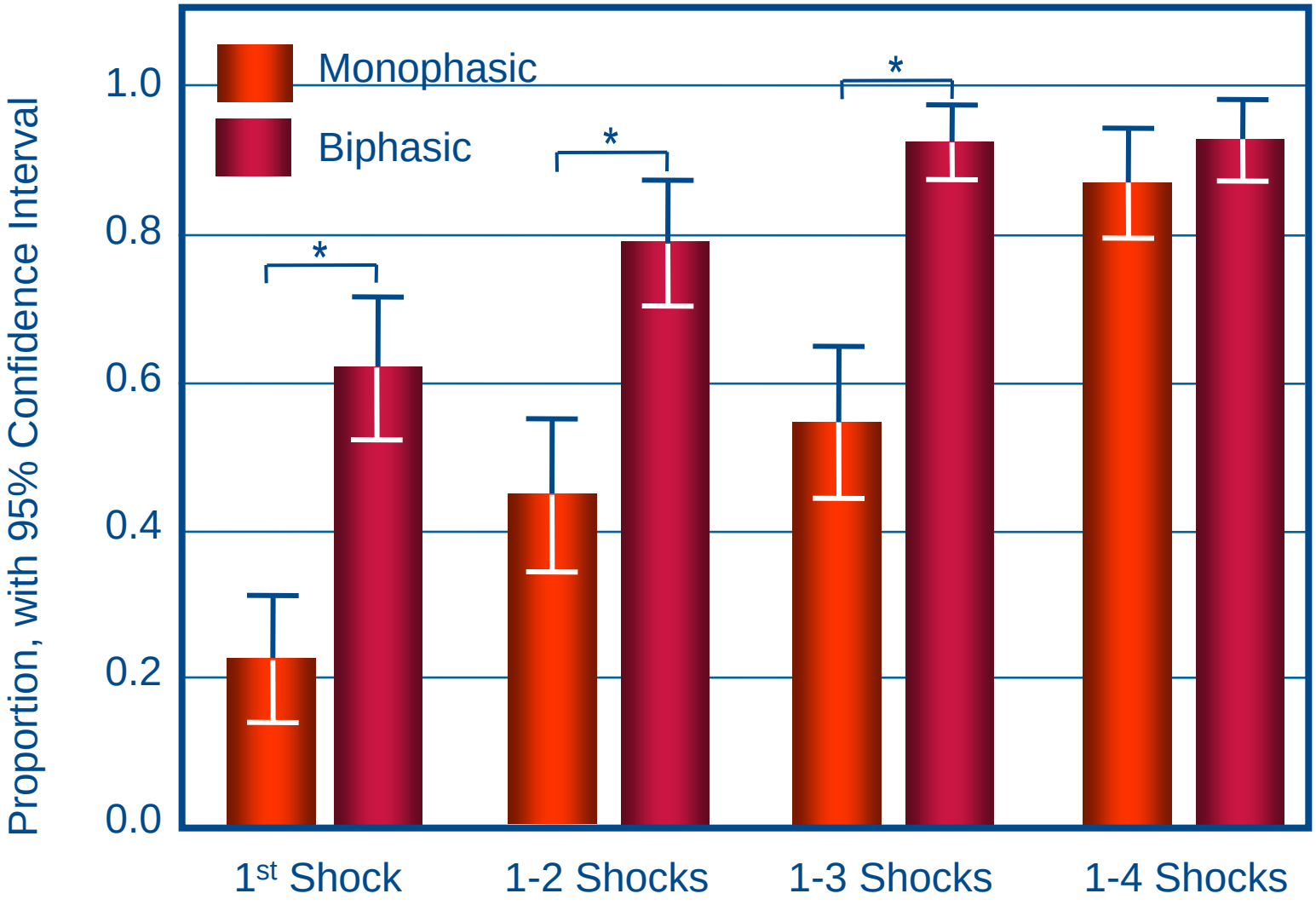
- The narrow QRS complex rules out ventricular tachycardia; the irregular response rules out supraventricular tachycardia.
- The heart rate of 150 beats per minute is consistent with atrial fibrillation.
- Furthermore, the suddenness of the onset of symptoms and the absence of clear P waves suggest atrial fibrillation.
- **Flecainide, Propafenone, Vernakalant and Amiodarone would be expected to terminate the atrial fibrillation, or DC shock.**

MS. Link, N Engl J Med, 2012

AADs and action

CLASS	SAN	AVN	Accessory pathways	Ventricles	Atria	
IA	/	/	yes	yes	yes	*
IB	no	no	no	yes	no	
IC	yes	yes	yes	yes	yes	*
II	yes	yes	no	no	no	
III	yes	yes	yes	yes	yes	*
IV	yes	yes	no	no	no	

Cumulative Success in Cardioversion of A. Fib: Biphasic vs. Monophasic Waveform



Page RL et al. JACC 2002; 39: 1956-63

Primary Therapeutic Aims in AFib

- Restore and maintain sinus rhythm whenever possible
- Prevent thromboembolic events

In order to:

- Reduce symptoms and improve QoL
- Minimize impact of AFib on cardiac performance
- Reduce risk of stroke
- Minimize cardiac remodelling

ACC/AHA/ESC 2006 Guidelines for the Management of Patients With Atrial Fibrillation
J Am Coll Cardiol (2006) 48: 854

Atrial Fibrillation: overview

Chugh SS, Circulation 2013

Atrial Fibrillation: overview

Atrial Fibrillation

represent the most common cardiac arrhythmia

in acute cardiac care (1-2% of ED visits),

in hospitalization (21-31% of hospitalization for arrhythmia)

Camm AJ et al *Eur Heart J* 2010;**31**(19):2369-2429.
Chugh, S. S. *et al*.*Circulation* **129**, 837–847 (2013)
Colilla, S. *et al*. *Am. J. Cardiol.* **112**, 1142–1147 (2013)

Atrial Fibrillation: overview

Atrial Fibrillation

represent the most common cardiac arrhythmia

in acute cardiac care

in hospitalization

The worldwide age-adjusted **prevalence** of AF is near 4-6% (women and men, respectively)

Overall, 6 millions of individuals in Europe and 3–5 million in the USA have AF

Camm AJ et al *Eur Heart J* 2010;**31**(19):2369-2429.
Chugh, S. S. *et al*.*Circulation* **129**, 837–847 (2013)
Colilla, S. *et al*. *Am. J. Cardiol.* **112**, 1142–1147 (2013)

The Consequences of AF

Thromboembolism

- Stroke: 4.5× risk
- Microemboli: cognitive function
- Prothrombotic state

Mortality

- 2× risk independent of comorbid CV disease
- Sudden death in HF and HCM

Hospitalizations

- Most common arrhythmia requiring hospitalization
- 2-3× risk for hospitalization

Impaired hemodynamics

- Loss of atrial kick
- Irregular ventricular contractions
- Heart failure
- Tachycardia-induced cardiomyopathy

Quality of life

- Palpitations, dyspnea, fatigue, exercise tolerance

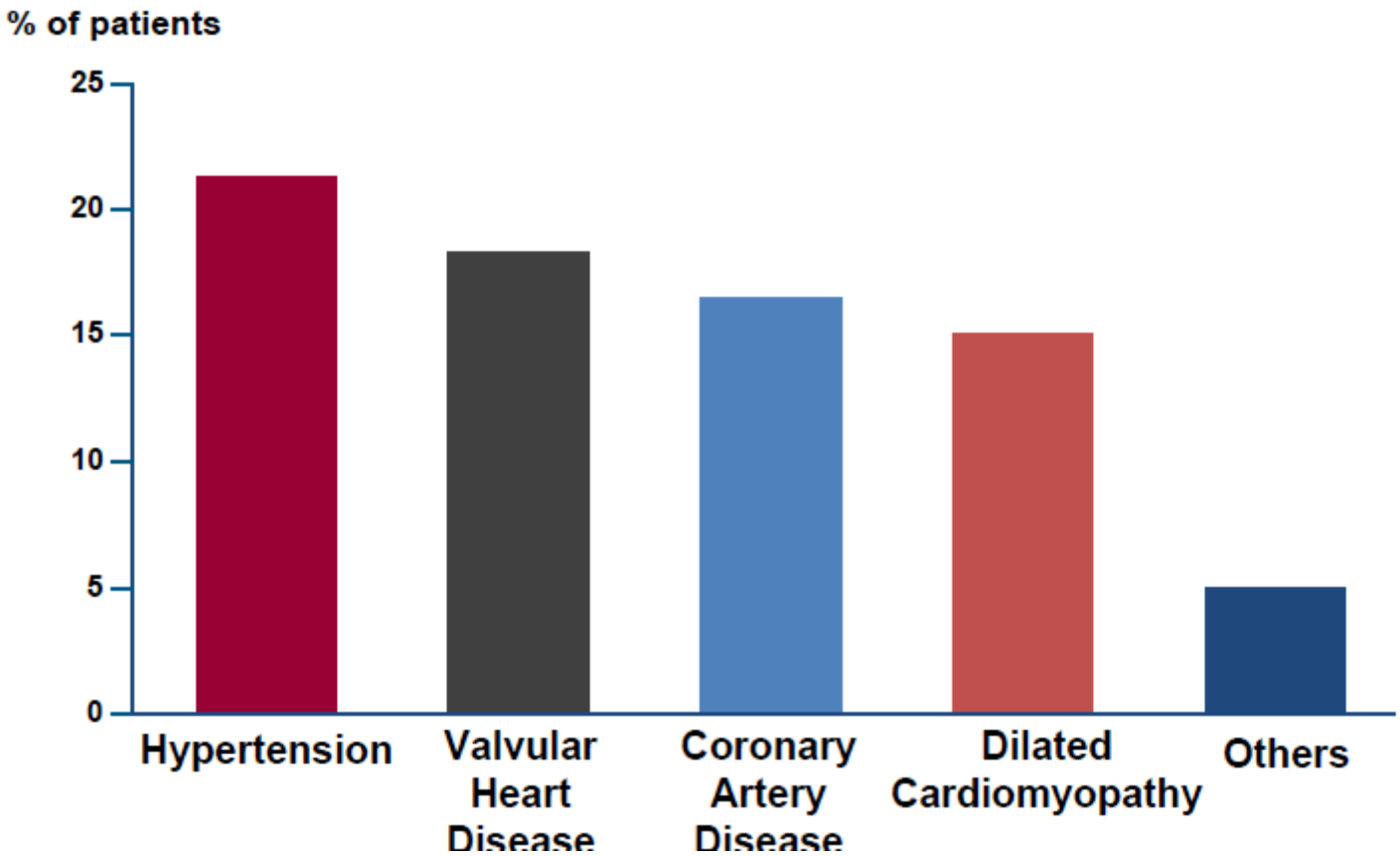
Costly

High prevalence results in a major public health-care burden

annual incremental cost US$26 billion in USA, and 3.2 million hospital-days. In Europe the estimated combined annual cost in all five countries was 6.2 billion

Heart Disease and Stroke Statistical Update 2014, Circulation 2014.
Van Gelder IC et al. *Europace*. 2006;8:943-9; Narayan SM et al. *Lancet.* 1997;350:943-50.
Wattigney WA et al. Circulation. 2003;108:711-6. Wyse DG et al. Circulation. 2004;109:3089-95.
Ringborg, A. et al. Europace 2008;10, 403–411 ().Kim, M. H. et al Circ. Cardiovasc. Qual. Outcomes 2011; 4, 313–320.
Conen D, et al JAMA 2011;305(20):2080-2087. Miyasaka Y et al J AmColl Cardiol. 2007;49(9):986-992

AF and other conditions



Levy S. Circulation 1999.

Atrial Fibrillation

Cardiac Causes

- Hypertensive heart disease
- Ischemic heart disease
- Valvular heart disease
  - Rheumatic: mitral stenosis
  - Non-rheumatic: aortic stenosis, mitral regurgitation
- Pericarditis
- Cardiac tumors: atrial myxoma
- Sick sinus syndrome
- Cardiomyopathy
  - Hypertrophic
  - Idiopathic dilated (? cause vs. effect)
- Post-coronary bypass surgery

Non-Cardiac Causes

- Pulmonary
  - COPD
  - Pneumonia
  - Pulmonary embolism
- Metabolic
  - Thyroid disease: hyperthyroidism
  - Electrolyte disorder
- Toxic: alcohol ('holiday heart' syndrome)

Isolated AF (“Lone AF”) in the world

Prevalence

Euro Heart Suvey 2008	10%
Framingham 1985	8%
CHS 1994	11%
Kopeky 1987	3%
Olmsted County 2010	2%
ATA-AF	2%

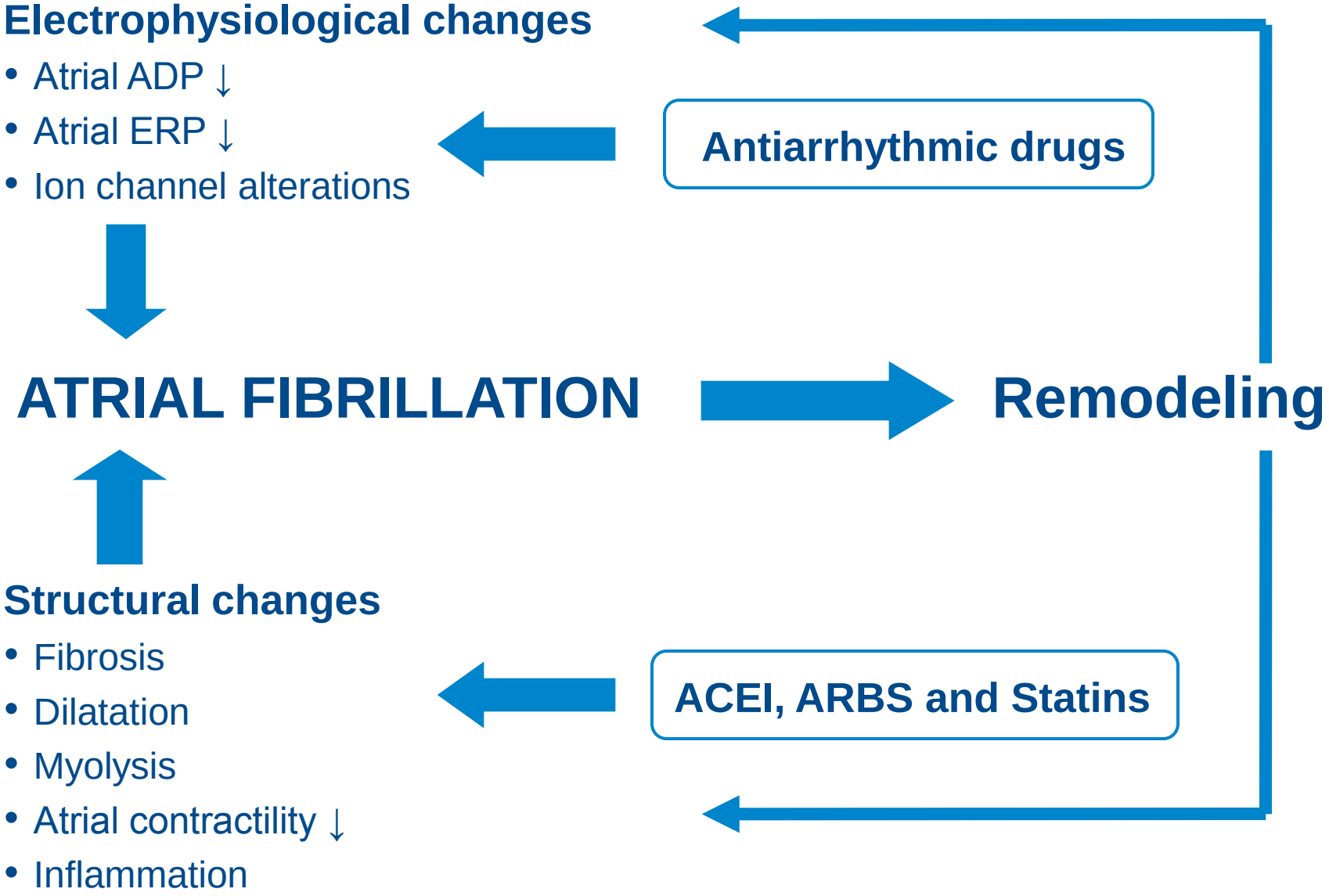
Data on file 2010

AF

Parossistica
Persistente
Long-lasting
Permanente

Elettrica
Anatomo-elettrica
Anatomica

The vicious circle of AF



Stroke is the leading complication of AF

Without prevention (anticoagulation)

5%; 1 in 20 patients

will have a stroke each year

Atrial Fibrillation Investigators. Arch Intern Med 1994;154:1449–57;

Stroke
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association | American Stroke Association

Adelaide Stroke Incidence Study: Declining Stroke Rates but Many Preventable Cardioembolic Strokes

James M. Leyden, Timothy J. Kleinig, Jonathan Newbury, Sally Castle, Jennifer Cranefield, Craig S. Anderson, Maria Crotty, Deirdre Whitford, Jim Jannes, Andrew Lee and Jennene Greenhill

Stroke. 2013;44:1226-1231; originally published online March 12, 2013;

Stroke is the leading complication of AF

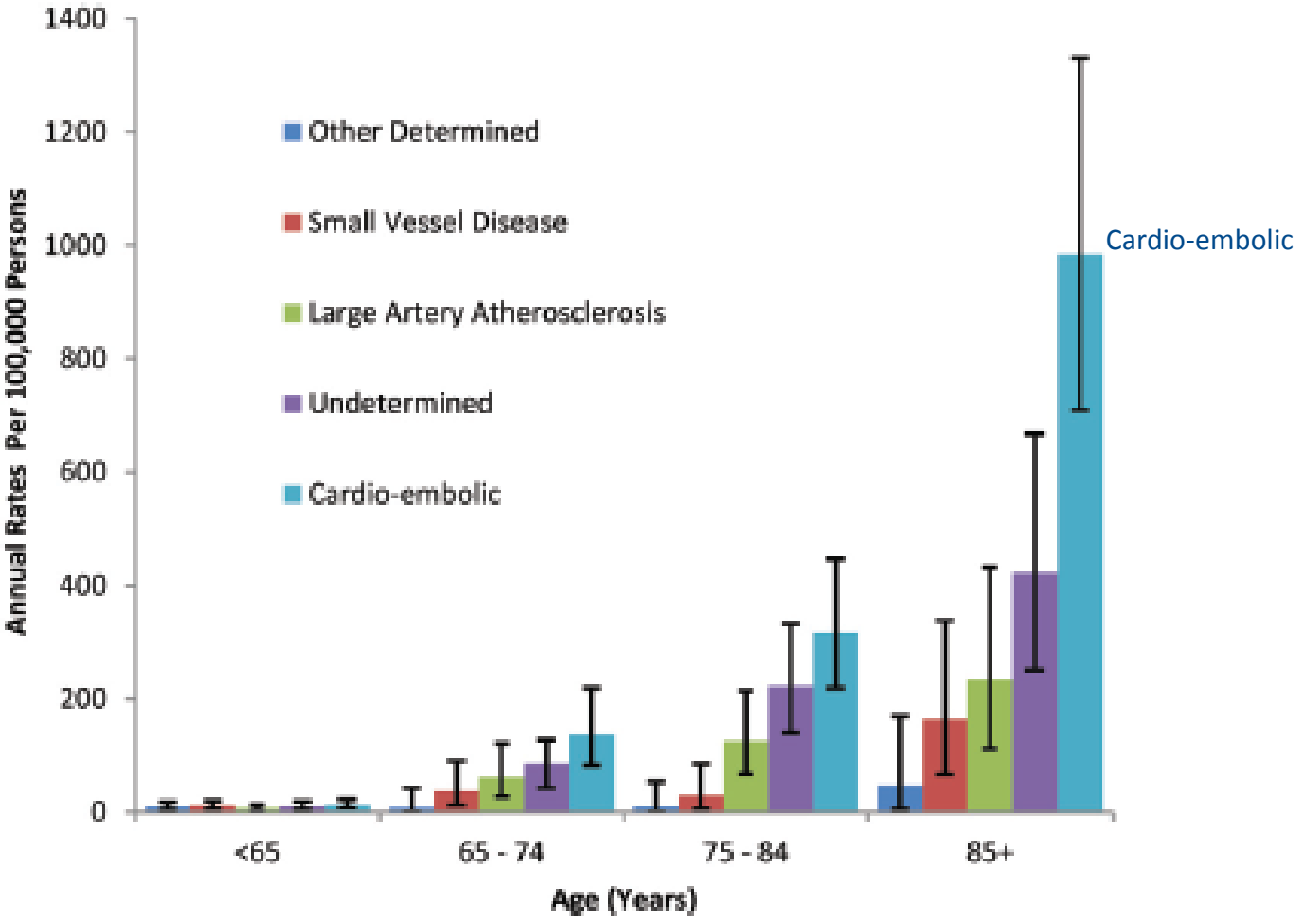
4/10 ischemic strokes were cardioembolic (15-30% reported in previous studies).

The trend suggested there was a need for more effective anticoagulation:
"We could stop a third of cardioembolic strokes if we could anticoagulate properly".

The study found there were 318 strokes in the 140,000 people studied, of which 258 were ischaemic. 42% of ischaemic strokes were cardioembolic and 36% were caused by AF.

Leyden JM. Stroke 2013

Age-specific incidence rates for all ischemic stroke subtypes in Adelaide (2009-2010)



Cardio-embolic STROKE up to 45% in older age
10% each year

Leyden JM. Stroke 2013

Management of Atrial Fibrillation: ESC and ACC/AHA Guidelines

- **Anticoagulation risk stratification**
- **Use of novel oral anticoagulants**

- **Pharmacological cardioversion**
- **Oral antiarrhythmic therapy**

- **Left atrial catheter ablation**

ESC AF Guidelines. Focus of 2012 Update. Eur Heart J 2012
ACC/AHA/ESC 2006 AF Guidelines *J Am Coll Cardiol* 2006

CHA_2DS_2VASc score and stroke rate

a) The risk factor based approach expressed as a point based scoring system, with the acronym CHA_2DS_2-VASc (Note: maximum score is 9 since age may contribute 0, 1 or 2 points)	
Risk factor	**Score**
Congestive heart failure/LV dysfunction	1
Hypertension	1
Age ≥75	2
Diabetes mellitus	1
Stroke/TIA/TE	2
Vascular disease[a]	1
Age 65-74	1
Sex category (i.e., female gender)	1
Maximum score	**9**

b) Adjusted stroke rate according to CHA_2DS_2-VASc score		
CHA_2DS_2-VASc score	Patients (n = 73538)	Stroke and thromboembolism event rate at 1 year follow-up (%)
0	6369	0.78
1	8203	2.01
2	12771	3.71
3	17371	5.92
4	13887	9.27
5	8942	15.26
6	4244	19.74
7	1420	21.50
8	285	22.38
9	46	23.64

10%

20%

donna, >75 anni, Ipertesa:
Cioè…tutte

Corrigendum to: 'Guidelines: 2012 focused update of the ESC Guidelines for the management of atrial fibrillation: an update of the 2010 ESC Guidelines for the management of atrial fibrillation'[Eur Heart J (2012) 33 (21): 2719-2747; doi:10.1093/eurheartj/ehs253.

Antithrombotic therapies in stroke prevention

Warfarin
Relative RR vs. placebo 64% (CI 49–74)
Absolute risk reduction primary 2.7%/yr
Absolute risk reduction secondary 8.4%/yr
NNT primary prevention 37
NNT secondary prevention 12

ASA
Relative RR vs. placebo 22% (CI -1–35)
Absolute risk reduction primary 0.8%/yr
Absolute risk reduction secondary 2.5%/yr
NNT primary prevention 125
NNT secondary prevention 40

Warfarin vs ASA
RR 38% (CI 23-48)

Hart RG et al. *Ann Intern Med* 2007; 146: 857–867

Pregi Degli Inibitori Della Vitamina K

✓

a terapia antitrombotica si è dimostrata l'unica terapia che è in grado di ridurre le morti correlate all'aritmia

✓

ertanto rappresenta "Gold standard nel trattamento della prevenzione dello stroke e tromboembolismo sistemico"

✓

ifatti gli eventi si riducono del 60%

I Limiti Degli Inibitori Della Vitamina K

✓

tretta finestra terapeutica (range INR 2-3) = frequente monitoraggio

✓

’efficacia e la sicurezza sono legate al Time in Therapeutic Range (TTR)

✓

ariabili importanti sono:

- metabolismo e compliance del paziente
- interazioni con farmaci e alimenti
- qualità del laboratorio
- qualità della prescrizione (curante, centri TAO, self monitoring)

✓

mportante undertreatment (meno della metà in Italia, solo il 60-70% negli USA)

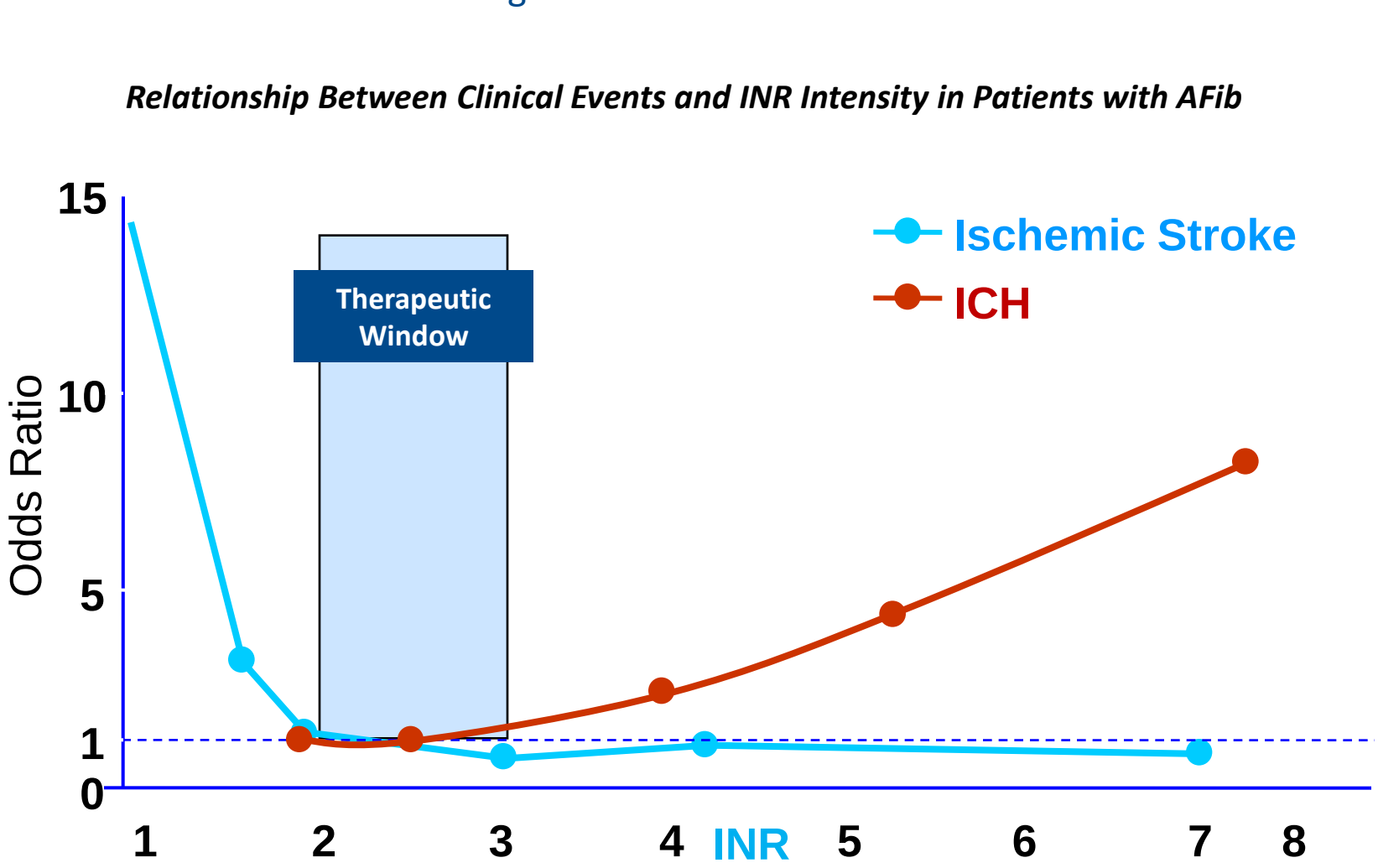
✓

levato rischio di eventi avversi emorragici (ICH)

✓

Stretta finestra terapeutica (range INR 2-3) = frequente monitoraggio

I Limiti Degli Inibitori Della Vitamina K

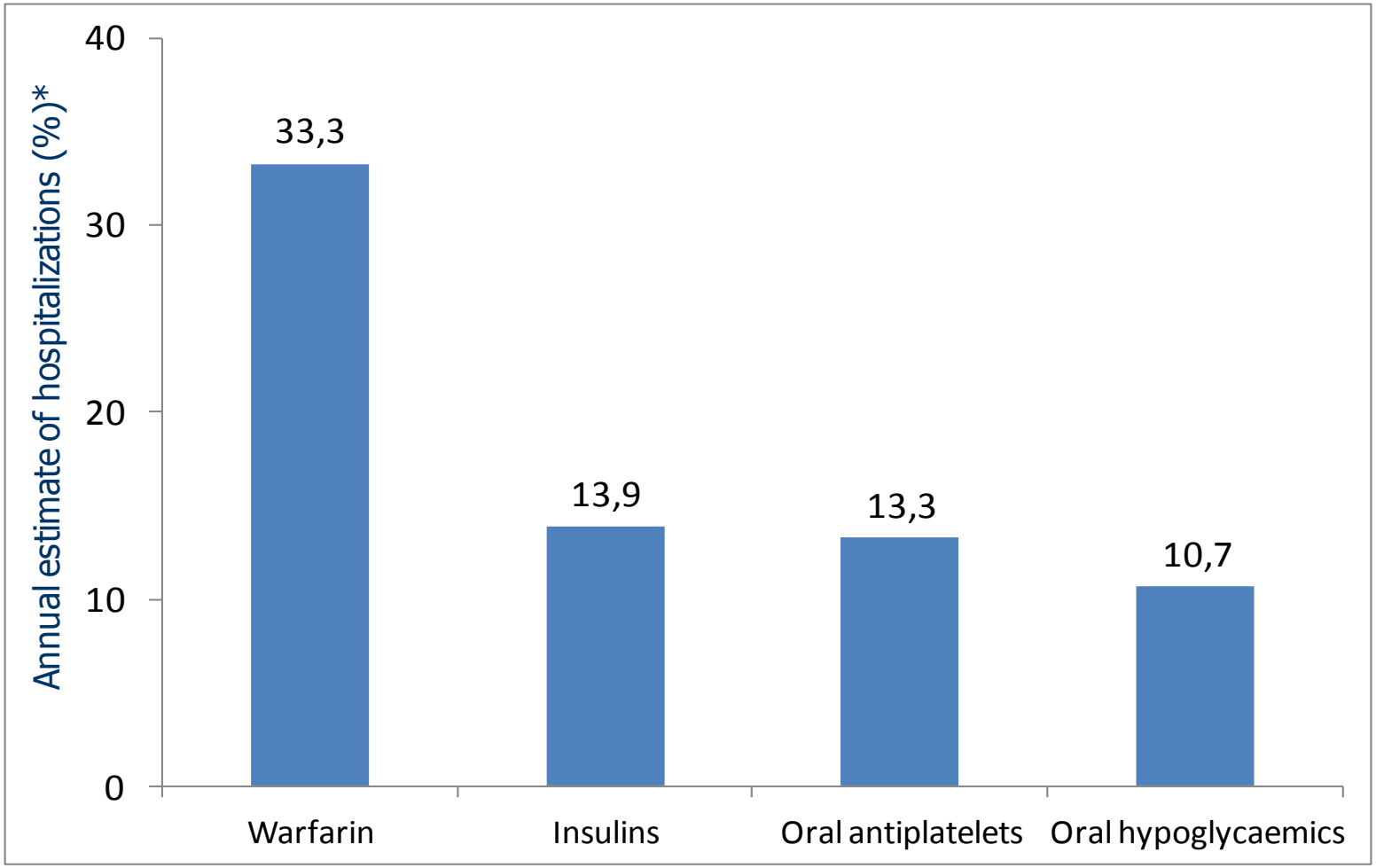


Hylek EM, et al. *Ann Intern Med.* 1994;120:897-902.

Hylek EM, et al. *N Engl J Med.* 1996;335:540-546.

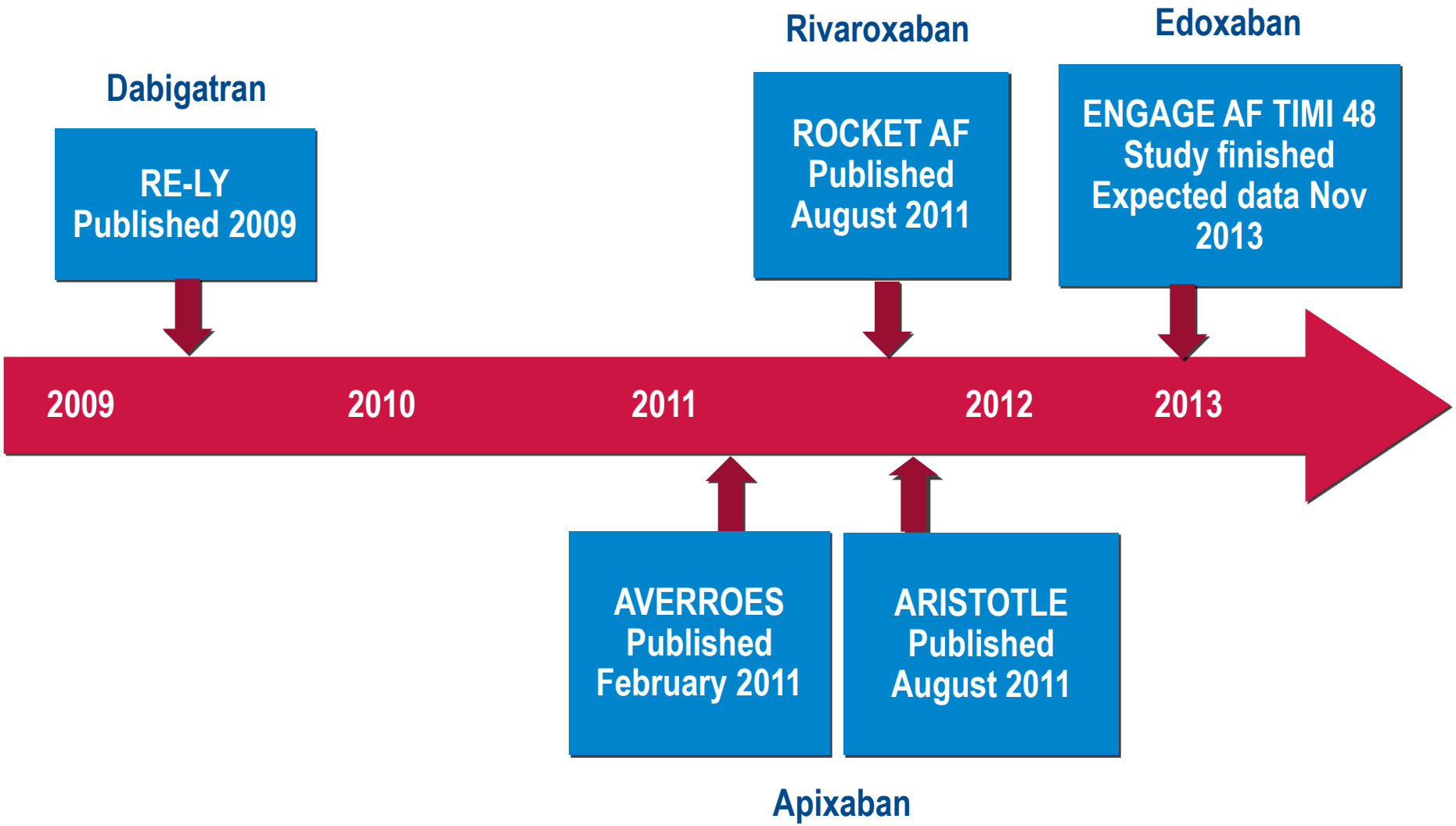
Warfarin implicato in circa un terzo dei ricoveri ospedalieri per:

eventi avversi a farmaci



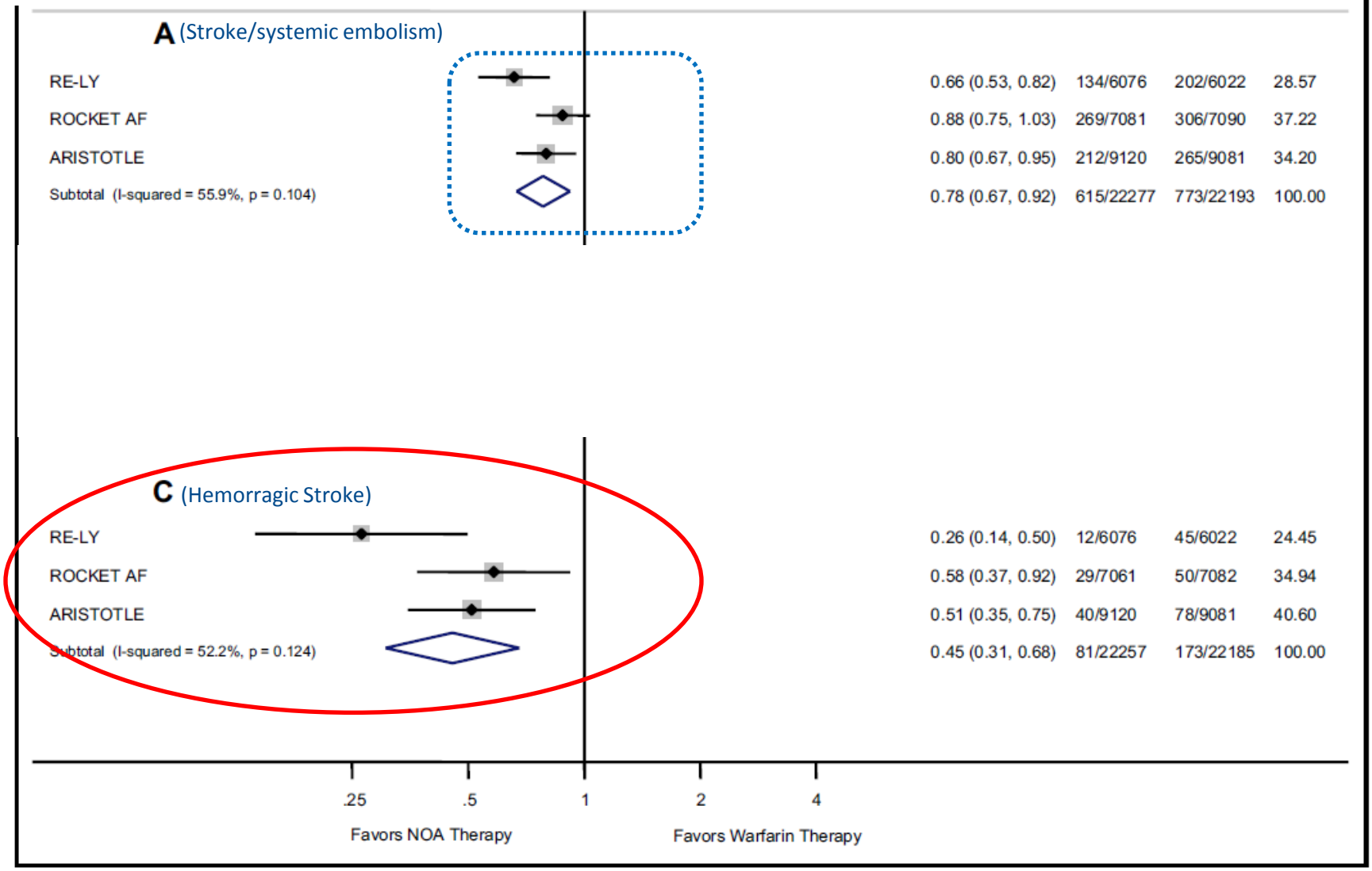
Budnitz DS et al., NEJM 365, 2011

Atrial Fibrillation: new oral anticoagulants (RCT)



Meta-Analysis of Efficacy and Safety of New Oral Anticoagulants (*Dabigatran, Rivaroxaban, Apixaban*) Versus *Warfarin* in Patients With Atrial Fibrillation

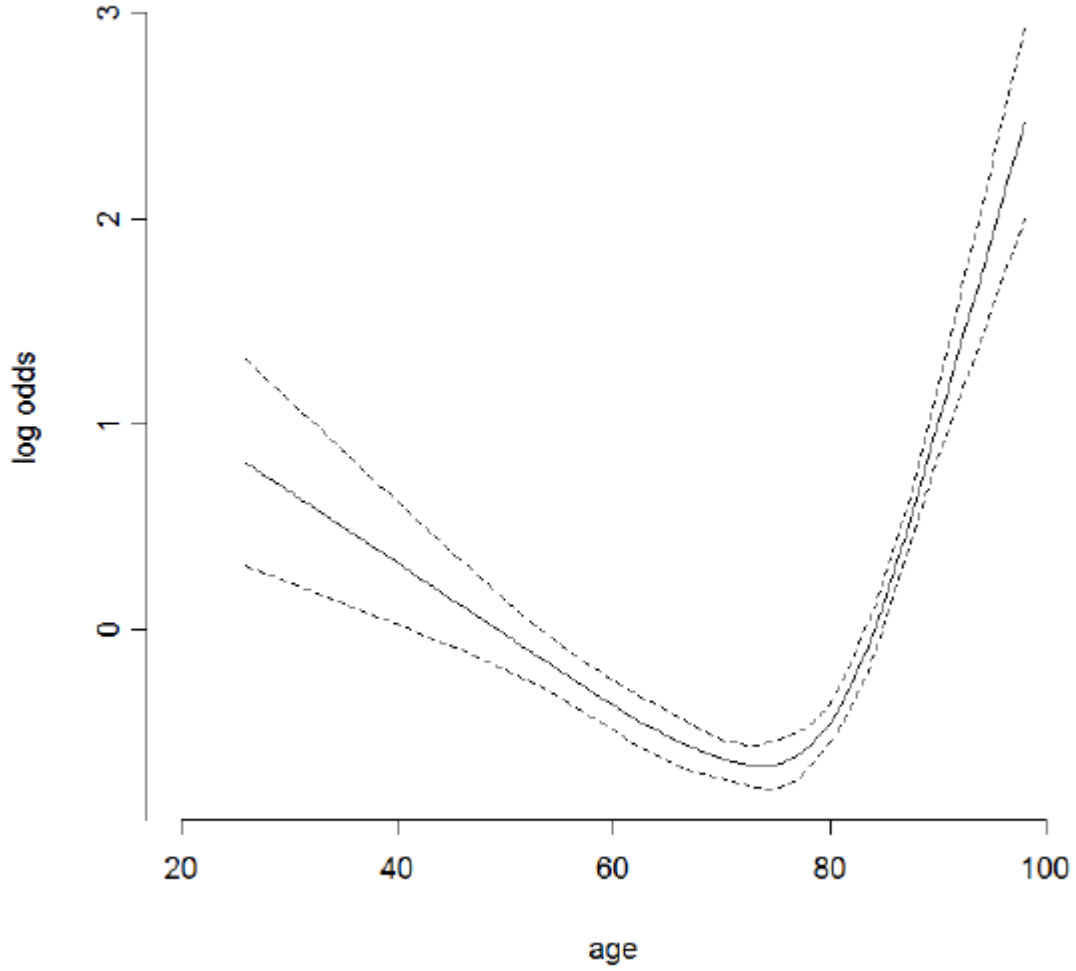
Corey S. Miller, BA[a,c], Sonia M. Grandi, MSc[a], Avi Shimony, MD[a,b,d], Kristian B. Filion, PhD[a], and Mark J. Eisenberg, MD, MPH[a,b,c,*]



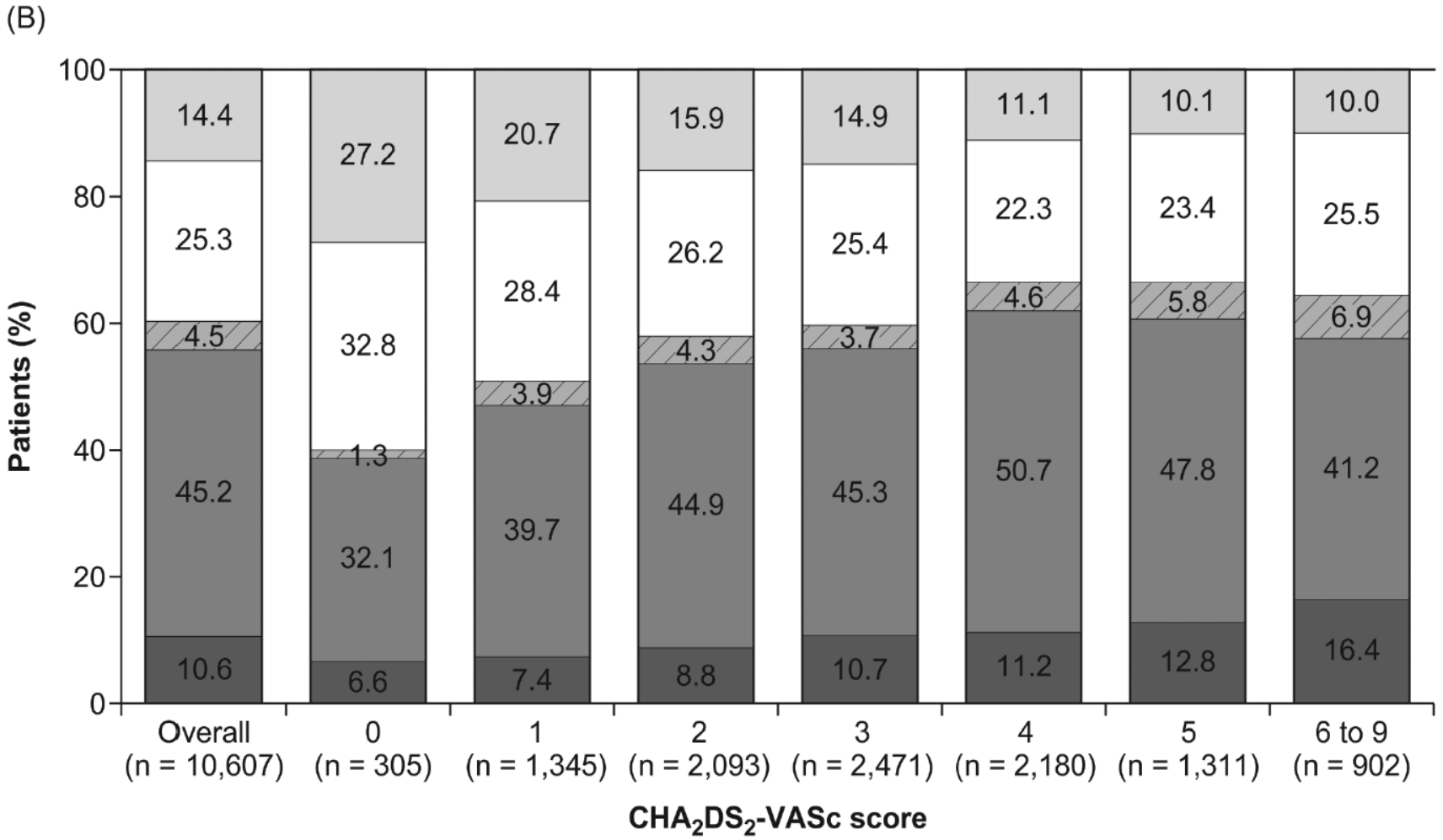
Miller CS. Am J Cardiol 2012; 110:453-460.

Age-based lack of prescribing Warfarin

Predittori di mancata prescrizione di VKA:
- Sesso femminile
- Ricovero in Medicina
- Età
- Deficit cognitivo



Use of antithrombotic therapies, overall and according to CHA_2DS_2-VASc score in the Garfield registry



Kakkar AK , PLOSone 2013

Rischio emorragico – HAS-BLED

HAS-BLED risk criteria	Score
Hypertension	1
Abnormal renal or liver function (1 point each)	1 or 2
Stroke	1
Bleeding	1
Labile INRs	1
Elderly (e.g. age >65 yrs)	1
Drugs or alcohol (1 point each)	1 or 2

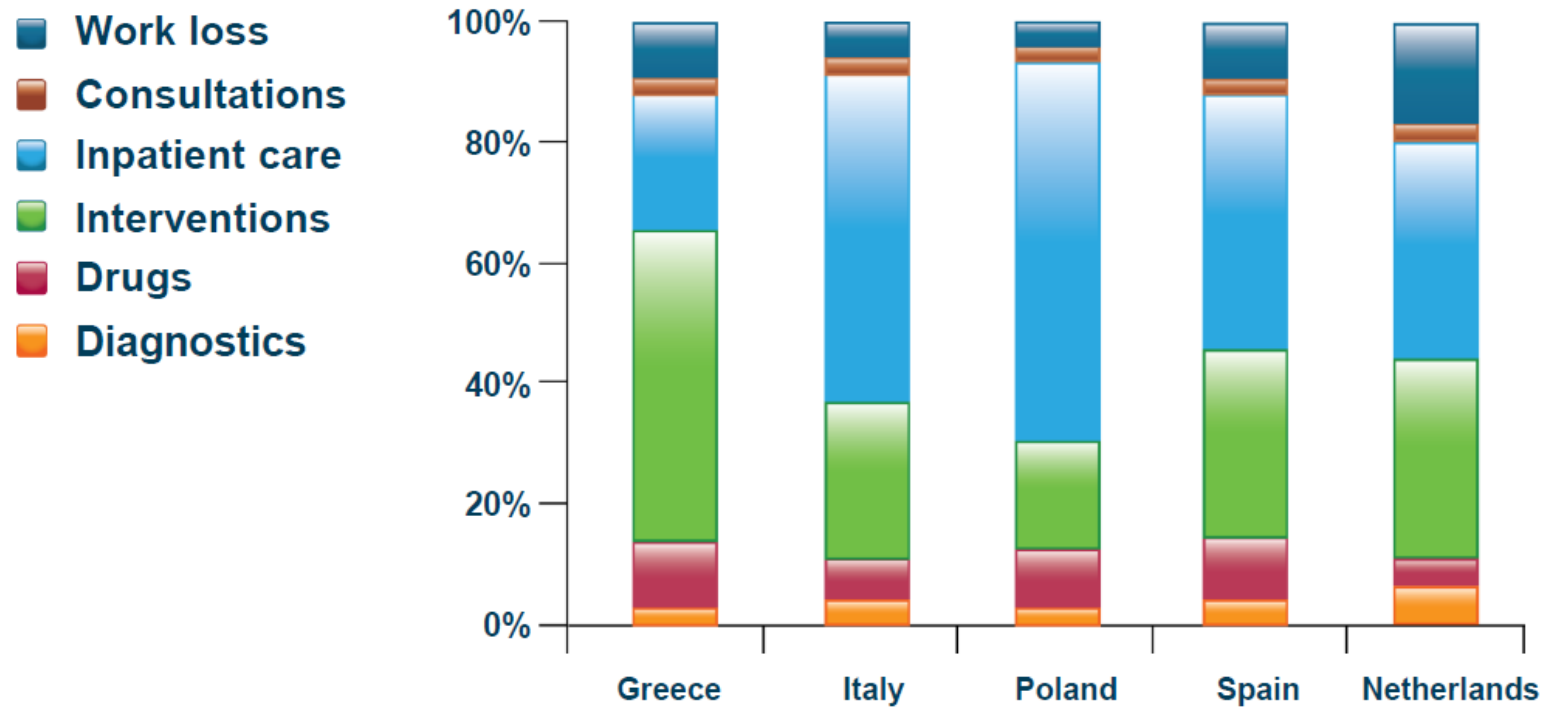
HAS-BLED total score	N	Number of bleeds	Bleeds per 100 patient-yrs*
0	798	9	1.13
1	1286	13	1.02
2	744	14	1.88
3	187	7	3.74
4	46	4	8.70
5	8	1	12.5
6	2	0	0.0
7	0	–	–
8	0	–	–
9	0	–	–

10%

Pisters R et al. Chest. 2010;138:1093–100; ESC guidelines: Camm J et al. Eur Heart J 2010;31:2369–429

70% of the cost of AF management is driven by inpatient care and interventions.

EUROHEART SURVEY (2004-2005)



Ringborg et al. Europace 2008

Association between clinical variables and admission

(n=3475, AOUC,Florence Italy)

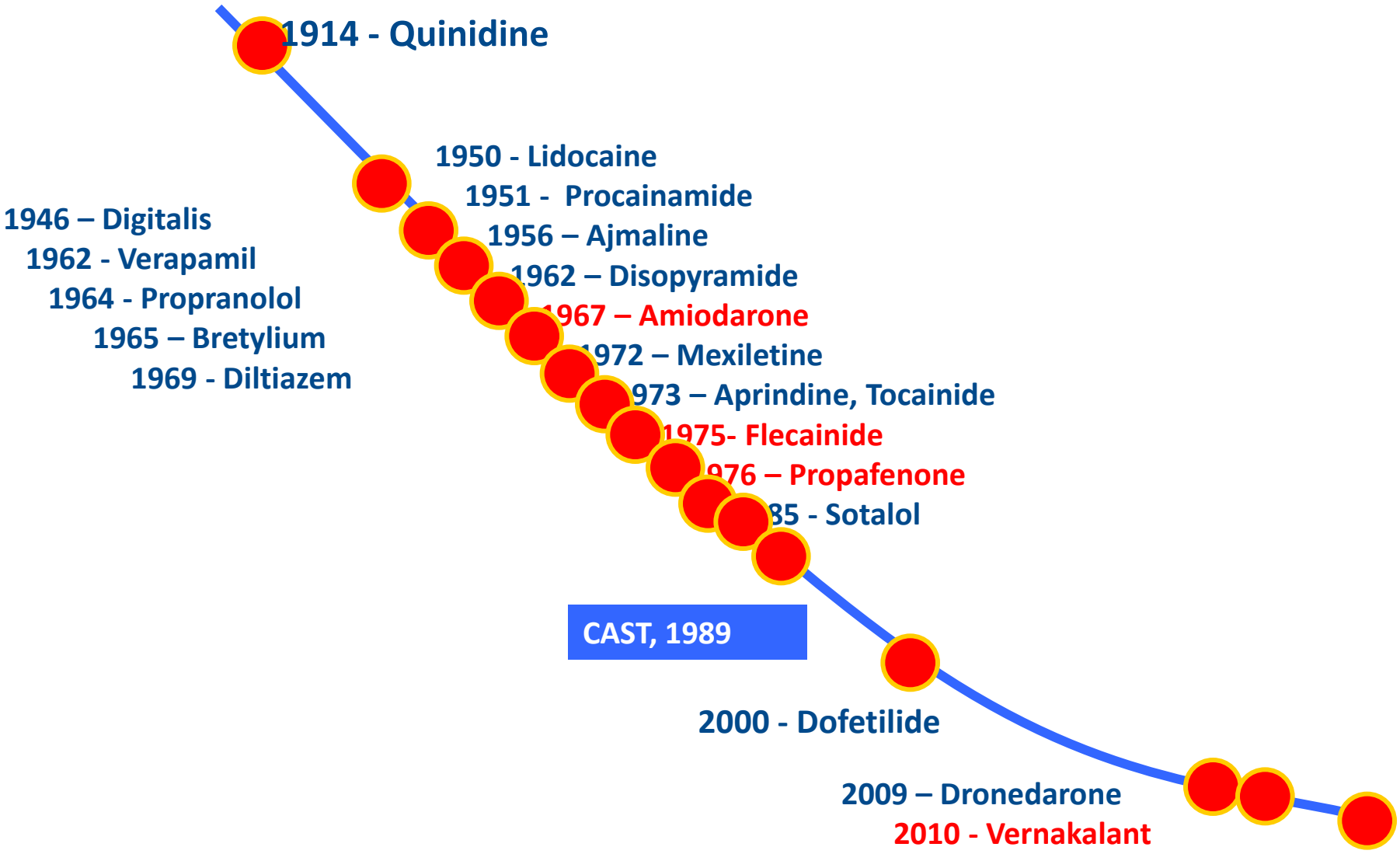
	Univariate Analysis			Multivariate Analysis		
	OR	Confidence interval 95%	p	OR	Confidence interval 95%	p
Lack of rhythm control	9.837	8.409-11.592	<0.001	8.653	7.343-10.197	<0.001
Diabetes mellitus	2.421	2.102-2.789	<0.001	1.864	1.581-2.197	<0.001
Comorbidities	2.156	1.692-2.749	<0.001	1.700	1.277-2.263	<0.001
Age	1.034	1.028-1.041	<0.001	1.016	1.009-1.023	<0.001
Hypertension	**0.987**	**0.860-1.134**	**NS**	-	-	-
Male gender	0.930	0.810-1.068	NS	-	-	-

X 9

X 2

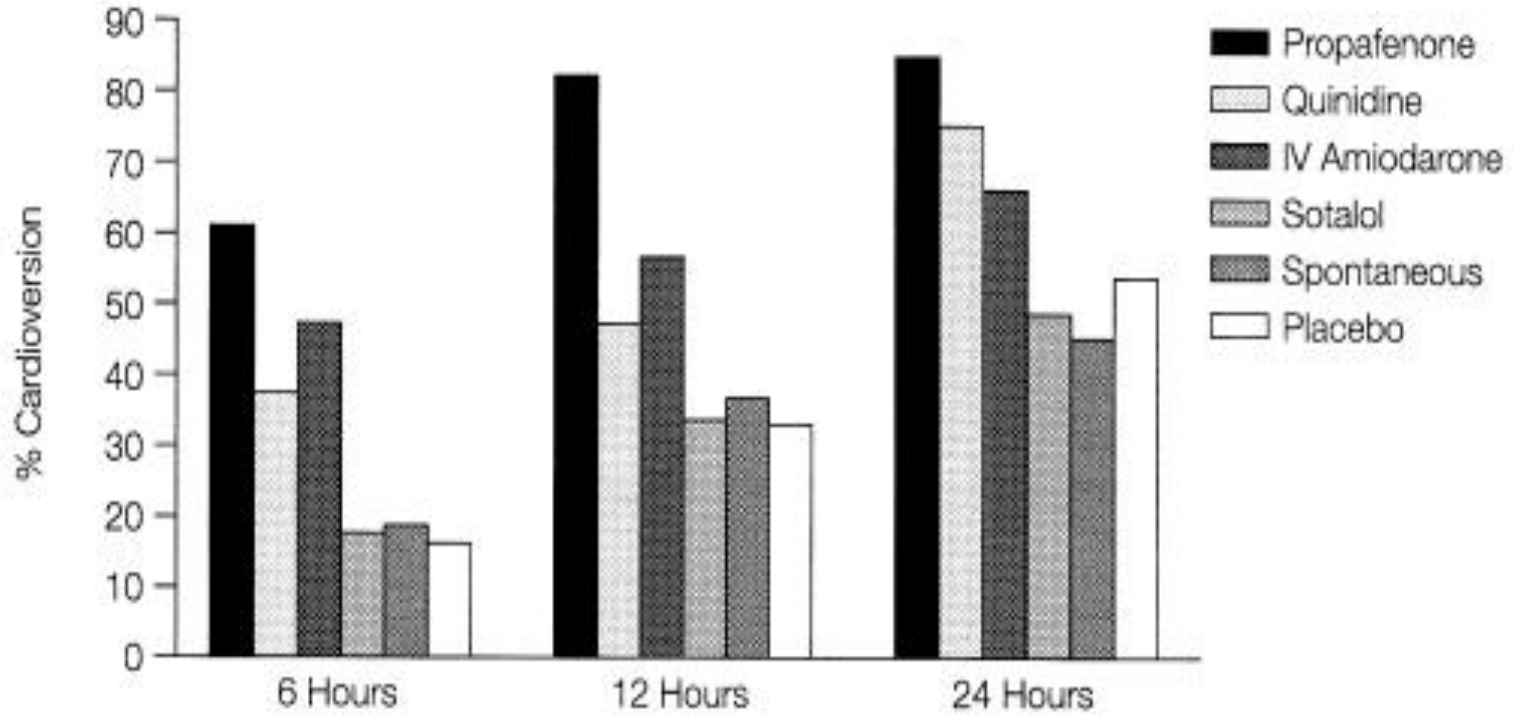
Em Med AOUC, Florence Italy. Int J cardiol 2011

History of Antiarrhythmic Drugs



Treatment of recent-onset AF: comparative efficacy

The evidence



Naccarelli. Am J Cardiol, 2003

Pooled efficacy rates for short-duration AF patients with cardioversion success at 2 hours and 8-24 hours by treatment

Treatment	Cardioversion at 2 hours	Cardioversion within 8-24 hours
Vernakalant-iv	**52%**	-
Amiodarone-oral	9%	87%
Amiodarone-iv	16%	61%
Flecainide-oral	68%	81%
Flecainide-iv	**64%**	70%
Propafenone-oral	21%	79%
Propafenone-iv	**51%**	82%
Sotalol-iv	12%	48%
Placebo-iv	12%	48%

Bosh LD, Cardiovasc Drugs Ther 2012. DOI 10.1007/s 10557-012-6374-4

References, country	N centers/ N patients*	AF population	Study design/ level of evidence	Treatment studied	SR conversion rate/time to conversion	Rate of discharge/ length of stay	Recurrences and readmissions	Adverse events / embolic complications	Main limitations
Cristoni *et al.* [23], Italy	2/322	Stable AF<48 h High risk of embolism and acute clinical conditions excluded	Prospective, controlled, not randomized IV	DCC vs. PhC (DCC cohort: PhC was attempted first if AF duration <6 h)	Discharge in SR higher in DCC cohort (93 vs. 51%, $P<0.001$)	Similar LS Rate of discharge higher DCC cohort (94 vs. 56%, $P<0.001$)		Similar low rate of short-term AE (2 [illegible]%, not [illegible]s) [illegible]-term EC	More class IC drugs used in the PhC cohort Indirect follow-up Results in the PhC group are not differentiated by drugs used
Hirschl *et al.* [28], Austria	1/376	Stable AF<48 h ICC, stroke, or SCA excluded	Prospective, controlled, not randomized IV	Flecainide vs. magnesium vs. ibutilide vs. amiodarone vs. digoxin vs. diltiazem vs. digoxin + diltiazem	Primary res[illegible]			Lower AE with digoxin and higher with amiodarone (1 vs. 6%, P=NS)	Small number o enrolled patients in each group
Bellone *et al.* [24], Italy	1/247	Stable AF<48 h >75 years, hi[illegible] emb[illegible]			[illegible]n rate higher with DCC [illegible].3 vs. 73.8%, P=0.02)	Shorter LS with DCC (180 min vs. 420 min, $P<0.001$)	Similar rate of recurrence (26.3–28.2%) at 2 months	Similar low rate of AE (4.8% in propafenone group vs. 0.8% in DCC group, P=NS)	
Vinson *et al.* [25], USA	3/1[illegible]		[illegible]ied, not randomized IV	Spontaneous cardioversion vs. DCC or PhC attempted vs. home observation 48 h ('wait-and-see' approach) vs. cardioversion contraindicated	SR conversion: higher with DCC as a first option (96.9%) PhC 60% 'Wait-and-see' 69%	Rate of discharge 94% in the 'wait-and-see' approach, and 91% with attempted cardioversion		Low rate of AE (2.9–2.6% in DCC group), all resolved in the ED Two EC at 30 days (one in PhC, one in cardioversion contraindicated group)	Different size of groups Some results are not differentiated by AF/flutter
Conti *et al.* [29], Italy	1/341	Stable AF<48 h NYHA>II or complications excluded	Prospective, controlled, not randomized IV	IV flecainide vs. IV propafenone vs. IV amiodarone	SR conversion rate at 6 h higher with flecainide (72.1%) and propafenone (54.5%) vs. amiodarone (29.7%, $P<0.001$) Overall SR conversion at 24 h high and similar in all groups (overall 87%) Time to conversion shorter with flecainide (178 min) and propafenone (292 min) vs. amiodarone (472 min, $P<0.001$)	Shorter LS with flecainide (8.9 h) and propafenone (11 h) vs. amiodarone (26.1 h, P=0.001)		Similar rate of AE (1.7%), one requiring DCC (propafenone)	Not randomized Different size of groups
Chu *et al.* [33], Australia	1/48	Stable AF<48 h and rate >100 bpm Wide QRS, hypotension, pulmonary edema, and MI excluded	Prospective, randomized (small sample),	Magnesium sulfate vs. placebo	No differences in heart rate control or in SR conversion				Convenience sample Basal differences between

Best option:
IC AADs
Propafenone or Flecainide.

Coll-Vinent B, Eur J Em Med, 2012

TREATMENT STRATEGY IN THE ED

AF ≤ 48 hours

eligible

⇩

Rhythm-control

<u>IV bolus</u>

Flecainide (2 mg/Kg) or

Propafenone (2 mg/Kg) or

Amiodarone (5 mg/Kg)

⇩

…consider DC Shock

AF >48 hours

eligible

⇩

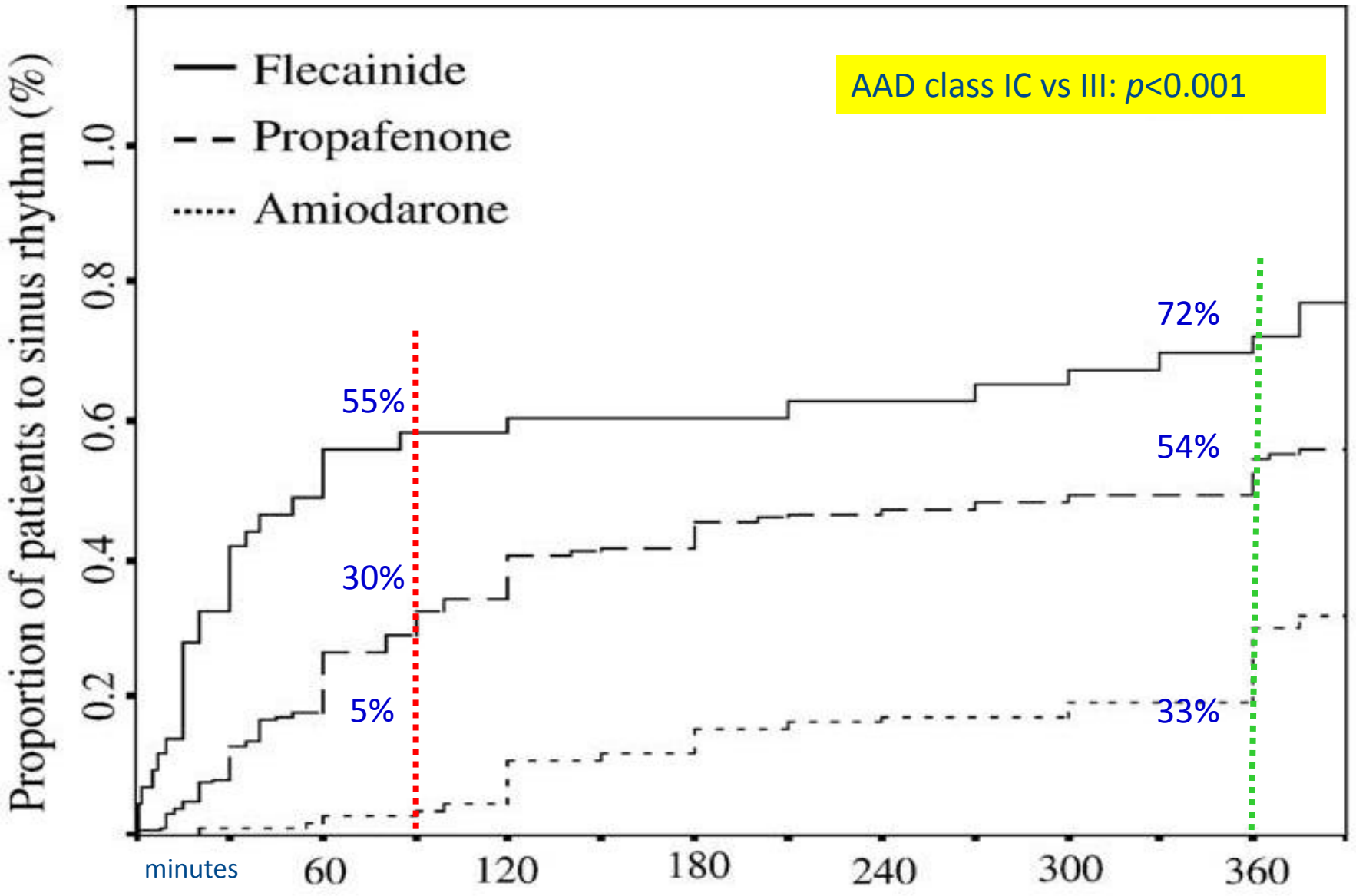
Rate-control

⇩

…eventually DC Shock

Em Med AOUC, Florence, Italy. Int J cardiol 2011.

Time course to sinus rhythm by treatment within the firstline 6-hour approach (n = 341, AOUC,Florence Italy)



Em Med, Florence, Italy. Am J Emerg Med. 2010

Oral Loading ?

Pill-in-the-Pocket

- In a selected (no or mild HD), risk-stratified patient population with recurrent AFib not currently taking AADs
  - Acute oral flecainide or propafenone successfully terminated 94% of episodes within 113 $\pm$ 84 min, with side effects in 7% of patients

Alboni, *N Engl J Med* 2004

Always in your mind…DC shock

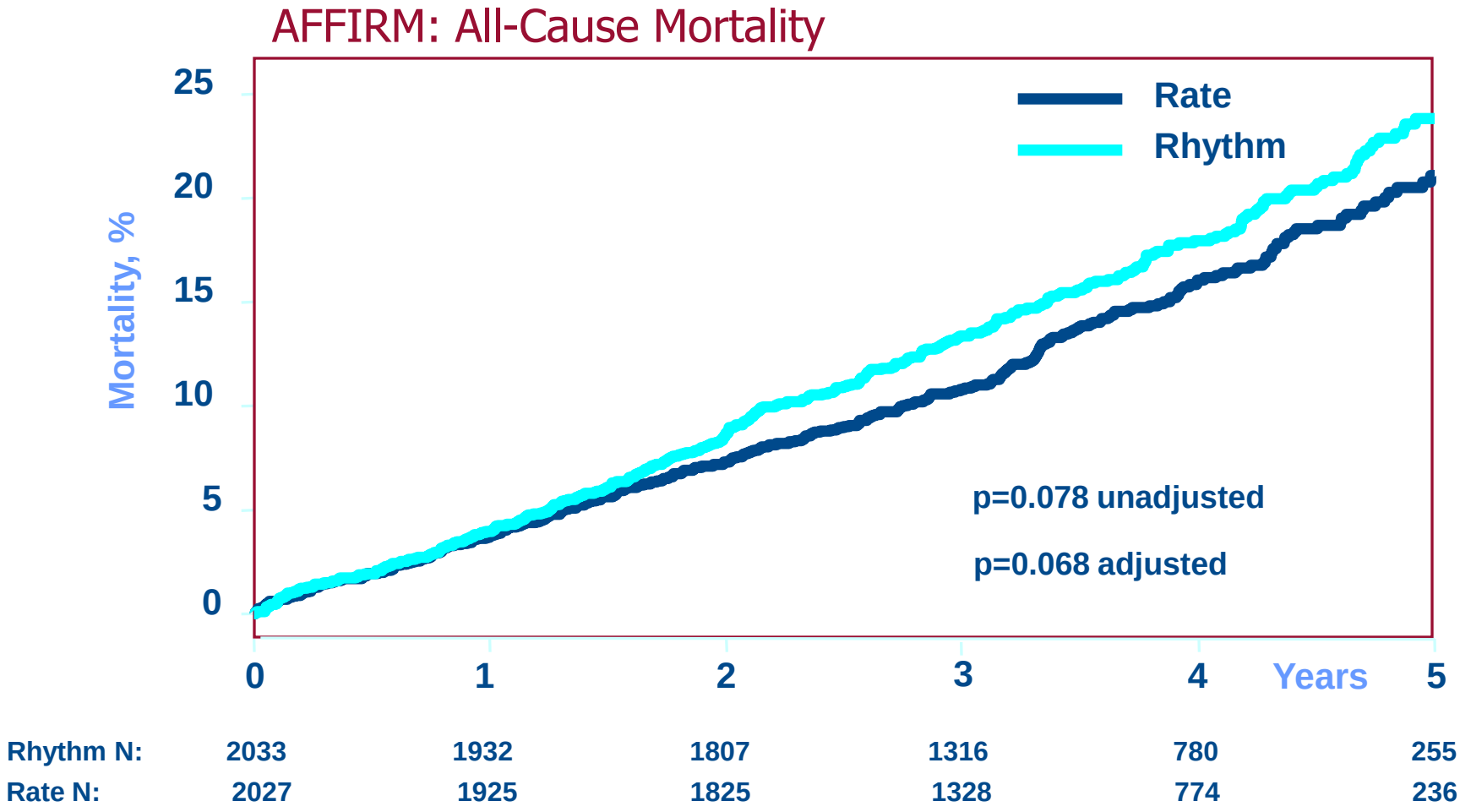
AF Rate vs. Rhythm Control Trials: Implications

- AFFIRM has demonstrated that rate control is an acceptable primary therapy in a selected high-risk subgroup of AF patients

- Continuous anticoagulation seems warranted in all patients with risk factors for stroke

AFFIRM:

5-year, randomized. Primary endpoint: overall mortality. **4.060 pts** with AF and risk factors for stroke. Mean Age = 69 yo Hx of hypertension: 70.8% CAD: 38.2% Enlarged LA: 64.7% Depressed EF: 26.0%



The AFFIRM Investigators. *N Engl J Med.* 2002

Is it important to treat rhythm?

May we treat rhythm?

a

But:

Bias in the selection of patients?

- Questions remained
- All the studies enrolled only patients for whom Rhythm Control considered to be an option by both the patient and the physician

Implications of Trials: Guideline Statement

- Theoretically, rhythm control should have advantages over rate control, yet a trend toward lower mortality was observed in the rate-control arm of the AFFIRM study and did not differ in the other trials from the outcome with the rhythm control strategy. This might suggest that attempts to restore sinus rhythm with presently available antiarrhythmic drugs are obsolete.

- The RACE and AFFIRM trials did not address AF in younger, symptomatic patients with little underlying heart disease, in whom restoration of sinus rhythm by cardioversion antiarrhythmic drugs or non-pharmacological interventions still must be considered a useful therapeutic approach.

- One may conclude from these studies that rate control is a reasonable strategy in elderly patients with minimal symptoms related to AF. An effective method for maintaining sinus rhythm with fewer side effects would address a presently unmet need.

ACC/AHA/ESC Guidelines 2006

b

But:

Hemodinamic consequences of AF

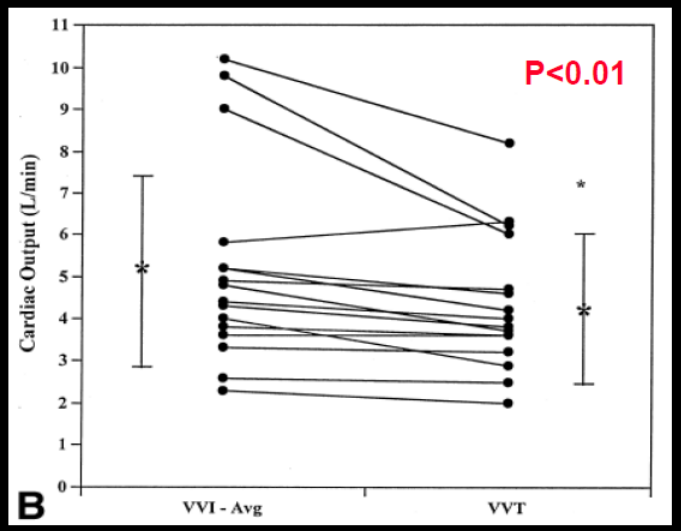
-Loss of atrial kick
-Elevated HR
-No HR adaptation
-Irregularity

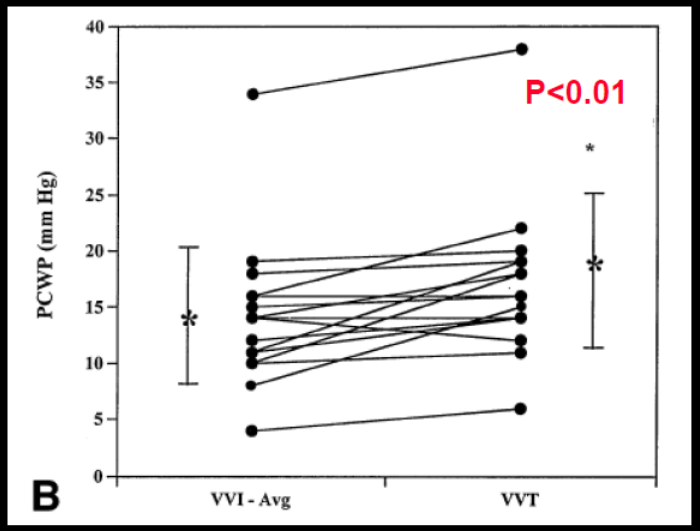
Hemodynamic Effects of an Irregular Sequence of Ventricular Cycle Lengths During Atrial Fibrillation

DAVID M. CLARK, MD, VANCE J. PLUMB, MD, FACC, ANDREW E. EPSTEIN, MD, FACC,
G. NEAL KAY, MD,
Birmingham, Alabama

Objectives. The aim of thi
dent hemodynamic effects o
cycle lengths in patients wit
Background. Atrial fibril
several possible mechanism
bution to left ventricular fil
ventricular rate or irregula
signed to evaluate the effec
pendent of the average vent
data during AF.
Methods. Sixteen patien
During intrinsically conduc
min), the right ventricular
frequency-modulated (FM)
lation, the right ventricular
modes in randomized seque

Hemodynamic consequences of AF
Regular versus irregular VVI pacing





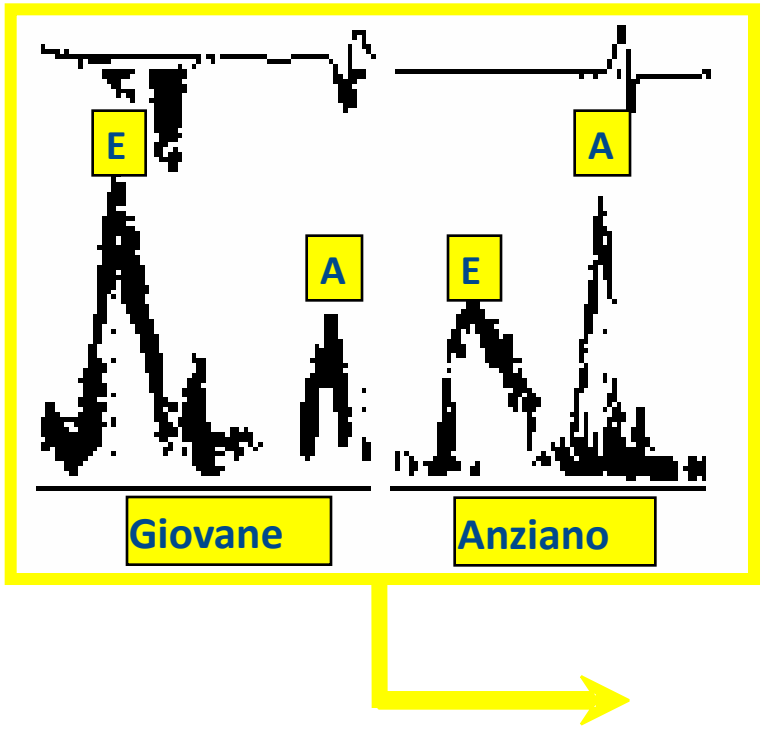
CO decrease 0.8 l/min

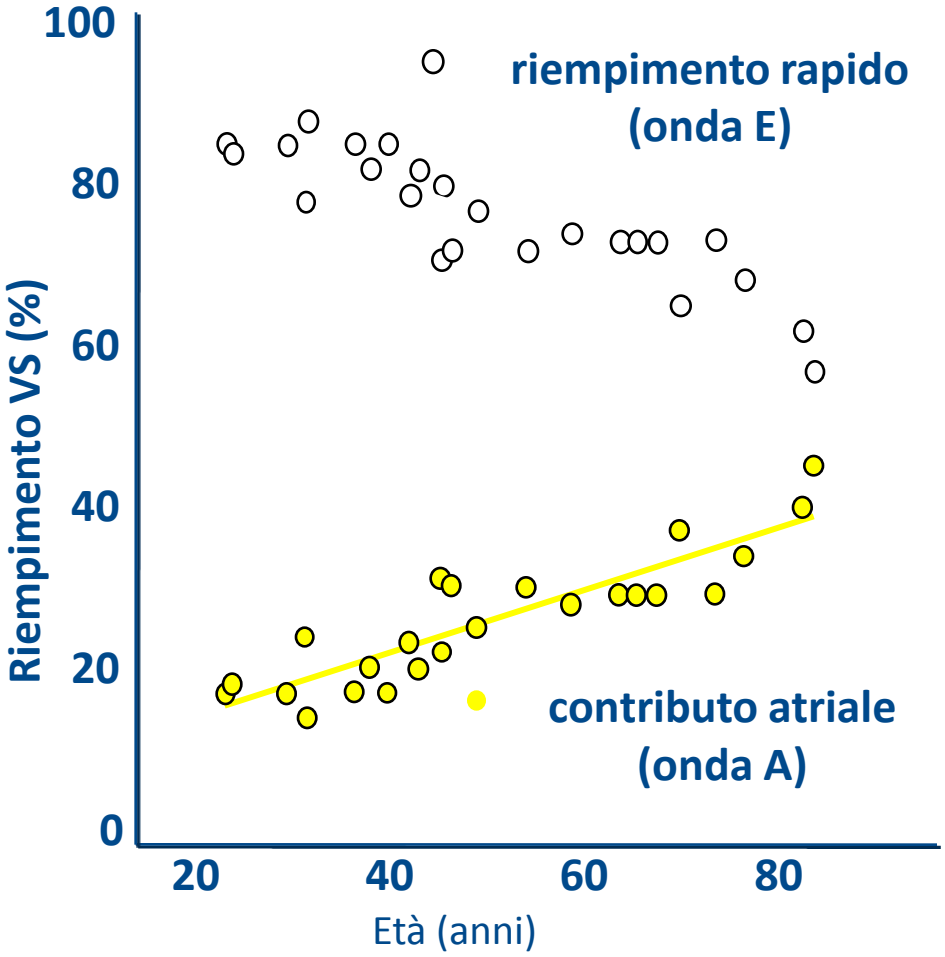
PCWP increase 3 mmHg

Clarck DM, JACC, 1997

Age-associated changes in left ventricular filling pattern in normal subjects

Flusso transmitralico Doppler

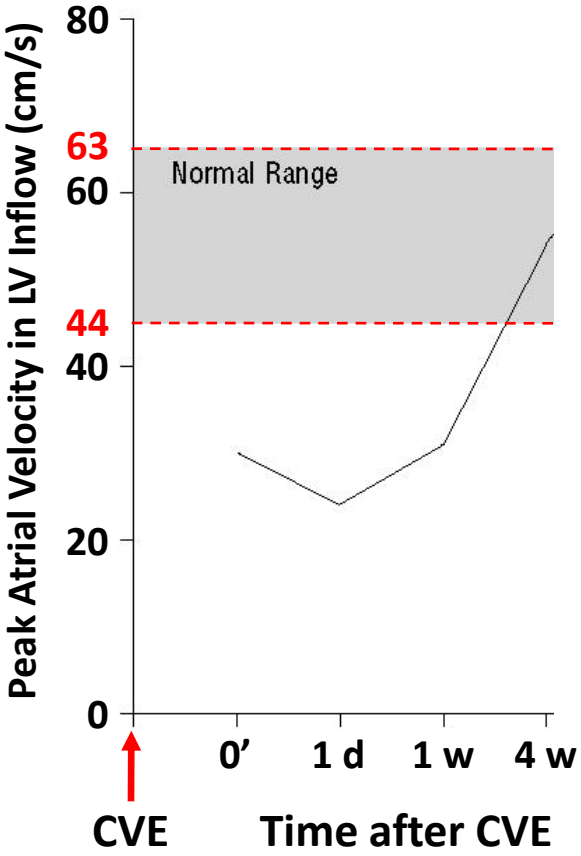


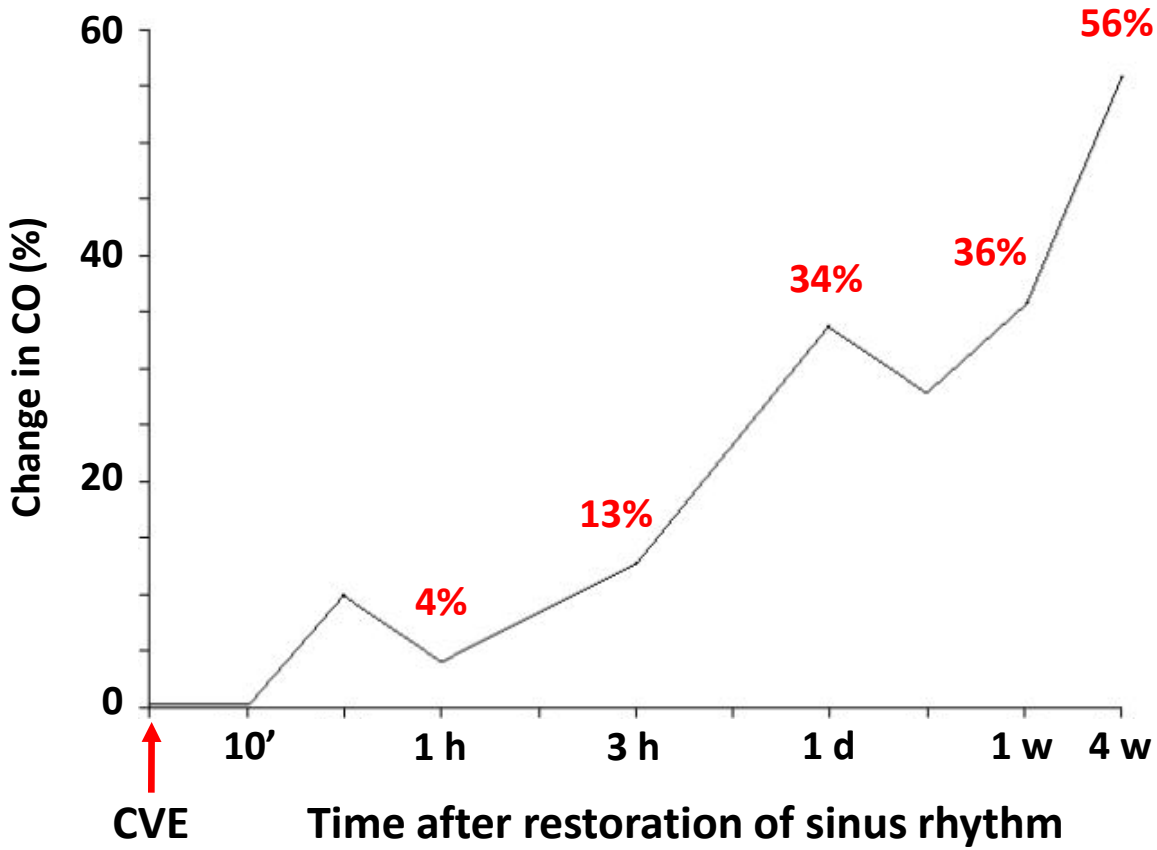


Swinne. JACC 1989

Hemodynamic Changes After Cardioversion of Chronic Atrial Fibrillation

b





Upshaw CB, Arch Int Med 1997

Sinus rhythm is associated with fewer heart failure symptoms: Insights from the AFFIRM trial

Maya Guglin, MD, PhD, FACC, Ren Chen, MD, MPH, Anne B. Curtis, MD, FHRS

From the University of South Florida, Tampa, Florida.

BACKGROUND The AF... nd efit from a rhythm con... es. atrial fibrillation (AF)... HF morbidity and mortali... AF, rhythm, which is more... ate strategy.

OBJECTIVE This study... HF toms in the different ... hm tigation of Rhythm M... are prevalence of AF or sin... nal

METHODS This study... ay AFFIRM trial, provided... Institute.

RESULTS Symptomati... RM than in the rhythm ... rial rhythm, New York Hear... All in patients who were ...

NYHA status and CVEs in rhytm control vs rate control

(intention to treat)

Arm	N of records	NYHA (0 + I) N of records	%	NYHA (II + III) N of records	%
Rate control	20,672	18,754	90.7	1,905	9.2
Rhythm control	20,843	19,087	91.6	1,746	8.4*

*$P < .01$.

Guglin M, Heart Rhythm. 2010 May;7(5):596-601. Epub 2010 Jan 6.

Atrial Fibrillation and Tachycardia Induced Cardiomyopathy

c

- Cardiomyopathy can be caused by any tachycardia (>110 bpm) that occurs as little as 10-15% of day
- Severity related to rate and duration of ↑ HR
- Maximal improvement after rate control may require up to 8 months
- After improvement susceptibility to rapid deterioration remains if tachycardia recurs

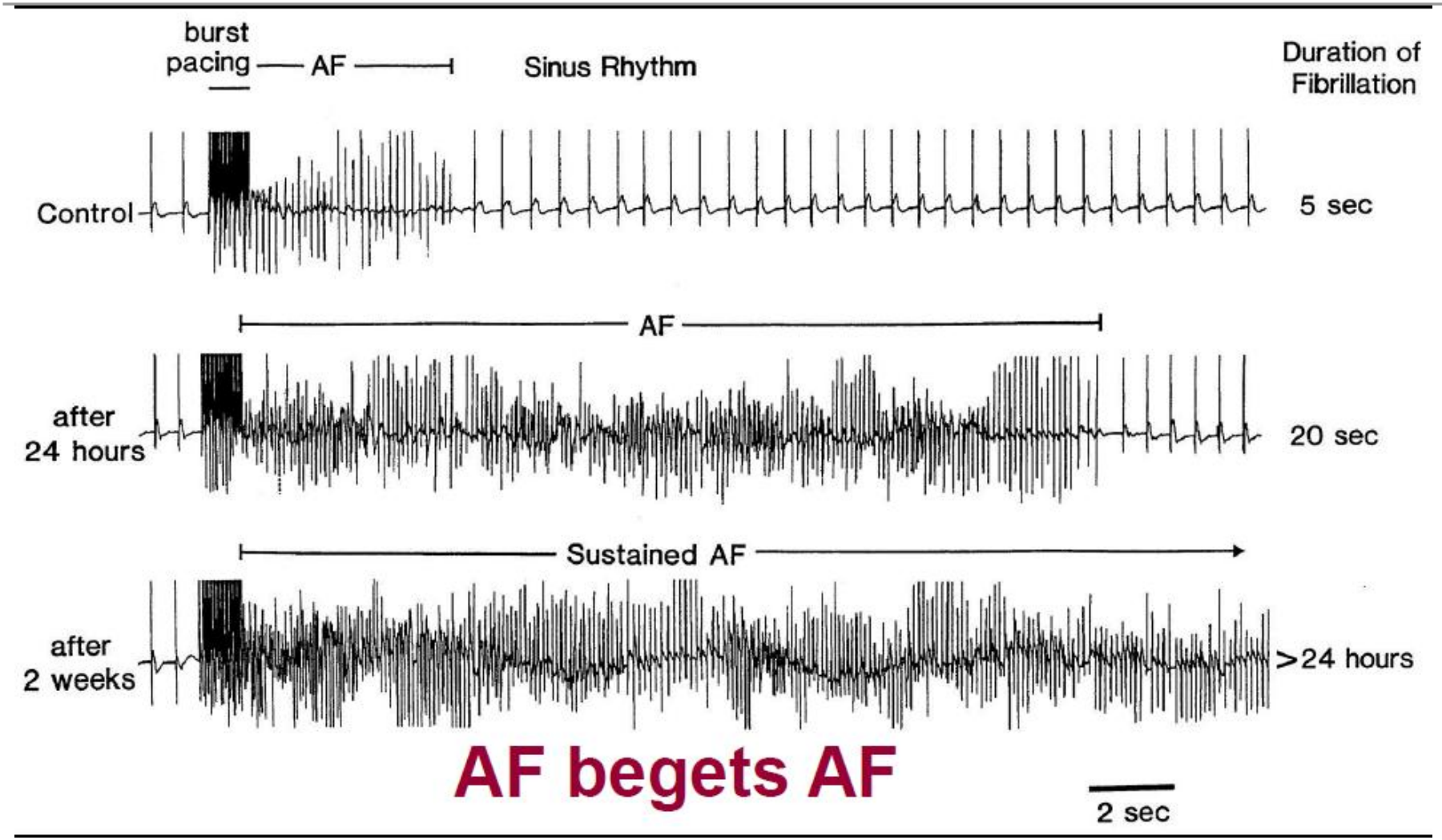
Olshansky et al Circulation 2004,

Fenelon et al PACE 1996;19:95-106,

Shinbane J et al. JACC 1997:29: 709-715

But:
Electrical remodeling

d



Wijffels Circulation 1995

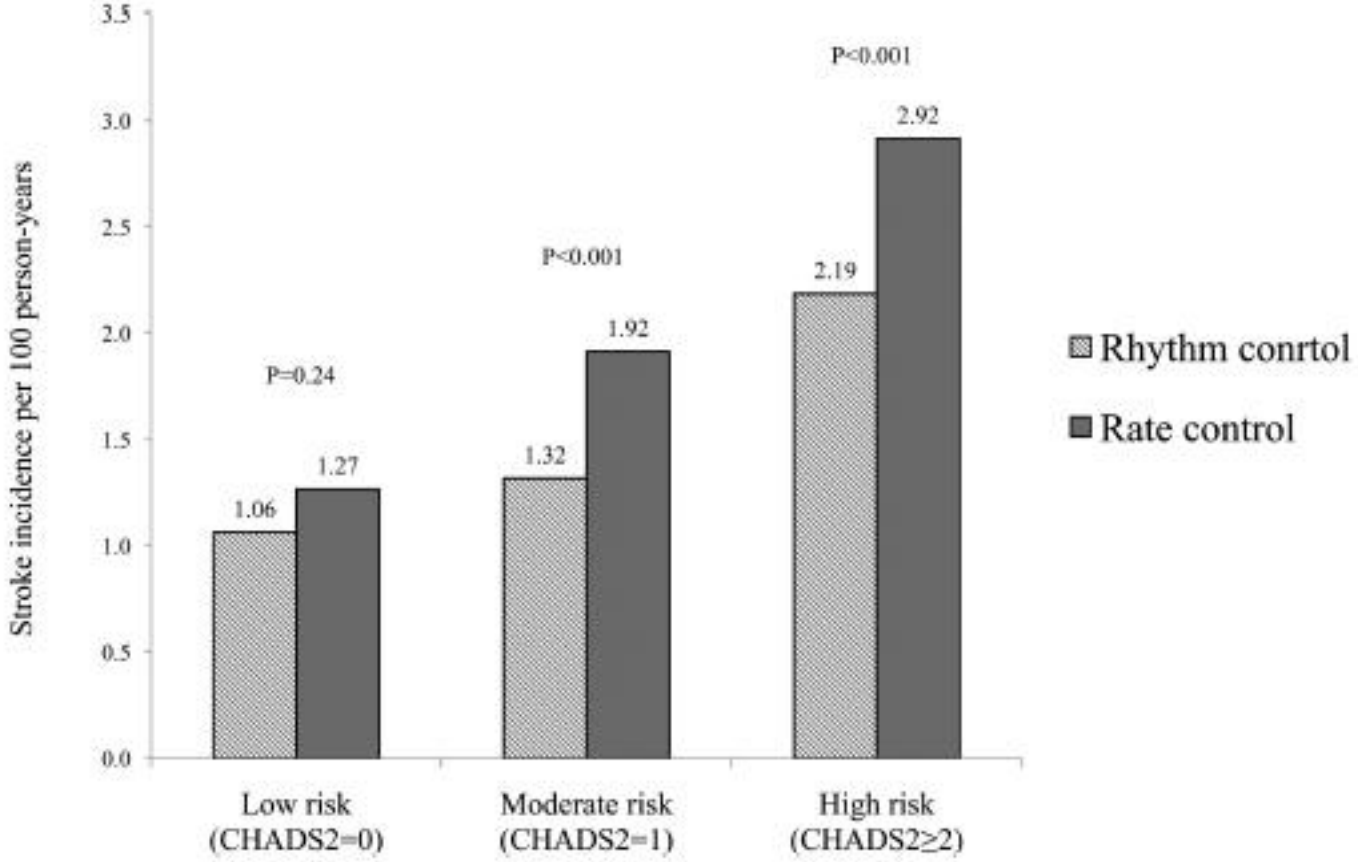
Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association®

Rhythm Versus Rate Control Therapy and Subsequent Stroke or Transient Ischemic Attack in Patients With Atrial Fibrillation

Meytal Avgil Tsadok, Cynthia A. Jackevicius, Vidal Essebag, Mark J. Eisenberg, Elham Rahme, Karin H. Humphries, Jack V. Tu, Hassan Behlouli and Louise Pilote

Circulation. 2012;126:2680-2687; originally published online November 2, 2012;
doi: 10.1161/CIRCULATIONAHA.112.092494



Tsadok MA, Circulation 2012

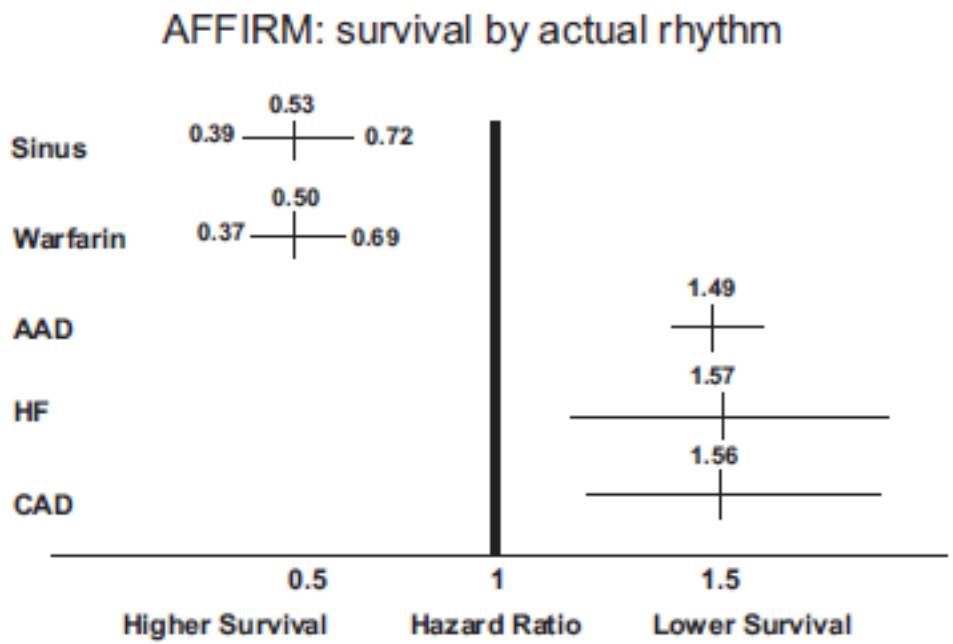
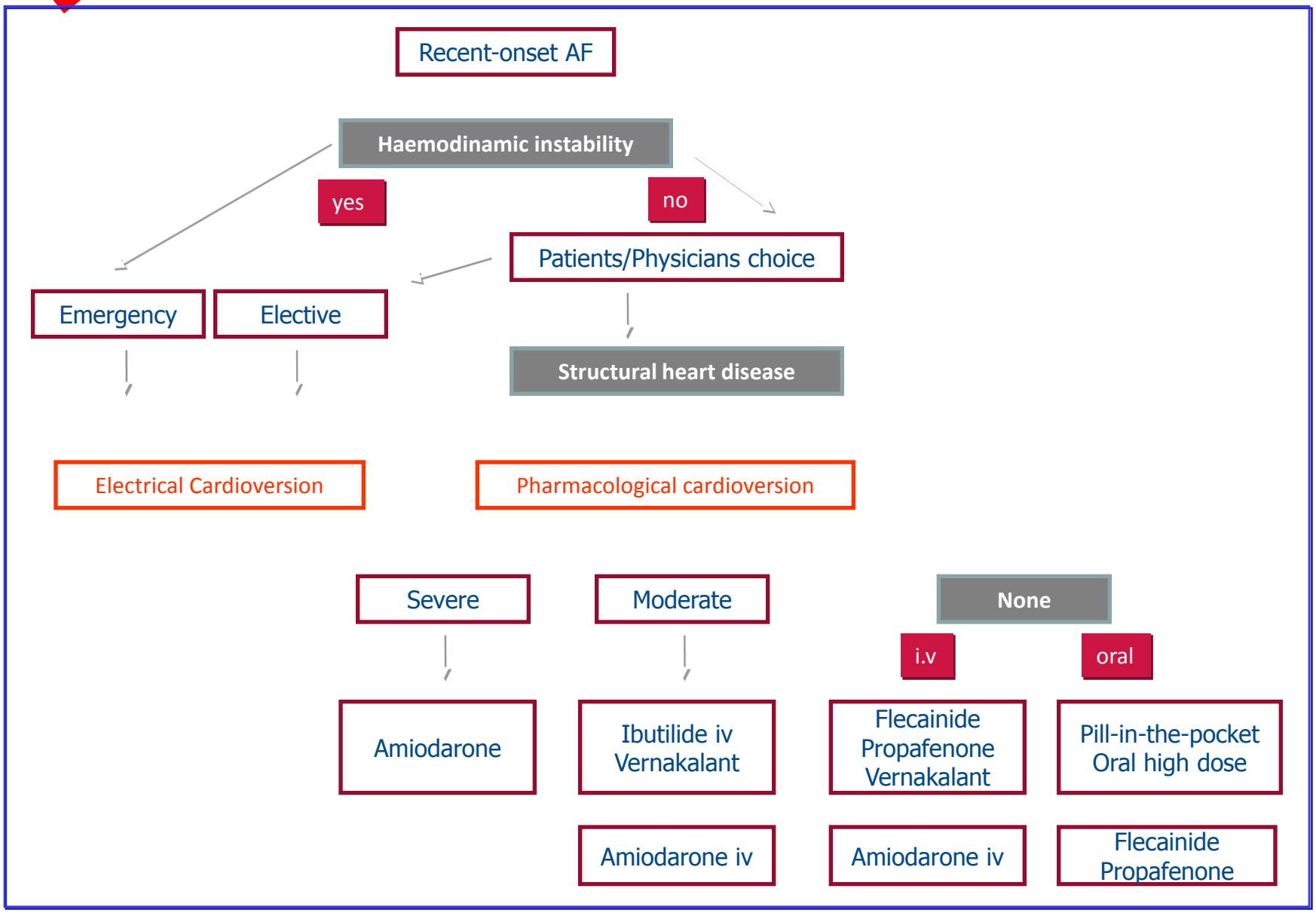


Figure 1. An "on-treatment" analysis of the AFFIRM study allowed for the inclusion of time-dependent variables, such as the presence or absence of sinus rhythm.[49] Multivariable analysis demonstrated that the presence of sinus rhythm is either an important determinant of survival or a marker for other characteristics associated with survival that were not captured in the model. The positive impact of sinus rhythm is essentially equal and opposite of that of AAD therapy. CAD indicates coronary artery disease; HF, heart failure. Reproduced from Corley et al[49] with permission of the publisher. Copyright © 2004, the American Heart Association.

Wyse G Circulation 2009

New !

Choice of antiarrhythmic drug according to underlying pathology



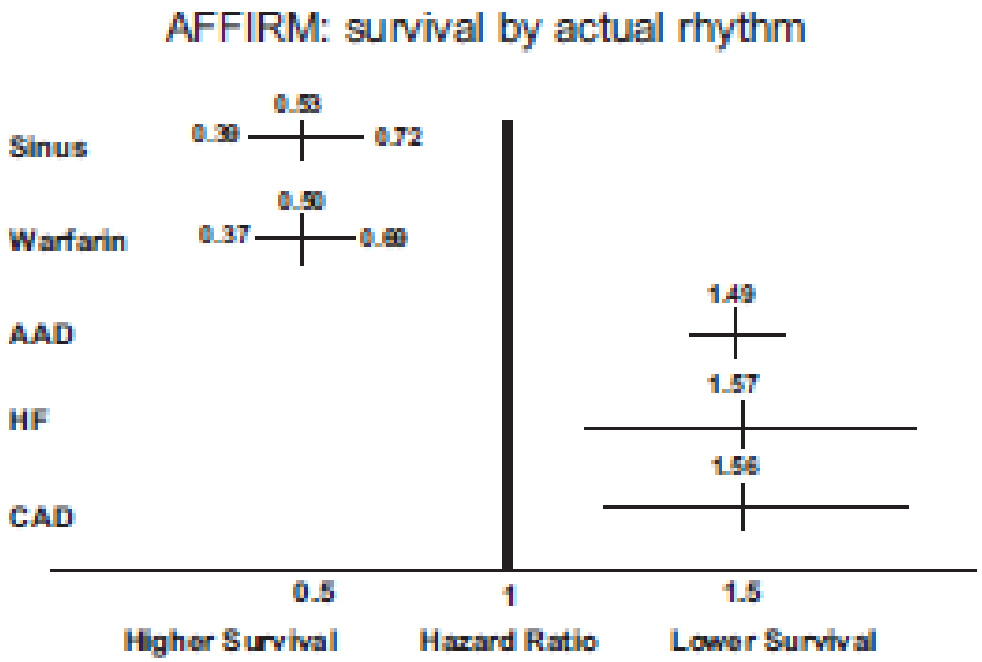
2012 focussed update ESC Guidelines in AF management.

CONTROVERSIES IN CARDIOVASCULAR MEDICINE

Pharmacological and electrical conversion of atrial fibrillation to sinus rhythm: Is it worth it?

Pharmacological and Electrical Conversion of Atrial Fibrillation to Sinus Rhythm Is Worth the Effort

Elad Anter, MD; David J. Callans, MD



Anter E, Circulation, 2009

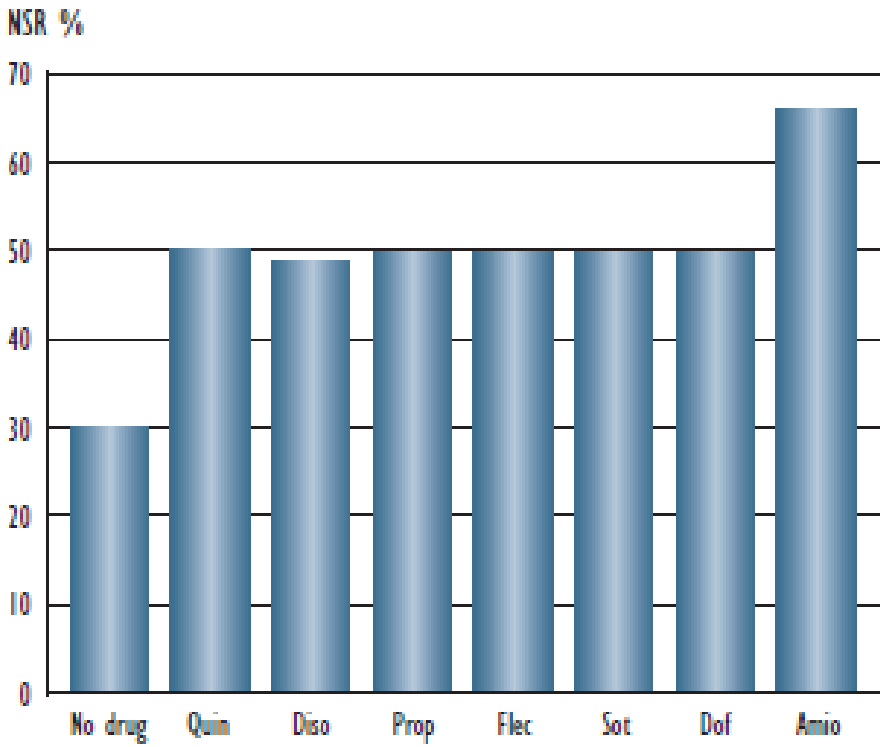
Prevention of AF relapse

- Even with the most effective AAD, such as amiodarone, long-term efficacy is low

  ~50% or less at 1 year

Prevention of AF relapse

Available Antiarrhythmic Agents in Treating AF with Maintenance of Sinus Rhythm over a Six-month Period

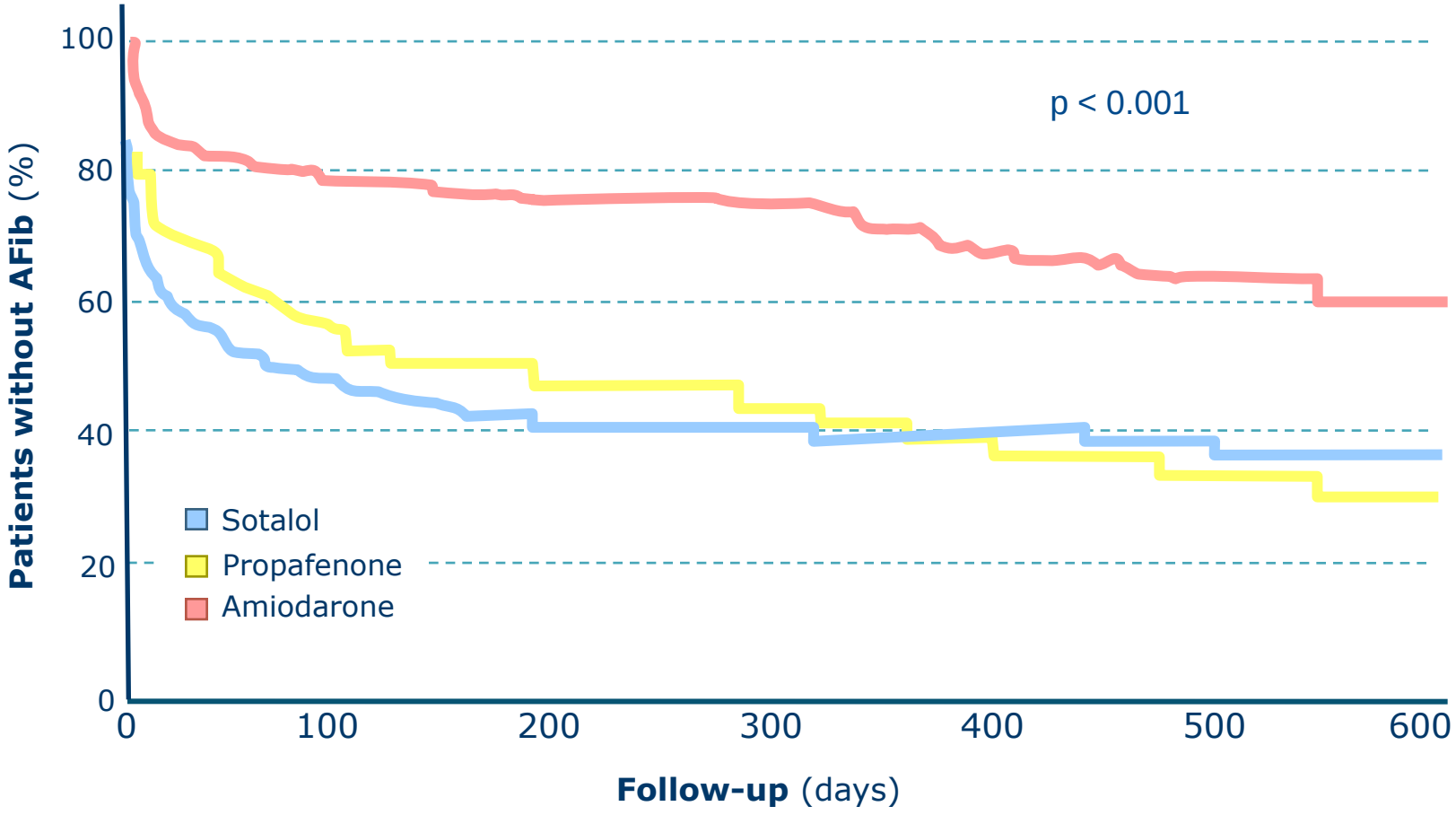


Quin = quinidine; Diso = disopyramide; Proc = procainamide; Prop = propafenone; Flec = flecainide; Sot = d,l-sotalol; Amio = amiodarone

Naccarelli G V, Wolbrette D L, Khan M, Bhatta L, Hynes J, Samii S, and Luck J, "Old and new antiarrhythmic drugs for converting and maintaining sinus rhythm in atrial fibrillation: Comparative efficacy and results of trials", Am. J. Cardiol. *2003;91: 15D–26D.*

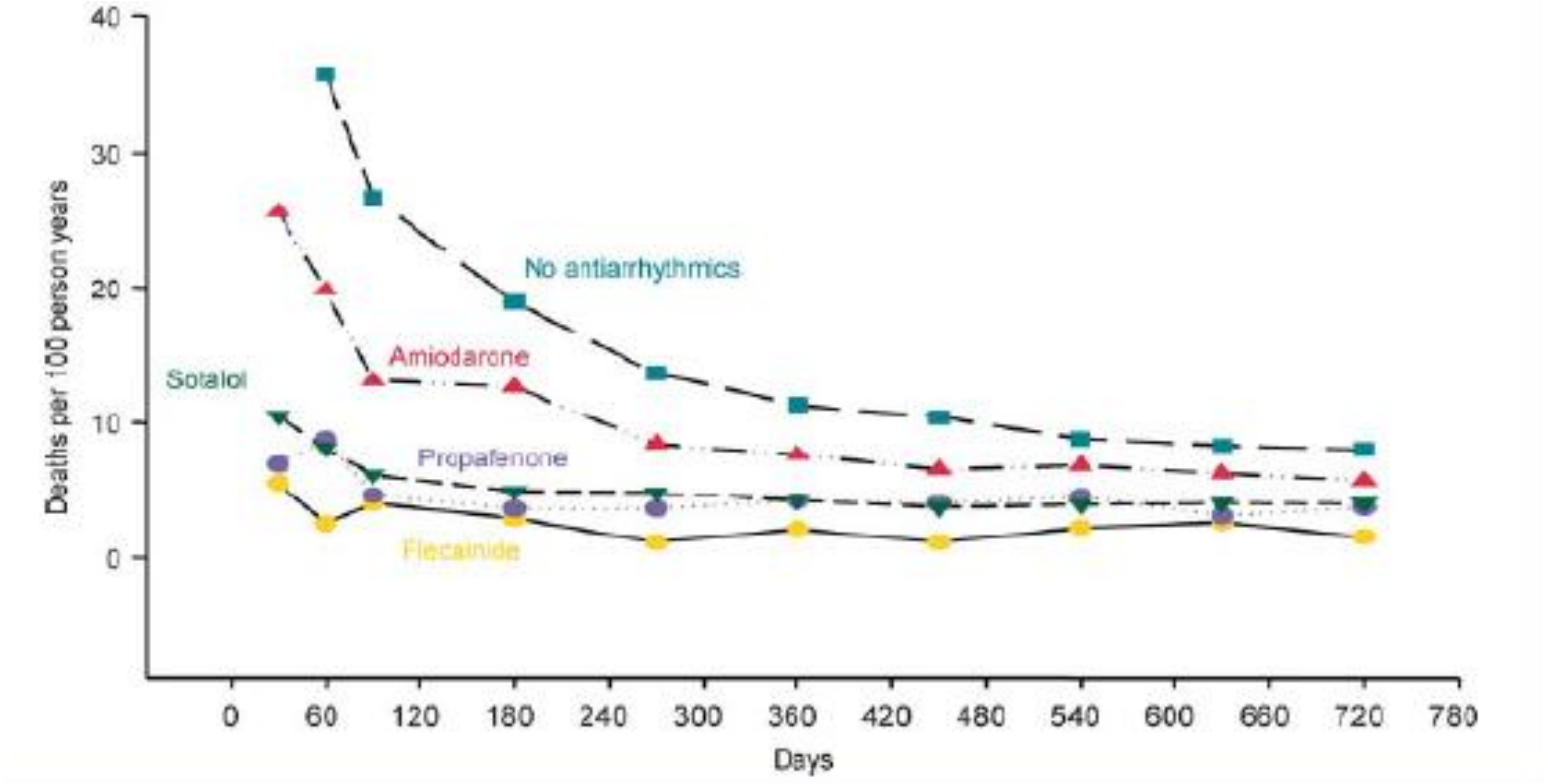
Drugs to Prevent Recurrence of AFib

CTAF Study: mean follow-up 16 months



Roy D, et al. *N Engl J Med* (2000) 342: 913

Antiarrhythmic therapy and the risk of death



Andersen SS . Europace 2009

Treatment Options for AFib

Cardioversion

- Pharmacological
- Electrical

Drugs to prevent AFib

- Antiarrhythmic drugs
- Non-antiarrhythmic drugs

Drugs to control ventricular rate

Drugs to reduce thromboembolic risk

Non-pharmacological options

- Electrical devices (implantable pacemaker and defibrillator)
- AV node ablation and pacemaker implantation (ablate & pace)
- Catheter ablation
- Surgery (Maze, mini-Maze)
- Surgical closure left atrial appendage