How to Treat ? :
Atrial Fibrillation in STEMI Patients

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Coronary artery disease in AF Patient

The Euro Heart Survey on Atrial Fibrillation

	First detected ($n = 978$)	Paroxysmal ($n = 1517$)	Persistent ($n = 1167$)	Permanent ($n = 1541$)	*P*-value
Demographics					
Age, years	65 (14)	64 (13)	66 (12)	71 (11)	*
Female gender	418 (43)	652 (43)	451 (39)	668 (43)	
Concomitant disease					
Hypertension	620 (63)	942 (62)	772 (66)	984 (64)	
Coronary artery disease	309 (32)	514 (34)	338 (29)	543 (36)	
Acute infarction	65 (7)	32 (2)	24 (2)	41 (3)	*
Old infarction	124 (13)	228 (15)	142 (12)	259 (17)	
Previous PCI / CABG	102 (11)	187 (12)	136 (12)	166 (11)	
Angina	179 (19)	350 (23)	172 (15)	304 (20)	*
Heart failure	255 (26)	341 (23)	401 (35)	754 (49)	*
Valvular heart disease	203 (21)	287 (19)	276 (24)	607 (40)	*
Cardiomyopathy	79 (8)	101 (7)	148 (13)	243 (16)	*
Tachycardiomyopathy	9 (1)	4 (0)	28 (2)	14 (1)	*
Hypertrophic	25 (3)	34 (2)	24 (2)	21 (1)	
Dilated	38 (4)	49 (3)	73 (6)	152 (10)	*
Other type	7 (1)	14 (1)	23 (2)	56 (4)	*
Sick sinus syndrome	9 (1)	93 (6)	55 (5)	82 (5)	*
Chronic obstructive pulmonary disease	103 (11)	185 (12)	133 (12)	272 (18)	*
Thyroid disease	61 (7)	148 (11)	132 (12)	149 (11)	
Idiopathic AF[a]	130 (14)	226 (15)	112 (10)	61 (4)	*
Cardiovascular risk factors					
Diabetes mellitus	187 (19)	232 (15)	186 (16)	336 (22)	*
Hyperlipidemia	309 (32)	588 (40)	413 (36)	518 (34)	
Current smoker	181 (19)	204 (14)	128 (11)	120 (8)	*
No regular exercise	484 (51)	596 (42)	488 (44)	785 (53)	*
Family history of CAD	111 (14)	291 (23)	195 (20)	252 (20)	*

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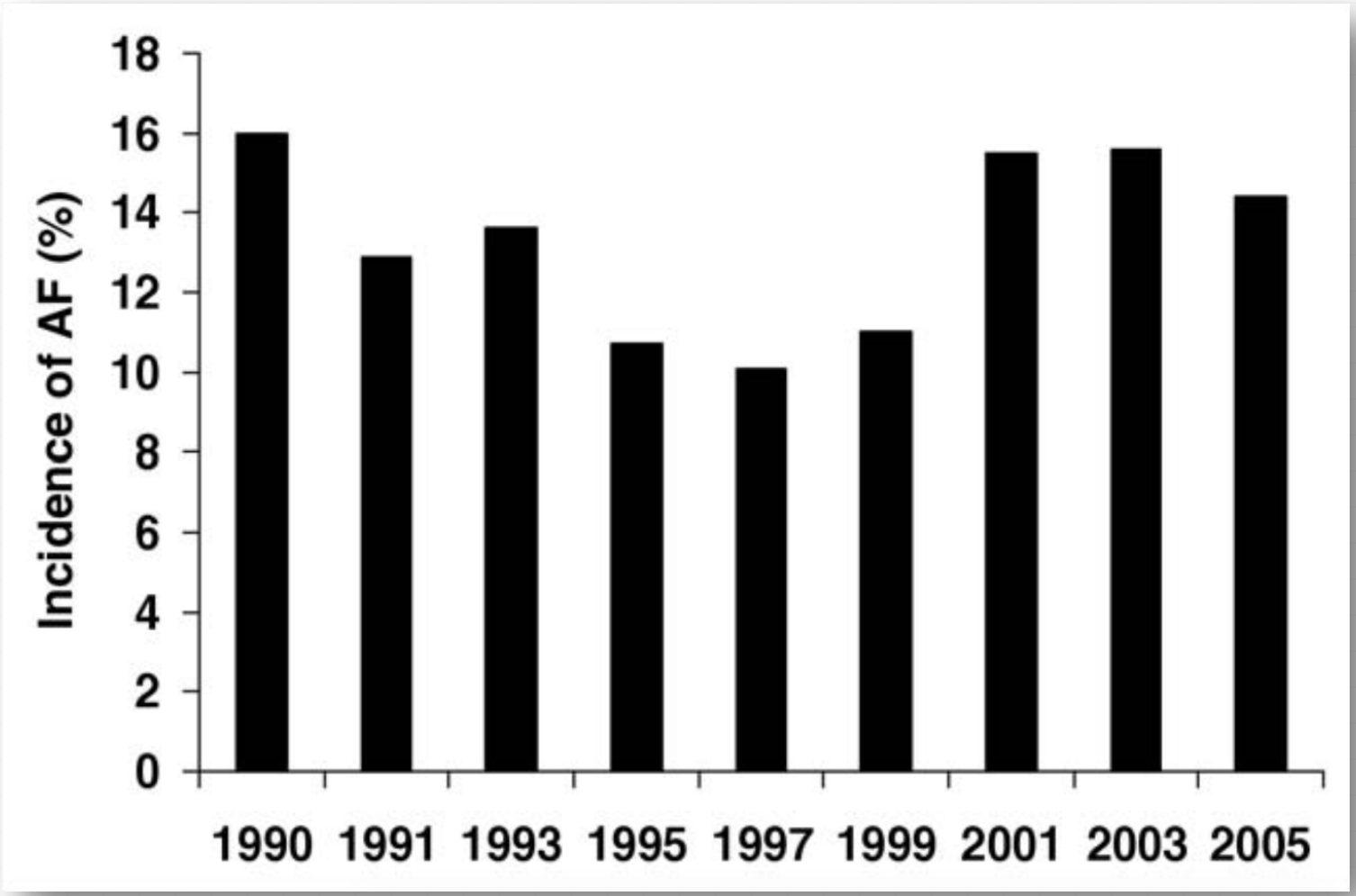
Nieuwlaat R et al., Eur Heart J 2005;26:2422-2434

Incidence rates of AF in AMI patient



Saczynski JS et al., Am J Cardiol 2009;104:169–174

AF Incidence in Patients with MI

Table 4 Changing Trends in Various Hospital Outcomes for Patients with ST-segment (STEMI) and Non-ST-segment (NSTEMI) Elevation Myocardial Infarction

			Atrial Fibrillation		Heart Failure		Cardiogenic Shock	
	Year	n	% Developing	Adjusted OR* (95% CI)	% Developing	Adjusted OR* (95% CI)	% Developing	Adjusted OR* (95% CI)
STEMI								
	1997	477	11.7	1.0	25.8	1.0	8.8	1.0
	1999	493	14.0	1.13 (0.74-1.74)	29.4	1.20 (0.86-1.68)	7.9	0.93 (0.55-1.60)
	2001	443	21.9	1.84 (1.23-2.77)	31.8	1.25 (0.90-1.76)	9.9	1.14 (0.68-1.91)
	2003	368	20.9	2.02 (1.33-3.08)	31.8	1.39 (0.99-1.97)	6.8	0.71 (0.40-1.28)
	2005	290	16.9	1.53 (0.97-2.44)	29.7	1.21 (0.83-1.77)	8.6	1.09 (0.61-1.95)
NSTEMI								
	1997	582	13.4	1.0	36.9	1.0	5.5	1.0
	1999	534	17.4	1.19 (0.81-1.75)	43.8	1.21 (0.90-1.63)	5.1	1.04 (0.55-1.96)
	2001	796	20.0	1.43 (1.02-2.02)	41.1	1.06 (0.80-1.39)	4.0	0.80 (0.44-1.47)
	2003	789	23.3	1.69 (1.21-2.37)	45.1	1.31 (1.00-1.72)	2.8	0.58 (0.31-1.10)
	2005	613	25.1	1.96 (1.38-2.79)	41.8	0.99 (0.75-1.33)	4.1	0.85 (0.45-1.60)

CI = confidence interval; OR = odds ratio.

*Adjusted for age, sex, history of atrial fibrillation, heart failure, stroke, angina, diabetes mellitus, estimated glomerular filtration rate, AMI type (Q wave vs non Q wave), presenting systolic blood pressure.

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McManus DD et al., Am J Med. 2011;124:40-7.

Incidence of AF in STEMI patient

Study	Pts, n	Design	Inclusion criteria	Treatment	Trial Period	Any AF, %	Prior AF, %	New-Onset/In-Hospital AF, %
GUSTO I[2]	40891	RCT	STEMI	Thrombolysis streptokinase vs alteplase	1 year	10.4%	2.5%	7.9%
GUSTO III[8]	13858	RCT	STEMI	Thrombolysis alteplase vs reteplase	1 year	-	-	6.5%
GISSI[9]	17944	RCT	STEMI	Thrombolysis 72% lisinopril/lisinopril+nitrates/nitrates	4 years	-	-	7.8%
TRACE[10]	6776	RCT Pre-enrolment	STEMI LV dysfunction	Thrombolysis 75% of patients	5 years	-	3.9%	21%
OPTIMAAL[11]	5477	RCT	STEMI HF and LV dysfunction (EF<40% or LVED>=65)	Thrombolytics- 54.4% Captopril vs losartan	3 years	-	12%	7.2%
VALIANT[12]	14703	RCT	STEMI Radiological or clinical HF and/or LV dysfunction	Thrombolytics 35.1%, primary PCI 14.8% Captorpil, valsartan or both	3 years	-	2.3%	12.3%
OACIS[4]	2475	Observa-tional co-hort study	STEMI	Primary PCI	1 year	12%	4.3%	7.7%
APEX-MI[15]	5745	Observa-tional co-hort	STEMI	Primary PCI, dual and triple anti-thrombotic therapy		11%	4.8%	6.3%

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Gorenek B et al., Curr Cardiol Rev. 2012;8:281-9.

Prognostic Significance of AF in STEMI

GISSI-3 Data

Table 3 In-hospital events in patients with or without atrial fibrillation (AF)

Event	*Without AF (n=16 363)*	*With AF (n=1386)*	*p Value*
Clinical evidence of heart failure	23.6	51.5	< 0.0001
Congestive heart failure > 4 days	3.8	12.1	< 0.0001
Reinfarction + postinfarction angina	13.8	15.3	NS
Sustained ventricular tachycardia	1.9	4.3	< 0.0001
Ventricular fibrillation	2.3	4.4	< 0.0001
Death in hospital	5.0	12.6	< 0.0001
Stroke	0.7	0.8	NS

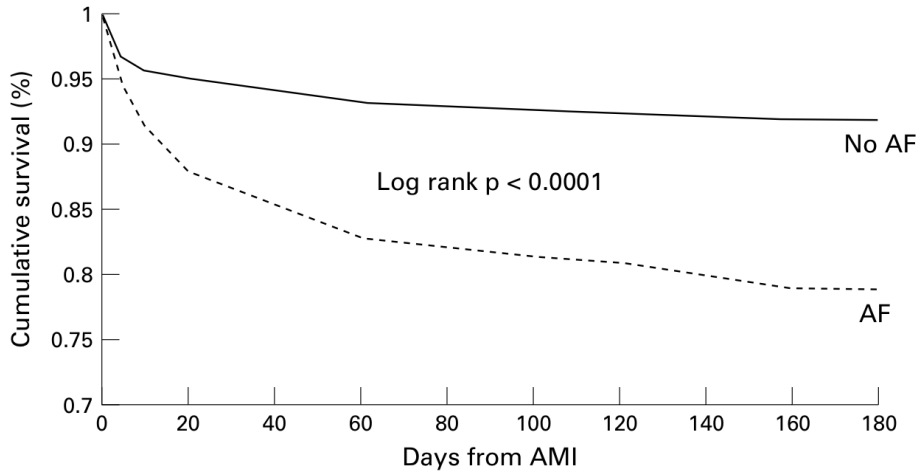

Figure 2 Six month survival of patients with or without the development of atrial fibrillation in hospital. AMI, acute myocardial infarction.

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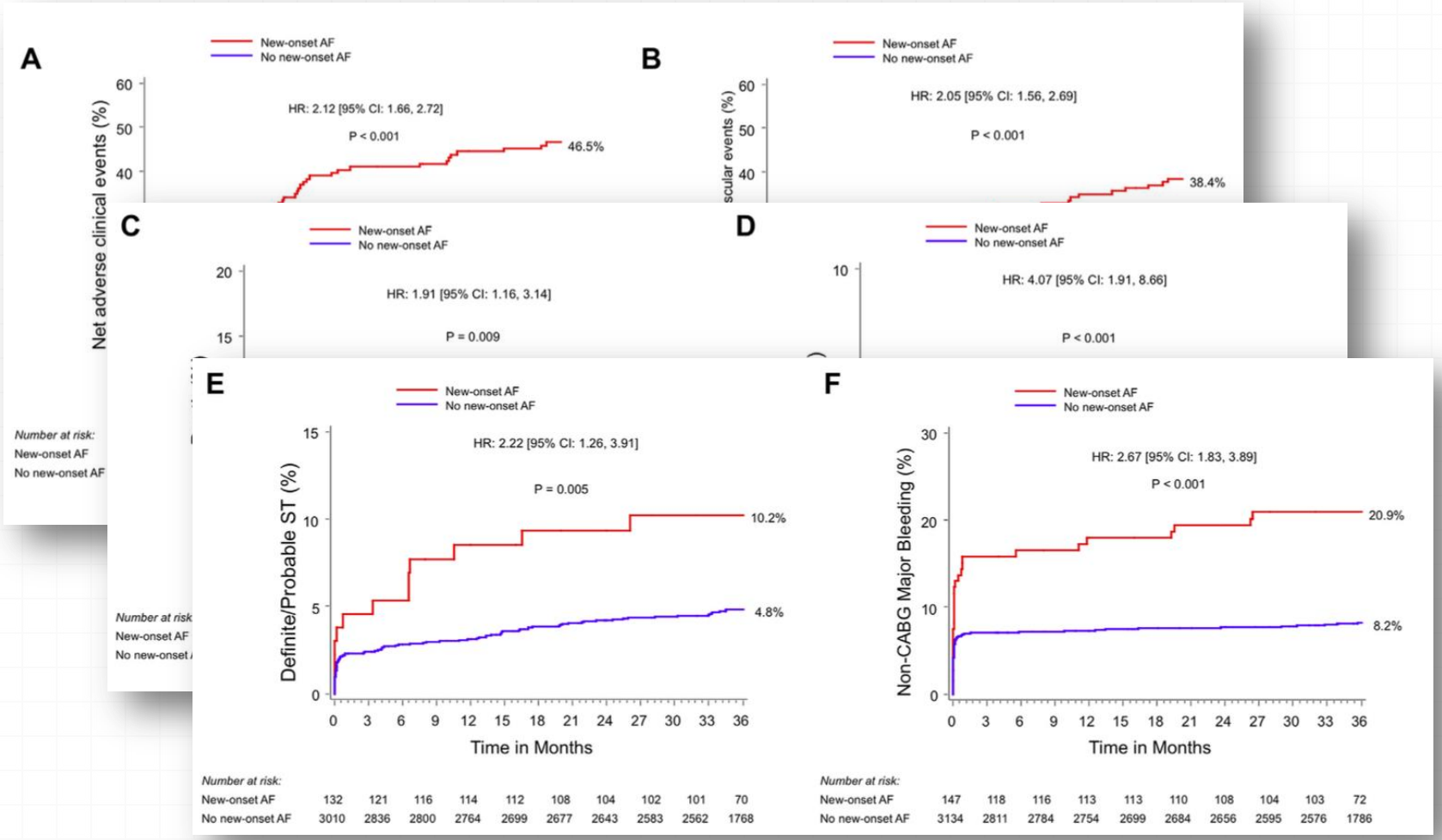
Pizzetti F et al., Heart. 2001;86(5):527-32.

AF in Patients wit STEMI treated with PCI (HORIZONS-AMI)



Rene AG et al., Am J Cardiol. 2014;113:236-42.

Prognostic significance of AF in STEMI patients

Study	Risk of mortality	
	In-hospital/30-day/90-day	**≥1-year**
GUSTO I[2]		
Any AF	30-day *OR 1.3 (1.2-1.4)	1-year n.a. Kaplan-Meier estimates: 21.5 vs 8.4%, p<0.001
Prior AF	30-day *ns	1-year n.a. Kaplan-Meier estimates: 22.2 vs 8.4%,p<0.001
New-onset AF	30-day *OR 1.4 (1.3-1.5)	1-year n.a. Kaplan-Meier estimates: 21.2 vs 8.4%,p<0.001
GUSTO III[8]		
New-onset AF	30-day **OR 1.49 (1.17-1.89)	1-year **OR 1.64 (1.35-2.01)
GISSI[9]		
New-onset AF	In-hospital *RR 1.98 (1.67-2.34)	4-year *RR 1.78 (1.6-1.99)
TRACE[10]		
Any AF	In-hospital *OR 1.5 (1.2-1.9)	5-year *RR 1.3 (1.2-1.4)
Prior AF	In-hospital *OR 1.2 (0.8-1.9) n.s.	5-year *RR 1.3 (1.2-1.4)
New-onset AF	In-hospital *OR 1.5 (1.2-1.9)	5-year *RR 1.4 (1.2-1.7)
OPTIMAAL[11]		
Prior AF	30-day n.s.	3-year *HR 1.32 (1.13-1.56)
New-onset AF	30-day *HR 3.83(1.97-7.43)	3-year *HR 1.82 (1.39-2.39)
VALIANT[12]		
Any AF	-	3-year *HR 1.3 (1.19-1.43)
Prior AF	-	3-year *HR1.25 (1.03-1.54)
New-onset AF	-	3-year *HR1.32 (1.2-1.45)
OACIS[4]		
Any AF	In-hospital *HR 1.42 (0.88-2.31) n.s.	1-year *HR 1.64 (1.05-2.55)
Prior AF	In-hospital *n.s.	1-year *HR 1.87 (0.45-7.52) n.s.
New-onset AF	In-hospital *n.s.	1-year *HR 3.04(1.24-7.48)
APEX-MI[15]		
New onset AF	90-day HR**1.81(1.06-3.09)	-

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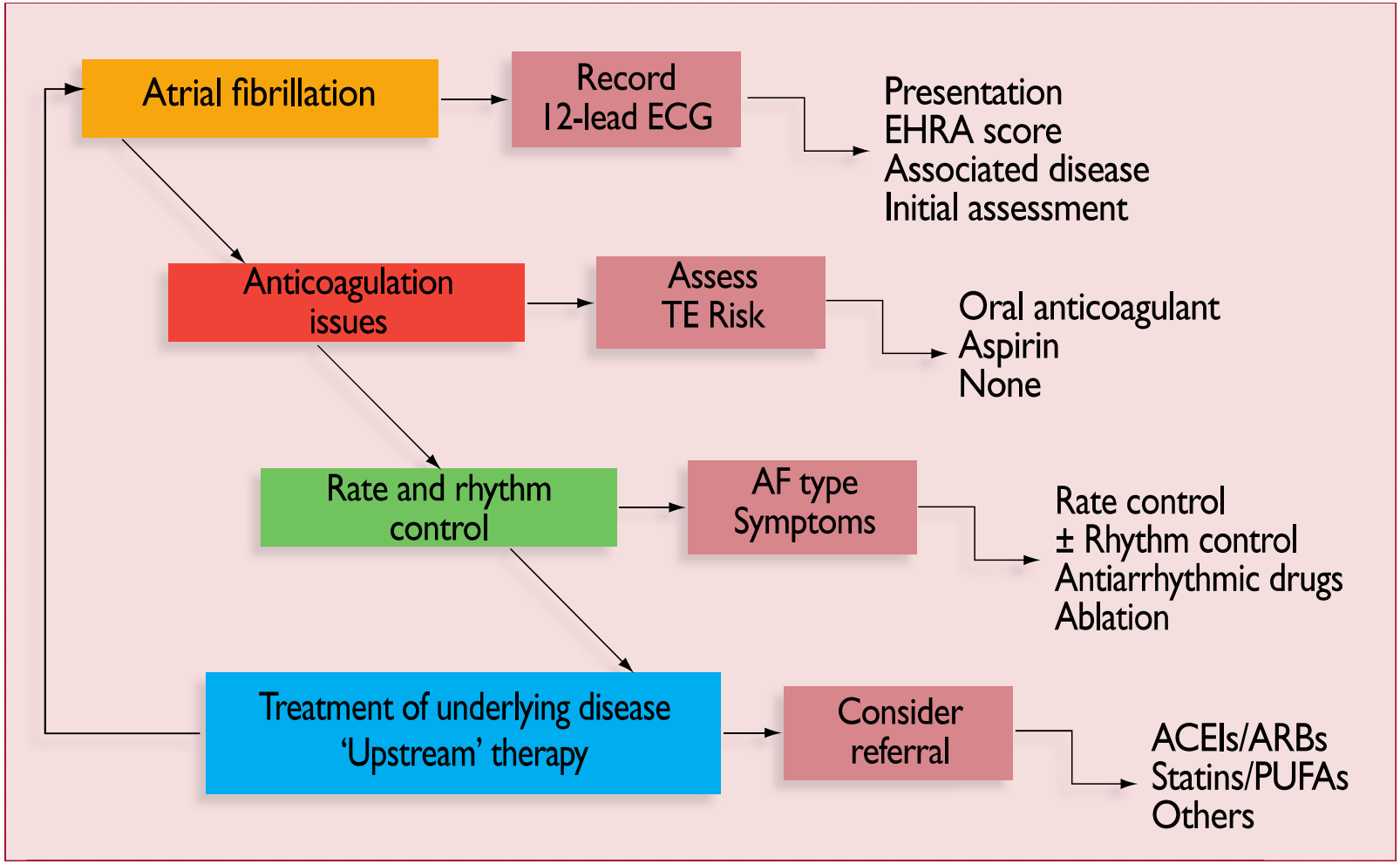
Gorenek B et al., Curr Cardiol Rev. 2012;8:281-9.

Management Cascade of AF



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Camm AJ et al. Eur Heart J. 2010;31:2369-2429

Rhythm Control

Rhythm Control Strategies for AF

1. Antiarrhythmic Drugs
2. Electrical Cardioversion
3. Catheter Ablation for AF

Rhythm Control in AMI : GUSTO-III Trial

Table 3 Antiarrhythmic drugs and percentages of successful conversion

	All patients (n=1138)	Patients with no history of previous AF (n=883)	Patients with history of paroxysmal AF (n=117)	Patients with history of chronic AF (n=138)
Use of drugs				
Any class I agent	132 (12%)	112 (13%)	14 (12%)	6 (4%)†
Procainamide	92 (8%)	85 (10%)	3 (3%)*	4 (3%)*
Quinidine	23 (2%)	16 (2%)	4 (3%)	3 (2%)
Disopyramide	8 (1%)	3 (<1%)	2 (2%)	3 (2%)*
Encainide	4 (<1%)	2 (<1%)	0%	2 (1%)
Flecainide	6 (1%)	4 (<1%)	0%	2 (1%)
Propafenone	24 (2%)	16 (2%)	5 (4%)	3 (2%)
Sotalol	55 (5%)	41 (5%)	8 (7%)	6 (4%)
Amiodarone	168 (15%)	137 (16%)	16 (14%)	15 (11%)
Any antiarrhythmic agent	317 (28%)	262 (30%)	32 (27%)	23 (17%)†
Successful conversion to sinus rhythm				
Any class I agent	72%	74%	64%	50%
Procainamide	70%	72%	33%	50%
Quinidine	61%	69%	50%	33%
Disopyramide	13%	0%	50%	0%
Encainide	0%	0%	0%	0%
Flecainide	17%	25%	0%	0%
Propafenone	67%	69%	100%	0%
Sotalol	67%	73%	63%	33%
Amiodarone	79%	85%	63%†	6%‡
Any antiarrhythmic agent	80%	84%	72%	48%‡

Data are presented as actual patient numbers with percentages in the first half and percentages only in the second half.
*p < 0.05, †p < 0.01, ‡p < 0.001 *v* patients with no history of previous AF.
AF, atrial fibrillation.

** Electrical Cardioversion was attemped in 116 (10%). Sinus rhythm was restored in 64%.*

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Wong CK et al., Heart. 2002;88:357-62.

Rhythm Control in AMI : GUSTO-III Trial

Table 6 Odds ratios (and 95% confidence intervals) for 30 day and one year mortality, comparing the different in-hospital treatment of atrial fibrillation

	Unadjusted	Adjusted for baseline characteristics*	Adjusted for baseline characteristics and pre-AF complications†
30 day mortality			
Class I antiarrhythmic agents‡	0.30 (0.15 to 0.63)	0.38 (0.18 to 0.81)	0.42 (0.19 to 0.89)
Sotalol	0.21 (0.05 to 0.85)	0.26 (0.06 to 1.12)	0.31 (0.07 to 1.32)
Amiodarone	1.23 (0.81 to 1.87)	1.21 (0.77 to 1.90)	1.08 (0.68 to 1.74)
Electrical cardioversion	1.22 (0.75 to 2.01)	1.24 (0.73 to 2.10)	1.16 (0.66 to 2.03)
1 year mortality			
Class I antiarrhythmic agents‡	0.41 (0.24 to 0.70)	0.54 (0.30 to 0.95)	0.58 (0.33 to 1.04)
Sotalol	0.19 (0.06 to 0.63)	0.26 (0.08 to 0.85)	0.31 (0.09 to 1.02)
Amiodarone	1.12 (0.78 to 1.63)	1.14 (0.75 to 1.73)	1.03 (0.67 to 1.57)
Electrical cardioversion	1.24 (0.81 to 1.91)	1.33 (0.82 to 2.16)	1.27 (0.78 to 2.09)

*Adjusted for grouping of atrial fibrillation (AF) including paroxysmal AF, chronic AF, and no previous AF; pulse rate; systolic blood pressure; age; history of myocardial infarction; angina; percutaneous transluminal coronary angioplasty; Killip class; and smoking class (previous, current, never).
†In addition to the above demographics, adjusted for significant pre-AF complications including worsening heart failure, shock, acute ventricular septal defect, and stroke.
‡Includes procainamide, quinidine, disopyramide, encainide, flecainide, and propafenone.

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Wong CK et al., Heart. 2002;88:357-62.

Rhythm Control in AMI : VALIANT Trial

Table 2 Baseline medication use of patients in VALIANT with AF after MI, according to treatment group

	Rate control group (n = 760)	Rhythm control group (n = 371)	p Value
β-blocker (%)	84.7	47.4	<0.0001
Digoxin (%)	43.8	30.7	0.57
Anti-arrhythmics			
Amiodarone (%)	0	87.3	<0.0001
Other (%)	0	14.8	<0.0001
Antiplatelet agents			
Aspirin (%)	88	88	0.94
Other (ie, clopidogrel) (%)	21.4	27.2	0.03
Oral anticoagulant (%)	19.5	19.5	0.98
'Triple therapy' (eg, aspirin, clopidogrel, warfarin)	3.8	4.9	0.41

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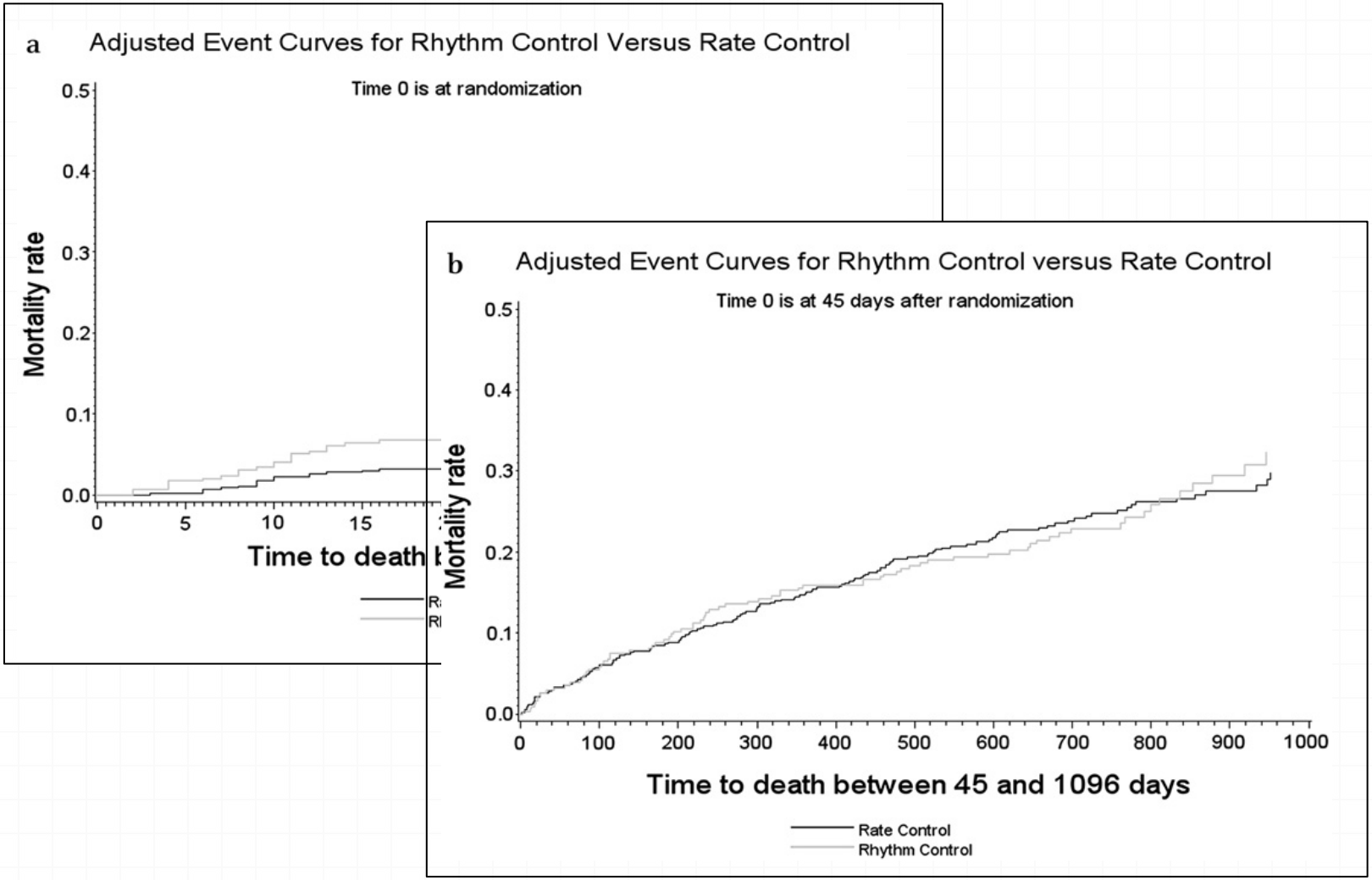
Nilsson KR Jr et al., Heart. 2010;96:838-42.

Rhythm Control in AMI : VALIANT Trial



Nilsson KR Jr et al., Heart. 2010;96:838-42.

Carvedilol after AMI (CAPRICORN trial)

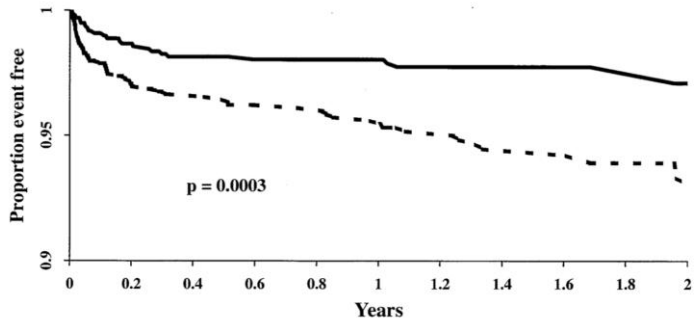


Figure 1. Survival free of atrial fibrillation or atrial flutter. **Dotted line** = placebo; **solid line** = carvedilol.

Table 2. Combined Outcomes of Death or Arrhythmia

Outcome	Subjects With Event Carvedilol (n = 975)/ Placebo (n = 984)	Carvedilol/Placebo Hazard Ratio (95% CI)	Log-Rank p Value
Death or SV arrhythmia	133/187	0.70 (0.56, 0.88)	0.0016
Death or SV arrhythmia (excluding patients with a history of AF/AFL)	112/152	0.72 (0.57, 0.92)	0.0090
Death or AF/AFL	129/186	0.68 (0.55, 0.85)	0.0008
Death or AF/AFL (excluding patients with a history of AF/AFL)	109/151	0.71 (0.55, 0.91)	0.0057
Death or any ventricular arrhythmia	138/201	0.67 (0.54, 0.84)	0.0003
Death or any ventricular arrhythmia (excluding patients with a history of VT/VF)	137/197	0.68 (0.54, 0.84)	0.0004
Death or a malignant ventricular arrhythmia	123/173	0.70 (0.56, 0.89)	0.0028
Death or any arrhythmia	154/233	0.64 (0.52, 0.79)	<0.0001

AF/AFL = atrial fibrillation/atrial flutter; CI = confidence interval; SV = supraventricular; VT/VF = ventricular tachycardia/ventricular fibrillation.

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McMurray J et al., J Am Coll Cardiol. 2005 ;45:525-30.

2014 AHA/ACC/HRS AF Guideline

Recommendations	COR	LOE
Hypertrophic cardiomyopathy		
Anticoagulation is indicated in HCM with AF independent of the CHA_2DS_2-VASc score	I	B
Antiarrhythmic drugs can be useful to prevent recurrent AF in HCM. Amiodarone or disopyramide combined with a beta blocker or nondihydropyridine calcium channel antagonist are reasonable	IIa	C
AF catheter ablation can be beneficial for HCM to facilitate a rhythm-control strategy when antiarrhythmics fail or are not tolerated	IIa	B
Sotalol, dofetilide, and dronedarone may be considered for a rhythm-control strategy in HCM	IIb	C
AF complicating ACS		
★ Urgent cardioversion of new-onset AF in the setting of ACS is recommended for patients with hemodynamic compromise, ongoing ischemia, or inadequate rate control	I	C
★ IV beta blockers are recommended to slow RVR with ACS and no HF, hemodynamic instability, bronchospasm	I	C
★ With ACS and AF with CHA_2DS_2-VASc score ≥2, anticoagulation with warfarin is recommended unless contraindicated	I	C
★ Amiodarone or digoxin may be considered to slow RVR with ACS and AF and severe LV dysfunction and HF or hemodynamic instability	IIb	C
★ Nondihydropyridine calcium antagonists might be considered to slow RVR with ACS and AF only in the absence of significant HF or hemodynamic instability	IIb	C

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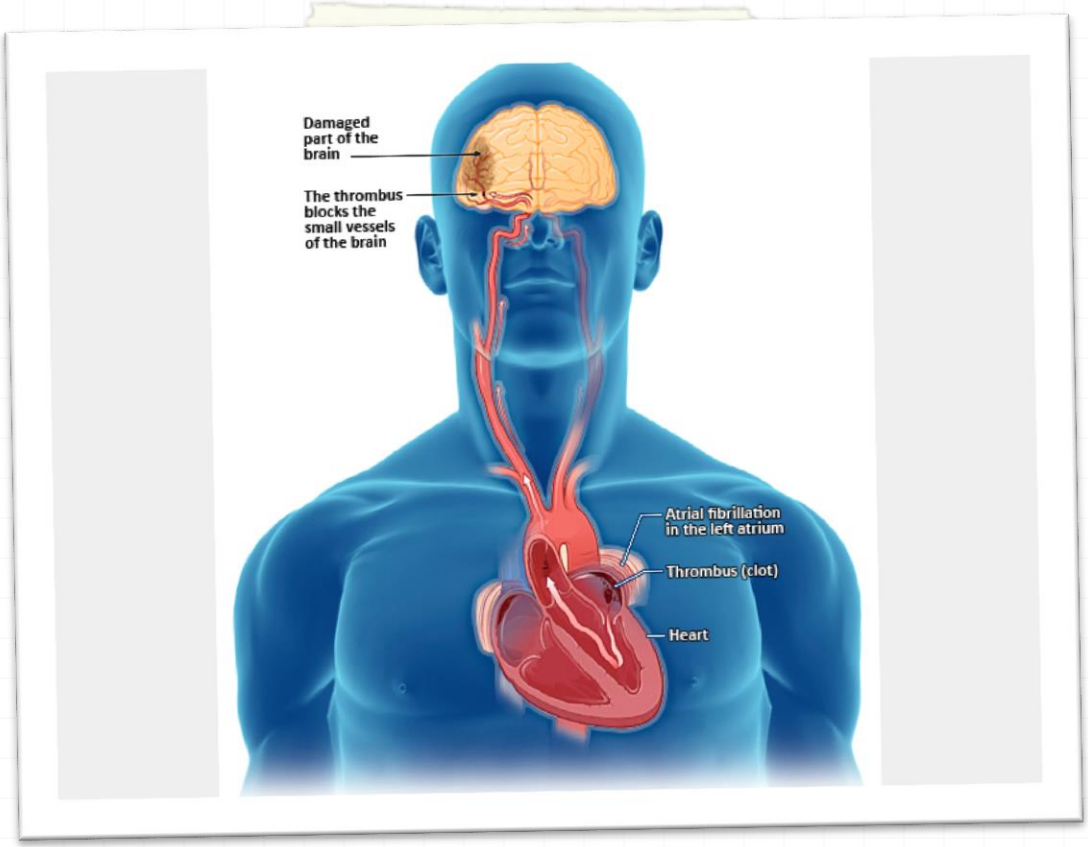
January CT et al., Circulation. 2014;130:e199-267

2010 ESC AF Management Guideline

Recommendations	Class[a]	Level[b]
DCC is recommended for patients with severe haemodynamic compromise or intractable ischaemia, or when adequate rate control cannot be achieved with pharmacological agents in patients with ACS and AF.	I	C
Intravenous administration of amiodarone is recommended to slow a rapid ventricular response to AF in patients with ACS.	I	C
Intravenous β-blockers are recommended to slow a rapid ventricular response to AF in patients with ACS.	I	C
Intravenous administration of non-dihydropyridine calcium antagonists (verapamil, diltiazem) should be considered to slow a rapid ventricular response to AF in patients with ACS and no clinical signs of heart failure.	IIa	C
Intravenous administration of digoxin may be considered to slow a rapid ventricular response in patients with ACS and AF associated with heart failure.	IIb	C
Administration of flecainide or propafenone is not recommended in patients with AF in the setting of ACS.	III	B

Camm AJ et al. Eur Heart J. 2010;31:2369-2429



Anticoagulation

CHA_2DS_2-VASc Score

Risk factor	Score
Congestive heart failure/LV dysfunction	1
Hypertension	1
Age ≥75	2
Diabetes mellitus	1
Stroke/TIA/thrombo-embolism	2
Vascular disease[a]	1
Age 65–74	1
Sex category (i.e. female sex)	1
Maximum score	**9**

[a]Prioior myocardial infarction, peripheral artery disease, aortic plaque.

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Camm AJ et al. Eur Heart J. 2010;31:2369-2429

HAS-BLED Bleeding Score

Letter	Clinical characteristic[a]	Points awarded
H	Hypertension	1
A	Abnormal renal and liver function (1 point each)	1 or 2
S	Stroke	1
B	Bleeding	1
L	Labile INRs	1
E	Elderly (e.g. age >65 years)	1
D	Drugs or alcohol (1 point each)	1 or 2
		Maximum 9 points

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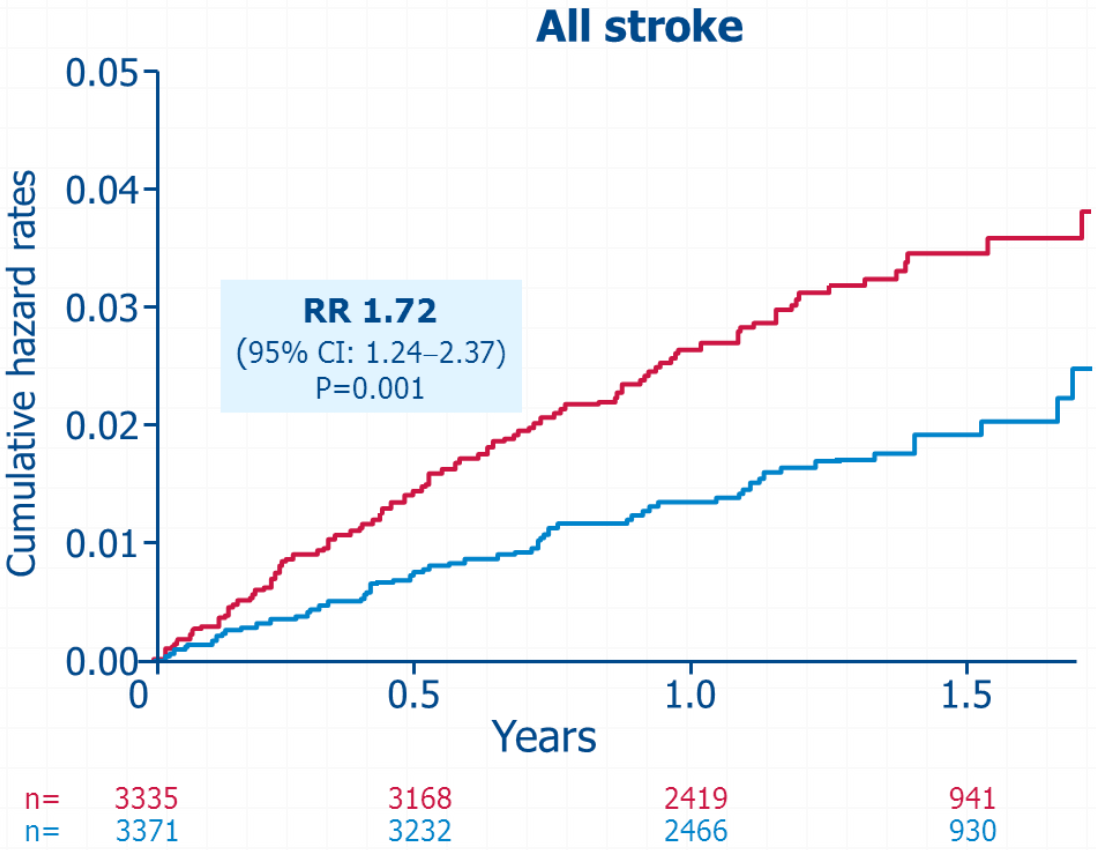
Camm AJ et al. Eur Heart J. 2010;31:2369-2429

Options for Stroke Prevention

1. Aspirin + Clopidogrel
2. Warfarin + Aspirin
3. Warfarin + Clopidogrel
4. Warfarin + Aspirin + Clopidogrel

5. New Drugs?

Aspirin & Clopidogrel for Stroke



Dual antiplatelet therapy
Clopidogrel (75 mg/d) &
Aspirin (75–100 mg/d)

Oral anticoagulation
VKA (target INR = 2.0–3.0)

For ischaemic stroke:
RR 2.17 (95% CI: 1.51–3.11)

INR = international normalized ratio; RR = relative risk; VKA = vitamin K antagonist

ACTIVE Investigators. Lancet 2006;367:1903–12

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Triple Therapy after Primary PCI

Outcomes of Patients Treated With Triple Antithrombotic Therapy After Primary Percutaneous Coronary Intervention for ST-Elevation Myocardial Infarction (from the Harmonizing Outcomes With Revascularization and Stents in Acute Myocardial Infarction [HORIZONS-AMI] Trial)

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In the setting of ST-segment elevation myocardial infarction (STEMI), patients at high risk of systemic emboli who undergo primary percutaneous coronary intervention (PCI) using stents might require triple antithrombotic therapy (a combination of aspirin, thienopyridine, and vitamin K antagonist [VKA]). The risks and benefits of such therapy in the setting of STEMI have been incompletely characterized. We, therefore, assessed the outcomes of patients who received triple therapy after primary PCI in the large-scale, contemporary Harmonizing Outcomes with Revascularization and Stents in Acute Myocardial Infarction [HORIZONS-AMI] trial. Among the 3,320 patients triaged to primary PCI, 126 (3.8%) were prescribed triple therapy and 3,194 (96.2%) were prescribed dual antiplatelet therapy. The most frequent indications for VKA treatment were a severely reduced left ventricular ejection fraction with a large akinetic area, atrial fibrillation (23.8% each), and mural thrombus (23.0%). The assignment to triple therapy was associated with older age, female gender, rhythm disturbances, Killip class >1 on admission, lower left ventricular ejection fraction, left anterior descending artery territory infarcts, and Final Thrombolysis In Myocardial Infarction flow grade <3. Patients treated with triple versus dual therapy had comparable short- and long-term ischemic outcomes but had significantly increased rates of major bleeding during the index hospitalization (17.1% vs 6.5%, p <0.0001), resulting in premature VKA discontinuation in 14.3% of those patients. In conclusion, in the setting of STEMI treated with primary PCI, the combination of aspirin, thienopyridine, and VKA results in an excess of bleeding complications and premature discontinuation of VKA. The risk of adding oral anticoagulation to patients admitted for STEMI should be carefully considered before choosing drug-eluting or bare metal stents. (Am J Cardiol 2012;109:831–838)

KUDH

Nikolsky, E., et al., Am J Cardiol 2012;109:831-838

Triple Therapy after Primary PCI

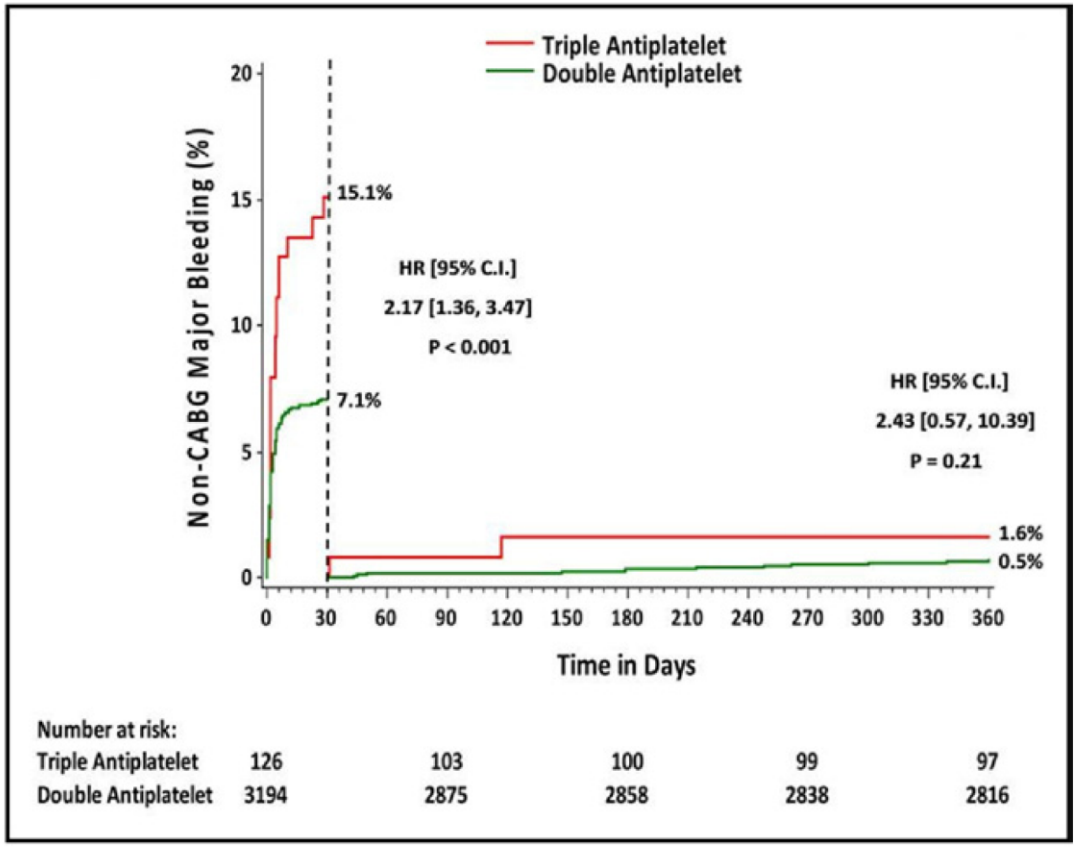


Figure 3. Landmark analyses of protocol-defined major bleeding ≤30 days and from 30 days to 1 year in patients treated with triple and dual therapy.

KUDH

Nikolsky, E., et al., Am J Cardiol 2012;109:831-838

2013 ACCF/AHA STEMI Guideline

- ✓ Anticoagulant therapy with a vitamin K antagonist should be provided to patients with STEMI and AF with $CHADS_2$ score ≥2 (Class I, Level of Evidence : C)

- ✓ The duration of triple antithrombotic therapy with a vitamin K antagonist, aspirin, a $P2Y_{12}$ receptor inhibitor should be minimized to the extent possible to limit the risk of bleeding (Class I, Level of Evidence : C)

KUDH

O'Gara PT et al., Circulation. 2013;127:e362-425.

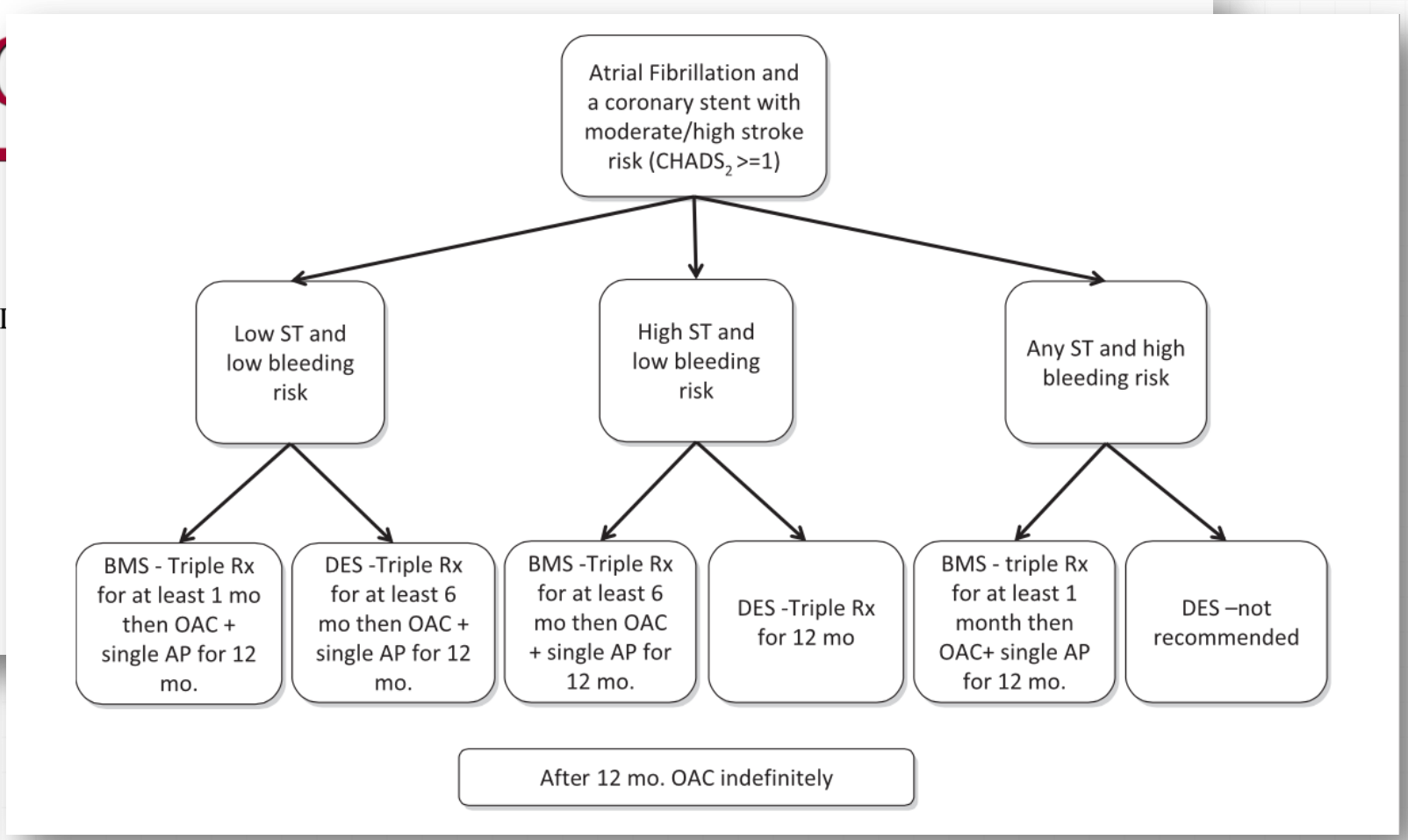
2010 ESC AF Management Guideline

Haemorrhagic risk	Clinical setting	Stent implanted	Anticoagulation regimen
Low or intermediate (e.g. HAS-BLED score 0–2)	Elective	Bare-metal	1 month: triple therapy of VKA (INR 2.0–2.5) + aspirin ≤100 mg/day + clopidogrel 75 mg/day Up to 12th month: combination of VKA (INR 2.0–2.5) + clopidogrel 75 mg/day[b] (or aspirin 100 mg/day) Lifelong: VKA (INR 2.0–3.0) alone
	Elective	Drug-eluting	3 (-olimus[a] group) to 6 (paclitaxel) months: triple therapy of VKA (INR 2.0–2.5) + aspirin ≤100 mg/day + clopidogrel 75 mg/day Up to 12th month: combination of VKA (INR 2.0–2.5) + clopidogrel 75 mg/day[b] (or aspirin 100 mg/day) Lifelong: VKA (INR 2.0–3.0) alone
★	ACS	Bare-metal/ drug-eluting	6 months: triple therapy of VKA (INR 2.0–2.5) + aspirin ≤100 mg/day + clopidogrel 75 mg/day Up to 12th month: combination of VKA (INR 2.0–2.5) + clopidogrel 75 mg/day[b] (or aspirin 100 mg/day) Lifelong: VKA (INR 2.0–3.0) alone
High (e.g. HAS-BLED score ≥3)	Elective	Bare-metal[c]	2–4 weeks: triple therapy of VKA (INR 2.0–2.5) + aspirin ≤100 mg/day + clopidogrel 75 mg/day Lifelong: VKA (INR 2.0–3.0) alone
★	ACS	Bare-metal[c]	4 weeks: triple therapy of VKA (INR 2.0–2.5) + aspirin ≤100 mg/day + clopidogrel 75 mg/day Up to 12th month: combination of VKA (INR 2.0–2.5) + clopidogrel 75 mg/day[b] (or aspirin 100 mg/day) Lifelong: VKA (INR 2.0–3.0) alone

KUDH

Camm AJ et al. Eur Heart J. 2010;31:2369-2429

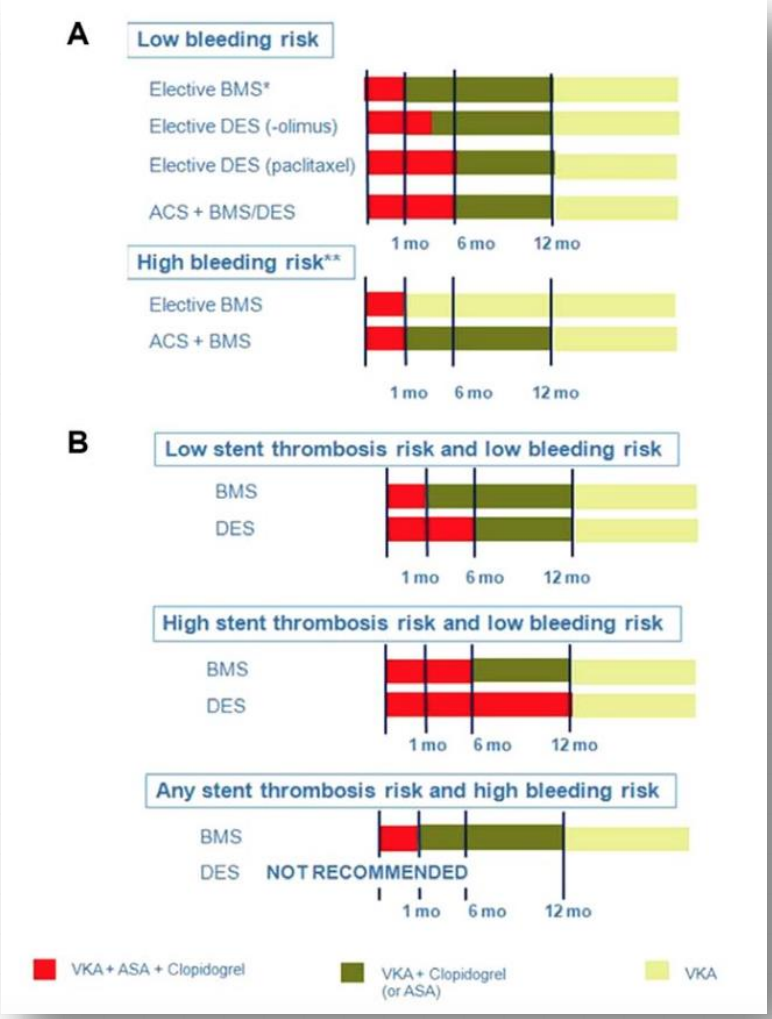
A North-American Perspective



In individual patients who are at high risk for thrombotic events or very late stent thrombosis, combined therapy with warfarin and an antiplatelet agent is not unreasonable.

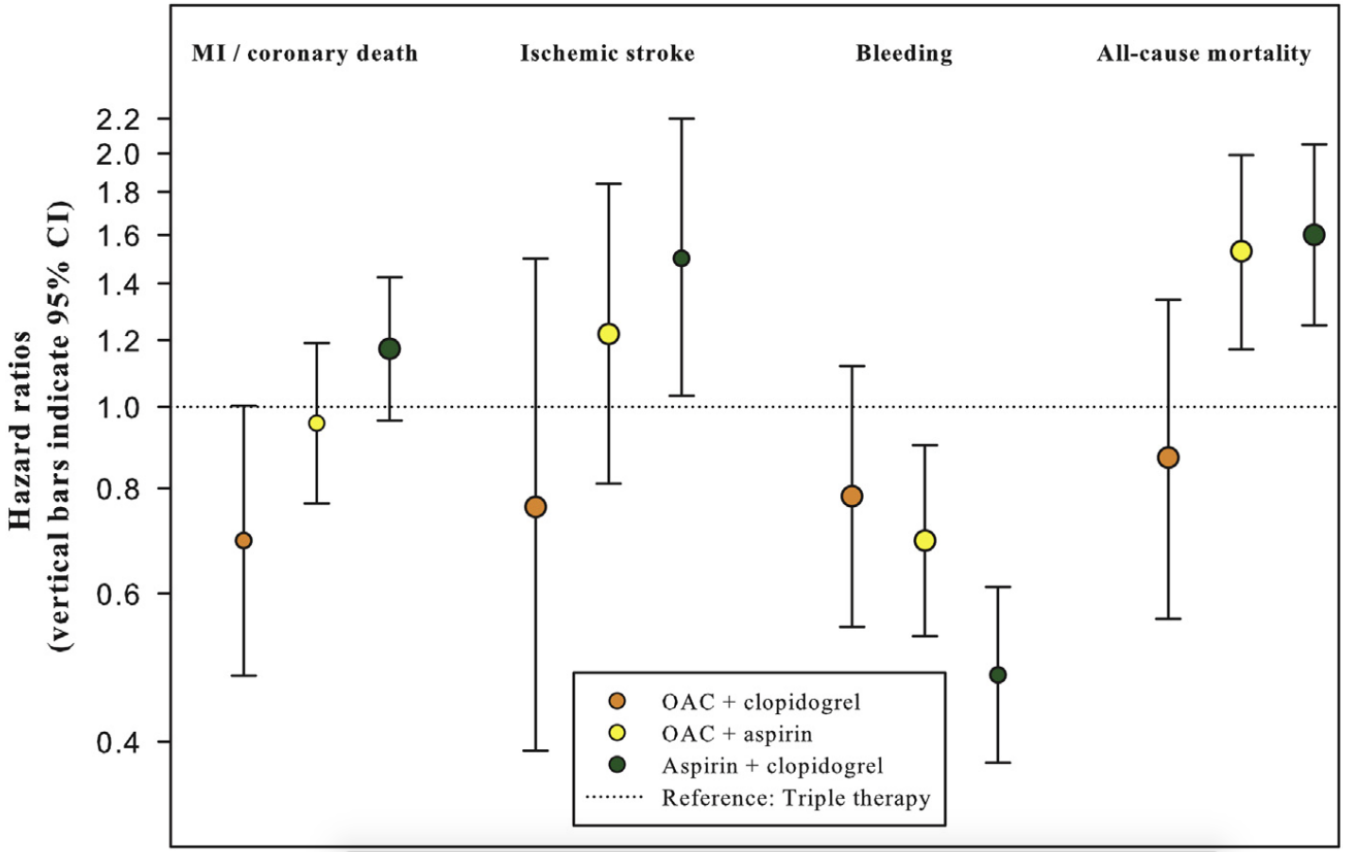
KUDH

European and American Recommendations



Verheugt FW et al., Circulation. 2013;128(18):2058-61.

Benefit and Safety With Triple vs. Dual Therapies



Lamberts M et al., J Am Coll Cardiol. 2013;62:981-9.

The WOEST Trial

Use of clopidogrel with or without aspirin in patients taking oral anticoagulant therapy and undergoing percutaneous coronary intervention: an open-label, randomised, controlled trial

Willem J M Dewilde, Tom Oirbans, Freek W A Verheugt, Johannes C Kelder, Bart J G L De Smet, Jean-Paul Herrman, Tom Adriaenssens, Mathias Vrolix, Antonius A C M Heestermans, Marije M Vis, Jan G P Tijsen, Arnoud W van 't Hof, Jurriën M ten Berg, for the WOEST study investigators

Summary

Background If percutaneous coronary intervention (PCI) is required in patients taking oral anticoagulants, antiplatelet therapy with aspirin and clopidogrel is indicated, but such triple therapy increases the risk of serious bleeding. We investigated the safety and efficacy of clopidogrel alone compared with clopidogrel plus aspirin.

Methods We did an open-label, multicentre, randomised, controlled trial in 15 centres in Belgium and the Netherlands. From November, 2008, to November, 2011, adults receiving oral anticoagulants and undergoing PCI were assigned clopidogrel alone (double therapy) or clopidogrel plus aspirin (triple therapy). The primary outcome was any bleeding episode within 1 year of PCI, assessed by intention to treat. This study is registered with ClinicalTrials.gov, number NCT00769938.

Findings 573 patients were enrolled and 1-year data were available for 279 (98·2%) patients assigned double therapy and 284 (98·3%) assigned triple therapy. Mean ages were 70·3 (SD 7·0) years and 69·5 (8·0) years, respectively. Bleeding episodes were seen in 54 (19·4%) patients receiving double therapy and in 126 (44·4%) receiving triple therapy (hazard ratio [HR] 0·36, 95% CI 0·26–0·50, p<0·0001). In the double-therapy group, six (2·2%) patients had multiple bleeding events, compared with 34 (12·0%) in the triple-therapy group. 11 (3·9%) patients receiving double therapy required at least one blood transfusion, compared with 27 (9·5%) patients in the triple-therapy group (odds ratio from Kaplan-Meier curve 0·39, 95% CI 0·17–0·84, p=0·011).

Interpretation Use of clopiogrel without aspirin was associated with a significant reduction in bleeding complications and no increase in the rate of thrombotic events.

Funding Antonius Ziekenhuis Foundation, Strect Foundation.

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See Online/Comment
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Dewilde WJ et al., Lancet. 2013;381:1107-15.

The WOEST Trial

1:1 Randomisation:

Double therapy group:	Triple therapy group
OAC + 75mg Clopidogrel qd	OAC + 75mg Clopidogrel qd + 80mg Aspirin qd
1 month minimum after BMS 1 year after DES	1 month minimum after BMS 1 year after DES

Follow up: 1 year

Primary Endpoint: The occurence of all bleeding events (TIMI criteria)

Secondary Endpoints:

- Combination of stroke, death, myocardial infarction, stent thrombosis and target vessel revascularisation
- All individual components of primary and secondary endpoints

KUDH

Dewilde WJ et al., Lancet. 2013;381:1107-15.

Primary Endpoint (Any Bleeding)

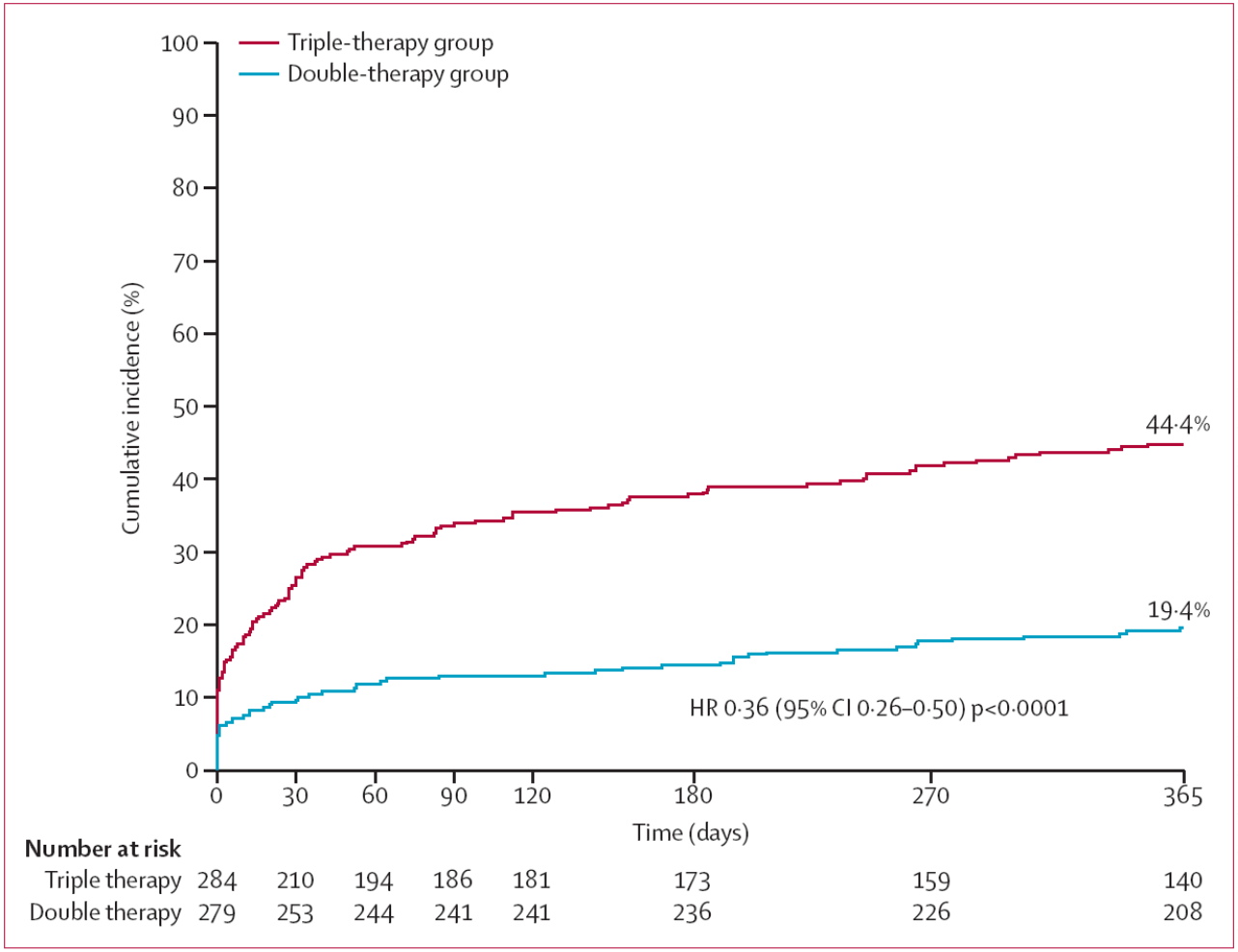


Figure 2: **Incidence of the primary endpoint (any bleeding)**
HR=hazard ratio.

KUDH

Dewilde WJ et al., Lancet. 2013;381:1107-15.

Death, MI, Stroke, TVR, ST

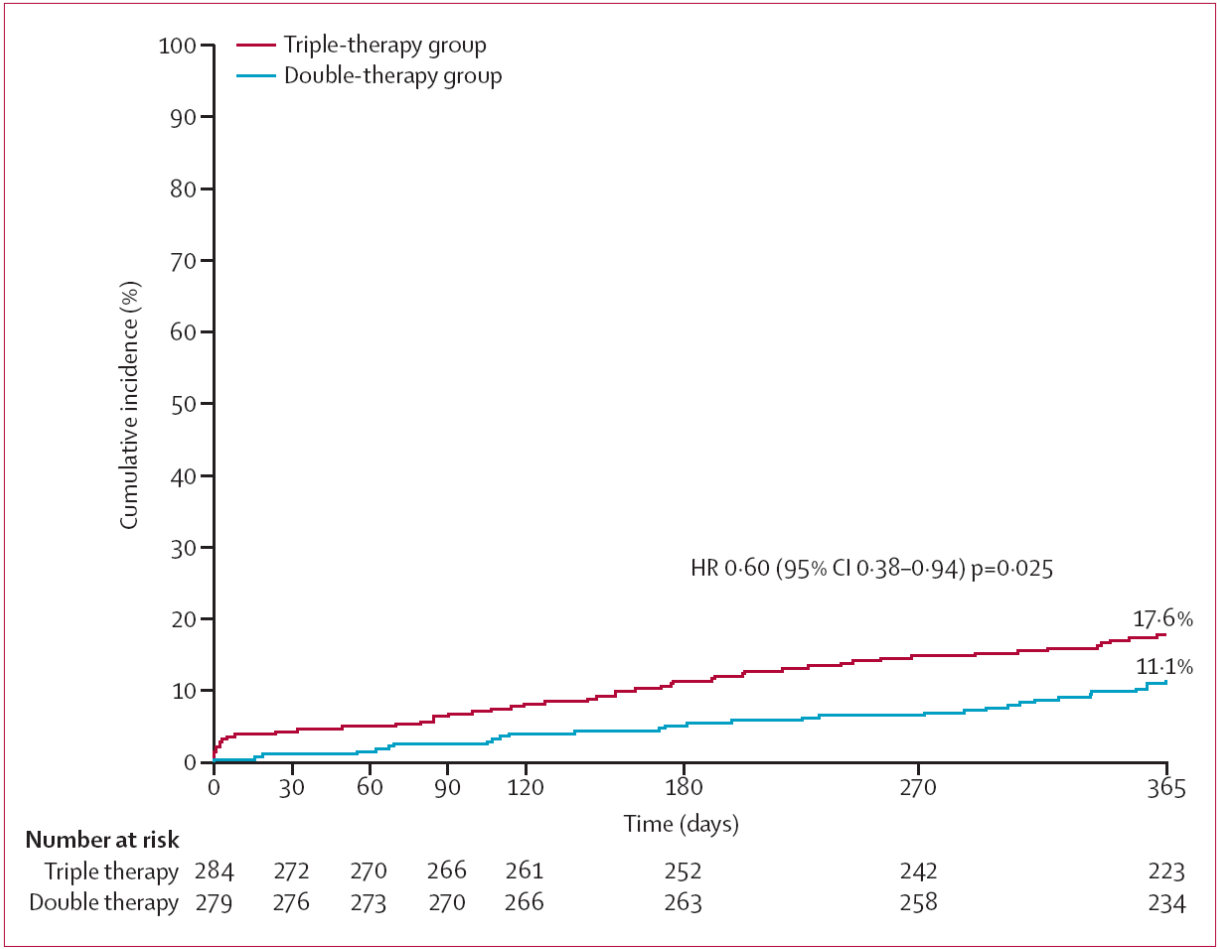


Figure 3: **Cumulative incidence of the secondary endpoint (death, myocardial infarction, stroke, target-vessel revascularisation, and stent thrombosis)**
HR=hazard ratio.

KUDH

Dewilde WJ et al., Lancet. 2013;381:1107-15.

2014 AHA/ACC/HRS AF Guideline

Recommendations	COR	LOE
With nonvalvular AF and CHA_2DS_2-VASc score of 0, it is reasonable to omit antithrombotic therapy	IIa	B
With CHA_2DS_2-VASc score ≥2 and end-stage CKD (CrCl <15 mL/min) or on hemodialysis, it is reasonable to prescribe warfarin for oral anticoagulation	IIa	B
With nonvalvular AF and a CHA_2DS_2-VASc score of 1, no antithrombotic therapy or treatment with an oral anticoagulant or aspirin may be considered	IIb	C
With moderate-to-severe CKD and CHA_2DS_2-VASc scores of ≥2, reduced doses of direct thrombin or factor Xa inhibitors may be considered	IIb	C
★ For PCI,* BMS may be considered to minimize duration of DAPT	IIb	C
★ Following coronary revascularization in patients with CHA_2DS_2-VASc score of ≥2, it may be reasonable to use clopidogrel concurrently with oral anticoagulants, but without aspirin	IIb	B
Direct thrombin, dabigatran, and factor Xa inhibitor, rivaroxaban, are not recommended with AF and end-stage CKD or on hemodialysis because of the lack of evidence from clinical trials regarding the balance of risks and benefits	III: No Benefit	C
Direct thrombin inhibitor, dabigatran, should not be used with a mechanical heart valve	III: Harm	B

KUDH

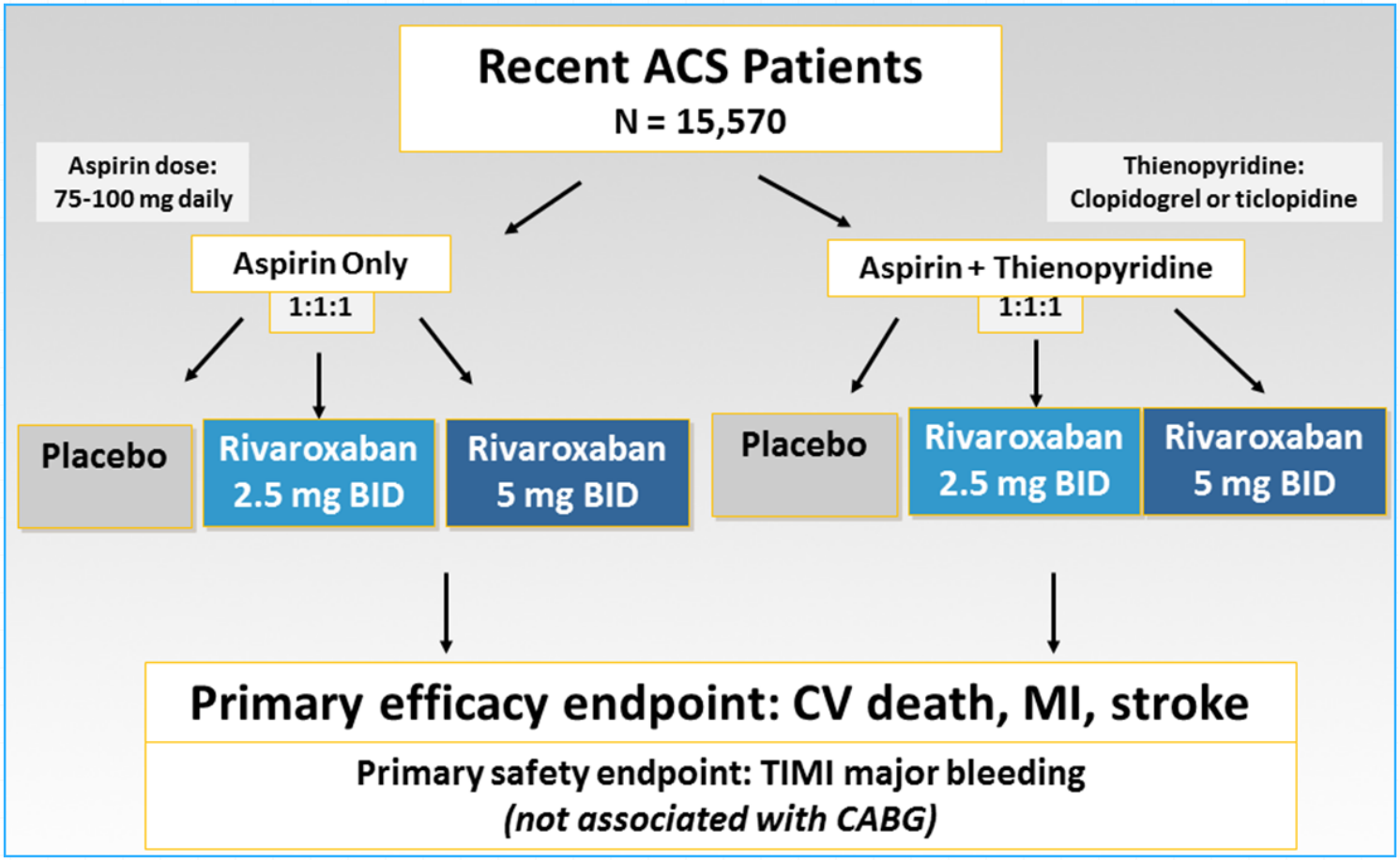
January CT et al., Circulation. 2014;130:e199-267

New Oral Anticoagulants (NOAC) in STEMI

KUDH

Rivaroxaban in ACS (ATLAS-ACS 2 TIMI 51)

15,570 patients with ACS randomized to rivaroxaban 2.5 or 5mg BID vs. placebo on top of DAPT (>92.6%) for 13~31 months



KUDH

Gibson CM et al. Am Heart J. 2011;161:815-821

Rivaroxaban in ACS (ATLAS-ACS 2 TIMI 51)

	Rivaroxaban %	Placebo %		
	2.5 mg BID n = 5114	n = 5113	Hazard ratio (95% CI)	*P* value
Primary outcome	9.1	10.7	0.84 (0.72-0.97)	.02
Secondary outcome	2.7	4.1	0. 66 (0.51-0.86)	.002
Major non-CABG bleeding	1.8	0.6	3.46 (2.08-5.77)	.001
ICH	0.4	0.2	2.83 (1.02-7.86)	.04
Fatal bleeding	0.1	0.2	0.67 (0.24-1.89)	.45

Primary outcome: death from CV causes, stroke
Secondary outcome: death from any cause, MI, stroke

KUDH

Mega JL, et al. N Engl J Med 2012;366:9 –19.

Rivaroxaban in ACS (ATLAS-ACS 2 TIMI 51)

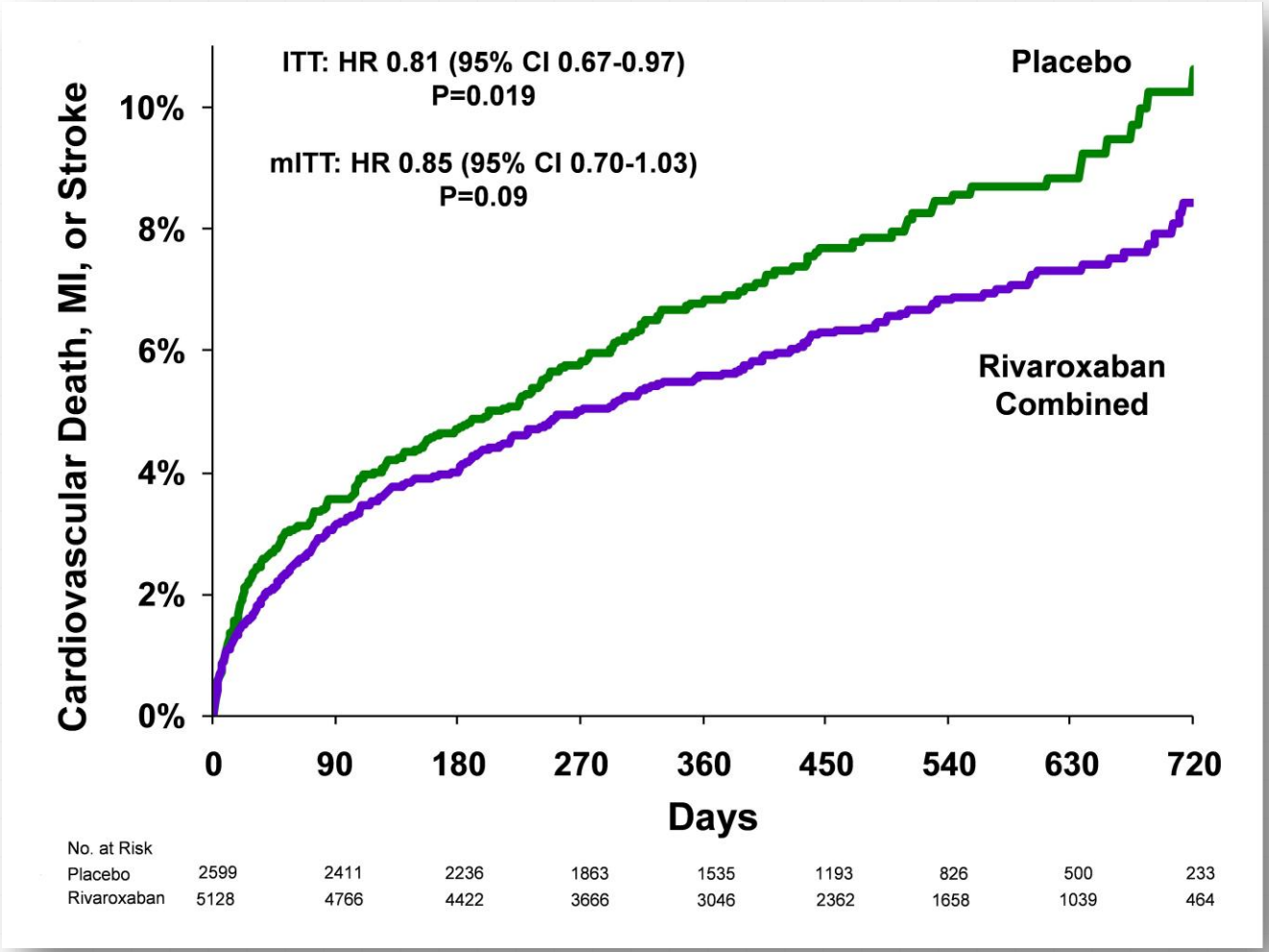
	Rivaroxaban %	Placebo %		
	5 mg BID n = 5115	n = 5113	Hazard ratio (95% CI)	*P* value
Primary outcome	8.8	10.7	0.85 (0.73-0.98)	.03
Secondary outcome	4.0	4.1	0.94 (0.75-1.20)	.63
Major non-CABG bleeding	2.4	0.6	4.47 (2.71-7.36)	<.001
ICH	0.7	0.2	3.74 (1.39-10.07)	.005
Fatal bleeding	0.4	0.2	1.72 (0.75-3.92)	.20

Primary outcome: death from CV causes, stroke
Secondary outcome: death from any cause, MI, stroke

KUDH

Mega JL, et al. N Engl J Med 2012;366:9 –19.

Rivaroxaban in ACS (ATLAS-ACS 2 TIMI 51)



Mega, J. L et al., J Am Coll Cardiol 2013

NOACs in Different Clinical Scenario

	Drug	Considerations
Patients' preference		
Once per day dosing	Rivaroxaban, edoxaban	..
Patients' features		
Age ≥80 years	Dabigatran 110 mg Apixaban, rivaroxaban, edoxaban	Dabigatran 150 mg has been associated with excess bleeding in these patients[22] No particular safety issues with these drugs[8,23,24]
History of stroke	Apixaban, rivaroxaban	Apixaban has largest reduction compared with warfarin;[7] rivaroxaban has largest population with previous stroke[6]
Previous gastrointestinal bleeding	Apixaban	Only NOAC with reduction in gastrointestinal bleeding compared with warfarin[7]
High stroke risk, low bleeding risk	Dabigatran 150 mg	Dabigatran 150 mg has largest reduction in ischaemic stroke[5]
High stroke risk, high bleeding risk	Dabigatran 110 mg, apixaban, or edoxaban	Significantly safer than warfarin[5,7,8]
Concomitant coronary disease	Rivaroxaban	Only NOAC with mortality reduction after acute coronary syndromes[14]
Concomitant kidney disease	Apixaban, rivaroxaban, edoxaban	These drugs have only 25%, 35%, and 50% renal elimination, respectively
Intended electrocardioversion	Rivaroxaban	Only NOAC with prospective trial compared with warfarin[25]

Table 2: **Appropriate indications for use of non-vitamin K antagonist oral anticoagulants (NOACs) in different clinical scenarios of atrial fibrillation[20,21]**

KUDH

Verheugt FW et al. Lancet. 2015

EHRA/EAPCI/ACCA/HRS/APHRS Joint Consensus

European Heart Journal (2014) **35**, 3155–3179
doi:10.1093/eurheartj/ehu298

CURRENT OPINION

Management of antithrombotic therapy in atrial fibrillation patients presenting with acute coronary syndrome and/or undergoing percutaneous coronary or valve interventions: a joint consensus document of the European Society of Cardiology Working Group on Thrombosis, European Heart Rhythm Association (EHRA), European Association of Percutaneous Cardiovascular Interventions (EAPCI) and European Association of Acute Cardiac Care (ACCA) endorsed by the Heart Rhythm Society (HRS) and Asia-Pacific Heart Rhythm Society (APHRS)

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.

Antithrombotic Therapy in Primary PCI

- ✓ In the acute setting, a patient with AF and STEMI may be treated with primary PCI, aspirin, clopidogrel, and heparin (UFH) or bivalirudin, while GP IIb/IIIa inhibitors in bailout situations might be useful in some cases. Given the risk of bleedng with such combination antithrombotic therapies, it may sometimes be prudent to temporarily stop OAC therapy. Regular or even 'routine' use of GP IIb/IIIa inhibitors is discouraged, as are the novel $P2Y_{12}$ inhibitors (Class IIb, level of evidence B).

KUDH

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.

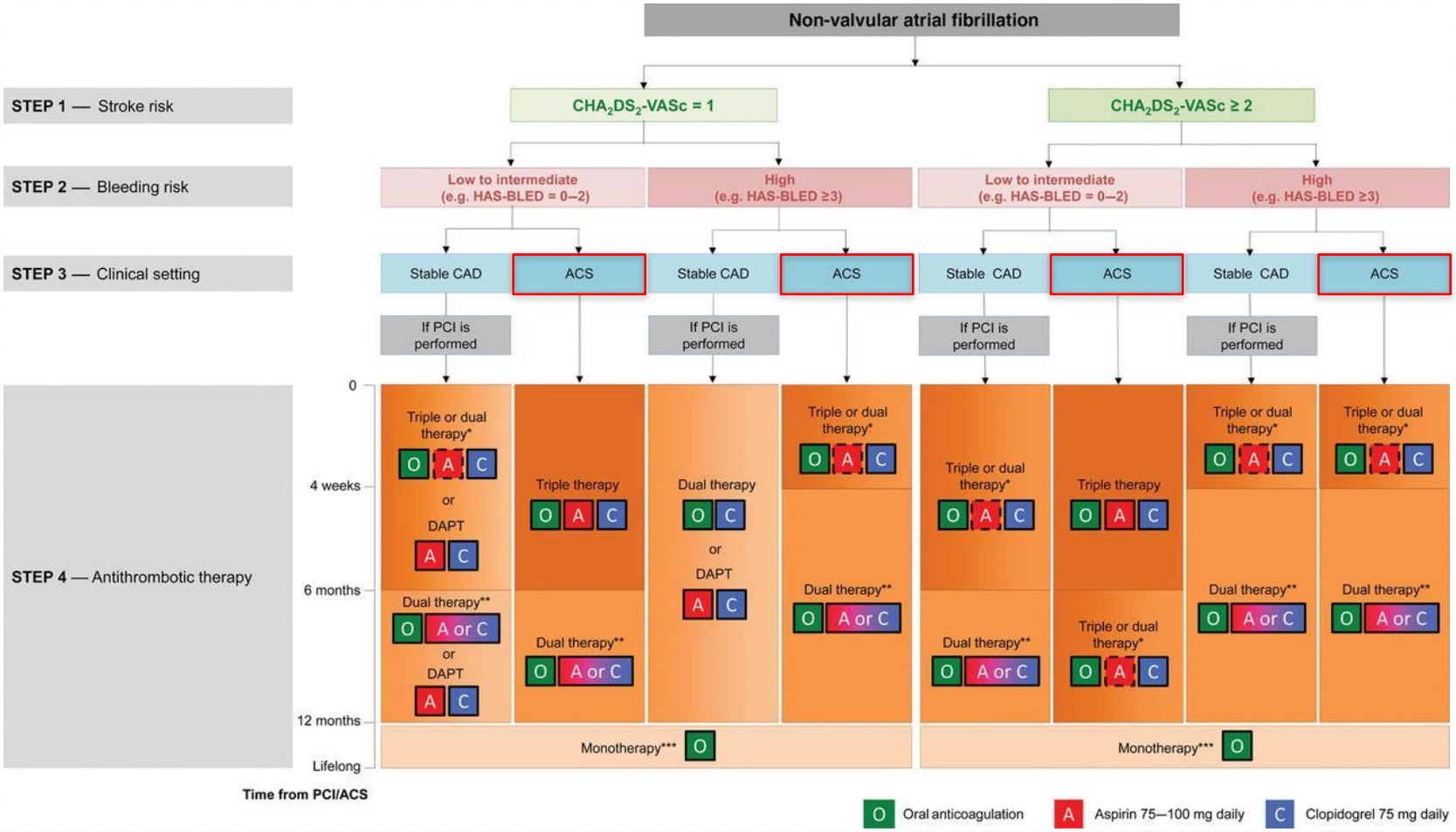
Antithrombotic Therapy in Primary PCI

- ✓ In the setting of STEMI, radial access for primary PCI is the best option to avoid procedural bleeding depending on operator expertise and preference (Class I, level of evidence A).

KUDH

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.

EHRA/EAPCI/ACCA/HRS/APHRS Joint Consensus



*** Dual therapy with oral anticoagulation and an antiplatelet agent (aspirin or clopidogrel) may be considered in patients at very high risk of coronary events.

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.

Antithrombotic Therapy in Primary PCI

- ✓ Long-term antithrombotic therapy (beyond 12 months) is recommended with OAC in all patients (Class I, level of evidence B).
  - ✓ Combination OAC plus single antiplatelet therapy (preferably clopidogrel 75 mg/day, or as an alternative, aspirin 75 – 100 mg/day) may sometimes be continued in very selected cases, e.g. stenting of the left main, proximal bifurcation, recurrent MIs, etc. (Class IIb, level of evidence B).

KUDH

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.

Antithrombotic Therapy in Primary PCI

- ✓ The routine use of ticagrelor or prasugrel in combination with OAC is not recommended (Class III, level of evidence B).
  - ✓ The use of ticagrelor or prasugrel in combination with OAC may only be considered under very circumstances (e.g. definite stent thrombosis while on clopidogrel, aspirin, and OAC) (Class IIb, level of evidence C).

KUDH

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.


SO WHAT?

Take Home Message

- ✓ AF occurs in 8% to 21% of patients with STEMI.
- ✓ The occurrence of AF after MI is associated with a worse clinical outcome, including a higher mortality.
- ✓ Beta blockers are recommended to slow RVR with STEMI and no HF.
- ✓ The duration of triple antithrombotic therapy with a vitamin K antagonist, aspirin, a $P2Y_{12}$ receptor inhibitor should be minimized to the extent possible to limit the risk of bleeding

KUDH

Thanks for your attention !!

KUDH

Backup Slide

Rhythm Control in AMI : GUSTO-III Trial

Table 5 Odds ratios and 95% confidence intervals for normal sinus rhythm at the time of discharge or before hospital death

	Unadjusted	Adjusted for baseline characteristics*	Adjusted for baseline characteristics and pre-AF complications†
Excluding in-hospital deaths			
Class I antiarrhythmic agents‡	1.33 (0.83 to 2.15)	0.83 (0.48 to 1.42)	0.83 (0.48 to 1.43)
Sotalol	2.09 (0.88 to 4.99)	2.05 (0.75 to 5.59)	2.10 (0.77 to 5.75)
Amiodarone	1.60 (0.99 to 2.57)	1.40 (0.80 to 2.44)	1.47 (0.84 to 2.57)
Electrical cardioversion	1.18 (0.70 to 2.00)	0.95 (0.52 to 1.75)	0.96 (0.52 to 1.77)
At discharge or before in-hospital death			
Class I antiarrhythmic agents‡	1.67 (1.08 to 2.60)	1.10 (0.68 to 1.78)	1.10 (0.68 to 1.79)
Sotalol	2.75 (1.22 to 6.16)	2.31 (0.96 to 5.57)	2.30 (0.95 to 5.57)
Amiodarone	1.44 (0.99 to 2.09)	1.38 (0.89 to 2.14)	1.45 (0.94 to 2.25)
Electrical cardioversion	1.15 (0.75 to 1.76)	1.01 (0.62 to 1.65)	1.05 (0.64 to 1.72)

*Adjusted for grouping of atrial fibrillation (AF) including paroxysmal AF, chronic AF, and no previous AF; baseline pulse rate; baseline systolic blood pressure; age; hypercholesterolaemia; and Killip class.
†In addition to the above demographics, adjusted for significant pre-AF complications including recurrent ischaemia, reinfarction, and acute ventricular septal defect.
‡Includes procainamide, quinidine, disopyramide, encainide, flecainide, and propafenone.

KUDH

Wong CK et al., Heart. 2002;88:357-62.

NOACs and antiplatelet agents in AF and/or ACS

Author/year	Study design	Size	Summary of findings	Comment
(a) Concomitant NOAC and antiplatelets in RCTs on NOAC in non valvular AF				
Dans *et al.*[59]	*Post hoc* analysis of RE-LY RCT, PROBE design (prospective, warfarin (INR 2.0 to 3.0) vs. dabigatran 110 mg b.i.d. or 150 mg b.i.d. non-valvular AF patients	6952 patients (38.4% of 18 113 RE-LY patients) received concomitant aspirin or clopidogrel at some time during the study	Concomitant APT (aspirin or clopidogrel) increased risk of major bleeding without affecting the advantages of dabigatran over warfarin. In the time-dependent analysis, concomitant use of a single APT increased risk of major bleeding (HR, 1.60; 95% CI: 1.42–1.82) Dual APT increased this risk even more (HR: 2.31; 95% CI: 1.79–2.98), but number of patients with TT was limited Absolute risks lowest with dabigatran 110 mg b.i.d. compared with dabigatran 150 mg bid or warfarin (annual risk of major bleeding in association with APTs 3.9, 4.4, and 4.8% per year, respectively)	Underestimation of the risks associated with full use of APT is likely, since mean duration of use was only 66% of the total study duration (2 years) Thrombo-embolic benefit of dabigatran 150 mg b.i.d. compared with warfarin was attenuated in patients with additional (dual) APT. However, dabigatran substantially lowers the risk of ICH even in combination with APTs
(b) RCTs on NOAC and antiplatelets in STEMI/NSTEMI/PCI				
Oldgren *et al.*[60]	RE-DEEM, Multi-centre, RCT, double-blind, placebo-controlled, dose-escalation trial with dabigatran	1861 patients (99.2% on dual APT) enrolled at mean 7.5 days after an STEMI (60%) or NSTEMI (40%) Randomized to dabigatran 50 mg ($n = 369$), 75 mg ($n = 368$), 110 mg ($n = 406$), 150 mg ($n = 347$) b.i.d., or placebo ($n = 371$)	Dabigatran, in addition to dual APT associated with a dose-dependent increase in bleeding in patients with recent MI 6-month incidence of primary end-point (composite of major or clinically relevant minor bleeding events) was 3.5, 4.3, 7.9, and 7.8% in the respective 50, 75, 110, and 150 mg b.i.d. dabigatran groups, compared with 2.2% with placebo ($P < 0.001$ for linear trend) Compared with placebo, HR (95% CI) for the primary outcome were 1.77 (0.70–4.50) for 50 mg, HR: 2.17 (0.88–5.31), for 75 mg 3.92 (1.72–8.95) for 110 mg, and 4.27 (1.86–9.81) for 150 mg b.i.d., respectively	Total number of ischaemic CV events was low; minor differences between treatment groups

KUDH

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.

NOACs and antiplatelet agents in AF and/or ACS

Author/year	Study design	Size	Summary of findings	Comment
Mega *et al.*[61]	ATLAS ACS-TIMI 46 RCT, double-blind, dose-escalation, phase II study, with rivaroxaban in patients stabilized after ACS	3491 patients stabilized after STEMI (52%), NSTEMI (30%) or UAP (18%) randomized to placebo or rivaroxaban (at doses 5, 10, 15 or 20 mg) given q.d. or the same total daily dose given b.i.d. according to 2 strata (aspirin alone or with thienopyridine)	Clinically significant bleeding with rivaroxaban vs. placebo increased in a dose-dependent manner, HR (95% CI) ranged from 2.21, (1.25–3.9) for 5 to 5.06 (3.45–7.42) for 20 mg doses; $P < 0{\cdot}0001$ irrespective of q.d. vs. b.i.d. dosing Rates of primary efficacy end-point (death, MI, stroke, or severe recurrent ischaemia requiring revascularization) were 5.6% for rivaroxaban vs. 7.0% for placebo (HR: 0.79, 95% CI: 0.60–1.05, $P = 0.10$) Rivaroxaban reduced the main secondary efficacy end-point of death, MI, or stroke compared with placebo (3.9 vs. 5.5%, HR: 0.69, 95% CI: 0.50–0.96, $P = 0.027$) irrespective of q.d. or b.i.d. dosing or thienopyridine use	
Mega *et al.*[62]	ATLAS ACS 2–TIMI 51 Prospective RCT, double-blind, placebo-controlled trial with rivaroxaban	15 526 ACS patients (50% STEMI, 26% NSTEMI, 24% UAP randomized to 2.5 or 5 mg rivaroxaban b.i.d. or placebo for a mean of 13 months	Rivaroxaban significantly reduced the primary efficacy end-point (a composite of CV death, MI, or stroke) compared with placebo; respective rates of 8.9% and 10.7% (HR: 0.84; 95% CI: 0.74–0.96; $P = 0.008$), with significant improvement for both rivaroxaban 2.5-mg b.i.d. (9.1 vs. 10.7%, $P = 0.02$) and rivaroxaban 5 mg b.i.d. (8.8 vs. 10.7%, $P = 0.03$). Rivaroxaban 2.5 mg b.i.d. reduced CV death rates (2.7 vs. 4.1%, $P = 0.002$) and all-cause mortality (2.9 vs. 4.5%, $P = 0.002$), a survival benefit that was not seen with rivaroxaban 5 mg b.i.d. Compared with placebo, rivaroxaban increased rates of major bleeding not related to CABG (2.1 vs. 0.6%, $P < 0.001$) and ICH (0.6 vs. 0.2%, $P = 0.009$), without a significant increase in fatal bleeding (0.3 vs. 0.2%, $P = 0.66$) or other adverse events Rivaroxaban 2.5 mg b.i.d. resulted in fewer fatal bleeds than the 5 mg b.i.d. dose (0.1 vs. 0.4%, $P = 0.04$)	Lower doses of rivaroxaban were tested when compared with non-valvular AF trials

KUDH

Lip GY et al., Eur Heart J. 2014;35(45):3155-79.

NOACs and antiplatelet agents in AF and/or ACS

Alexander *et al.*[63]	APPRAISE Phase 2, double-blind, placebo-controlled, dose-ranging study with apixaban in recent STEMI and NSTEMI ACS with ≥1 additional risk factor for recurring events (including age ≥65 years, elevated cardiac biomarkers, heart failure, diabetes, or prior MI)	1715 ACS patients (63% STEMI in 63, 30% NSTEMI, and 8% UAP). randomized to 6 months of placebo ($n = 11$) or 1 of 4 doses of apixaban: 2.5 mg b.i.d. ($n = 317$), 10 mg q.d. ($n = 318$), 10 mg b.i.d. ($n = 248$), or 20 mg q.d. ($n = 221$)	Apixaban 10 mg b.i.d. and 20 mg b.i.d. arms discontinued due to excess total bleeding Dose-dependent increase in major or clinically relevant non-major bleeding compared with placebo, HR (95% CI) for apixaban 2.5 b.i.d., 1.78 (0.91–3.48); $P = 0.09$ and for 10 mg q.d. , 2.45 (1.31–4.61); $P = 0.005$) Lower ischaemic event rates with apixaban 2.5 mg b.i.d. 0.73(0.44–1.19; $P = 0.21$) and 10 mg q.d., 0.61 (0.35–1.04; $P < 0.07$) compared with placebo Increase in bleeding more pronounced and reduction in ischaemic events less evident in those taking aspirin plus clopidogrel than those on aspirin alone	Doses of rivaroxaban proved effective in stroke prevention in non-valvular AF caused higher bleeding rates
Alexander *et al.*[64]	APPRAISE-2 RCT, double-blind, placebo-controlled with in recent ACS patients with ≥2 risk factors for recurrent ischaemic events	$n = 7392$ ACS patients (40% STEM, 42% NSTEMI, 18% UAP) within the previous 7 days randomly assigned to apixaban 5 mg b.i.d. or placebo	Terminated prematurely after 74% recruitment due to increased major bleeding events with apixaban, without reduction in recurrent ischaemic events Primary outcome (CV death, MI, or ischaemic stroke) in 7.5% vs. 7.9% with apixaban or placebo, respectively, (HR: 0.95; 95% CI: 0.80–1.11; $P = 0.51$) Primary safety outcome (major bleeding) occurred in 1.3% vs. 0.5% of patients assigned to apixaban or placebo, respectively, (HR: 2.59; 95% CI: 1.50–4.46; $P = 0.001$) More ICH and fatal bleeding with apixaban vs. placebo Increased bleeding risk irrespective of APT regimen or revascularization, and consistent among all other key subgroups	Doses of apixaban proved effective in stroke prevention in non-valvular AF caused higher bleeding rates

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Antithrombotic Therapy in Primary PCI

- In patients with STEMI and AF at low risk of bleeding (HAS-BLED 0–2), the initial use of triple therapy (OAC, aspirin, and clopidogrel) should be considered for 6 months following PCI irrespctive of stent type; this should be followed by long-term therapy (up to 12 months) with OAC and clopidogrel 75 mg/day (or alternatively, aspirin 75–100 mg/day) (Class IIa, level of evidence C).
  - In selected patients with STEMI and a CHA2DS2-VASc score≥2 at low risk of bleeding (HAS-BLED0–2), continuation of triple therapy or dual antiplatelet therapy consisting of OAC (i.e. whether NOAC or a VKA) and clopidogrel 75 mg/day may be considered (Class IIb, level of evidence C) between 6 and 12 months.

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Antithrombotic Therapy in Primary PCI

- In patients with STEMI and AF at high risk of bleeding (HAS-BLED ≥3), the initial use of triple therapy (OAC, aspirin, and clopidogrel) should be considered for 4 weeks following PCI irrespective of stent type; this should be followed by long-term therapy (up to 12 months) with OAC and clopidogrel 75 mg/day (or alternatively, aspirin 75–100 mg/day) (Class IIa, level of evidence C).
  - As an alternative to the initial triple therapy in selected patients at high risk of bleeding (e.g. HAS-BLED ≥3) and low risk of stent thrombosis/recurrent ischaemic events, dual therapy consisting of OAC and clopidogrel 75 mg/ day may be considered (Class IIb, level of evidence B).

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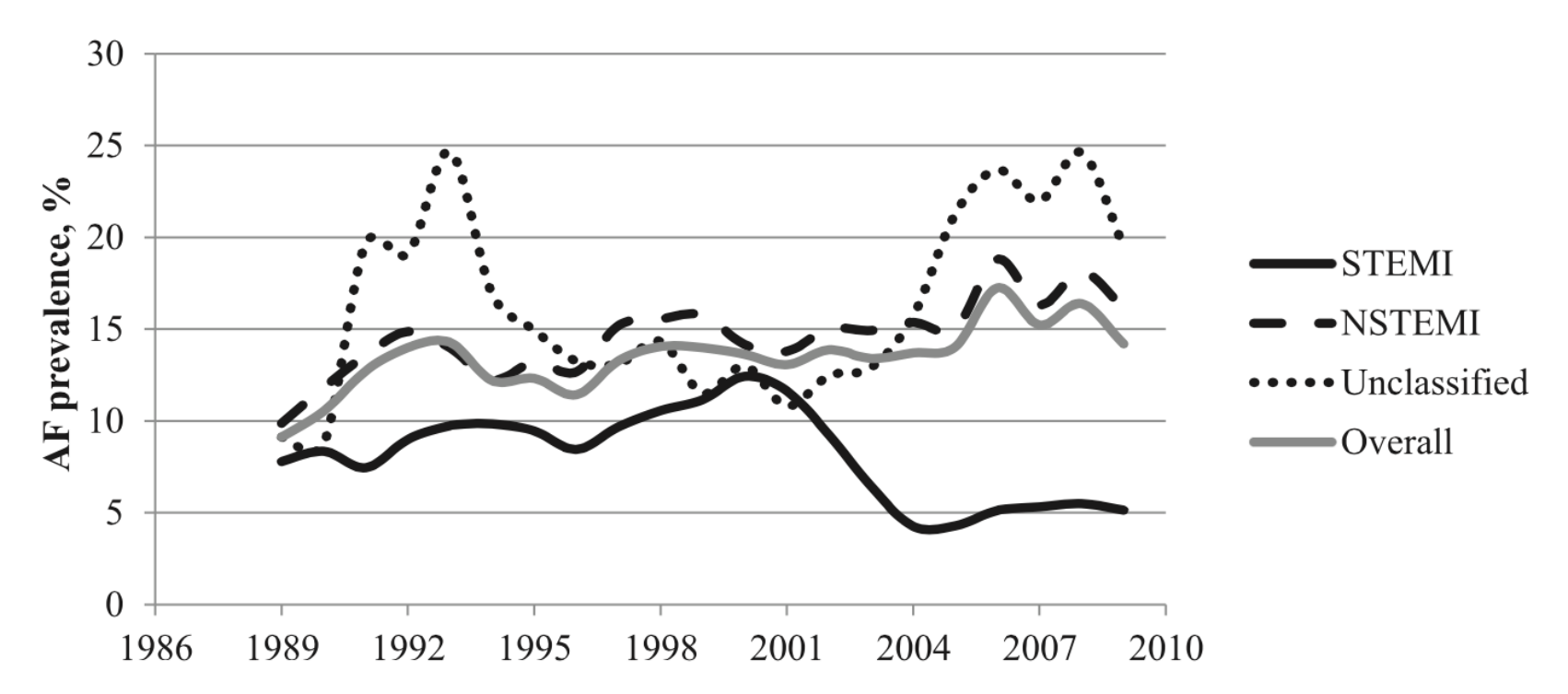
AF prevalence by subtypes of MI



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