Prediction of Risk for Stroke in Patients with Atrial Fibrillation

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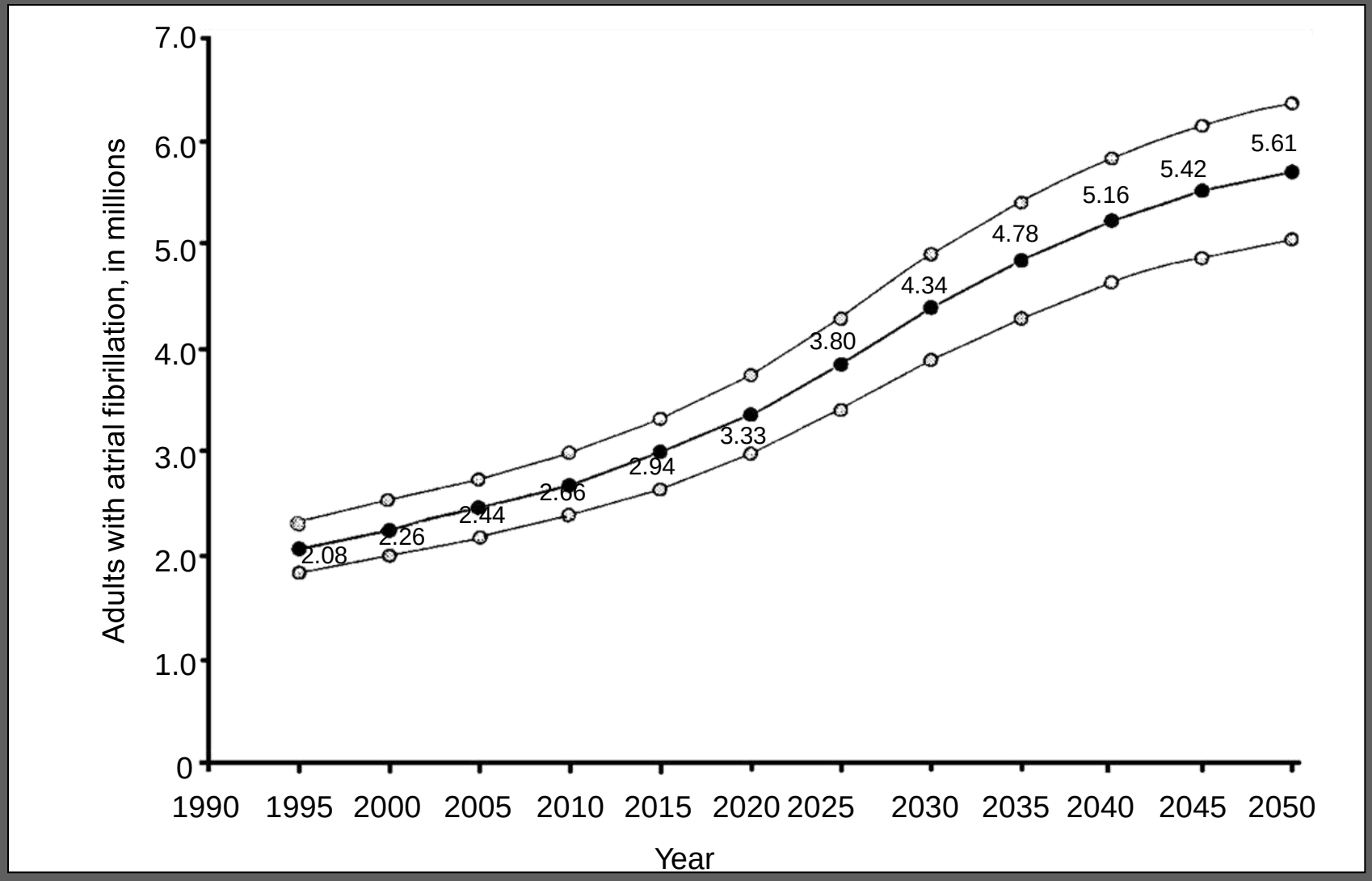
Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

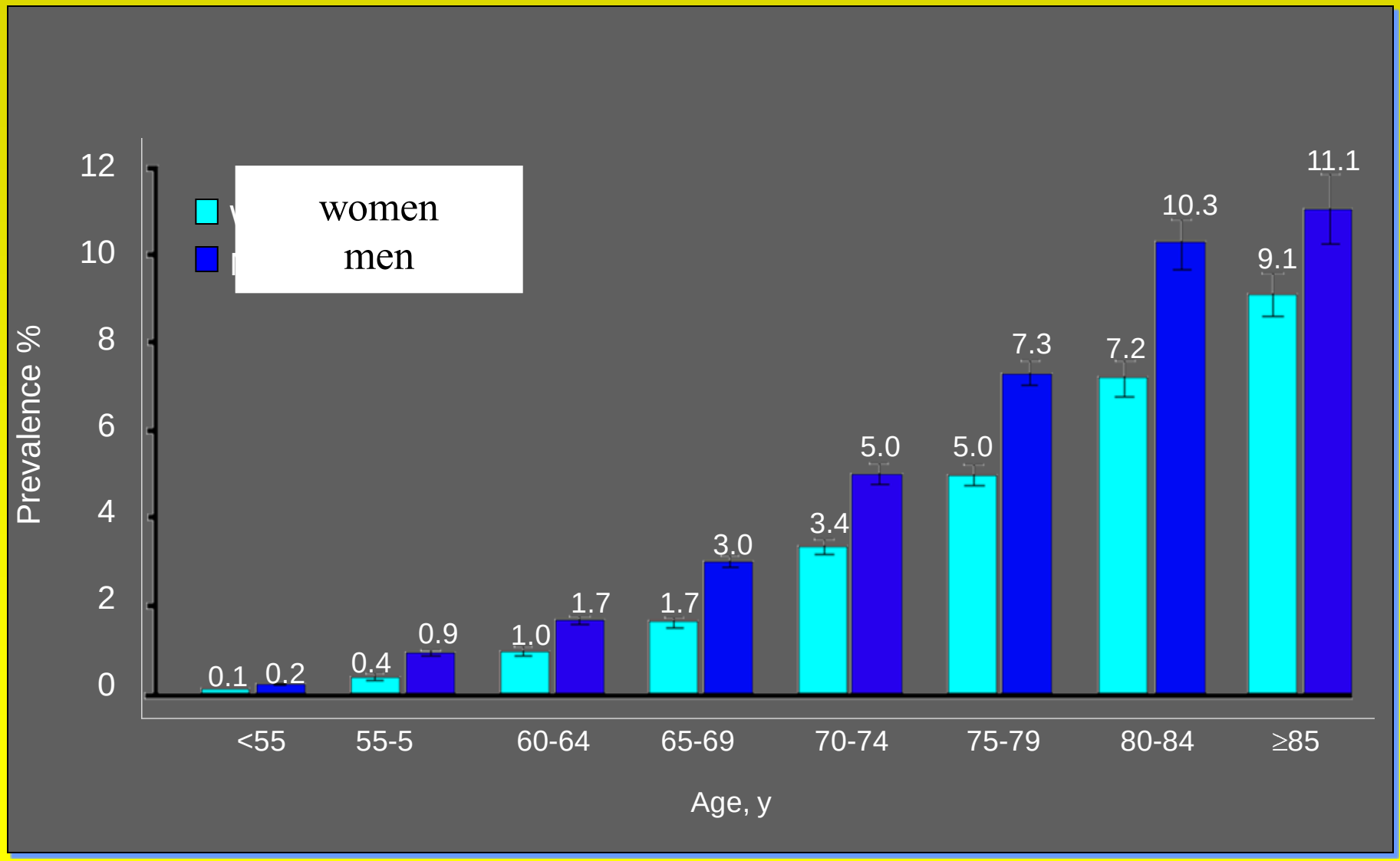
Affiliation/Financial Relationship	Company
• Grant/Research Support	• Biosense/Webster • Medtronic

Prospective Increase of AF



Go et al, JAMA 2001;285:2370

Prevalence of atrial fibrillation



Go et al, JAMA 2001;285:2370

Prevalence of stroke

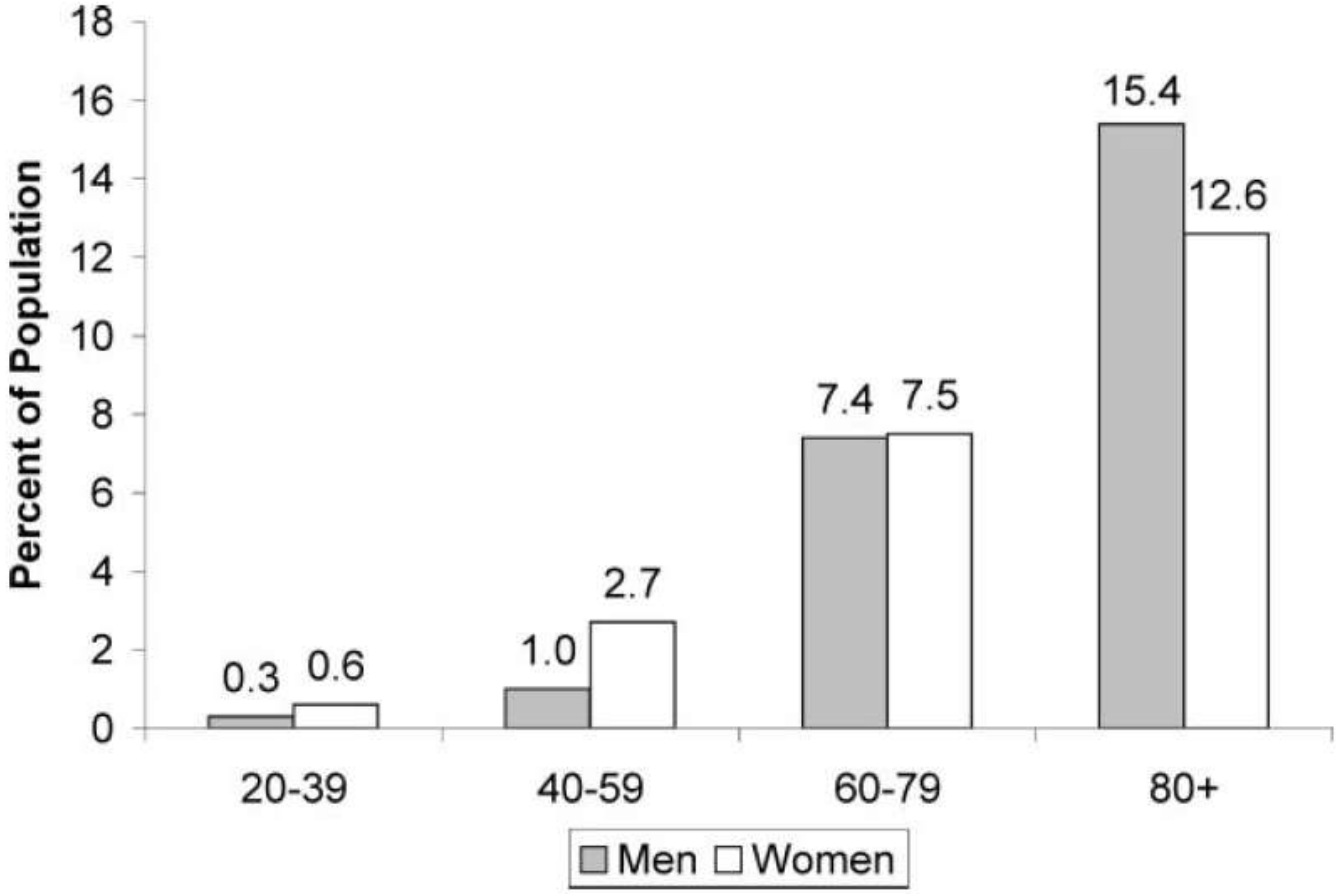
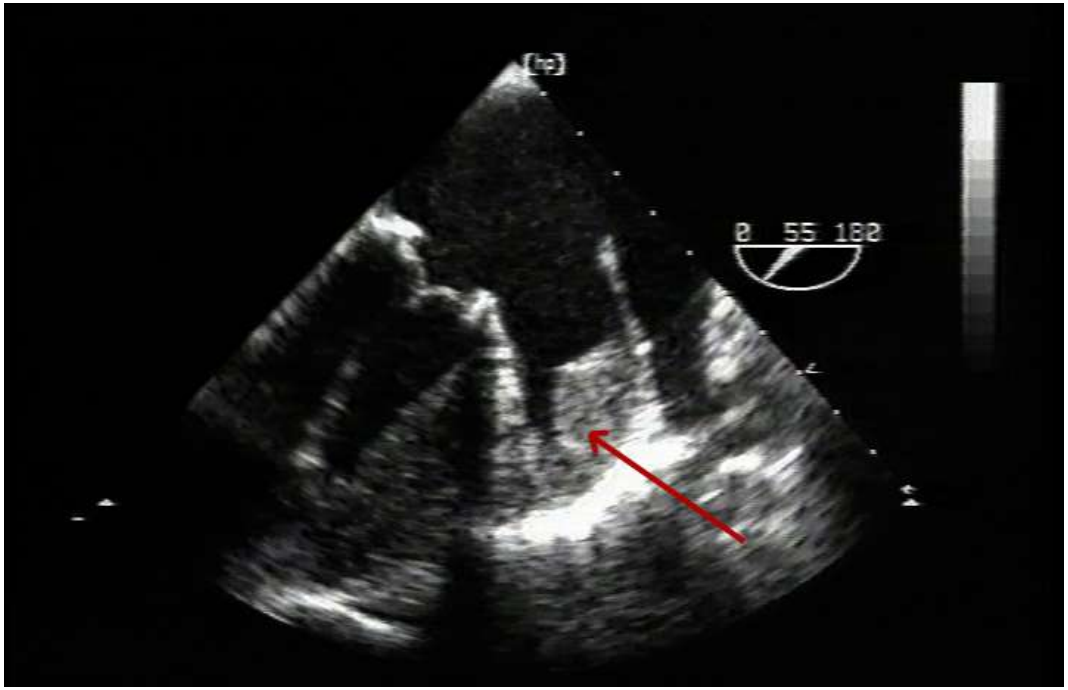


Chart 5-1. Prevalence of stroke by age and sex (NHANES: 2003–2006). Source: NCHS and NHLBI.

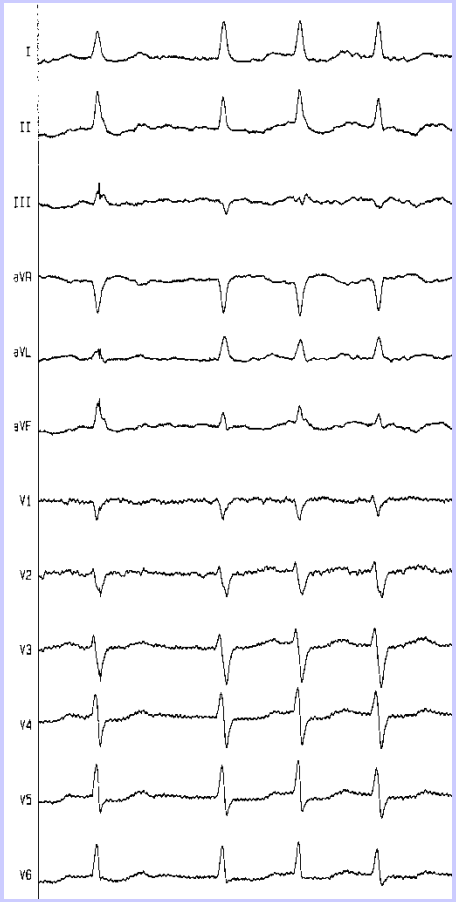
Lloyd-Jones D et al. (*Circulation*. 2010;121:e1-e170.)

Antikoagulation

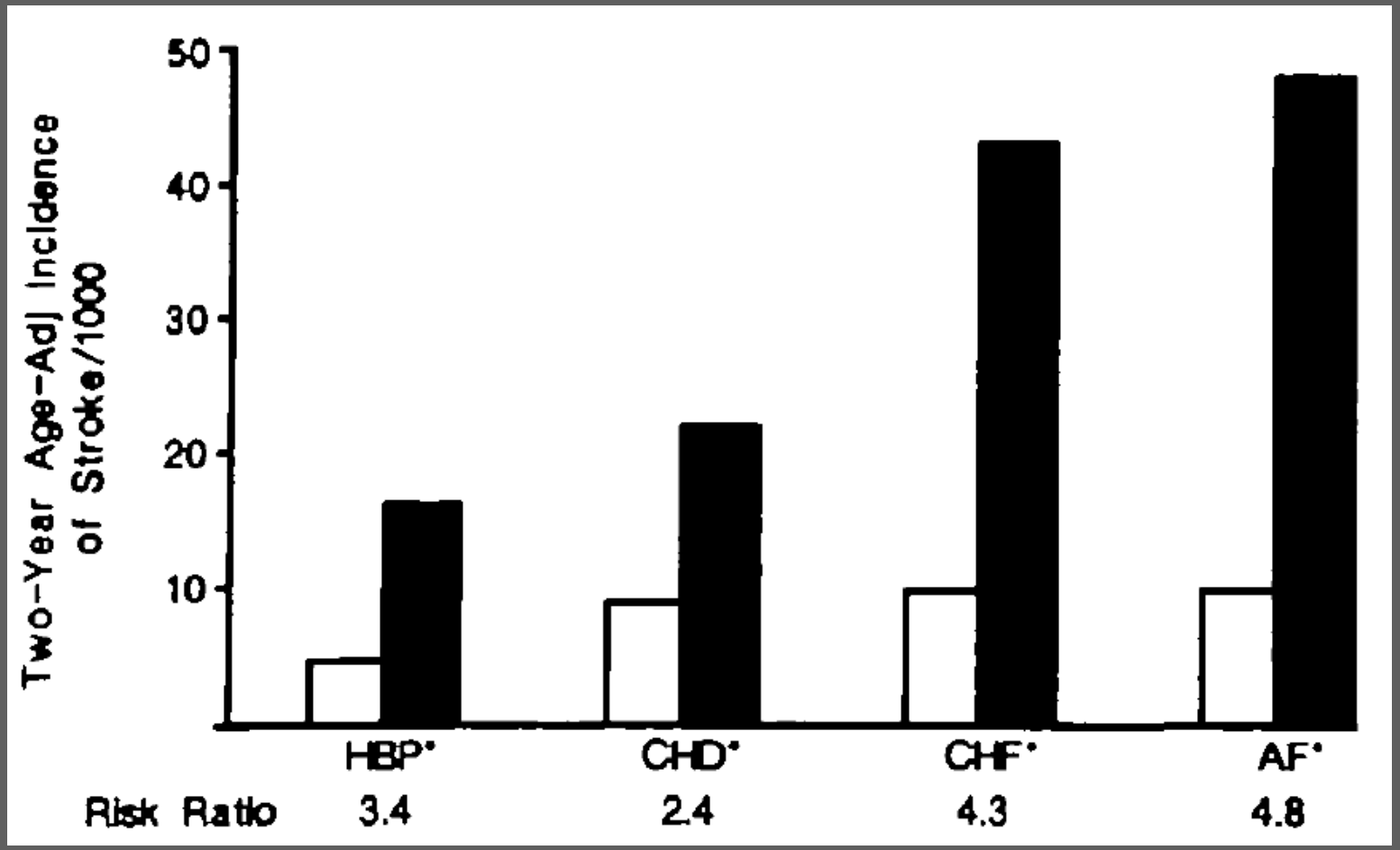
Vorhofflimmern



Kardiogene Embolie

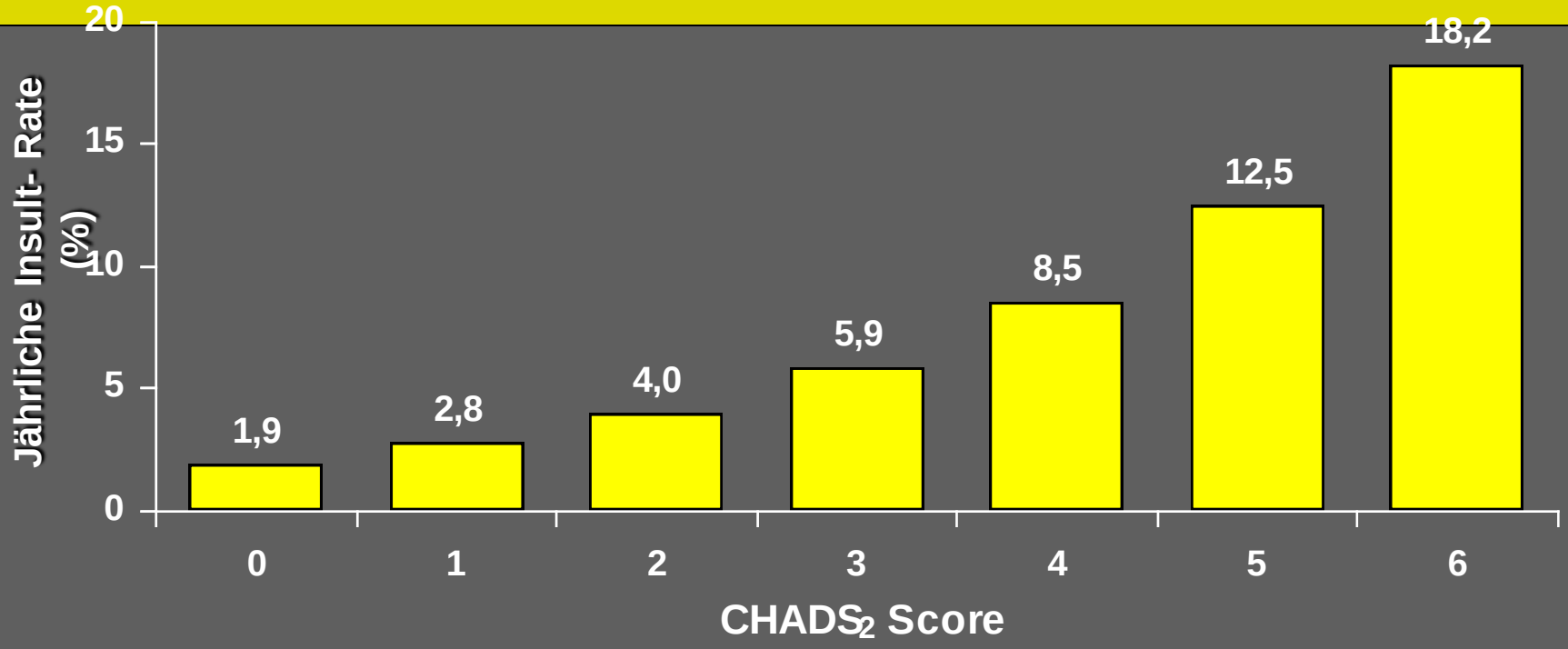


Risk factors for stroke



Wolf PA et al. (*Stroke* 1991;22;983-988)

$CHADS_2$: Risk for stroke in AF per year without anticoagulation



Risiko Faktoren		Punkte
C	Congestive Herzinsuffizienz	1
H	Hypertonus	1
A	Alter ≥75 Jahre	1
D	Diabetes mellitus	1
S_2	Stroke- (=Insult) oder TIA-Anamnese	2

Rockson S & Albers G, JACC 2004;43:929–935

AF guidelines

Guidelines for the management of atrial fibrillation

The Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC)

Developed with the special contribution of the European Heart Rhythm Association (EHRA)†

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Risk factors for stroke in AF

Table 7 $CHADS_2$ score and stroke rate

$CHADS_2$ score	Patients (n = 1733)	Adjusted stroke rate (%/year)[a] (95% confidence interval)
0	120	1.9 (1.2–3.0)
1	463	2.8 (2.0–3.8)
2	523	4.0 (3.1–5.1)
3	337	5.9 (4.6–7.3)
4	220	8.5 (6.3–11.1)
5	65	12.5 (8.2–17.5)
6	5	18.2 (10.5–27.4)

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Echo Risk factors for stroke in AF

The presence of moderate to severe LV systolic dysfunction on two-dimensional transthoracic echocardiography is the only independent echocardiographicrisk factor for stroke onmultivariable analysis.

On TOE, the presence of LA thrombus relative risk (RR) 2.5; P = 0.04], complex aortic plaques (RR 2.1; P ,0.001), spontaneous echo-contrast (RR 3.7; P ,0.001), and low LAA velocities (≤20 cm/s; RR 1.7; P ,0.01) are independent predictors of stroke and thrombo-embolism

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Risk for stroke in AF

Patients with paroxysmal AF should be regarded as having a stroke risk similar to those with persistent or permanent AF, in the presence of risk factors.

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Risk factors for stroke in AF

CHA2DS2-VASc
Congestive heart failure, hypertension, age ≥75 (doubled), diabetes, stroke (doubled), vascular disease, age 65–74, and sex category
This scheme is based on a point system in which 2 points are assigned for a history of stroke or TIA, or age ≥75; and 1 point each is assigned for age 65–74 years, a history of hypertension, diabetes, recent cardiac failure, vascular disease (myocardial infarction, complex aortic plaque, and PAD, including prior revascularization, amputation due to PAD, or angiographicevidence of PAD, etc.), and female sex

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Risk factors for stroke in AF

(a) Risk factors for stroke and thrombo-embolism in non-valvular AF	
'Major' risk factors	**'Clinically relevant non-major' risk factors**
Previous stroke, TIA, or systemic embolism Age ≥75 years	Heart failure or moderate to severe LV systolic dysfunction (e.g. LV EF ≤40%) Hypertension - Diabetes mellitus Female sex - Age 65–74 years Vascular disease[a]
(b) 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)	

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Risk factors for stroke in AF

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**

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Risk factors for stroke in AF

(c) Adjusted stroke rate according to CHA_2DS_2-VASc score		
CHA_2DS_2-VASc score	Patients (n= 7329)	Adjusted stroke rate (%/year)[b]
0	1	0%
1	422	1.3%
2	1230	2.2%
3	1730	3.2%
4	1718	4.0%
5	1159	6.7%
6	679	9.8%
7	294	9.6%
8	82	6.7%
9	14	15.2%

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Thromboprophylaxis in AF

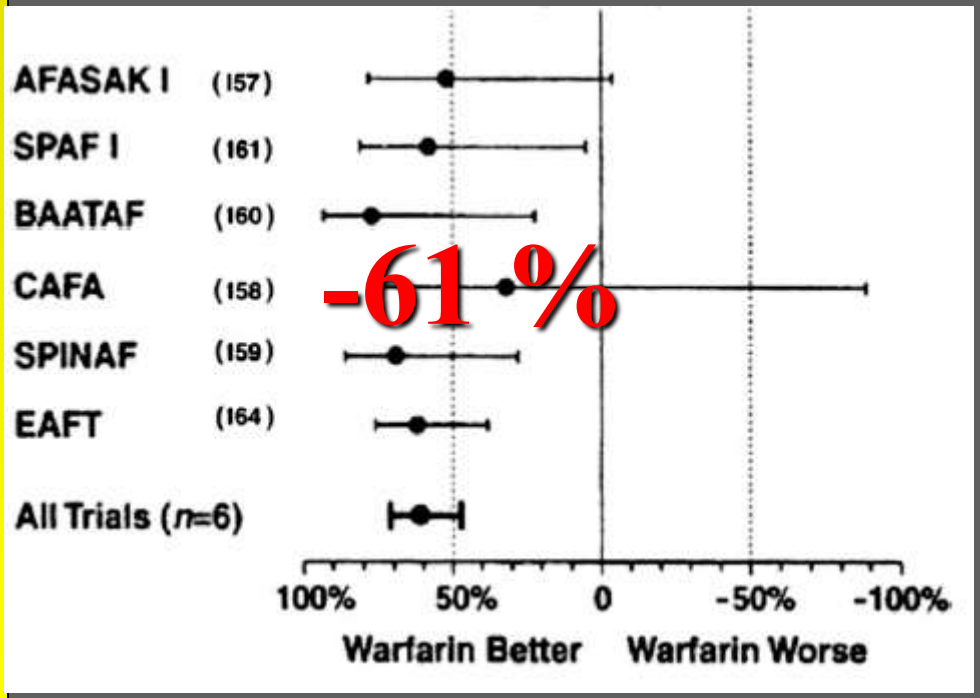
Table 9 Approach to thromboprophylaxis in patients with AF

Risk category	CHA_2DS_2-VASc score	Recommended antithrombotic therapy
One 'major' risk factor or ≥2 'clinically relevant non-major' risk factors	≥ 2	OAC*
One 'clinically relevant non-major' risk factor	1	Either OAC* or aspirin 75–325 mg daily. Preferred: OAC rather than aspirin.
No risk factors	0	Either aspirin 75–325 mg daily or no antithrombotic therapy. Preferred: no antithrombotic therapy rather than aspirin.

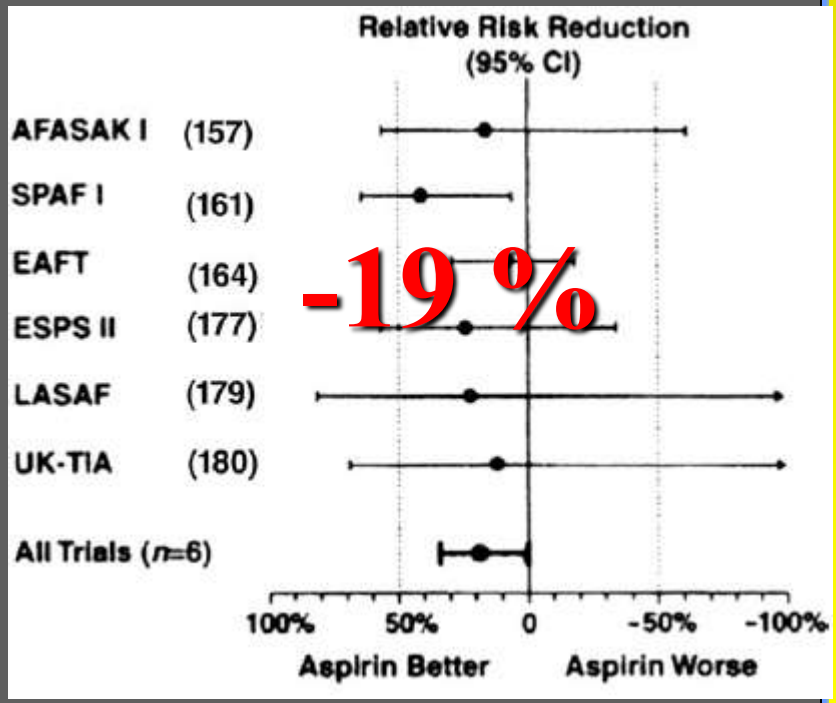
Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Oral anticoagulation in AF

Warfarin versus Placebo

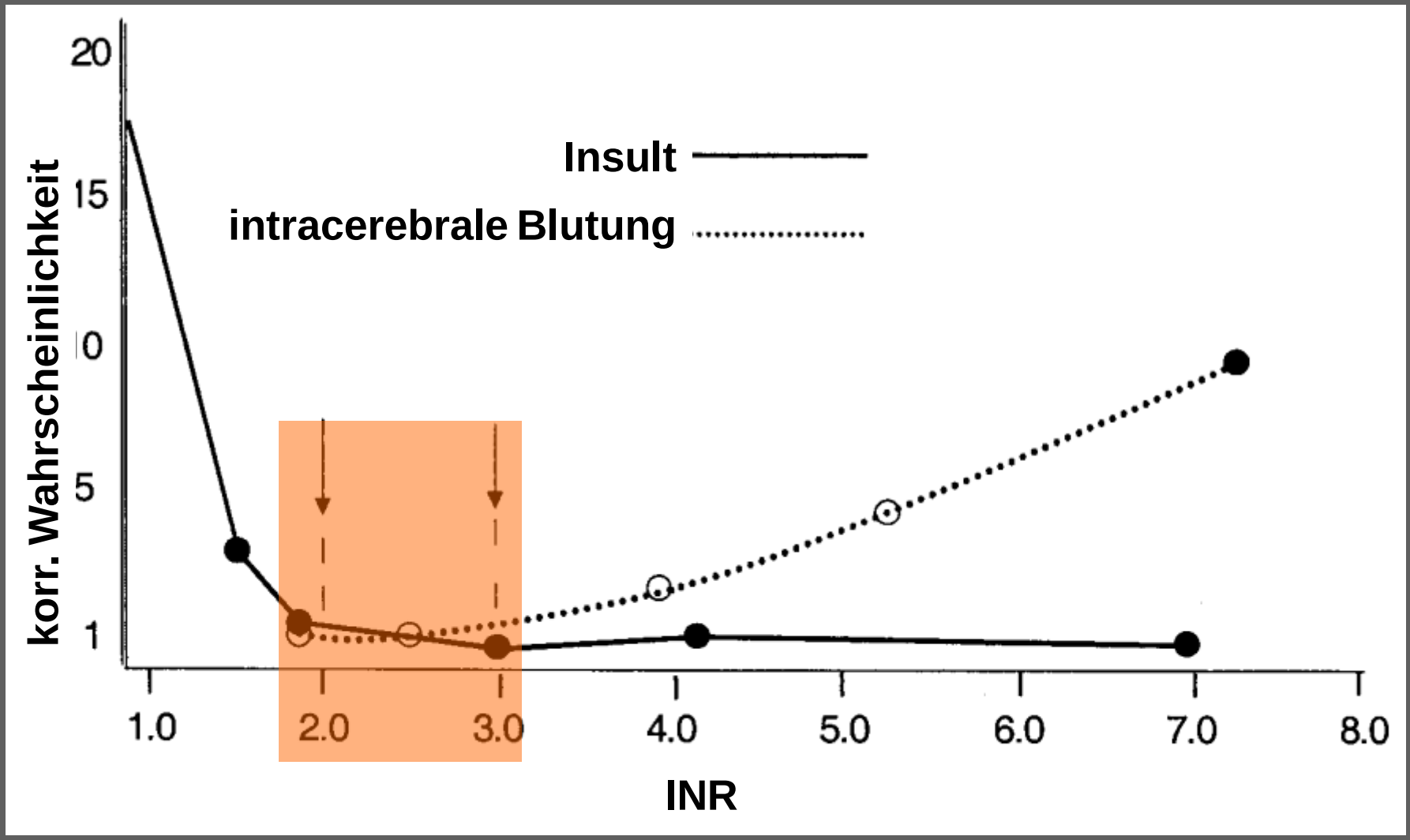


ASS versus Placebo



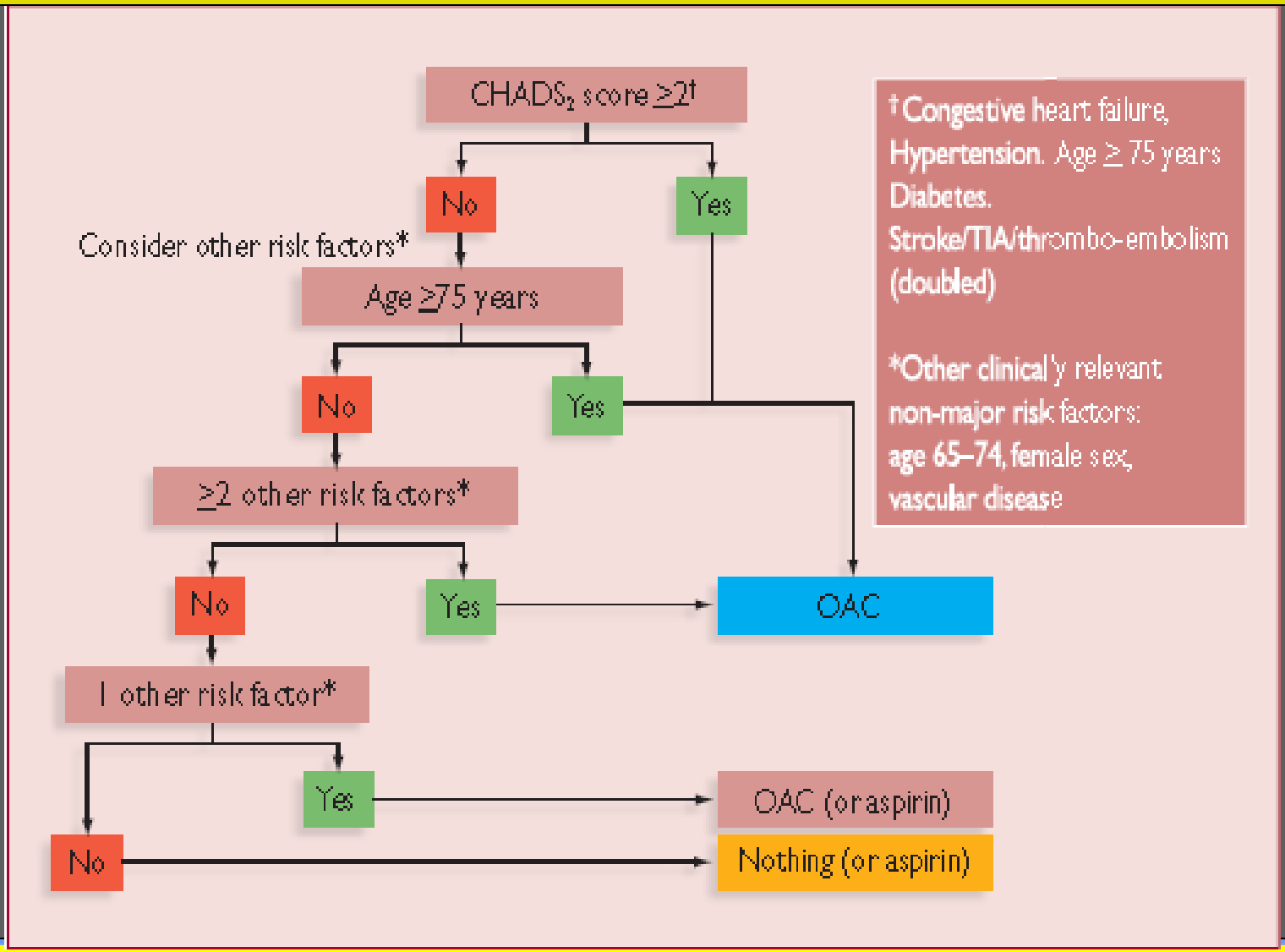
Hart R (*Ann Intern Med.* 1999;131:492-501)

Oral anticoagulation for stroke prevention



Fuster et al, Circ 2001;104:2118–2150

Oral anticoagulation for stroke prevention



Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278

Risk of bleeding

Table 10 Clinical characteristics comprising the HAS-BLED bleeding risk 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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Risk of bleeding

A HAS-BLED score of ≥3 indicates ‘high risk’, and some caution and regular review of the patient is needed following the initiation of antithrombotic therapy, whether with VKA or aspirin

Camm et al, European Heart Journaldoi:10.1093/eurheartj/ehq278