$CHADS_2$ score and stroke rate

$CHADS_2$ score	Patients (n = 1733)	Adjuste stroke rate (%/y)* (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)

*The adjusted stroke rate was derived from the multivariable analysis assuming no aspirin usage; these stroke rates are based on data from a cohort of hospitalised AF patients, published in 2001, with low numbers in those with a **$CHADS_2$ score** of 5 and 6 to allow an accurate judgement of the risk in these patients. Given that stroke rates are declining overall, actual stroke rates in contemporary non-hospitalised cohorts may also vary from these estimates. Adapted from Gage BF et al.

AF = atrial fibrillation; $CHADS_2$ = cardiac failure, hypertension, age, diabetes, stroke (doubled).

European Heart Journal (2010) 31, 2369-2429

Risk factor-based point-based scoring system - CHA_2DS_2-VASc

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

*Prior myocardial infarction, peripheral artery disease, aortic plaque. Actual rates of stroke in contemporary cohorts may vary from these estimates.

European Heart Journal (2010) 31, 2369-2429

'Major' risk factors (previously referred to as 'high' risk factors) are prior stroke or TIA, or thrombo-embolism, and older age (≥75 years). The presence of some types of valvular heart disease (mitral stenosis or prosthetic heart valves) would also categorize such 'valvular' AF patients as 'high risk'.

'Clinically relevant non-major' risk factors (previously referred to as 'moderate' risk factors) are heart failure [especially moderate to severe systolic LV dysfunction, defined arbitrarily as left ventricular ejection fraction (LVEF) ≤40%], hypertension, or diabetes. Other 'clinically relevant non-major' risk factors (previously referred to as 'less validated risk factors') include female sex, age 65–74 years, and vascular disease (specifically, myocardial infarction, complex aortic plaque and PAD). Note that risk factors are cumulative, and the simultaneous presence of two or more 'clinically relevant non-major' risk factors would justify a stroke risk that is high enough to require anticoagulation.

Adjusted stroke rate according to CHA_2DS_2-VASc score

CHA_2DS_2-VASc score	Patients (n = 7329)	Adjusted stroke rate (%/y)
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%

European Heart Journal (2010) 31, 2369-2429

Approach to thromboprophylaxis in 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.

AF = atrial fibrillation; CHA_2DS_2-VASc = cardiac failure, hypertension, age ≥ 75 (doubled), diabetes, stroke (doubled)-vascular disease, age 65–74 and sex category (female); INR = international normalized ratio; OAC = oral anticoagulation, such as a vitamin K antagonist (VKA) adjusted to an intensity range of INR 2.0–3.0 (target 2.5).

European Heart Journal (2010) 31, 2369-2429

The HAS-BLED bleeding risk score

Letter	Clinical characteristic*	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

*Hypertension is defined as systolic blood pressure > 160 mmHg.

INR = international normalized ratio.

European Heart Journal (2010) 31, 2369-2429

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

[a]'Hypertension' is defined as systolic blood pressure > 160 mmHg. 'Abnormal kidney function' is defined as the presence of chronic dialysis or renal transplantation or serum creatinine ≥200 μmol/L. 'Abnormal liver function' is defined as chronic hepatic disease (e.g. cirrhosis) or biochemical evidence of significant hepatic derangement (e.g. bilirubin > 2 x upper limit of normal, in association with aspartate aminotransferase/alanine aminotransferase/alkaline phosphatase >3 x upper limit normal, etc.). 'Bleeding' refers to previous bleeding history and/or predisposition to bleeding, e.g. bleeding diathesis, anaemia, etc. 'Labile INRs' refers to unstable/high INRs or poor time in therapeutic range (e.g. <60%). Drugs/alcohol use refers to concomitant use of drugs, such as antiplatelet agents, non-steroidal anti-inflammatory drugs, or alcohol abuse, etc.
INR = international normalized ratio. Adapted from Pisters *et al.*[60]

Prevention of thromboembolism in AF

Recommendations	Class[a]	Level[b]
Antithrombotic therapy to prevent thromboembolism is recommended for all patients with AF, except in those at low risk (lone AF, aged < 65 years or with contraindications).	I	A
It is recommended that the selection of the antithrombotic therapy should be based upon the absolute risks of stroke/thromboembolism and bleeding and the relative risk and benefit for a given patient.	I	A
The $CHADS_2$ (Cardiac failure, Hypertension, Age, Diabetes, Stroke [Doubled]) score is recommended as a simple initial (easily remembered) means of assessing stroke risk in non-valvular AF.	I	A
For the patients with a $CHADS_2$ score of ≥ 2, chronic OAC therapy with a VKA is recommended in a dose-adjusted regimen to achieve an INR range of 2.0-3.0 (target 2.5), unless contraindicated.	I	A
For a more detailed or comprehensive stroke risk assessment in AF (e.g. with $CHADS_2$ score 0-1), a risk factor-based approach is recommended, considering 'major' and 'clinical relevant non-major' stroke risk factors.	I	A
Patients with 1 'major' or ≥ 2 'clinically relevant non-major' risk factors are high risk and OAC therapy [for example, with a VKA, dose adjusted to achieve the target intensity INR of 2.0-3.0] is recommended, unless contraindicated	I	A
Patient with one 'clinically relevant non-major' risk factor are at intermediate risk and antithrombotic therapy is recommended, either as:	I	A B
i. OAC therapy (e;g; VKA), or	I	A
ii. aspirin 75-325 mg daily	I	B
Patients with no risk factors are at low risk (essentially patients aged < 65 years with lone AF, with none of the risk factors) and the use of either aspirin 75-325 mg daily or no antithrombotic therapy is recommended.	I	B
For patients with AF who have mechanical heart valves, it is recommended that the target intensity of anticoagulation with a VKA should be based on the type and position of the prosthesis, maintaining an INR of at least 2.5 in the mitral position and at least 2.0 for an aortic valve.	I	B
Antithrombotic therapy is recommended for patients with atrial flutter as for those with AF.	I	C

[a]Class of recommendation. [b]Level of evidence. AF = atrial fibrillation; CHADS2 = cardiac failure, hypertension, age, diabetes, stroke (doubled); INR = international normalized ratio; LMWH = low molecular weight heparin; OAC = oral anticoagulant; TIA = transient ischaemic attack; VKA = vitamin K antagonist.

Prevention of thromboembolism in AF

Recommendations	Class[a]	Level[b]
The selection of antithrombotic therapy should be considered using the same criteria irrespective of the pattern of AF (i.e. paroxysmal, persistent, or permanent).	IIa	A
Most patients with one 'clinically relevant non-major' risk factor should be considered for OAC therapy (e.g. with a VKA) rather than aspirin, based upon an assessment of the risk of bleeding complications, the ability to safely sustain adjusted chronic anticoagulation, and patient preferences.	IIa	A
In patients with no risk factors who are at low risk (essentially patients aged < 65 years with lone AF, with none of the risk factors), no antithrombotic therapy should be considered, rather than aspirin.	IIa	B
Combination therapy with aspirin 75-100 mg plus clopidogrel 75 mg daily, should be considered for stroke prevention in patients for whom there is patient refusal to take OAC therapy or a clear contraindication to OAC therapy (e.g. inability to cope or continue with anticoagulation monitoring), where there is a low risk of bleeding.	IIa	B
Assessment of the risk of bleeding should be considered when prescribing antithrombotic therapy (whether with VKA or aspirin), and the bleeding risk with aspirin should be considered as being similar to VKA, especially in the elderly.	IIa	A
The HAS-BLED score (Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile INR, Elderly (>65), Drugs/alcohol concomitantly) should be considered as a calculation to assess bleeding risk whereby a score of ≥ 3 indicates 'high risk' and some caution and regular review is needed, following the initiation of antithrombotic therapy, whether with OAC or aspirin.	IIa	B
In patients with AF who do not have mechanical prosthetic heart valves or those who are not at high risk for thromboembolism who are undergoing surgical or diagnostic procedures that carry a risk of bleeding, the interruption of OAC (with subtherapeutic anticoagulation for up to 48 h) should be considered, without substituting heparin as 'bridging' anticoagulation therapy.	IIa	C
In patients with a mechanical prosthetic heart valve or AF at high risk for thromboembolism who are undergoing surgical or diagnostic procedures, 'bridging' anticoagulation with therapeutic doses of either low molecular weight heparin (LMWH) or unfractionated heaparin during the temporary interruption of OAC therapy should be considered.	IIa	C

[a]Class of recommendation. [b]Level of evidence. AF = atrial fibrillation; CHADS2 = cardiac failure, hypertension, age, diabetes, stroke (doubled); INR = international normalized ratio; LMWH = low molecular weight heparin; OAC = oral anticoagulant; TIA = transient ischaemic attack; VKA = vitamin K antagonist.

Prevention of thromboembolism in AF

Recommendations	Class[a]	Level[b]
Following surgical procedures, resumption of OAC therapy should be considered at the 'usual' maintenance dose (without a loading dose) on the evening of (or the next morning after) surgery, assuming there is adequate haemostasis.	IIa	B
Re-evaluation at regular intervals of the benefits, risks and need for antithrombotic therapy should be considered.	IIa	C
In patients with AF presenting whith acute stroke or TIA, management of uncontrolled hypertension should be considered before antithrombotic treatment is started, and cerebral imaging (computed tomography or magnetic resonance imaging) performed to exclude haemorrhage.	IIa	C
In the absence of haemorrhage, OAC should be considered approximately 2 weeks after stroke, but in the presence of haemorrhage, anticoagulation should not be given.	IIa	C
In the presence of a large cerebral infarction, delaying the initiation of anticoagulation should be considered, given the risk of haemorrhagic transformation.	IIa	C
In patients with AF and an acute TIA, OAC therapy should be considered as soon as possible in the absence of cerebral infarction or haemorrhage.	IIa	C
In some patients with one 'clinically relevant non-major' risk factor, for example, female patients aged <65 years with no other risk factors, aspirin may be considered rather than OAC therapy.	IIb	C
When surgical procedures require interruption of OAC therapy for longer than 48 h in high-risk patients, unfractionated heparin or subcutaneous LMWH may be considered	IIb	C
In patients with AF who sustain ischaemic stroke or systemic embolism during treatment with usual intensity anticoagulation with VKA (INR 2.0-3.0), raising the intensity of the anticoagulation to a maximum target INR of 3.0-3.5 may be considered, rather than adding an antiplatelet agent.	IIb	C

[a]Class of recommendation. [b]Level of evidence. AF = atrial fibrillation; CHADS2 = cardiac failure, hypertension, age, diabetes, stroke (doubled); INR = international normalized ratio; LMWH = low molecular weight heparin; OAC = oral anticoagulant; TIA = transient ischaemic attack; VKA = vitamin K antagonist.

www.escardio.org/guidelines

European Heart Journal (2010) 31, 2369-2429

EUROPEAN SOCIETY OF CARDIOLOGY®