The \( \text{CHA}_2\text{DS}_2\text{-VASc} \) score

<table>
<thead>
<tr>
<th>Risk factors for stroke and thromboembolism in non-valvular AF</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Major’ risk factors</td>
<td></td>
</tr>
<tr>
<td>Previous stroke, TIA or systemic embolism</td>
<td></td>
</tr>
<tr>
<td>Age ( \geq 75 ) years</td>
<td></td>
</tr>
<tr>
<td>‘Clinically relevant non-major’ risk factors</td>
<td></td>
</tr>
<tr>
<td>Heart failure or moderate to severe LV systolic dysfunction [e.g. LV EF ( \leq 40% )]</td>
<td></td>
</tr>
<tr>
<td>Hypertension - Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>Female sex - Age 65-74 years</td>
<td></td>
</tr>
<tr>
<td>Vascular disease*</td>
<td></td>
</tr>
</tbody>
</table>

**Stroke risk factors**

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive heart failure/LV dysfunction</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Aged ( \geq 75 ) years</td>
<td>2</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>Stroke/TIA/TE</td>
<td>2</td>
</tr>
<tr>
<td>Vascular disease [prior MI, PAD, or aortic plaque]</td>
<td>1</td>
</tr>
<tr>
<td>Aged 65–74 years</td>
<td>1</td>
</tr>
<tr>
<td>Sex category [i.e. female gender]</td>
<td>1</td>
</tr>
</tbody>
</table>

Lip et al Chest. 2010; 137:263-72
Camm, Kirchhof, Lip et al
Eur Heart J 2010; 31, 2369–2429
**CHA\textsubscript{2}DS\textsubscript{2}-VASc Scores of Patients With AF ±Ischemic Stroke: Baseline, Follow-Up, Delta**

Incident Co-Morbidities in AF Patients Initially with a CHA₂DS₂-VASc Score of 0 (Males) or 1 (Females): Implications for Reassessment of Stroke Risk in Initially ‘Low-Risk’ Patients

Chao .. Lip et al
Thromb Haemostat 2019

Among 6,188 patients who newly acquired heart failure, hypertension, diabetes mellitus or vascular diseases, 80% would acquire these co-morbidities after 4.2 months of AF diagnosis, and the duration from the acquirement of incident co-morbidities to the occurrence of ischaemic stroke was longer than 4.4 months for 90% of patients.

Three to four months may be a reasonable timing interval at which stroke risk should be reassessed so that OACs could be prescribed timely.
Patients who were categorized as low risk consistently had an event rate <1% per year.
Risk stratification and thromboprophylaxis made easy

Lip and Lane Circ J 2014 June; Griffiths and Lip Circulation 2014;130(21):1837-9

Patient with atrial fibrillation

STEP 1  Is the patient 'low risk'?
'Low risk' = CHA_2DS_2-VASc score = 0 (male) or 1 (female)

If yes ...
No antithrombotic therapy

STEP 2  Offer stroke prevention if ≥1 additional stroke risk factors*

- CHA_2DS_2-VASc best to identify 'low risk'
- Even 1 CHA_2DS_2-VASc factor confers risk of stroke and death
- The NCB is +ve for OAC even with 1 stroke risk factor

NOAC

VKA (eg. warfarin)
with Time in Therapeutic Range (TTR) >70%

VKA, Vitamin K Antagonist
NOAC, non-Vitamin K antagonist oral anticoagulant

* Use the HAS-BLED score to identify patients at ‘high risk’ of bleeding for more careful review and followup, and to address reversible risk factors for bleeding. A high HAS-BLED score (≥3) does not preclude use of OAC, and may help with NOAC dose selection.
The initiation rates of OACs in newly diagnosed AF patients significantly increased from 13.6% to 35.6%, contemporaneous with the introduction of NOACs.

A lower risk of ischemic stroke and mortality was temporally associated with the increasing prescription rates of OACs.
Risks of ischemic stroke and ICH were compared between 11,064 AF and 14,658 non-AF patients aged ≥90 years without antithrombotic therapy from year 1996 to 2011.
We need a holistic approach to improving management of patients with AF

Cardiovascular risk factors & associated comorbidities

Symptoms? Rate control or rhythm control?

Stroke prevention

The patient pathway … integrated care for managing atrial fibrillation in a holistic manner

Real world management requires simple and practical decision making processes
The Atrial fibrillation Better Care (ABC) pathway for integrated management provides a simple strategy that streamlines primary and secondary care of patients with AF.
Primary Care Clinical Pathway for Atrial Fibrillation Detection & Management

**Symptomatic Presentation**
ce.g. palpitations

- Patient is unwell or haemodynamically unstable

**Opportunistic Detection**
e.g. flu, HTN, diabetes clinic

- Clinical Suspicion of AF
  Confirmation of AF usually requires demonstration on either a 12 lead ECG or presence for >30 seconds on ECG monitoring. Mobile device suggestion of AF should be confirmed on a 12 lead ECG

- Confirmed Diagnosis of AF
  Consider an echocardiogram if there is suspicion of LVSD, valve disease or a new murmur is identified on auscultation

- **Targeted/Systematic Detection**
e.g. GRASP-AF, case finding

**Assess thromboembolic risk using CHA2DS2-VASc**

- Risk Factors
  - Congestive heart failure
  - Hypertension
  - Age ≥ 75
  - Diabetes
  - Prior stroke
  - Age 65-74
  - Non-valvular atrial fibrillation
  - Male
  - Co-morbidities: PAD, MI, complex aortic plaque disease

- Score
  - 0 in males or 1 in females = No antithrombotic therapy
  - 1 = Consider OAC (men only)
  - ≥ 2 = Offer OAC

**Organise investigations**
e.g. FBC, TTFs, U&Es, LFTs

**Assess bleeding risk using HAS-BLED**

- Risk Factors
  - Hypertension
  - Abnormal renal and/or liver function
  - Stroke
  - bleeding history (≥ 1 in males, ≥ 2 in females)
  - ? History of alcohol (> 8 drinks/week)
  - Drug use: anticoagulants, antiplatelet drugs (NSAIDs/antiplatelet)

- Score
  - 0 - 2 = likely to do well on a VKA with good TTR
  - ≥ 3 are high risk and should be ‘flagged up’ for early review/ follow up

- **Determine OAC strategy using SAMe-TT2R2**

- O2 = 2 - 3 are high risk and should be ‘flagged up’ for early review/ follow up

- Do not withhold OAC
- Address modifiable risk factors to reduce bleeding risk at every point of contact
- ≥ 3 are high risk and should be ‘flagged up’ for early review/ follow up

**Best symptom management (B’)**

- Initiate rate control e.g. with a beta-blocker (aim for a target resting heart rate that renders the patient asymptomatic). If the patient remains symptomatic despite optimal rate control refer to secondary care for consideration of a rhythm control strategy

**Optimise management of comorbidities and reinforce lifestyle advice i.e. Cardiovascular and other risk factor management (C’)**
(e.g. manage HTN, diabetes, cardiovascular disease, weight loss, sleep apnoea, etc)

- Undertake a regular/annual review
  - Review quality of OAC (For VKA, assess TTR and aim for TTR > 65%. For NOACs, assess renal function). Assess adherence, symptom control, general health and well-being. Ensure NOACs are prescribed in line with licensed indications and as per manufacturers recommendations regarding age, weight, renal function and drug interactions. Ensure patient &/or carer involvement in decision making regarding treatment options.

- Specialist Cardiology Input/Secondary Care if:
  - Haemodynamic instability, breathlessness at rest, syncope, dizziness, chest pain, stroke, TIA, resting heart rate > 150bpm
  - Recent onset AF (<48hours) for consideration of electrical cardioversion
  - Still symptomatic, despite optimal rate control

---

**Detect, Protect, Perfect elements:**
- **Detect** more cases of AF,
- **Protect** with Anticoagulation and modification of other CV risk factors
- **Perfect** the quality of therapy by ensuring that patients are monitored and followed up appropriately

**CHA2DS2-VASc**

**HAS-BLED**

**SAMe-TT2R2**

**The ABC of Atrial Fibrillation management**

Mobile Health Technology for Atrial Fibrillation Management Integrating Decision Support, Education, and Patient Involvement: mAFA App Trial

Yutao Guo, MD, PhD, Yundai Chen, MD, PhD, Deirdre A. Lane, PhD, Lihong Liu, MD, Yutang Wang, MD, PhD, Gregory Y. H. Lip, MD

Chinese PLA General Hospital, Beijing, China; Institute of Cardiovascular Sciences, University of Birmingham, Birmingham, United Kingdom; Aalborg Thrombosis Research Unit, Department of Clinical Medicine, Aalborg University, Aalborg, Denmark; Meishan City People’s Hospital, Chengdu, China.


‘The pilot mAFA Trial is the first prospective randomized trial of Mobile Health technology in patients with atrial fibrillation, demonstrating that the mAFA App, integrating clinical decision support, education, and patient-involvement strategies...

... significantly improved knowledge, drug adherence, quality of life, and anticoagulation satisfaction.’
## Improved Outcomes by Integrated Care of Anticoagulated Patients with Atrial Fibrillation using the simple ABC (Atrial Fibrillation Better Care) Pathway

*Proietti ... Lip Am J Med 2018
https://doi.org/10.1016/j.amjmed.2018.06.012*

<table>
<thead>
<tr>
<th>Integrated Care (ABC) vs. Non-ABC Care*</th>
<th>HR (95% CI)§</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Cause Death</td>
<td>0.35 (0.17-0.75)</td>
<td>0.006</td>
</tr>
<tr>
<td>Composite Outcome</td>
<td>0.35 (0.18-0.68)</td>
<td>0.002</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.90 (0.39-2.06)</td>
<td>0.804</td>
</tr>
<tr>
<td>Major Bleeding</td>
<td>0.26 (0.08-0.81)</td>
<td>0.021</td>
</tr>
<tr>
<td>CV Death</td>
<td>0.17 (0.04-0.70)</td>
<td>0.014</td>
</tr>
<tr>
<td>First Hospitalization</td>
<td>0.65 (0.53-0.80)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>First CV Hospitalization</td>
<td>0.57 (0.43-0.77)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OR (95% CI)#</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Hospitalizations</td>
<td>0.38 (0.26-0.56)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Std. Beta†</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hospitalizations</td>
<td>-0.098</td>
</tr>
<tr>
<td>First Hospitalization Days</td>
<td>-0.034</td>
</tr>
<tr>
<td>Total Hospitalization Days</td>
<td>-0.061</td>
</tr>
</tbody>
</table>

*Adjusted for age, gender, diabetes mellitus, hepatic/renal disease, pulmonary disease, first AF episode, use of aspirin; §Cox regression model; #Logistic regression model; †Linear regression model; CI= confidence interval; CV= cardiovascular; HR= hazard ratio; OR= odds ratio.
Improved Outcomes by Integrated Care of Anticoagulated Patients with Atrial Fibrillation using the simple ABC (Atrial Fibrillation Better Care) Pathway Proietti .. Lip Am J Med 2018 https://doi.org/10.1016/j.amjmed.2018.06.012

Kaplan-Meier curves for All Cause Death and the Composite outcome according amount of ABC criteria fulfilled

Log-Rank: 43.485, p<0.001

Log-Rank: 52.907, p<0.001
Integrated care management of patients with AF and risk of CV events: The ABC (Atrial fibrillation Better Care) pathway in the ATERO-AF study cohort.


Prospective single-center cohort study including 907 consecutive patients with non-valvular AF on VKAs from February 2008 to December 2016. Median followup 37 months

A, B and C groups were defined as follows:
- “A” by a Time in Therapeutic Range $\geq$65%; “B” by a European Heart Rhythm Association (EHRA) symptom scale I-II; “C” as optimized cardiovascular comorbidity management.
- Primary endpoint was a composite outcome of CVEs.

<table>
<thead>
<tr>
<th>Multivariate model</th>
<th>HR for MACE</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘ABC’ pathway management</td>
<td>0.44</td>
<td>0.24</td>
<td>0.80</td>
</tr>
<tr>
<td>Female sex</td>
<td>0.62</td>
<td>0.42</td>
<td>0.91</td>
</tr>
<tr>
<td>Paroxysmal AF</td>
<td>0.91</td>
<td>0.63</td>
<td>1.31</td>
</tr>
<tr>
<td>Age $\geq$75 years</td>
<td>2.17</td>
<td>1.49</td>
<td>3.15</td>
</tr>
</tbody>
</table>
Integrated care management of patients with AF and risk of CV events: The ABC pathway in the Athero-AF study

Pastori .. Lip. Mayo Clin Proc 2018
DOI: 10.1016/j.mayocp.2018.10.022
Atrial fibrillation management: Easy as ABC...

Atrial fibrillation confers a major healthcare and economic burden.
Stroke and bleeding risk is dynamic, not static.

The default is stroke prevention (ie OAC) unless the patient is ‘low risk’ – so ‘Avoid Stroke’ (A)
We then manage
  • Symptoms ie. “Better symptom control’ (B)
  • Cardiovascular and comorbidity risk factor management (C)

An integrated care approach was associated with a significantly lower risk of clinically relevant outcomes (including mortality, stroke/major bleeding/CV death and hospitalization), as well as lower risks of hospitalization and CV hospitalization.

Use of a simple ABC pathway allows holistic and integrated management of AF patients.