ATRIAL FIBRILLATION IN HEART FAILURE - TREATMENT OPTIONS AND ANTICOAGULATION

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Special Article

SHATTUCK LECTURE — CARDIOVASCULAR MEDICINE AT THE TURN OF THE MILLENNIUM: TRIUMPHS, CONCERNS, AND OPPORTUNITIES

Ezriel Braunwald, M.D.

“Two epidemics of cardiovascular disease are emerging: heart failure and atrial fibrillation”

AF and HF: two interconnected epidemics

- Common predisposing factors
- Co-exist and promote each other
- Prevalence of AF ~ 30% in HF (5% in NYHA I to 50% in NYHA IV)
- Prognostic value of AF in HF (both HFREF and HFP EF)

![Diagram](image1)

*GF et al. Europe 2016;18:12-36
Verma et al. Circulation 2017;135:1547-1563
Modified from Verma et al.*

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Co-existence of Afib and HF

The vicious circle of the chicken and the egg

- Neurohormonal remodelling
- Atrial enlargement
- Atrial hypertrophy
- Atrial stretch
- Atrial fibrosis
- Electrical remodelling

HF as the "chicken"

Structural heart disease
(HTN, VHD, age, diabetes, ...)

Afib as the "chicken"

- Loss of atrial function
- Non-physiologic ventricular rate
- Increased ventricular response
- Loss of AV synchrony

*Lessons from experimental studies, HF and AF therapy*
Clinical Characteristics and Management of Hospitalized and Ambulatory Patients with Heart Failure-Results from ESC Heart Failure Long-Term Registry- Egyptian cohort

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ESC Heart Failure 2015; 2: 159-167
Prevention of AF in patients with heart failure

- ACEIs
- ARBs
- Betablockers
- MRAs
- CRT...little effect
- Beware *ivabradine* may increase the incidence of AF in patients with heart failure

Amiodarone

- Reduces the incidence of AF
- Induces pharmacological cardioversion
- Maintains more patients in sinus rhythm after cardioversion
- May be used to control symptoms in patients with paroxysmal AF if beta-blockers fail to do so.
Amiodarone

• Amiodarone should generally be restricted to short-term (6 months) use in patients with paroxysmal or persistent AF
• It helps attain sinus rhythm and reduce the high rate of recurrent AF immediately after cardioversion.
• Dronedarone is contraindicated in patients with HF and AF

Identification of potentially correctable causes

• Thyroid disorder……hypo/hyperthyroidism
• Electrolyte disorders
• Uncontrolled hypertension
• Mitral valve disease
• Other precipitating factors……. recent surgery, chest infection or exacerbation of COPD/asthma, acute myocardial ischaemia, alcohol binge
Management Strategy

• Assessment of stroke risk and need for anticoagulation
• Assessment of ventricular rate and need for rate control
• Evaluation of symptoms of HF and AF

Assessment of stroke risk and need for anticoagulation
Thromboembolism profilaxis: OAC

- Same risk and protection for HFrEF and HFpEF
- More difficult balance of CHA₂DS₂-Vasc and HAS-BLED scores
- Attention to renal function for dosage (no data for NOACS when creatinine clearance <30 mL/min)
- Age >75 years
- Small differences among different NOACs

Clinical risk factors for stroke, transient ischaemic attack, and systemic embolism

<table>
<thead>
<tr>
<th>CHA₂DS₂-VASc risk factor</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive heart failure</td>
<td>1</td>
</tr>
<tr>
<td>Signs/symptoms of heart failure or objective evidence of reduced left-ventricular ejection fraction</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Resting blood pressure &gt;140/90 mmHg on at least two occasions or current antihypertensive treatment</td>
<td></td>
</tr>
<tr>
<td>Age 75 years or older</td>
<td>2</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>Fasting glucose &gt;125 mg/dL (7 mmol/L) or treatment with oral hypoglycaemic agent and/or insulin</td>
<td></td>
</tr>
<tr>
<td>Previous stroke, transient ischaemic attack, or thromboembolism</td>
<td>2</td>
</tr>
<tr>
<td>Vascular disease</td>
<td>1</td>
</tr>
<tr>
<td>Previous myocardial infarction, peripheral artery disease, or aortic plaque</td>
<td></td>
</tr>
<tr>
<td>Age 65–74 years</td>
<td>1</td>
</tr>
<tr>
<td>Sex category (female)</td>
<td>1</td>
</tr>
</tbody>
</table>
Modifiable and non-modifiable risk factors for bleeding in anticoagulated patients with AF

**Modifiable bleeding risk factors:**
- Hypertension (especially when systolic blood pressure is >160 mmHg)
- Labile INR or time in therapeutic range <60% in patients on vitamin K antagonists
- Medication predisposing to bleeding, such as antiplatelet drugs and non-steroidal anti-inflammatory drugs
- Excess alcohol (≥8 drinks/week)

**Potentially modifiable bleeding risk factors:**
- Anaemia
- Impaired renal function
- Impaired liver function
- Reduced platelet count or function

**Non-modifiable bleeding risk factors:**
- Age (>65 years) (≥75 years)
- History of major bleeding
- Previous stroke
- Dialysis-dependent kidney disease or renal transplant
- Cirrhotic liver disease
- Malignancy
- Genetic factors

**Biomarker-based bleeding risk factors:**
- High-sensitivity troponin
- Growth differentiation factor-15
- Serum creatinine/estimated CrCl

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The prevention of thrombo-embolism in patients with symptomatic heart failure (NYHA Class II-IV) and paroxysmal or persistent/permanent atrial fibrillation (1)

**Recommendations**

The CHA₂DS₂-VASc and HAS-BLED scores are recommended tools in patients with HF for the estimation of the risk of thromboembolism and the risk of bleeding associated with oral anticoagulation, respectively.

An oral anticoagulant is recommended to prevent thrombo-embolism for all patients with paroxysmal or persistent/permanent AF and a CHA₂DS₂-VASc score ≥2, without contra-indications, and irrespective of whether a rate or rhythm management strategy is used (including after successful cardioversion).

NOAC treatment is contra-indicated in patients with mechanical valves or at least moderate mitral stenosis.

In patients with AF of ≥48 h duration, or when the duration of AF is unknown, an oral anticoagulant is recommended at a therapeutic dose for ≥3 weeks prior to electrical or pharmacological cardioversion.
A left atrial occlusion device could be considered in a patient with AF as an alternative to an oral anticoagulant who is at high-risk both of thromboembolism and of bleeding in order to avoid the risk of haemorrhage due to anticoagulation risk.
Rate control

- Limited drug therapy: Beta-blocker and Digoxin
- Optimal resting ventricular rate is uncertain
  - ESC AF guidelines suggest <110/min
  - In HF is suggested 70-100/min
  - <70/min could worsen prognosis
- Optimal ventricular rate also uncertain by exercise: probably <110/min
- AV node ablation and CRT implantation

Tachycardiomyopathy

- Persistent HR>150/min
- Respond better with increase of LVEF after treatment: rhythm control
- Some degree of tachycardiomyopathy in 20-50% of patients
Rhythm control

AF-CHF trial
- > 1300 patients
- LVEF <35% (27±6%)
- NYHA II-IV (>III 76%)
- Px and Persistent AF
- Amiodarone >80%

Rate versus rhythm control

Sinus Rhythm in 73% in Rhythm control versus 35% in Rate control arm

Management of new-onset, rapid atrial fibrillation in patients with heart failure

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent electrical cardioversion is recommended if AF is thought to be contributing to the patient’s haemodynamic compromise in order to improve the patient clinical condition.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>For patients in NYHA Class IV, in addition to treatment for AHF, an intravenous bolus of amiodarone or, in digoxin-naive patients, an intravenous bolus of digoxin should be considered to reduce the ventricular rate.</td>
<td>IIa</td>
<td>B</td>
</tr>
</tbody>
</table>
For patients in NYHA Class I–III, a beta-blocker, usually given orally, is safe and therefore is recommended as first-line treatment to control ventricular rate, provided the patient is euolaemic.

For patients in NYHA Class I–III, digoxin, should be considered when ventricular rate remains high despite beta-blockers or when beta-blockers are not tolerated or contra-indicated.

AV node catheter ablation may be considered to control heart rate and relieve symptoms in patients unresponsive or intolerant to intensive pharmacological rate and rhythm control therapy, accepting that these patients will become pacemaker dependent.

### Recommendations

<table>
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<td>Electrical cardioversion or pharmacological cardioversion with amiodarone may be considered in patients with persisting symptoms and/or signs of HF, despite OMT and adequate control of ventricular rate, to improve clinical/symptomatic status.</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>AF ablation may be considered in order to restore sinus rhythm to improve symptoms in patients with persisting symptoms and/or signs of HF, despite OMT and adequate control of ventricular rate, to improve clinical/symptomatic status.</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>Amiodarone may be considered prior to (and following) successful electrical cardioversion to maintain sinus rhythm.</td>
<td>IIb</td>
<td>B</td>
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Conclusions

- AF is the most common arrhythmia in HF
- AF increases the risk of thromboembolic complications
- AF may impair cardiac function, leading to worsening symptoms of HF
- New-onset AF in a patient with established HF is associated with a worse outcome
CONCLUSIONS

• Identification of potentially correctable causes and precipitating factors is mandatory
• Management strategy should be based on assessment of stroke risk and need for anticoagulation and assessment of ventricular rate and need for rate control

THANK YOU