The significance of atrial fibrillation in heart failure

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This editorial refers to 'Atrial fibrillation, ischaemic heart disease, and the risk of death in patients with heart failure'\(^1\) by O.D. Pedersen et al., on page 2866

As discussed by Van den Berg et al., the significance of atrial fibrillation (AF) on morbidity and mortality in the congestive heart failure patient continues to be debated in many publications.\(^1\)

Pedersen et al.\(^2\) give long-term follow-up data of a large number of heart failure patients with systolic left ventricular (LV) dysfunction and with or without AF at discharge from hospital. Patients were divided into those with and without ischaemic heart disease. It was found that AF resulted in greater mortality during follow-up in the ischaemic as compared to the non-ischaemic patients. Enrolment in a multicenter registry started in the period 1993–95. In this retrospective study, no information is given about possible risk factors such as QRS width (especially presence of left bundle branch block), anti-arrhythmic drug therapy [although part of the patients were enrolled in the DIAMOND (dofetilide heart failure) study] and presence or absence of anti-coagulant therapy. Information about the role of these factors in the AF vs. the non-AF cohorts would have been of interest.

Why is AF a more ominous arrhythmia in the heart failure patient with ischaemic cardiac disease? Factors that have to be discussed include a high ventricular rate during AF causing increased myocardial ischaemia and the induction of serious ventricular arrhythmias by AF in patients who have a scar from a previous myocardial infarction. In the Pedersen study, no information is given about the mode of death during follow-up. It would be of great interest to know whether arrhythmic (sudden) death was more common in the ischaemic AF population.

From implantable cardioverter defibrillator (ICD) studies, we know that in primary and secondary prevention of life-threatening ventricular arrhythmias, AF patients not only receive more often inappropriate ICD shocks because of a high ventricular rate during AF, but also more often appropriate shocks because of the more frequent occurrence of life-threatening ventricular arrhythmias.\(^3\)–\(^7\) Indeed, atrial tachyarrhythmias beget ventricular tachyarrhythmias in defibrillator recipients.\(^8\) In the ischaemic population, induction of a ventricular arrhythmia is not only facilitated by increasing ischaemia during the high ventricular rate when in AF, but also as suggested by Gronefeld et al.,\(^9\) because of irregular RR intervals during AF. As shown in Figure 1, when during AF a short-long-short RR sequence occurs, a re-entrant ventricular arrhythmia may be initiated in a ventricular scar from a previous myocardial infarction. Such an arrhythmia may deteriorate in ventricular fibrillation and death.

As indicated by the ICD studies, AF frequently precedes ventricular tachycardia (VT)/VF, and is, therefore, a risk factor for heart failure patients, especially those with a scar after myocardial infarction. The likelihood that the presence of a scar is an important determinant of risk in the AF population is suggested by the finding in the Pedersen study of a higher mortality in the group of ischaemic heart failure patients with better preserved LV function.\(^2\)

Another possibility of VT initiation in ischaemic AF patients is the administration of digitalis. Digitalis, which is often used in the AF patient with heart failure, may initiate ventricular ectopic activity.\(^8\) Although the mechanism of digitalis-induced ventricular ectopic rhythms is delayed after-depolarizations, they may trigger more serious ventricular arrhythmias based upon a re-entrant mechanism in a scar. It is of interest that several studies such as the DIG trial, AFFIRM, and SPORTIV 3 and 5 showed a higher mortality in the patients receiving digitalis. Unfortunately, in those studies mode of death in relation to digitalis use has not been analysed, neither a distinction has been made between mortality in ischaemic vs. non-ischaemic heart failure patients on digitalis.

What about trying to bring and keep the AF heart failure patient in sinus rhythm. We know that drugs currently routinely given to heart failure patients, but who are not specifically anti-arrhythmic drugs, such as beta-blocking agents, ACE-inhibitors, angiotensin receptor blockers, and aldosterone antagonists reduce the incidence of AF. They work by causing haemodynamic improvement, diminishing myocardial ischaemia, affecting neurohumoral factors, and reducing fibrosis formation in the atrium.

The value of repeated efforts to bring and keep the heart failure patient in sinus rhythm by pharmacological and non-pharmacological methods is less clear. Pedersen et al.\(^9\) suggested that restoration of sinus rhythm is associated with improved survival. The CHF-AF study, currently performed in Canada, will give us more answers to that...
question both in the ischaemic and non-ischaemic patient. Our current anti-arrhythmic drugs are of dubious value because of their side effects. Hopefully, atrial specific anti-arrhythmic agents will be more successful.

The message from the study by Pedersen et al.\textsuperscript{2} is that AF is a risk factor in patients with ischaemic heart failure, also in case of reasonably preserved LV function. That information should be considered when constructing the risk profile of the heart failure patient and help in individualizing management including decision-making about ICD implantation.

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References