Atrial fibrillation (AF) affects millions of people worldwide. It has been known for several decades that AF is not a benign condition; it is associated with a 5-fold increased risk of stroke, a 3-fold increased risk of heart failure, and 2-fold increased risk of dementia and death. Myocardial infarction and coronary heart disease are traditional risk factors for AF; however, whether myocardial infarction is a consequence of AF has not yet been studied in great detail. Current treatment for AF is focused on the prevention of stroke. This is of utmost importance; however, other cardiovascular morbidities and mortality should not be overlooked. An analysis of patients originally diagnosed with idiopathic AF demonstrated that these patients frequently develop cardiovascular disease, including myocardial infarction and coronary artery disease. An analysis of Medicare data emphasized the importance of cardiovascular events beyond stroke such as heart failure, myocardial infarction, and death in older adults with AF.

In the current issue of Circulation, Soliman et al describe the association of AF with myocardial infarction. Similar findings in 2 other cohorts by the same lead author have been published in the last few months. The analysis of 23,928 US residents without coronary heart disease included in the Reasons for Geographic and Racial Differences in Stroke (REGARDS) cohort demonstrated that prevalent AF was associated with a 2-fold higher incidence of myocardial infarction. Risk of myocardial infarction was significantly higher in women and blacks. Second, the analysis from the Cardiovascular Health Study (CHS) showed similar associations. Soliman and colleagues present an analysis of 14,462 participants who were free of coronary heart disease at baseline and were included in the Atherosclerosis Risk in Communities (ARIC) study. The authors investigated the association of AF as a time-varying variable (n=1,545) with overall incident myocardial infarction and by type of myocardial infarction (ST-segment–elevation myocardial infarction [STEMI] or non-STEMI [NSTEMI]). AF was associated with a 63% increase in risk of myocardial infarction after multivariable adjustments. The association was limited to NSTEMI; no association with STEMI was found. In accordance with REGARDS, women had higher risks of developing myocardial infarction than men. Racial differences did not reach statistical significance here.

How can we explain the recent findings in several independent cohorts? Are the prevalences of both AF and myocardial infarction increasing, and is it only a matter of time until both conditions happen in the same individual? Or do high sensitivity troponin assays enhance the detection of minimal myocardial damage, so the diagnosis of myocardial infarction, especially NSTEMI, is made more often than in the old days and may even represent myocardial damage as a result of AF itself rather than as a result of atherosclerosis? There are also other possible explanations.

First, AF and myocardial infarction share many cardiovascular risk factors, including age, hypertension, and diabetes mellitus. The association of AF and myocardial infarction possibly reflects a final common pathway of underlying vascular disease. Extrapolating ideas from the relation of AF and stroke to the relation of AF and myocardial infarction may be of value to support this notion. There has always been a strong belief that AF, clot formation, and stroke are temporally linked, especially because this fits the Virchow triad with low flow, increased plasma clotting factors, and vessel wall, here, atrial wall, abnormalities. However, the Asymptomatic AF and Stroke Evaluation in Pacemaker Patients and the AF Reduction Atrial Pacing (ASSERT) Trial has recently shown that there is a temporal disconnect between stroke and the continuously monitored occurrence of AF. This suggests that stroke, and probably myocardial infarction, and AF have pathophysiological mechanisms in common. This is also reflected by the CHA, VASc score. The risk of stroke depends on the number of cardiovascular conditions present in patients with a diagnosis of AF, not on the number of AF recurrences after the initial diagnosis. However, the explanation of shared risk factors and common pathways negates the complex relationships between AF and myocardial infarction. Myocardial infarction and transient ischemia may beget AF. Myocardial infarction and coronary heart disease are well-established risk factors for incident AF, and subclinical coronary artery disease also increases AF risk, potentially via atrial remodeling or transient ventricular ischemia with atrial diastolic overload. Studies investigating oral anticoagulants in AF suggested an increased risk of myocardial infarction in patients with AF, and it has...
been suggested that there are differences between the diverse oral anticoagulants in reducing the risk of myocardial infarction.15,16 The opposite, that AF may beget myocardial infarction, also seems true, as was convincingly demonstrated by the studies by Soliman and colleagues. AF may lead to myocardial infarction through increased heart rate and thus increased oxygen demand, sympathetic activation, endothelial dysfunction, and proinflammatory and prothrombotic effects (Figure). The finding that NSTEMI, but not STEMI, was associated with AF supports the notion that recurrent atrial fibrillation and myocardial infarction.

Figure. Conceptual figure of the bidirectional relation between atrial fibrillation and myocardial infarction.

References


Key Words: Editorials ■ atrial fibrillation ■ epidemiology ■ myocardial infarction ■ risk factors
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