PRESIDENT'S PAGE

Acute coronary syndromes and atrial fibrillation

Atrial fibrillation is the most common sustained cardiac arrhythmia and affects 1.5%—2% of the general population. More than six million Europeans suffer from atrial fibrillation, and the incidence of atrial fibrillation is estimated to double over the next 50 years. The incidence of atrial fibrillation increases with age, from <0.5% at 40 to 50 years old, up to 5% to 15% at 80 years old. Men suffer more often than women from atrial fibrillation. It is estimated that more than 8 million patients over 80 years old will be affected by atrial fibrillation in 2050. Atrial fibrillation is associated with an increased risk of stroke, heart failure and death, as well as a deterioration in the quality of life.[1]

Atrial fibrillation, permanent or paroxysmal, is common in patients with acute coronary syndrome. The associated mechanisms for the development of atrial fibrillation in these patients includes ischemia and reduced atrial blood flow, increased left ventricle end-diastolic pressure and left atrial pressure, diastolic dysfunction and disorders of the autonomic nervous system. Recently, inflammation and neurohormonal activation mechanisms appear to be associated with the development of atrial fibrillation in patients with acute myocardial infarction. The incidence of atrial fibrillation in acute coronary syndromes ranges from 2% to 23%. Recently, a downward trend in the incidence of atrial fibrillation in patients with acute coronary syndromes has been observed and this could be explained by the widespread use of thrombolytic therapy and percutaneous coronary interventions (PCI). The primary clinical prognostic markers of risk for atrial fibrillation in patients with acute coronary syndromes are advanced age, tachycardia on admission and advanced heart failure.[2]

Atrial fibrillation increases the risk of worsening ischemia, heart failure and thromboembolic complications. Patients with acute coronary syndromes who developed atrial fibrillation, have increased in-hospital and long-term mortality. In a large meta-analysis that included 278,854 patients with myocardial infarction by 43 trials, atrial fibrillation was associated with a 40% increase in the risk of death compared to patients with sinus rhythms. Moreover, atrial fibrillation was associated with increased risk of in-hospital and long-term mortality, irrespective of the time of occurrence, i.e., whether it was new onset or chronic.[3] However, in a different meta-analysis, new onset atrial fibrillation in patients with acute myocardial infarction was associated with an 87% increase in in-hospital mortality risk compared to patients with pre-existing atrial fibrillation.[4] Atrial fibrillation leads to a number of hemodynamic changes, such as loss of atrial contraction, rapid ventricular rate and the loss of atrioventricular synchrony. These changes cause a decrease in cardiac output, which may explain the increased risk of death.[5]

Patients with atrial fibrillation with a fast ventricular response may experience angina or discomfort and elevated troponin levels, complicating the differential diagnosis of acute coronary syndromes. In a large retrospective observational study of patients with atrial fibrillation, 9.2% of patients had elevated levels of high-sensitivity troponin I, and this percentage may be even higher in acute onset atrial fibrillation.[6] Changes of troponin in patients with atrial fibrillation and rapid ventricular response may mimic myocardial infarction type 1. In cases with very high troponin levels, the possibility of myocardial infarction type 1 is high, and the performance of coronary angiography is justified. In contrast, in the majority of cases of atrial fibrillation and increased troponin levels we suggest an ischemia detection test.[7]

Treatment of atrial fibrillation in patients with acute coronary syndromes depends on the duration of arrhythmia, the heart rate and the hemodynamic and functional status of patients. Based on the above criteria, different therapeutic approaches are needed, such as administration of antiarrhythmic drugs for controlling the heart rate, pharmaceutical cardioversion, or direct electrical cardioversion in patients with hemodynamic instability.[8]

Patients with acute coronary syndromes requires dual antiplatelet therapy with aspirin and a second agent, such as clopidogrel, and optional (depending on the CHA_2DS_2-VASc score) addition of a vitamin K antagonist or a newer oral anticoagulant factor (NOACs) when atrial fibrillation coexists (triple antithrombotic therapy). The duration of

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triple antithrombotic therapy increases the risk of bleeding complications and should be as short as possible, depending on the hemorrhagic and ischemic risk and the possibility of a PCI. The use of ticagrelor or prasugrel as part of the triple antithrombotic therapy is not recommended because there are no data on its safety and effectiveness in triple therapy.[9]

For patients requiring long term oral anticoagulation and are going to have PCI, there is insufficient data on the selection of the appropriate type of stent. When the hemorrhagic risk is low (HAS-BLED score ≤2), using new generation coated stents (DES) is recommended. When there is high bleeding risk (HAS-BLED score ≥3), the choice between bare metal stent (BMS) and new-generation DES should be individualized. In patients with acute coronary syndrome treated with oral anticoagulants (vitamin K antagonists or NOACs) due to atrial fibrillation, PCI should be performed without interruption of anticoagulation; therefore, radial access should be preferred. In patients treated with vitamin K antagonists, if the INR is above 2.5, heparin should not be administered. Conversely, if the patients take NOACs, a small dose of intravenous heparin dose should be used.[7]

Atrial fibrillation is a common co-morbidity in patients with acute coronary syndromes and is an independent risk factor for adverse cardiovascular events. Oral anticoagulants are superior to antiplatelet therapy for preventing stroke in atrial fibrillation, while the dual antiplatelet therapy is indicated for acute coronary syndromes. The triple antithrombotic therapy consisting of an anticoagulant, aspirin and clopidogrel is recommended in patients with acute coronary syndromes and atrial fibrillation, although there is insufficient data from randomized clinical trials. The ischemic and hemorrhagic risk should be estimated, and the treatment should be chosen, with an optimal balance between benefit and risk.

References

1. Go AS, Hylek EM, Phillips KA, et al. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention: the AnTicoagulation and Risk Factors in Atrial Fibrillation (ATRIA) Study. *JAMA*. 2001;285: 2370—2375.

2. Gonzalez-Pacheco H, Marquez MF, Arias-Mendoza A, et al. Clinical features and in-hospital mortality associated with different types of atrial fibrillation in patients with acute coronary syndrome with and without ST elevation. *Journal of cardiology*. 2015;66:148—154.

3. Jabre P, Roger VL, Murad MH, et al. Mortality associated with atrial fibrillation in patients with myocardial infarction: a systematic review and meta-analysis. *Circulation*. 2011;123: 1587—1593.

4. Angeli F, Reboldi G, Garofoli M, et al. Atrial fibrillation and mortality in patients with acute myocardial infarction: a systematic overview and meta-analysis. *Current cardiology reports*. 2012;14:601—610.

5. Lubitz SA, Benjamin EJ, Ellinor PT. Atrial fibrillation in congestive heart failure. *Heart failure clinics*. 2010;6:187—200.

6. Lippi G, Picanza A, Formentini A, Bonfanti L, Cervellin G. The concentration of troponin I is increased in patients with acute-onset atrial fibrillation. *International journal of cardiology*. 2014;173:579—580.

7. Authors/Task Force M, Roffi M, Patrono C, et al. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). *Eur Heart J*. 2015;2015.

8. January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. *J Am Coll Cardiol*. 2014;64:e1—e76.

9. Lip GY, Windecker S, Huber K, et al. Management of antithrombotic therapy in atrial fibrillation patients presenting with acute coronary syndrome and/or undergoing percutaneous coronary or valve interventions: a joint consensus document of the European Society of Cardiology Working Group on Thrombosis, European Heart Rhythm Association (EHRA), European Association of Percutaneous Cardiovascular Interventions (EAPCI) and European Association of Acute Cardiac Care (ACCA) endorsed by the Heart Rhythm Society (HRS) and Asia-Pacific Heart Rhythm Society (APHRS). *Eur Heart J*. 2014;35: 3155—3179.

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