Abstract:

Introduction

Atrial fibrillation is an arrhythmia characterized by rapid, uncoordinated electrical activation of the atria leading to their ineffective contraction. In the electrocardiogram, in the absence of atrioventricular conduction disturbances, the frequency of the R waves is irregular, and repeated P waves cannot be distinguished between them.

According to current guidelines for the diagnosis and treatment of atrial fibrillation, a single-lead ECG of at least 30 seconds or an abnormal 12-lead ECG recording of the arrhythmia is required for diagnosis. At the global scale, this arrhythmia is the most common and affects 2-4% of the entire population. According to current estimates, by 2050 atrial fibrillation will affect 6-12 million people in the United States, and by 2060 it will be diagnosed in 17.9 million people in Europe. The projected further progression is the reason to view atrial fibrillation as a global epidemic problem. The risk profile of atrial fibrillation is diverse, and it is extremely difficult to closely define the characteristics of the group of patients most susceptible to the disease. This is one of the reasons for the still unsatisfactory effectiveness in diagnosing new cases of arrhythmia, and thus the impossibility of implementing preventive interventions and avoiding complications. Arrhythmia may be asymptomatic and contribute to the lengthening of the time from the onset of the disease to diagnosis, delays in the implementation of therapy and the occurrence of avoidable complications. The silent clinical course may affect up to 40% of the population diagnosed with atrial fibrillation. The beta blocker used after myocardial infarction reduces symptoms. In a study using an implantable arrhythmia recorder in patients after myocardial infarction, it was shown that 90% of arrhythmia cases were asymptomatic. Compared to full-blown arrhythmia, there was no difference in all-cause mortality, cardiovascular mortality, and thromboembolic complications, including stroke. The diagnosis of atrial fibrillation in a patient with coronary artery disease (myocardial infarction) has a direct impact on the modification of pharmacotherapy.

Objective

The main aim of the study was to assess risk factors for atrial fibrillation in patients with acute myocardial infarction. The project was intended to answer the following questions:

1. Are there any clinical factors that may indicate an increased risk of atrial fibrillation?

2. Are there any laboratory parameters that may be a predictor of arrhythmia development in patients with acute myocardial infarction?

3. Is it possible to identify echocardiographic parameters in patients with acute coronary syndrome that are a risk factor for atrial fibrillation?

Material and methods

The prospective study included 74 patients hospitalized for acute myocardial infarction at the Cardiology Department of 'St. Vincent a Paulo' Hospital in Gdynia. All patients underwent an interview and physical examination, analysis of performed laboratory tests, electrocardiography, coronary angiography protocol and angioplasty, if performed. Echocardiography was performed in each patient. In particular, the left atrium was undergoing advanced evaluation. Subjects were classified into 4 subgroups: A – patients who completed the study without a diagnosis of arrhythmia; B- patients with arrhythmia before hospitalization due to myocardial infarction; C- patients with arrhythmia diagnosed for the first time during this hospitalization; D- patients in whom arrhythmia was diagnosed for the first time during long-term follow-up. Considering a low number of patients with atrial fibrillation diagnosed for the first time during the long-term follow-up, the population was finally divided into 2 groups: Arrhythmia (-): patients who were not diagnosed with atrial fibrillation during the study; Arrhythmia (+): patients with atrial fibrillation first diagnosed during hospitalization or long-term follow-up.

Patients with a history of arrhythmia before the study hospitalization were excluded from comparative statistical analysis.

Results

The maximum follow-up period in the study was 14 months, minimum 3 months, mean 10.43 months (SD=2.03). Atrial fibrillation was first diagnosed in acute myocardial infarction in 13.5% of patients, and in 5.4% the diagnosis was made during the long-term follow-up.

As a result of the analysis of the collected data, it was shown that patients with arrhythmia were older compared to those who were not diagnosed with arrhythmia during the study. Body mass index (BMI) differed significantly in the compared groups and was higher in patients with atrial fibrillation. Subjects without arrhythmia were characterized by lower CHA2DS2 VASc scores, lower total cholesterol (TCH), lower levels of its low-density lipoprotein (LDL) fraction and a lower percentage of neutrophils in the leukocyte pool in peripheral blood. Carbohydrate metabolism disorders were more common in patients with arrhythmia.

The study showed that echocardiographic parameters such as left atrial deformation in the reservoir phase (LASr), identical to the peak longitudinal strain of the left atrium (PALS), total left atrial emptying fraction (LAEF), left atrial area (LA area), left atrial stiffness index (LASI), left ventricular end-diastolic dimension (LVEDd), left ventricular global longitudinal strain (GLS) and its sum with the peak left atrial strain in absolute terms (PALS+GLS), as well as the ratio of the maximum early diastolic inflow velocity to the left ventricle and the maximum mitral annulus velocity were associated with an increased risk of atrial fibrillation.

Conclusion

The study showed that it was possible to identify clinical factors that may indicate an increased risk of atrial fibrillation.

In the panel of laboratory tests, we can indicate parameters that are associated with an increased risk of arrhythmia.

By performing an echocardiographic examination with an advanced assessment of the left atrium, we can specify parameters that are a prognostic for atrial fibrillation.