Defects of coagulation and antiphospholipid antibodies in patients up to 40 years old with acute coronary syndrome

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Abstract

A higher prevalence of acute coronary syndromes (ACS) is observed in young patients up to 40 years old. Many differences between young and older patients are described in literature, according to: cardiac risk factors, symptomatology, clinical course, therapy and prognosis as to health or as to life. Except classical risk factors leading to ACS other cardiac predictors are being searched in the group of younger sick persons. It is worth considering the importance of defects of coagulation, such as: proportions' disorders of tissue factor, tissue plasminogen activator, Leiden factor, protein C, lipoprotein (a) and mutations of propter genes (the role of the polymorphism in the fibrinogen beta-chain gene, prothrombin gene, thrombopoetin gene). There is also the significant role of antiphospholipid antibodies in the pathogenesis of cardiac ischemic episodes, especially in young patients. These antibodies are determined in 10-20% of cases. However, among classical cardiac risk factors the most common are: smoking, burdening family history and lipid disorders. Often in the group of young patients no atheromatous coronary arteries are angiographically described or changes are not so advanced. It is connected with a smaller necessity of interventional procedures, also surgical, and with a better prognosis – without complications and recurrent ACS.

Key words: acute coronary episode, risk factors, coagulation, young patients.

Introduction

An analysis of acute coronary syndromes' (ACS) prevalence focuses attention on an important and interesting clinical problem, which refers to increasing frequency of ischemic incidents in young patients. The literature shows comparisons of risk factors, symptomatology, clinical courses, therapeutic management and prognosis in relation to older patients.

Israeli scientists have analyzed a clinical course of ischemic episodes in fifteen young patients (mean age – 28 years), hospitalized in the cardiologic department in years 1993-2000. In 7 of these patients atheromatous changes in coronary arteries and also a special role of classical risk factors for coronary disease have been documented [1]. The remaining patients had normal coronary arteries and a complete diagnosis has confirmed a significance of trombophilia, arterial spasm caused by abuse of alcohol, withdrawal and

hormonal disorders (hyperthyroidism). All the patients have presented a typical chest pain. A better prognosis has referred to patients without coronary arteries' lesion. It has been connected with: a good left ventricular ejection fraction (LVEF) evaluated on follow-up echocardiography, an absence of hemodynamic complications and a lack of recurrent ACS in about four years. Four out of seven patients have shown incidents of ACS [1].

Very often clinicians find it difficult to arrive at the diagnosis of ACS in young patients, so a necessity for finding different than classical cardiac risk factors has occurred. On the basis of biochemical investigations performed among 127 males hospitalized with a first MI, Japanese scientists have formed a conclusion. It relates to the importance of hyperhomocysteinemia in the pathogenesis of early ACS [2]. They have also shown evidence of the essential role of tissue factor, tissue plasminogen activator (t-Pa) – their concentration has a positive correlation with hyperhomocysteinemia and influences coagulation cascade [2].

Other disorders of coagulation activation can be also considered in the case of MI. Increased levels of thrombin-antithrombin complexes, a lower concentration of factor VIIa and elevated tissue factor pathway inhibitor antigen can be responsible for ACS [3].

In 99 male patients with MI a connection between Bc1I polymorphism in the fibrinogen beta – chain gene (Bc1I βFb), plasma fibrinogen concentration and the number of abnormal coronary arteries has been determined in a comparison of healthy volunteers [4]. In patients with MI the prevalence of Bc1I βFb polymorphism was significantly higher than in the control group and has correlated with the increased level of plasma fibrinogen. Investigations have not confirmed a relationship between number of atheromatous coronary arteries and Bc1I βFb polymorphism [4].

Other polymorphisms have been also documented as a non-classical cardiac risk factors in young sick persons. In clinical investigations the role of following polymorphisms was observed: in the prothrombin gene – G20210A, in the thrombopoetin gene, in the Apo B (connexion with an increased level of LDL-ch), in the Apo E, in the CD 14 gene (C-260T) and in the E Selectin gene [5].

Articles on the role of antiphospholipid syndrome in the pathogenesis of ACS more often occur in the literature. Its clinical manifestation is caused by the presence of antiphospholipid antibodies (APA) and is characterized by: arterial embolism, recurrent venous thromboses and premature births or miscarriages [6]. APA can activate various cells: thrombocytes, monocytes and endothelial cells. This syndrome was diagnosed in 21-year-old female, who had experienced a TIA (transient ischemic attack) and half a year later – an ACS with thrombocytopenia [6]. So, there is a necessity of paying attention to APA as a risk factor of ACS, especially in young patients with thromboembolic incidents in anamnesis. In these clinical situations APA are determined in 10 – 20 % of cases [6]. Also, the role of APA has been detected in an ischemic stroke's occurrence without identifiable risk factors for atherosclerosis [7].

An increased concentration of Lp (a), i.e. lipoprotein (a) can also be an important predictor of ACS [8]. This is strongly stressed in young patients after MI. In this group a high level of Lp (a) is a hereditary susceptibility, which has been confirmed by investigations made among their first – degree relatives. There is also a correlation between a higher level of Lp (a) and elevated interleukin-6 (IL-6) concentration in MI. An abnormal IL-6 often coexists with abdominal obesity and increased concentration of fibrinogen, which has been documented in the group of young women at mean age 40 [9].

An investigation of a coexistence of prothrombotic coagulation defects and the most common cardiac risk factor – smoking – has proved that in this situation the risk of MI increases 12 – fold in young women in comparison with a control, healthy group. Also, smoking women with the presence of factor V Leiden have a two times higher possibility of ACS' occurrence [10].

A syndrome of protein C deficiency can play an important role in the pathogenesis of ACS, even in very young sick persons. Literature reports a special case of a 19-year-old man, who was diagnosed as anterior wall MI. Angiographically there was a total occlusion of LAD (left anterior descending coronary artery). Not for the first time an abnormal concentration of protein C has been presented as a cause of ACS in young age [11].

It is important to pay attention to the use of anabolic steroids as a predictor of ACS in the group of young patients. Steroids can cause a state of hipercoagulation and lipid disorders [12]. A case of a 27-year-old man with a dramatic course of MI caused by LAD occlusion has been described. He had been using anabolic steroids regularly for 10 years. Despite treatment by PTCA and intra-aortic balloon support in this case a serious myocardial lesion has developed [12].

Conclusions

Consecutive clinical studies prove that in the group of young patients up to 40 years old ACS is observed mainly in men, accompanied by ST segment elevation. The common anatomical localization is an anterior wall of heart muscle. In coronary angiography atheromatous changes are rarely revealed or there is a single vessel disease. It is connected with a decreased necessity of revascularization, also made by surgical procedures. It results in a smaller

frequency of reoclusion, rare complications after an ischemic episode and a better prognosis. In connexion with a variety of cardiac risk factors investigated in young patients, there is a need of a detailed diagnosis and suitable treatment in comparison with older than 40 years old patients.

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