Examination of the vasomotor function of coronary microvessels in patients with metabolic syndrome

The multifactorial origin metabolic syndrome and its characteristic conditions like obesity, hypertension and diabetes mellitus all together have an effect on the function of cardiovascular system. The underlying mechanism, how this conditions change the vasomotor function of coronary microvessels has not yet been fully elucidated. This prompted us to investigate the vasomotor function of coronary arterioles, isolated from the heart of patients who underwent cardiac surgery. In addition, we aimed to investigate the role of action of obesity, hypertension and diabetes mellitus on vasomotor function of coronary microvessels. The key, novel findigns of our studies are the followings: 1.) There is a decreased vasodilation of isolated coronary microvessels in normotensive patients who suffered from obesity. 2.) However, among hypertensives agonists induced isolated coronary microvessel dilations were significantly enhanced in obese patients, when compared to lean individuals. By this observations I suppose that obesity may lead to activation of adaptive vascular mechanisms to enhance the dilator function of coronary and peripheral arterial vessels in hypertensive patients. Other part of our investigation shows 3.) that in isolated coronary arterioles of diabetic patients bradykinin induces enhanced COX-2-derived prostaglandin-mediated dilation compared with non diabetic patients. It shows that in diabetes mellitus increases COX-2 expression and dilator prostaglandin synthesis in coronary arterioles, which may serve to increase dilator capacity and maintain adequate perfusion of cardiac tissues.

In summary, our present data suggest that in metabolic syndrome the different conditions, like obesity, hypertension or diabetes mellitus changes the vaomotor function of coronary microvessels on different ways. Despite, that probably all of this conditions damage the function of coronary microvessels, it can't be out of account, that there are some adaptív mechanisms, which could play role in maintenance of adequate perfusion of cardiac tissues in pathologic conditions.

Key words

metabolic syndrome , hypertension, obesity, diabetes mellitus
coronary microvessels, endothel, nitrogen monoxid, prostaglandin, ciklooxigenase-2