

Research Article

Histamine Blood Concentration in Ischemic Heart Disease Patients

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The aim of this study was to investigate histamine blood concentration in subjects suffering from different types of ischemic heart diseases during the period of eight days. Our results showed that the histamine blood level was associated with different types of ischemic heart diseases. The blood histamine level in all investigated patients was significantly higher when compared to control subjects ($44.87 \pm 1.09 \text{ ng mL}^{-1}$), indicating the increase of histamine release in patients suffering from coronary diseases. In patients suffering from ACS-UA and ACS-STEMI, the second day peak of histamine level occurs ($90.85 \pm 6.34 \text{ ng mL}^{-1}$ and $121.7 \pm 6.34 \text{ ng mL}^{-1}$, resp.) probably as the reperfusion event. Furthermore, our data suggest that histamine can be additional parameter of myocardial ischemia along with cardiac specific enzymes and may prove to be an excellent single prognostic marker for multitude of ischemic heart diseases.

1. Introduction

Histamine, a low-molecular-weight amine synthesized from L-histidine in the reaction catalyzed by L-histidine decarboxylase, is known to activate the four G protein-coupled receptors: H1, H2, H3 and H4, through which it is involved in the regulation of several physiological processes [1]. Although it is contained in almost all tissues in human organism, it is most frequently found in mast cells and basophilic leukocytes. This biogenic amine is released by endothelial cells, aggregating platelets, lymphocytes, and monocytes/macrophages [2, 3]. Mast cells and histamine also have cranium-caudal distribution in the heart which means that the largest quantity of this amine is in the right atrium and the least in left ventricle tissue. Increased number of mast cells was found in coronary blood vessels adventitia in the patients suffering from ischemic heart diseases, especially in the narrow parts of blood vessels, or at the site of plaque rupture [4, 5]. Obvious connection was also determined between

coronary blood vessel inflammation and mast cells activation in the process of atherogenesis [6, 7]. Furthermore, previous studies have shown that histamine affects atherosclerosis through H1 receptor mechanisms [8]. For example, histamine enhances the expression of adhesion molecules in vascular endothelial cells, thereby augmenting leukocyte-endothelial cell interactions, an important onset event in atherogenesis [8]. Moreover, this biogenic amine suppresses hepatic LDL receptor expression and reduces plasma HDL cholesterol in rats [9]. This suggests that histamine may play an important role in lipoprotein metabolism, which may be related to its role in the development of atherosclerosis. Histamine has also been shown to increase smooth muscle cell proliferation and migration and implicated in intimal thickening and atherogenesis [6].

Histamine's effects on coronary arteries are the result of multiple actions of this molecule on both smooth muscle and endothelial cells. Relaxation and constriction of coronary vessels have been widely reported as its effects. These effects

