

Coronary flow and oxidative stress during local anaphylactic reaction in isolated mice heart: the role of nitric oxide (NO)

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Abstract The aim of this study was to assess the role of nitric oxide (NO) in cardiac anaphylaxis regarding changes in coronary reactivity and oxidative status of the mice heart. The animals were divided into two groups: experimental group (CBA, iNOS^{-/-} mice) and control group: wild-type mice (CBA/H). The hearts of male mice ($n = 24$; 6–8 weeks old, body mass 20–25 g, 12 in each experimental group) were excised and retrogradely perfused according to the Langendorff technique at a constant perfusion pressure (70 cm H₂O). Cardiac anaphylaxis was elicited by injection of solution (1 mg/1 ml) of ovalbumin into the aortic cannula. For the next 10 min, in intervals of 2 min (0–2, 2–4, 4–6, 6–8, 8–10 min) coronary flow (CF) rates were measured and samples of coronary effluent were collected. Markers of oxidative stress including index of lipid peroxidation measured as thiobarbituric acid-reactive substances (TBARS), NO measured in the form of nitrites (NO₂⁻), superoxide anion radical (O₂⁻), and hydrogen peroxide (H₂O₂) in the coronary venous effluent were assessed spectrophotometrically. After the ovalbumin challenge, CF was significantly lower in the wild mice group. NO and H₂O₂ release were significantly higher in iNOS^{-/-}

mice group. TBARS and O₂⁻ values did not vary significantly between wild and iNOS^{-/-} mice groups. Our results indicate that coronary vasoconstriction during cardiac anaphylaxis does not necessarily depend on inducible nitric oxide synthase (iNOS)/NO activity and that iNOS/NO pathway may not be an only influential mediator of redox changes in this model of cardiac anaphylaxis.

Keywords Cardiac anaphylaxis · Isolated mice heart · Coronary flow · Nitric oxide · Oxidative stress

Abbreviations

CF	Coronary flow
eNOS	Endothelial nitric oxide synthase
HRPO	Peroxidase from horse radish
iNOS	Inducible nitric oxide synthase
IgE	Immunoglobulin E
NBT	Nitro blue tetrazolium
NO	Nitric oxide
PRS	Phenol red solution
PAF	Platelet-activating factor
ROS	Reactive oxygen species
TBARS	Thiobarbituric acid-reactive substances
TBA	Thiobarbituric acid

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Introduction

Anaphylaxis is a systemic allergic reaction which consists of some or all of the following signs and symptoms: diffuse erythema, pruritus, urticaria and/or angioedema, bronchospasm, laryngeal edema, hyperperistalsis, hypotension, and/or cardiac arrhythmias [1]. Biochemical mediators and chemotactic substances are released systemically during the

