Pulmonary transcription of CAT-2 and CAT-2B but not CAT-1 and CAT-2A were upregulated in hemorrhagic shock rats

蔡佩珊
Huang CJ;Tsai PS;Yang CH;Su TH;Steens BR;Skimming JW;Pan WHT

摘要

Abstract

Hemorrhagic shock stimulates nitric oxide (NO) biosynthesis through upregulation of inducible NO synthase (iNOS) expression. Trans-membrane l-arginine transportation mediated by the isozymes of cationic amino acid transporters (e.g. CAT-1, CAT-2, CAT-2A, and CAT-2B) is one crucial regulatory mechanism that regulates iNOS activity. We sought to assess the effects of hemorrhage and resuscitation on the expression of these regulatory enzymes in hemorrhage-stimulated rat lungs. Twenty-four rats were randomized to a sham-instrumented group, a sustained shock group, a shock with blood resuscitation group, or a shock with normal saline resuscitation group. Hemorrhagic shock was induced by withdrawing blood to maintain MAP between 40 and 45mmHg for 60min. Resuscitation by infusing blood/saline mixtures (blood resuscitation group) or saline alone (saline resuscitation group) was then performed. At the end of the experiment (300min after hemorrhage began), rats were sacrificed and enzymes expression as well as pulmonary NO biosynthesis and lung injuries were assayed. Our data revealed that hemorrhage-induced pulmonary iNOS, CAT-2, and CAT-2B transcription which was associated with pulmonary NO overproduction and subsequent lung injury. Resuscitation significantly attenuated the hemorrhage-induced enzyme upregulation, pulmonary NO overproduction, and lung injury. Blood/saline mixtures were superior to saline as a resuscitation solution in treating hemorrhage-induced pulmonary NO overproduction and lung injury. Hemorrhage and/or resuscitation, however, did not affect the expression of pulmonary CAT-1 and CAT-2A. It is, therefore, concluded that the expression of pulmonary iNOS, CAT-2, and CAT-2B is inducible and that of CAT-1 and CAT-2A is constitutive in hemorrhagic shock rat lungs.