

Protective Effects of Coenzyme Q10 and N-Acetylcysteine on Myocardial Oxidative Stress, Inflammation, and Impaired Energy metabolism in Carbon Tetrachloride Intoxicated Rats

Authors : Nayira A. Abd Elbaky, Amal J. Fatani, Hazar Yaqub, Nouf M. Al-Rasheed, Naglaa El-Orabi, Mai Osman

Abstract : The present work is aimed to evaluate the protective effect of N-acetyl cystiene (NAC), coenzyme Q10 (CoQ10), and their combination against carbon tetrachloride (CCl4)-induced cardiotoxicity in rats. CCl4 treatment significantly elevated the levels of cardiac oxidative stress bio markers including nitric oxide (NO) and malondialdehyde (MDA). A concomitant decrease in the level of reduced glutathione and the activity of membrane bound enzyme, calcium-adenosine triphosphatase were observed in the hearts of rats exposed to CCl4 compared to respective values in normal group. Quantitative analysis of myocardial energy metabolism revealed a significant decrease in the glucose content coupled with depletion in the activities of myocardial glycolytic enzymes as hexokinase (HK), phosphofructokinase (PFK) and lactate dehydrogenase (LDH) after CCl4 treatment. In addition, a significant elevation in myocardial hydroxyproline level was observed in CCl4 intoxicated rats indicating interstitial collagen accumulation. Pretreatment with either NAC, CoQ10 or their combination successively alleviated the alterations in myocardial oxidative stress and antioxidant markers, as well as effectively up-regulated the decrease in cardiac energetic biomarkers in CCl4 intoxicated rats. Moreover, these antioxidants markedly reduced myocardial hydroxyproline level versus that of CCl4-treated animals. In conclusion, the present results illustrated that the prophylactic use of the current antioxidant resulted in a remarkable cardioprotective effect against CCl4 induced myocardial damage, which suggest that they may candidates as prophylactic agents against different cardio-toxins.

Keywords : carbon tetrachloride, lipid peroxidation, antioxidant, energy metabolism, hydroxyproline

Conference Title : ICBSO 2014 : International Conference on Biomedical Sciences and Oncology

Conference Location : Paris, France

Conference Dates : November 21-22, 2014