

Contributory Antioxidant Role of Testosterone and Oxidative Stress Biomarkers in Males Exposed to Mixed Chemicals in an Automobile Repair Community

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Abstract : Background: Testosterone is a known androgenic and anabolic steroid, primarily secreted in the testes. It plays an important role in the development of testes and prostate and has a range of biological actions. There is evidence that exposure to mixed chemicals in the workplace leads to the generation of free radicals and inadequate antioxidants leading to oxidative stress, which may serve as an early indicator of a pathophysiologic state. Based on findings, testosterone shows direct antioxidant effects by increasing the activities of antioxidant enzymes like glutathione peroxidase, thus indirectly contributing to antioxidant capacity. Objective: To evaluate the antioxidant role of testosterone as well as the relationship between testosterone and oxidative stress biomarkers in males exposed to mixed chemicals in the automobile repair community. Methods: The study included 43 participants aged 22- 60years exposed to mixed chemicals (EMC) from the automobile repair community. Forty (40) apparently healthy, unexposed, age-matched controls were recruited after informed consent. Demographic, sexual and anthropometric characteristics were obtained from pre-test structured questionnaires using standard methods. Blood samples (10mls) were collected from each subject into plain bottles and sera obtained were used for biochemical analyses. Serum levels of testosterone and luteinizing hormone (LH) were determined by enzyme immunoassay method, EIA (Immunometrics UK.LTD). Levels of total antioxidant capacity (TAC), total plasma peroxide (TPP), Malondialdehyde (MDA), hydrogen peroxide (H₂O₂), glutathione peroxidase (GPX), superoxide dismutase (SOD), glutathione-S-transferase (GST), and reduced glutathione (GSH) were determined using spectrophotometric methods respectively. Results obtained were analyzed using the Student's t-test and Chi-square test for quantitative variables and qualitative variables respectively. Multiple regression was used to find associations and relationships between the variables. Results: Significant higher concentrations of TPP, MDA, OSI, H₂O₂ and GST were observed in EMC compared with controls ($p < 0.001$). Within EMC, significantly higher levels of testosterone, LH and TAC were observed in eugonadic when compared with hypogonadic participants ($p < 0.001$). Diastolic blood pressure, waist circumference, waist height ratio and waist hip ratio were significantly higher in participants EMC compared with the controls. Sexual history and dietary intake showed that the controls had normal erection during sex and took more vegetables in their diet which may therefore be beneficial. Conclusion: The significantly increased levels of total antioxidant capacity in males exposed to mixed chemicals despite their exposure may probably reflect the contributory antioxidant role testosterone that prevents oxidative stress.

Keywords : mixed chemicals, oxidative stress, antioxidant, hypogonadism testosterone

Conference Title : ICAAME 2018 : International Conference on Aeromechanics, Aerodynamics and Aero-Mechanical Engineering

Conference Location : New York, United States

Conference Dates : August 27-28, 2018