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The effects of sub-acute aluminium chloride administration on the hemostatic system: An animal model study

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Background: A healthy, functional liver is essential for normal homeostasis. Exposure to aluminium (Al^{+3}) can lead to hepatic damage and anemia in both animals and humans. However, the effect of Al+3 intoxications on the blood coagulation process remains unclear.

Aim: The aim of this study is to examine the effect of orally administered aluminium chloride (AlCl3) on the components of both primary and secondary hemostasis in rats.

Methods: Rats were divided into two groups and administered repetitive doses of either normal saline or physiological AlCl3 (0.5 mg/kg) for 30 days. In a separate group, aspirin (25 mg/kg) was administered for seven days as a positive control. At the end of the trial, liver damage was evaluated and bleeding time (BT), platelet count; levels of thromboxane B2, platelet aggregation as a function of the platelet function analyzer (PFA-100) assay, prothrombin time (PT) and activated partial thromboplastin time (aPTT) were assessed.

Results: Severe liver damage and enhanced serum levels of both ALT and AST were seen in AlCl3 intoxicated rats. Concomitantly, repetitive administration of a physiological dose of AlCl3 resulted in normocytic anemia associated with significantly decreased bleeding time (98.3%) and increased CEPI-CT (91.5%) and thromboxane B2 (47.3%), without affecting the platelet count. Additionally, AlCl3 significantly increased both the PT (67.2%) and aPTT (33.3%).

Conclusion: Our study is the first in the literature to clearly demonstrate that repetitive physiological administration of AlCl3 inhibits platelet aggregation due to decreased thromboxane synthesis and prolongs the thrombotic process due to liver damage.

Biography

Sultan Ayed Al Qahtani has completed his PhD from University of Manchester, United Kingdom in Hematology & Viral Oncology, Cancer Research, College of Medicine. He has joined the College of Medicine, King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) Saudi Arabia as an Assistant Professor of Hematology & Oncology at the Department of Basic Medical Sciences in 2015. As a Faculty Member, he is involved in teaching and other administrative work. He has been supervising several undergraduate students and has published many articles in journal of international repute.

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