Influence of chelating therapy against aluminum chloride induced immune suppression and hematological disorders in rabbits

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Abstract:

This study aimed to evaluate the capability of chelating therapy in reducing the immunotoxic and hematotoxic effects induced by aluminum chloride (AlCl3). For this purpose, 40 male, adult, New Zealand white rabbits were divided into four groups with 10 animals each [control, AlCl3, and hydroxyethyl-ethylene diaminetriacetic acid (HEDTA) or Tiron plus AlCl3 groups]. Aluminum chloride administered via drinking water in a dose of 20 mg/l for 3 months. After that HEDTA or Tiron was administered i.p. at a dose of 50 and 471 mg/kg b.w., respectively, for 21 days, three times/week. Aluminum chloride-exposed rabbits showed a significant decrease in the number of red blood cells, blood hemoglobin concentration, and hematocrit value. Blood δ-aminolevulinic acid dehydratase activity and heme concentration showed a significant decrease than the control group. Serum IgA, IgG, and IgM levels were also significantly lower in AlCl3-exposed group than control. A prominent exhaustion of lymphoid elements of all investigated lymphoid organs was obtained. Histochemical enzymatic detection revealed weak positive nonspecific esterase or alkaline phosphatase staining reaction in macrophages, T and B lymphocytes, respectively, in AlCl3-exposed group in comparison of strong staining reaction in the control group. The present results indicated that long-term oral exposure to low doses of AlCl3 promotes alterations on hematological indices and some immune parameters in rabbits. In addition, most of the above parameters responded positively with Tiron or HEDTA chelating therapy but the effectiveness of Tiron therapy is more pronounced.

Published In:

Comparative Clinical Pathology, 22, 63-73