

Effect of Amiodarone on the Thyroid Gland of Adult Male Albino Rat and the Possible Protective Role of Vitamin E Supplementation: A Histological and Ultrastructural Study

Authors : Ibrahim Abdulla Labib, Medhat Mohamed Morsy, Gamal Hosny, Hanan Dawood Yassa, Gaber Hassan

Abstract : Amiodarone is a very effective drug, widely used for arrhythmia. Unfortunately it has many side effects involving many organs especially thyroid gland. The current work was conducted to elucidate the effect of amiodarone on the thyroid gland and the possible protective role of vitamin E. Fifty adult male albino rats weighed 200 - 250 grams were divided into five groups; ten rats each. Group I (Control): Five rats were sacrificed after three weeks and five rats were sacrificed after six weeks. Group II (Sham control): Each rat received sunflower oil orally; the solvent of vitamin E for three weeks. Group III (Amiodarone-treated): each rat received an oral dose of amiodarone; 150 mg/kg/day for three weeks. Group IV (Recovery): Each rat received amiodarone as group III then the drug was stopped for three weeks to evaluate recovery. Group V (Amiodarone + Vitamin E-treated): Each rat received amiodarone as group III followed by 100 mg/kg/day vitamin E orally for three weeks. Thyroid gland of the sacrificed animals were dissected out and prepared for light and electron microscopic studies. Amiodarone administration resulted in loss of normal follicular architecture as many follicles appeared either shrunken, empty or contained scanty pale colloid. Some follicles appeared lined by more than one layer of cells while others showed interruption of their membrane. Masson's Trichrome stained sections showed increased collagen fibers in between the thyroid follicles. Ultrastructurally, the apical border of the follicular cells showed few irregular detached microvilli. The nuclei of the follicular cells were almost irregular with chromatin condensation. The cytoplasm of most follicular cells revealed numerous dilated rough endoplasmic reticulum with numerous lysosomes. After three weeks of stopping amiodarone, the follicles were nearly regular in outline. Some follicles were filled with homogenous eosinophilic colloid and others had shrunken pale colloid or were empty. Some few follicles showed exfoliated cells in their lumina and others were still lined by more than one layer of follicular cells. Moderate amounts of collagen fibers were observed in-between thyroid follicles. Ultrastructurally, many follicular cells had rounded euchromatic nuclei, moderate number of lysosomes and moderately dilated rough endoplasmic reticulum. However, few follicular cells still showing irregular nuclei, dilated rough endoplasmic reticulum and many cytoplasmic vacuoles. Administration of vitamin E with amiodarone for three weeks resulted in obvious structural improvement. Most of the follicles were lined by a single layer of cuboidal cells and the lumina were filled with homogenous eosinophilic colloid with very few vacuolations. The majority of follicular cells had rounded nuclei with occasional detection of ballooned cells and dark nuclei. Scanty collagen fibers were detected among thyroid follicles. Ultrastructurally, most follicular cells exhibited rounded euchromatic nuclei with few short microvilli were projecting into the colloid. Few lysosomes were also noticed. It was concluded that amiodarone administration leads to many adverse histological changes in the thyroid gland. Some of these changes are reversible during the recovery period however concomitant vitamin E administration with amiodarone has a major protective role in preventing many of these changes.

Keywords : amiodarone, recovery, ultrastructure, vitamin E.

Conference Title : ICMMA 2015 : International Conference on Microscopic and Macroscopic Anatomy

Conference Location : Venice, Italy

Conference Dates : August 13-14, 2015