Effect of all-trans-retinoic acid on the structure of thyroid gland and pituitary thyrotrophs in streptozotocin-diabetic male rats

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Abstract:

Background: Diabetes mellitus, a chronic disease with increasing prevalence worldwide, is known to be associated with thyroid disorders. Retinoic acid, a metabolite of vitamin A, is currently used for the treatment of diabetes and obesity. Aim of the work: The present study aimed to evaluate the possibility of using all-trans-retinoic acid (atRA) in reducing the structural changes of the thyroid gland and pituitary thyrotrophs in streptozotocin-induced diabetic rats. Materials and methods: Thirty adult male albino rats were divided into three equal groups: group I, control; group II, which included rats in which diabetes was induced by a single intraperitoneal injection of streptozotocin (100 mg/kg); and group III, which included rats in which diabetes was induced as in group II, followed by an intraperitoneal injection of atRA (2.5 mg/kg/day) from the third day. After 4 weeks, thyroid and pituitary specimens were processed for light and electron microscopic study. Results: Most thyroid follicles of diabetic rats were distended with colloid and lined with flattened thyrocytes with hyperchromatic nuclei and vacuolated cytoplasm that contained dilated rough endoplasmic reticulum, few colloid droplets, and few lysosomes. Some exfoliated cells were observed in the lumen. C cells had rarefied cytoplasm containing a few secretory granules. The number of mast cells showed a nonsignificant change. Thyrotrophs showed dilated rough endoplasmic reticulum, destroyed mitochondria, and decreased secretory granules. The atRA-treated diabetic group showed almost the same structural alterations in the thyroid gland, with even more changes in thyrotrophs. Conclusion: Despite its current use as a novel therapy for diabetes, atRA exerted no ameliorating effect on diabetes-induced histological changes in the thyroid gland and, moreover, exacerbated the changes of pituitary thyrotrophs.

Keywords:

all-trans-retinoic acid, diabetes mellitus, pituitary, thyroid

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