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Effect of mercuric chloride on the thyroid cycle of mice, *Musculus albinus*

R. S. Sisodia, M. Mehar, N. Pandit and L. Bhattacharya*

Endocrinology and Physiology Unit, School of Studies in Zoology and Biotechnology, Vikram University, Ujjain - 456010, Madhya Pradesh, (India).

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Corresponding Author
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ABSTRACT

Effects of mercuric chloride on the thyroid cycle of infant mice were investigated. The newborn animals were treated (through their mothers milk) with 0.5 ml/ day of 0.5 ppm aqueous solution of mercuric chloride for a period of 7, 14 and 21 days. The administration of mercuric chloride exhibited hypertrophied epithelial cells, acolloidal condition, necrotic debris of deformed colloid and epithelial layers. The intrafollicular proliferation of epithelial cells was prominent in treated group of infant mice. The follicular diameters of thyroid follicles significantly (P < 0.001) deceased and E/T ratio was found to increase in the treated group. The percentage of blue, red and yellow colloid bearing follicles exhibited that the population of blue follicles get reduced while red and yellow follicles showed higher percentage in treated group. The other parameters like cholesterol, T3, T4 and thyroid peroxidase also showed variations during treatment.

INTRODUCTION

Environmental pollutants such as pesticides and heavy metals affect thyroid function (Beard and Rawlings, 1999; Watanabe *et al.,* 1999; Ellingsen *et al.,* 2000; Rathore *et al.,* 2002). Long term work place exposure to Hg interferes with thyroid metabolism by reducing T4 deiodination (Ellingsen *et al.,* 2000). Whereas prenatal and postnatal exposition of humans or animals to PCBs resulted in hormonal changes and neuro development deficits (Jacobson and Jacobson 2002; 2003; Vreugdenhil *et al.,* 2002a,b; 2004). Further, there is little information regarding the effect of heavy metals on the thyroid cycle of new born animals though these pollutants are known to enter the infant body through mother's milk.

The present investigation was undertaken to study the effect of mercuric chloride on thyroid cycle of infant mice with special reference to thyroid histology, cholesterol level, triiodothyronine (T3), thyroxine (T4) and thyroid peroxidase (TPO) for a period of 21 days duration at the dose of 0.5 ppm of mercuric chloride.

MATERIALS AND METHODS

Experimental animals

A total number of 32 lactating female mice were randomized into two groups with their offsprings each consisting of 16 lactating females and 96 infants.

Group-I : Control group : 96 infant mice were kept in this group and were given standard diet via mother's milk upto age of 7, 14 and 21 days.
Group-II : Treated group : 96 infant mice were kept in this group and were given standard diet and 0.5 ml/day aqueous mercuric chloride solution via mother's milk up to the age of 7, 14 and 21 days.

After the scheduled treatment all animals were sacrificed and thyroid were immediately dissected out and fixed in 10% formalin and Bouins fluid. After 24 hrs. thyroid were washed with water and dehydrated in graded series of alcohols, cleared in xylene and finally embedded in paraffin wax. Sections were cut at 5-6 µ and stained with haematoxylin eosin and Mallory's triple stain and permanent slides of thyroid of different groups were prepared as per the standard protocol.

RESULTS AND DISCUSSION

The histopathological studies of the thyroid gland of infant treated with safe dose of mercuric chloride showed decreased activity of thyroid follicles and as well as hormonal level in damaged tissue.

7 days treatment: The postpartum period of newborn