Hypothyroidism Effects on Testes and Adrenal Glands

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Abstract

The functional relationship between thyroid, adrenal glands and tests was investigated using adult male rats. Hypothyroidism was produced by the administration of thiouracil in drinking water for 20 days. Hypothyroidism causes decrease in the weight of testes and adrenal gland which used as indicator for their functions as bioassay.

Introduction

The biological importance of the thyroid gland has been recognised for years. In response to reduced levels of thyroid hormones, the adrenal cortex has been known to shrink (Kamilaris, et al., 1991) and to enlarge under the influence of excess amounts of thyroid hormones (Boler & Moore, 1982; Sperelakis and Bank, 1998).

In addition to the adrenal gland, it has been reported that hypothyroidism can produce menstrual disorders, amenorrhea or sterility (Hacker & Moor, 1992), and testicular disfunction in adult men (Wortsman el al., 1987). Hypothyroidism decreases the plasma concentrations of luteinizing hormone (LH) and follicle stimulating hormone (FSH) . Hypothyroidism was associated with adrenal glands dysfunction and gonadotrophs. (Jannini et al., 1990):

Materials and Methods

Ten adult male rats (3 00±25 gm weight) were used, divided into two groups, control group and treatment group. Each consists of five animals. The diet and water were available ad. libitum. Hypothyroidism was produced by administration of 0.04% thiouracil in the drinking water of the treatment group for 20 days.

To study the effects of the hypothyroidism by bioassay, the animals were killed after the administration of thiouracil. After killing the animals, testes and adrenal glands were removed and weighted. Statistical analysis according to Steel & Torrie (1980).

Results

Adrenal weights were significantly lower (p<0.05) in the treatment group animals (43 ± 2.2 mg) as compared with control group animals (65.1±4.6 mg ), and there was decrease in the testicular weights of the treatment group animals (2.9 ± 0.3 mg) as compared with the testicular weights of the control group animals (3.2 ± 0.2 mg), but this decrease was non significant (p>0.05) as shown in following table.
Discussion
Hypothyroidism results in a decrease in the adrenal weights. The change in the adrenal weights due to the decrease in the plasma and pituitary levels of adimocorticotropic hormone (ACTH) according to study of (Murakami et. al., 1984) exploring the effect of hypothyroidism on the circadian adrenocortical rhythm in rats. Thyroidectomy resulted in a decrease in plasma and pituitary level of (ACTH).

Hypothyroidism also affects the gonadotroph functions, pituitary content of luteinizing hormone (LH) and pituitary responsiveness to gonadotropin-releasing hormone (GNRH) for luteinizing hormone release was significantly lowered in hypothyroidism (Jannini et al., 1990; Dalon & Carry, 1999).

The inhibition of gonadal function in hypothyroidism animals is primary mediated by the suppression at hypothalamic-pituitary levels (Bruni, et. al., 1975; Wortsman, et al., 1987) It has reported that hypothyroidism is associated with a decrease in the plasma levels of (LH) and (FSH) (Bruni, et al., 1975; Becker, et al., 1990).

References

Table: The adrenal and testicular weights of control group animal, and the treatment group animals.

<table>
<thead>
<tr>
<th>Group</th>
<th>No. of animals</th>
<th>Adrenal weights (mg)</th>
<th>Testicular weights (mg)</th>
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</thead>
<tbody>
<tr>
<td>Control</td>
<td>5</td>
<td>65.1 ± 4.6</td>
<td>3.2 ± 0.2</td>
</tr>
<tr>
<td>Treatment</td>
<td>5</td>
<td>43.3 ± 2.2</td>
<td>2.9 ± 0.3</td>
</tr>
</tbody>
</table>

- Significant difference P<0.05.

