STUDY OF THE CALCIUM ION LEVELS IN HYPOTHYROIDISM’S WOMEN IN KARBALA PROVINCE

Zahraa Ch. Hameed*, Aiyat Alshugary, Naseer Abdul Ameer

Alsa wa University College, Iraq

*Corresponding author E-mail:zahraa.jasib@alsafwa.edu.iq

ABSTRACT

This research included the study of thyroid hormones activities with calcium ion levels, in women with hypothyroidism in the province of Karbala. To achieve this aim 100 samples were arranged in two groups, 60 samples were patient women with hypothyroidism attending Imam Hussein medical city, and (40) healthy women as control. The results appear decrease in concentration of (T3) and (T4). While the results appear increased in concentration of (TSH), and appear no difference in calcium ion levels in hypothyroidism women compared with those non-hypothyroidism women (control group).

Keywords: Hypothyroidism, Calcium ion, Thyroid-stimulating hormone (TSH), Triiodothyronine (T3), Thyroxine (T4)


INTRODUCTION

The calcium ion is a body’s rich divalent action, indirectly regulated by thyroid hormones, in the skeletal system; the calcium ion forming about 99% and rapidly replaceable of blood about 1%. Outside the bones circulates in the serum, the calcium ion founded in lesser amounts, partially bound to proteins and ionized partially. This ion has a chief characters in the diffusion of nerve tissues (nerve cells), because it has normally cardiac beat and has a dynamic characters in heart accomplishment potentially, heart leader automaticity and also complicated to coagulation of blood and hormones secretions(1).

Many various cellular processes such proliferation, variation, secretions, cells death and motility regulated by the intracellular calcium ion because the intracellular calcium is a key of intracellular second messenger. While the calcium ion that founded in extracellular is essential for coagulation of blood, role of muscles and maintenance of the integrity of skeletal(2,3).

Balance calcium is closely regulated though the interactions among the vitamin D, parathyroid hormone (PTH) system, renal excretion, bone reabsorption and gastrointestinal absorption (4).

The metabolism of calcium and regulation of it, controlled by the thyroid gland through secreting when needed. The hormone (thyroid stimulating hormone) is a key for regulating the thyroid gland metabolism for producing two hormones thyroxin (T4) and triiodothyronine (T3). The main products of thyroid gland isthyroxin, it converts in the outside via deiodenation to triiodothyronine, it is the chief living activity of the
hormones of thyroid gland. The thyroid stimulating hormone (TSHs) is regulated by a negative feedback mechanism related to serum levels of free triiodothyronine and thyroxin (5).

**MATERIALS AND METHODS**

The samples were collected from the hospital, Imam Hussein medical city in the province of Karbala. Blood samples were collected from women in a laboratory, 100 samples were patients with hypothyroidism (women) and (40) samples from healthy women (control). All the patients and control, the average age was 25–30 years, serum samples separating from blood, blood samples were placed in tubes (without coagulants materials). Then, these tubes were centrifuged for 10 min at 3000 rpm, and used another plan tube and gave a special number to keep the serum.

- Determination of levels of calcium by Spectrophotometer according to Biolabo kits.
- Hormonal test procedure (T3-T4-TSH) by ELISA, according to Biolabo kits.

**Statistical Analysis**

The results of this study include means ± standard analytic by SPSS program and t-test for testing the differences between groups depending on (P < 0.05) as minimum significant levels between the study groups.

**RESULTS**

The results show decrease (p<0.05) in T3 concentration in hypothyroidism group compared with control (0.79 ± 0.41, 1.14 ± 0.07, respectively), also the results of T4 show lower (p<0.05) in hypothyroidism groups (2.88 ± 1.69 μg/dl) compared with control (9.13 ± 1.33 μg/dl), while show increase (p<0.05) of TSH concentration of hypothyroidism (78.75 ± 20.55 μIU/ml) in a comparison with the control (1.87 ± 0.07 μIU/ml), and the results show non- different (p<0.05) in calcium concentration in hypothyroidism group compared with control (9.14 ± 0.66, 9.08 ± 0.09, respectively) (Table 1).

Table 1: The means of T3, T4, TSH and calcium levels in hypothyroidism (women) and healthy women (control group).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Groups</th>
<th>Triiodothyronine (T3) (ng/ml)</th>
<th>Thyroxine (T4) (μg/dl)</th>
<th>Thyroid-stimulating hormone (TSH) (μIU/ml)</th>
<th>Calcium levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First group (hypothyroidism persons)</td>
<td>0.79± 0.41*</td>
<td>2.88± 1.69*</td>
<td>78.75±20.55*</td>
<td>9.14±0.66</td>
</tr>
<tr>
<td></td>
<td>Control group (healthy persons)</td>
<td>1.14± 0.07</td>
<td>9.13± 1.33</td>
<td>1.87± 0.07</td>
<td>9.08±0.09</td>
</tr>
</tbody>
</table>

- Values are means ± SD.
- Means with asterisk * found significantly differences at p<0.05.

**DISCUSSION**

This research was carried out to determine the calcium ion levels in hypothyroidism women compared with healthy women as control. Through this study was observed no differences in the concentration of calcium ion. While founded decreased in thyroid hormones (T4, T3) levels, and the concentration of TSH was increased. The deficiency of thyroid hormones, lead to one of the most common endocrine diseases called hypothyroidism, with a wide clinical manifestations ranging from metabolic disorders to cardiovascular disease, electrolyte, and mineral disturbances (6). The sensing receptor of calcium characterizes by the molecular mechanisms by the effect of parathyroid cell distinguish modification of calcium ionized concentrations in blood and modify (PTH) secretion to keep the levels of calcium in serum within a slight physiologic range (7). Dependent on various research that reported that the blood calcium Ca$^{2+}$ levels were curiously steady in healthy persons because of the hemostatic system including the action of many calcitropic hormones on the bones. Thus, the parathyroid hormone (PTH) secretion dependent on calcium (Ca$^{2+}$) greatly and signify the simple negative feed-back loop. The levels of parathyroid hormones in the serum is low and the secretion of parathyroid hormone is not completely suppressible; though, the parathyroid hormones secretion regulated by extracellular calcium in relatively slight range (8,9). The main effects of parathyroid hormones (PTH) is to keep the calcium (Ca$^{2+}$) in normal range. The bones were reabsorbing releasing calcium into extracellular fluids by stimulating of parathyroid hormones (PTH). There are found two effects lead to increase the concentration of calcium principally: (1) the first effect is a rapid, parathyroid hormones (PTH) decrease the excretions of the calcium by the kidney, (2) the second effect of parathyroid hormones to raise the phosphate and calcium absorption from the bones (9,10,11). In other studies disagree with this study, thyroid hormones effects on renal calcium, then, thyroid hormone were rise in hypothyroidism patients and fall in hyperthyroidism patients (12). Other researches showed the raised of the levels in free and total thyroxin hormone (T4) and also have been described in patients, when severe psychiatric diseases, iodinated differences representative, have also raised thyroxin hormone (T4) levels by inhibiting outer conversion of thyroxin (T4) to Triiodothyronine (T3). In patient with most severe mono thyroid diseases, the thyroxin (T4) was decreased (13). While other studies showed the calcium (Ca$^{2+}$) levels significantly fall in patients when have great Thyroid-stimulating hormone (TSH) levels in comparison with (TSH) normal (14).

**CONCLUSION**

No difference in calcium ion levels in hypothyroidism women compared with the control group.

**ETHICAL CLEARANCE**

The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**CONFLICT OF INTEREST**

The authors declare that they have no conflict of interest.

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REFERENCES


