Features of Vitamin D Metabolism in Women of Reproductive Age in the Background of Obesity

Nazarova A. B.

Bukhara State Medical Institute Abu Ali ibn Sina, Department of Endocrinology

Abstract. Vitamin D deficiency is very common in women of reproductive age. Vitamin D deficiency is very common in women of reproductive age [1,2,4]. The physiological role of vitamin D in reproduction remains controversial. In humans, low maternal vitamin D levels have been associated with adverse maternal and fetal outcomes, including preeclampsia [3,6,7], gestational diabetes mellitus, low for gestational age, and low birth weight. Along with its influence on many vital processes in the human body, vitamin D plays a very important role in regulating reproductive function in both women and men. Several studies have reported that vitamin D deficiency affects both insulin secretion and insulin resistance. Insulin resistance is a hallmark of obesity, one of the most common endocrine diseases affecting women of reproductive age [5,8]. D-hormone is able to act on the reproductive organs directly, through binding to its receptor (VDRs in women are detected in the ovarian tissue, endometrium, fallopian tubes, as well as in the decidua and placenta; in men, VDRs are expressed in the smooth muscles of the epididymis, spermatogonia, Sertoli cells, seminiferous tubules, prostate gland and seminal vesicles), and indirectly, through stimulation of the synthesis of steroid hormones (estrogens, progesterone, testosterone), which are necessary for proper maturation of follicles and endometrium in women and normal spermatogenesis in men [9-14].

Key words: reproductive age, vitamin D deficiency, obesity, infertility, hormone.

Purpose of the study: to evaluate the level of 25 (OH) D with endocrinological parameters related to reproduction, including follicle-stimulating hormone (FSH), luteinizing hormone (LH), thyroid hormones, especially thyroid-stimulating hormone (TSH), free thyroxine (T4free), antibodies to thyroid peroxidase (Anti-TPO), anti-Mullerian hormone (AMH), testosterone, estradiol as well as hematological and biochemical parameters.

Materials and methods of research. The study was conducted on 53 healthy women of reproductive age (mean age 27.0 years). We measured serum levels of both total and free 25(OH)D, endocrinological, hematological and biochemical parameters. Spearman's rank correlations were performed to evaluate the correlation between 25(OH)D metabolites and selected parameters. Blood was collected between days 2 and 5 of the menstrual cycle. All studies were conducted at the Department of Obstetrics and Gynecology No. 2 of the Bukhara State Medical Institute, as well as at the Bukhara Regional Endocrinological Dispensary. Written consents were taken from all patients for examination.
Research results. showed that 35 women had abdominal obesity (WC≥80 cm), which was 75.2%, while normal WC values were determined in 18 (24.8%) women. Serum 25(OH)D levels ranged from 8.2 to 49.0 ng/ml (mean value 46.75 ± 7.61 ng/ml). It turned out that all overweight and obese women examined had 25(OH)D levels below control values. At the same time, 48 (56.4%) women had a deficiency or deficiency of vitamin D (43.6% - 37 women).

It was found that in women with normal body weight the level of 25(OH)D in the blood was higher than in women with overweight and obesity (42.87±4.32 ng/ml; p<0.05), with In this case, 8 women (26.6%) had a deficiency, the remaining 22 (73.4%) had 25(OH)D within normal limits. At the same time, women with vitamin D deficiency had the highest body weight (Table 1).

Table 1. Characteristics of the examined women depending on the vitamin D content and correlation of biochemical markers.

<table>
<thead>
<tr>
<th>Options</th>
<th>Control n-30</th>
<th>Serum 25 (OH)D level ng/ml</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>32.5±0.9</td>
<td>31.5±1.4</td>
<td>35.8±0.1</td>
</tr>
<tr>
<td>Body weight, kg</td>
<td>91.4±0.5</td>
<td>92.8±0.9*</td>
<td>87.9±1.0</td>
</tr>
<tr>
<td>Height, cm</td>
<td>165.7±0.8</td>
<td>164.5±0.2</td>
<td>166.9±2.8</td>
</tr>
<tr>
<td>BMI, kg/m2</td>
<td>34.0±1.7</td>
<td>33.9±2.7*</td>
<td>34.1±7.1</td>
</tr>
<tr>
<td>WC, cm</td>
<td>88.2±3.8</td>
<td>93.6±5.8*</td>
<td>90.4±3.1</td>
</tr>
<tr>
<td>Vitamin D, ng/ml</td>
<td>46.9±9.6</td>
<td>23.4±5.6*</td>
<td>17.9±3.5*</td>
</tr>
<tr>
<td>Blood glucose, fasting, mmol/l</td>
<td>4.0±0.5</td>
<td>4.2±0.3</td>
<td>5.2±0.7</td>
</tr>
<tr>
<td>Insulin in blood, IU/l</td>
<td>7.7±4.0*</td>
<td>12.5±3.7</td>
<td>19.5±7.3*</td>
</tr>
</tbody>
</table>

Note: *p<0.05 – significant in relation to the study group

As can be seen from Table 1, the lack and deficiency of 25 (OH)D in the blood serum is reflected in the increase in body weight and BMI. Thus, if in the group with a normal vitamin D content the body weight was 91.4±0.5 kg, then in the group with a deficiency of this vitamin the weight was significantly higher than 92.8±0.9 kg (p<0.05). The same changes in BMI and WC were observed with increasing vitamin D deficiency. Evidence suggests that vitamin D deficiency may be involved in the pathogenesis of insulin resistance and metabolic syndrome [8–9], while the role of the vitamin in relation to endocrine parameters and fertility in MS is less clear. Our study showed comparable correlations of total and free 25(OH)D with endocrinological parameters.

Discussion. This study compared total 25(OH)D and free 25(OH)D in healthy women of reproductive age. Measurements of total vitamin D and free vitamin D correlated well. Both showed comparable correlations with reproductive endocrinological, hematological, liver function parameters, thrombophilia parameters and anemia-related parameters. Evidence suggests that vitamin D may play an important role in regulating female fertility. Low vitamin D levels are associated with adverse maternal and fetal outcomes and are implicated in the development of certain gynecological conditions that affect fertility, such as endometriosis and polycystic ovary syndrome (PCOS). The strength of the correlation between free and total 25(OH)D and endocrinological, hematological and biochemical parameters was similar in healthy women of reproductive age. Thus, both methods of analyzing vitamin
D status in healthy women of reproductive age from the point of view of assessing endocrine fertility parameters are suitable tools.

**Conclusion.** The relationship between obesity and reproductive dysfunction has long been proven. At the same time, it is known that weight loss improves this function in overweight and obese women. It is especially important that women with this pathology who visit specialized specialists receive the necessary recommendations and support aimed at reducing body weight. Weight loss is most often achieved by changing diet and increasing the level of physical activity and taking vitamin D in recommended doses helps to quickly restore these functions.

**Literature:**


