The Role of Vitamin D Sufficiency in the Formation of Benign Diseases of the Mammary Glands

Inoyatova Nodira Miranvarovna
Associate Professor, PhD «Center for the development of professional skills of medical staff» of the Ministry of Health of the Republic of Uzbekistan Department of Obstetrics, Gynecology and Perinatal Medicine
nodira.68@mail.ru

Asatova Munira Miryusupovna
Department of Obstetrics, Gynecology and Perinatal Medicine head of the department, Professor

Abstract: Benign diseases of the mammary glands, being a "mirror" of the hormonal background of a woman, create an unfavorable background for the development of breast cancer. A link has been established between the development of breast cancer and low blood levels of vitamin D in women. Given the above, the purpose of this study was to evaluate the status of vitamin D and the relationship with benign breast diseases. 111 women were examined, with the study of risk factors, with the determination of quantitative 25-OH vitamin D in blood serum and ultrasound examination of the mammary glands. All women were divided into two groups: group 1 - 78 women of reproductive age (22-49 years), group 2 - 33 women of menopausal age (50 years and older). The average age of group 1 was 37.8 years, group 2 - 54.9 years. 98.7% of women of reproductive age and 98% of postmenopausal women had vitamin D deficiency or insufficiency. The frequency of mastopathy according to ultrasound diagnostics was 61.5% in group 1 and 24.2% in group 2. In the group of women of reproductive age, benign diseases of the mammary glands were three times more common than in the group of older women, apparently, this is due to the presence of a hyper estrogen state. There are a lot of risk factors for the development of dys hormonal diseases of the mammary glands, vitamin D deficiency is one of them.

Keywords: risk factors, vitamin D, dys hormonal diseases of the mammary glands, sonography of the mammary glands.

Relevance. Vitamin D deficiency is now recognized as a global pandemic. There are a number of publications in the literature that emphasize its important role in numerous physiological functions of the human body. The association of vitamin D with many acute and chronic diseases, including disorders of calcium metabolism, autoimmune diseases, certain types of cancer, type 2 diabetes mellitus, cardio vascular and infectious diseases, has been reliably proven [3,6]. The development of gynecological and obstetric problems is also affected by low levels of vitamin D [3].

The mammary gland is under constant hormonal influence and is the target for various influences from other organs. This is the reason for the increase in the incidence of the mammary gland, which is one of the medical and social problems. According to WHO data, 2.2 million new cases of breast cancer were registered in 2020 [2]. This problem worries both onco logists-mammologists and gynecologists in the aspect of both cancerous and non-cancerous diseases of the mammary glands. The frequency of diffuse fibrocystic mastopathy is 39-60% in the general population, increasing to 35-90% in gynecological patients [4,5]. Being a benign disease, diffuse mastopathy leads to an increase in the risk of oncopathology by 2 or more times. To date, a link has been established between breast cancer and low vitamin D levels [1,6,7]. At the same time,
there is not enough data on the relationship between vitamin D and the development of benign diseases of the mammary glands.

Given the above, the purpose of this study was to assess the status of vitamin D and the relationship with benign breast diseases, depending on age. The study was conducted in the clinic of the City Perinatal Center. The study involved 111 women, whose average age was 46.3 years.

Materials and methods. A thorough medical history was taken to identify factors contributing to the development of breast diseases. To determine the state of the mammary glands, an ultrasound examination was performed, if necessary, mammography.

The initial level of 25-OH vitamin D in blood serum was carried out by in vitro chemiluminescent immunoassay using an automatic chemiluminescent immune assay analyzer of the MAGLUMI series, as the most sensitive of all methods. In clinical practice, the 25-hydroxyvitamin D test is used to measure the amount of vitamin D in the body, its concentration is considered the best indicator of vitamin D status. The results of this test are used to diagnose vitamin D deficiency, so its use is indicated when there is a high risk of developing this condition, and also in the case when the results obtained can serve as confirmation of the need to start intensive treatment.

Research results. We examined 111 women aged 25 to 60 years. All women were divided into two groups depending on age: group 1 - 78 women of reproductive age (22-49 years), group 2 - 33 women of menopausal and postmenopausal age (50 years and older). The average age of group 1 was 37.8 years, group 2 - 54.9 years.

Careful history taking showed that active smokers were 2.6% of women in group 1 and 6.1% of women in group 2, while passive smoking occurred in 26.9% of women of reproductive age and 18.2% of menopausal age. In nutrition, the intake of preservatives, smoked meats was noted in the first group in 52.6% and in the second group in 54.5%. The frequency of artificial termination of pregnancy was recorded 2 times more often in the group of women of menopausal age at 57.6%, while in the group of women of reproductive age the frequency was 29.5%, apparently, this is due to better access to contraceptive methods. The study of heredity in both groups showed that the presence of a family history of close relatives of breast cancer in the first group was in 17.9% (in 14 women), while in one patient breast cancer was registered in 2 generations (mothers and grandmothers), in the second group - in 12%. All women underwent sonographic examination of the mammary glands. When conducting ultrasound of the mammary glands in women of reproductive age, fibrocystic mastopathy was found in 48.7% (38 women), fibrocystic mastopathy in 12.8% (10 women), fibroadenoma in 5% (4 women). In women of menopausal age, fibrocystic mastopathy was found in 15.2% (5 women), fibrous mastopathy - 9.1% (3 women), fibroadenoma - in 3.0% (1 woman). The presence of calcifications of both mammary glands was confirmed in a 66-year-old patient, who was diagnosed early, and a consultation with an oncologist was recommended. Thus, dysfunctional changes in the mammary glands were 3 times more diagnosed in women of reproductive age according to ultrasound diagnostics than in women of menopausal age. For reproductive age, the most common problem in the development of gynecological problems is a hyperestrogen background with the development of proliferative changes, and the mammary gland reflects all dysfunctional pathological changes that occur in a woman's body [8].

The next step was to conduct an analysis to determine the quantitative determination of 25-OH vitamin D in the blood serum. To interpret the results, the most commonly recommended concentrations of 25(OH) vitamin D were used: an indicator of up to 10 ng / ml (25 nmol / l) is interpreted as a pronounced deficiency, 11-20 ng / ml (50 nmol / l) indicates a deficiency, 21-30 ng/ml (51-75 nmol/l) – deficiency, with values above 30 ng/ml (75 nmol/l), the concentration of vitamin D has an adequate level [9].
Table 1. Assessment of vitamin D levels in the study groups.

<table>
<thead>
<tr>
<th>Vitamin D Status</th>
<th>1 group (n=78)</th>
<th>2 group (n=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D deficiency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe vitamin D</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vitamin D deficiency</td>
<td>66 (84,6%)</td>
<td>26 (78,8%)</td>
</tr>
<tr>
<td>Adequate levels of vitamin D</td>
<td>1 (1,3%)</td>
<td>1 (3%)</td>
</tr>
</tbody>
</table>

As can be seen from this table, there was no significant vitamin D deficiency in women of both groups. However, in both groups, both vitamin deficiency was noted in 84.6% and 78.8%, respectively, and insufficiency in 14.1% and 18.2%, respectively. Analysis of the initial content of vitamin D in the blood showed that the values in group 1 ranged from 11.23 ng/ml to 24.32 ng/ml and averaged 16.4+1.6 ng/ml. An adequate level was observed only in 1.3-3% of women from the two groups (mean value was 50.8 ng/ml). At the same time, a female patient of reproductive age with an adequate vitamin D content (66.7 ng/ml) was also diagnosed with fibroadenoma. All patients with vitamin D deficiency and insufficiency were given recommendations for correction, and therapeutic doses were prescribed [9]. Conclusion. Despite the high incidence of vitamin D deficiency (98.7% in women of reproductive age and 98% in postmenopausal women) in both groups, the frequency of benign breast diseases according to ultrasound diagnostics was 61.5% in group 1 and 24.2% in group 2. At the same time, in the group of women of reproductive age, benign diseases of the mammary glands were three times more common than in the group of older women. Probably, the most important factor in the development of benign diseases of the mammary glands is the presence of a hyper estrogen background, i.e. excessive exposure to estradiol, which has mitotic activity on the epithelium. On the other hand, a lack of progesterone, which develops against the background of hyperestrogenism, leads to a violation of the receptor apparatus, which in turn also increases the risk of breast diseases. The relationship of vitamin D with diseases of the mammary glands has been shown in various studies, in which the emphasis is most often on the ant proliferative apoptosis-regulating effect [3,6]. A meta-analysis of prospective studies found a strong inverse relationship between serum vitamin D levels and breast cancer risk in postmenopausal women. In another large study of 252,000 women over 50 years of age with inadequate levels of vitamin D, daily prophylaxis for an average of 5 years did not affect the incidence of invasive breast cancer. At the same time, the normalization of the level of vitamin D in the blood in patients with initial hypovitaminosis made it possible to reduce the total incidence of tumor processes and mortality from them. There are a lot of risk factors for the development of dys Hormonal diseases of the mammary glands, one of them is vitamin D deficiency [8]. In this connection, all women, especially those with risk factors for breast cancer, need to determine the total 25 (OH) D in the blood serum, followed by an adequate correction.

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