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THE EFFECT OF VITAMIN D ON THE LIVER IN WOMEN OF REPRODUCTIVE AGE (LITERATURE REVIEW)

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Abstract: Currently, much attention is paid to vitamin D as a hormone. It is synthesized in the skin under the influence of ultraviolet rays from a compound that has an affinity for steroid hormones such as estrogens, progesterone, testosterone. It also participates in hormonal regulation, maintaining homeostasis, reduces the growth of cancer cells. Vitamin D 3 (cholecalciferol) is widely used in obstetrics and gynecology for the purpose of prevention and treatment in combination. Vitamin D 3 participates in the growth and division of liver cells, prevents further inflammation and activates the local immunity of the organ and resists fibrosis.

Key words: liver, vitamin D 3, reproductive age, cholecalciferol, hormone D.

Cholecalciferol metabolism

Vitamin D3 is formed in the deep layers of the skin epidermis under the influence of ultraviolet radiation. In the epidermis, it binds to the protein that binds vitamin D and albumin, where 60% of it enters the liver through the general bloodstream. Despite the fact that vitamin D3 has the greatest metabolic activity, vitamin D itself is not biologically active. Upon reaching the liver, it passes into its active form 25-hydroxyvitamin D (25(OH) D) or another name calcidiol , and in the kidneys calcetriol . Its lifespan is 3 weeks. It is the end product of liver metabolism, whose properties are equivalent to steroid hormones. In this regard, it is called hormone- D . The main processes of biotransformation occur in the skin, liver, and kidneys.

Biological role of vitamin D

Vitamin D is involved not only in the regulation of calcium-phosphorus metabolism, but also has a number of other important effects. There are receptors in the cells of the vessel wall, brain and immune system to vitamin D. It also affects myocardiocytes, insulin-dependent cells of the pancreas, and the production of steroid hormones .

Vitamin D and the Liver

D occurs in the human body's liver . Since the production of vitamin D directly depends on liver metabolism, a pathological decrease or pathological increase in vitamin D can be an indicator or predictor of liver dysfunction.

Physiological features of liver function in women

The liver plays an important role in the metabolism and biodynamics of steroid hormones. It is responsible for the production of cholesterol and its secretion as the main precursor of sex hormones. When synthesizing cholesterol, the liver also participates in the production of bile and bile acids. The liver is also the basis for the balance between catabolism and anabolism reactions. It is where mutually transforming hormones undergo changes. In women, estrogens first enter the liver, where they undergo an active metabolic process, and only then enter the blood for their implementation in the body.

Pregnancy and the Liver

Pregnancy may temporarily worsen cholestasis in primary liver cirrhosis and other chronic cholestatic disorders, and the increased total plasma volume in the 3rd trimester slightly increases the risk of variceal bleeding in liver cirrhosis. However, pregnancy is usually not harmful to women with chronic liver disease. In severe cases, pregnancy is an important predictor of increasing obstetric complications and should be identified promptly.

Preeclampsia

Severe preeclampsia can cause liver problems with fibrin accumulation in the liver, necrosis and hemorrhage, which can lead to abdominal pain, nausea, vomiting and mild jaundice.

Subcapsular hematoma with intra-abdominal bleeding is occasionally seen , most often in women with preeclampsia progressing to HELLP syndrome (hemolysis, elevated liver enzymes, decreased platelet count). Very rarely, a hematoma of unknown pathogenesis may cause spontaneous liver rupture, which is life-threatening.

The impact of vitamin D3 deficiency on liver cells

Based on recent studies (Matthew T Kitson , Stuart K Roberts 2012) a correlation was found between liver disease and vitamin D deficiency . Vitamin D3 is involved in the growth and division of liver cells, eliminates inflammation, activates local immunity of the organ, and resists fibrosis (scarring). These qualities play an important role in the development and treatment of chronic liver diseases such as fatty hepatosis , viral hepatitis. Research (Mihnea Marian Pomacu, Diana Maria Trașcă) the relationship between vitamin D deficiency and cirrhosis demonstrates that vitamin D3 deficiency increases liver damage by promoting oxidative stress, which affects the survival mechanisms of liver parenchymatous cells. Parenchymatous cells form the structure of the liver and ensure its proper functioning. The therapeutic response to the administration of oral cholecalciferol in patients with liver damage of various origins indicates positive dynamics of the current pathogenetic therapy.

Research was conducted (Kassidy Lundy , John F Greally) concerning liver health and vitamin D deficiency 3. We studied the histopathology and transcriptome profiles of the liver of male C57BL/6J mice exposed to prenatal vitamin D deficiency using a maternal dietary intervention model. We found that prenatal vitamin D deficiency increased the prevalence of histopathological changes in the liver and altered its gene expression profile. Analysis of cell subtype proportions showed that non-parenchymal liver cells, in particular macrophages, a subset of endothelial cells, and dendritic cells, were altered in the liver in prenatal vitamin D deficiency . These results indicate a long-term memory of prenatal vitamin D deficiency in the adult liver, which is a potential risk factor for the health of the offspring.

Considering that vitamin D metabolism occurs with the participation of the liver and its deficiency is associated with an increased risk of developing infectious diseases (Adams , J. S), it is of interest to study the concentration of vitamin D metabolites in patients with liver cirrhosis and establish an association with the development of infections.

Conclusions

Vitamin D deficiency can lead to various liver dysfunctions, such as impaired synthesis of bilirubin, which is a breakdown product of hemoglobin in the blood, and other important enzymes. This can lead to the development of liver diseases such as jaundice and cirrhosis.

In addition, vitamin D has antioxidant properties and helps protect liver cells from damage and restore damaged tissue. It also participates in the regulation of inflammatory processes in the liver, which can help prevent the development of liver diseases.

Thus, vitamin D plays an important role in liver health, and vitamin D deficiency can lead to various liver health problems.

Synthetic vitamin D is said to be better than natural vitamin D for several reasons. First, natural vitamin D, which is found in small amounts in some foods and is produced in the body when exposed to sunlight, breaks down quickly, while synthetic versions of vitamin D are less likely to break down. Second, too much natural vitamin D can cause hypercalcemia , or elevated calcium levels in the blood, which can lead to nausea and vomiting, frequent urination, muscle weakness, and joint pain. Synthetic vitamin D, on the other hand, causes a strong reaction without adding calcium to the blood.

Additionally, the researchers say this new model for treating liver fibrosis may also be useful in treating other diseases with a fibrotic component, including lung, kidney and pancreatic diseases.

List literature

1. Kitson MT, Roberts SK. D- living the message: the importance of vitamin D status in chronic liver disease. J Hepatol . 2012 Oct ;57 (4):897-909. doi : 10.1016/j.jhep.2012.04.033. Epub 2012 May 23. PMID: 22634121.
2. Pomacu MM, Trașcă DM, Pădureanu V, Stănciulescu EC, Busuioc CJ, Pisoschi CG, Bugă AM. Correlations of Serum Vitamin D Level with Markers of Oxidative Stress and Apoptosis in Liver Cirrhosis. Curr Health Sci J 2023 Jan-Mar ;49 (1):54-66. doi : 10.12865/CHSJ.49.01.54. Epub 2023 Mar 31. PMID: 37780191; PMCID: PMC10541071.
3. Lundy K, Greally JF, Essilfie-Bondzie G, et al. Vitamin D Deficiency During Development Permanently Alters Liver Cell Composition and Function. Front Endocrinol (Lausanne). 2022 ;13:860286 . Published 2022 May 12. doi:10.3389/fendo.2022.860286
4. Adams, JS Update in Vitamin D / JS Adams, M. Hewison //
5. J. Clin . Endocrinol . Metab . - 2010. - Vol. 95. - R. 471 –478.
6. Sun, J. Vitamin D and mucosal immune function / J. Sun // Curr . Opin . Gastroenterol . - 2010. - Vol. 26. - R. 591 –595.
7. American College of Obstetricians and Gynecologists' Committee on Obstetric Practice, Society for Maternal-Fetal Medicine. Medically Indicated Late-Preterm and Early-Term Deliveries: ACOG Committee Opinion, Number 831. Obstet Gynecol 138(1):e35-e39, 2021. doi:10.1097/AOG.0000000000004447
8. Ding N, Yu RT, Subramaniam N, et al. A vitamin D receptor/SMAD genomic circuit gates hepatic fibrotic response. Cell. 2013;153(3):601-613. doi:10.1016/j.cell.2013.03.028