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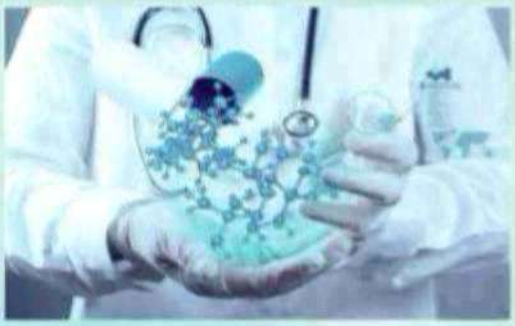

AVICENNA-MED.UZ

ISSN 2181-712X.
EiSSN 2181-2187

10 (84) 2025

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НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE

Илмий-рефератив, маънавий-маърифий журнал
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ООО «ТИББИЁТДА ЯНГИ КУН»

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Журнал был включен в список журнальных изданий, рецензируемых Высшей Аттестационной Комиссией Республики Узбекистан (Протокол № 201/03 от 30.12.2013 г.)

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10 (84)

2025

октябрь

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Received: 20.09.2025, Accepted: 06.10.2025, Published: 10.10.2025

UDC 616.36-003/826

MODERN VIEWS OF THE DEVELOPMENT OF OSTEOPOROSIS IN NON-ALCOHOLIC FATTY LIVER DISEASE (LITERATURE REVIEW AND OWN DATA)

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✓ ***Resume***

This article presents information based on a literature review on the risk factors for osteoporosis in nonalcoholic fatty liver disease, which is the most common digestive system disease and causes disability in the population. It also highlights the importance of molecular and genetic mechanisms for the development of osteoporosis in nonalcoholic fatty liver disease.

Keywords: Nonalcoholic fatty liver disease, osteoporosis, hyperlipidemia, steatosis, vitamin D.

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АЛКОГОЛСИЗ ЁҒЛИ ЖИГАР КАСАЛЛИГИДА ОСТЕОПОРОЗНИНГ РИВОЖЛАНИШИ ҲАҚИДА ЗАМОНАВИЙ ҚАРАШЛАР (АДАБИЁТЛАРНИ ЎРГАНИШ ВА ЎЗ МАЪЛУМОТЛАРИ)

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✓ ***Резюме***

Ушбу мақолада ҳазм тизими хасталиклари орасида энг кўп кузатиладиган ва аҳолининг ногиронлигига сабаб бўлаётган жигар ноалкогол ёғ хасталигида остеопороз ривожланишининг хавф омиллари тўғрисида адабиётлар шарҳи бўйича маълумотлар келтирилган. Шунингдек жигар ноалкогол ёғ хасталигида остеопороз ривожланиши молекуляр-генетик механизмларининг аҳамияти ёритилган.

Калит сўзлар. Жигар ноалкогол ёғ хасталиги, остеопороз, гиперлипидемия, стеатоз, витамин Д.

СОВРЕМЕННЫЕ ПРЕДСТАВЛЕНИЯ О РАЗВИТИИ ОСТЕОПОРОЗА ПРИ НЕАЛКОГОЛЬНОЙ ЖИРОВОЙ БОЛЕЗНИ ПЕЧЕНИ (ОБЗОР ЛИТЕРАТУРЫ И СОБСТВЕННЫЕ ДАННЫЕ)

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✓ ***Резюме***

В данной статье представлена информация, основанная на обзоре литературы, о факторах риска развития остеопороза при неалкогольной жировой болезни печени, которая является наиболее распространенным заболеванием пищеварительной системы и приводит к инвалидизации населения. Также подчеркивается важность молекулярно-генетических механизмов развития остеопороза при неалкогольной жировой болезни печени.

Ключевые слова: неалкогольная жировая болезнь печени, остеопороз, гиперлипидемия, стеатоз, витамин D.

Relevance

Nonalcoholic fatty liver disease (NAFLD) is associated with metabolic disorders - central nervous system obesity, dyslipidemia, hypertension, hyperglycemia, and persistent liver dysfunction. From the studied literature, it is shown that the stages of the disease in NAFLD increase, steatosis, steatohepatitis increase the risk of inflammation in the liver, the inflammatory cytokines increase, the amount of TNF-a and IL-1 in the blood increases, and the development of osteoporosis increases [1,3,7,9,11,12,14].

A number of studies show that BMD may be a risk factor for the development of osteoporosis [7,21-24]. One study conducted by Chinese researchers found a link between NAFLD and osteoporosis in middle-aged and elderly men [2,6]. However, other studies have debated the effect of osteoporosis on NAFLD [2,4,6,8,9].

Osteoporosis is a group of bone diseases caused by various causes, including common factors related to aging, obesity, and sex steroid hormone deficiency, as well as specific risk factors such as glucocorticoid use, decreased bone quality, and impaired microarchitectural integrity [1,3,6,7,9,12,14,17,18]. In most cases, osteoporosis is caused by loss of bone tissue, primarily due to increased bone resorption. Osteoporosis is characterized by low bone mineral density (BMD), bone pain, and easy fractures. Osteoporosis is an insidious disease that may not show symptoms until there are fractures in the bones, and can lead to serious problems and even death when the bones are damaged. Osteoporosis is scientifically proven to occur in 9-38% of women and 1-8% of men over the age of 50 in developed countries. It follows that osteoporosis is not only dangerous for health, but also increases the financial burden of these countries [1,2,4,5,7,8,17].

Many studies have shown that NAFLD is associated with BMD and osteoporosis.

The liver is a source of many proteins, a regulator of bone metabolism and several pathways. Among them, one of the important functions of the liver is the metabolism of vitamin D, which is important in the origin of the relationship between NAFLD and osteoporosis [1,2,3,5,6,9,18].

In addition to its role in calcium and bone metabolism, vitamin D interacts in many tissues. Serum vitamin D levels were found to be significantly lower in patients with NAFLD compared to controls [2,4,6,8,18].

Osteoporosis is associated with many physical diseases or somatic diseases such as estrogen deficiency, endocrine disorders, hypertension and smoking [2,6,8].

Interestingly, patients with NAFLD have a comorbid clinical feature with a clinical presentation similar to osteoporosis. For example, NAFLD is associated with hypertension, dyslipidemia, insulin resistance, and diabetes. Studies have shown that low bone mineral density can be caused by a variety of diseases, including obesity, depression, nephropathy, and heart failure. [1,4,5,7,9,12]. As Duarte and colleagues found, increased inflammation is important in the pathogenesis of NAFLD. High secretion of tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6) in patients with NAFLD; Kupffer cell phagocytosis disorders are important in the development of the disease. Increased production of TNF-α produced by hepatocytes and non-parenchymal cells in patients with NAFLD has been reported in several studies [3,5,9,11,13,15]. Osteopontin, a T-helper, promotes inflammation in several chronic inflammatory diseases, including NAFLD [5,17,18]. Many risk factors: Systemic inflammatory diseases increase the risk of bone loss and osteoporosis. Inflammatory cytokines TNF-a, IL-1 are associated with osteoporosis, and these pro-inflammatory cytokines are important in the development of osteoporosis [1,3,6,9]. Inflammatory cytokines (TNF-a, IL-1, IL-6) are associated with bone resorption by osteoclasts. Osteopontin has both osteoblastic and osteoclastic functions to inhibit bone mineral growth.

Detection of high levels of osteopontin in blood serum, menopause increases the development of osteoporosis [1,2,4,6,8,17]. These tests confirm the risk of bone metabolism and the development of osteoporosis. Vitamin D deficiency increases the risk of osteoporosis. One group of studies found that vitamin D deficiency increases the risk of NAFLD [3,7]. Chinese researchers have studied the relationship between NAFLD and vitamin D. In NAFLD, vitamin D deficiency increases the risk of osteomalacia, bone fractures, and osteoporosis. NAFLD may be a risk factor for osteoporosis due to insulin resistance and increased leptin levels. Other researchers have found that elderly patients with diabetes have an increased risk of developing osteoporosis[1,4,6,11,16]. Serum osteocalcin increases osteoblast expression and insulin secretion. The amount of osteocalcin in patients with NAFLD decreases. Thus, it can be concluded that the risk of developing osteoporosis may increase in NAFLD with insulin resistance. Dyslipidemia is considered a potential risk factor for the subsequent development of osteoporosis in patients with NAFLD. In the program in Taiwan, almost all patients diagnosed with dyslipidemia were widely treated with statins. A meta-analysis shows that men treated with statins had higher bone mineral density at the hip joint and lumbar spine [2,4,6,8,11,12]. It can be concluded that statins may also play an important role in gender differences.

Dyslipidemia is considered a potential risk factor for the subsequent development of osteoporosis in patients with NAFLD. In the program in Taiwan, almost all patients diagnosed with dyslipidemia were widely treated with statins. A meta-analysis shows that men treated with statins had higher bone mineral density at the hip joint and lumbar spine [2,4,5,7,17]. It can be concluded that statins may also play an important role in gender differences.

Conclusion

Thus, based on the literature review and personal data, the following conclusion can be drawn: the association between nonalcoholic fatty liver disease and osteoporosis depends on body mass index and vitamin D status, patient comorbidities, and gender. Also, the relationship between non-alcoholic fatty liver disease and osteoporosis has not been fully studied in different countries.

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Entered 20.09.2025