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Current Issues of Osteoporosis in Women Patients in Family Practice

Некоторые актуальные вопросы остеопороза у женщин в практике семейного врача

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Keywords: osteoporosis, bone fractures, pregnancy associated osteopenia.

Abstract

The article is devoted to the important problem of practical health - osteoporosis, which ranks fourth in the world among noncommunicable diseases. The focus is on mainly postmenopausal osteoporosis in women. In the last years it is considered appropriate to prescribe calcium and vitamin D drugs to pregnant women

with preeclampsia and expressed symptoms of calcium deficiency not only in the third trimester of gestation but also for osteopenia, diagnosed in the first trimester of gestation. Conducting necessary therapeutic measures for this cohort of the population is necessary to maintain their quality of life.

Ключевые слова: остеопороз, переломы костей, беременность связана остеопения.

Некоторые актуальные вопросы остеопороза у женщин в практике семейного врача

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Статья посвящена важнейшей проблеме практического здравоохранения - остеопорозу, который занимает четвертое место в мире среди неинфекционных заболеваний. Основное внимание уделяется преимущественно постменопаузальному остеопорозу у женщин. В последние годы полагают, что беременным с гестозом и выраженными признаками кальциевой недостаточности целесообразно назначать препараты кальция и витамина D не только в третьем триместре гестации, но и при остеопении, диагностированной в 1 триместре гестации. Проведение необходимых лечебно-оздоровительных мероприятий для этой когорты населения семейным врачом необходимы для поддержания их высокого уровня жизни.

Osteoporosis has for many years been one of the most important problems of practical healthcare. WHO expert data puts this condition in the fourth place in the world among non-infectious diseases, staying behind only cardiovascular, oncological conditions and diabetes. More than 200 million patients suffer from osteoporosis today [1,16]. Prevalence is not the only important aspect of this condition, but also a significant occurrence of complications and primarily high fracture risk. V.V. Porovozniuk states that every third woman of over 65 has had at least one osteopenic bone fracture. Every year over 1.5 million bone fractures are registered in USA only, among those are 700 thousand vertebral fractures, 250 thousand hip fractures, 250 thousand distal radius fractures and 300 thousand other skeletal fractures. Risk of vertebral, hip and radial fractures in female Caucasian patients over 50 equals 40%. Proximal femur fractures tend to be the most severe. Every year 1 out of 5 women and 1 out of 4 men experience them, 40% that survive these fractures become disabled, 50% of patients require assistance [22], a third of them lose ability to service themselves and 15-20% of patients die during their first year post-fracture. Patients who suffered one osteoporotic fracture have a high risk of recurrent fractures, for example risk of femoral neck fracture is increased by 2 in

patients with history of distal radius fracture, by 2.5 – in patients with history of vertebral fracture and by 6 – in patients with femoral fractures [22]. Life expectancy in these patients is 12-15% shorter [8,10]. Most frequently, the first osteoporotic fracture is a vertebral fracture, the course of which is asymptomatic in 60% of patients [22]. Aside from proper fractures, microdamage to the vertebral bone structure is often seen and they can cause persistent back pain, posture changes and functional disorders in other organs and systems. Osteoporosis is currently viewed as a metabolic disorder of the skeleton that is characterized by low bone density and bone microarchitectonic disturbances which lead to high fracture risk. Latest studies show that osteoporosis primarily impairs bone quality which is dependent on michroarchitecture of the trabecular bone tissue, microdamage, macrogeometry, mineralization and bone tissue metabolism [12]. Bones are a specialized connective tissue that together with cartilage makes up the skeletal system. It is a live tissue in which during the whole lifetime processes of old bone destruction and new bone building are held and these constitute a remodeling cycle, due to which bones grow and are renewed. The speed of these processes varies throughout the lifetime. In children and adolescents remodeling processes are active and rapid, bone building prevails over destruction and bone tissue peak is formed. It is widely known that bone mass peak formation, which determines the strength of bone tissue and speed of osteoporosis progression in adults happens during puberty. Definitive skeletal mineralization process in women according to various sources happens at the age of 20-25 or 25-35 [3]. This period is the most sensitive to extrinsic and intrinsic negative factors, hormonal disbalance development, menstrual function disorders and bone tissue metabolism disorders. Mineral composition of bone tissue in adults is a reflection of different factors, most prominent of which are hormonal homeostasis state, physical activity, food habits, in particular calcium and vitamin D intake, genetic factors, bad habits, among which smoking and immoderate alcohol consumption are the most important, also pregnancy, postpartum period, prolonged lactation, prolonged contraceptive use [3,6,9]. Sources state that every year up to 4% of bone matter is restructured, in 10-15 years of an adult life half of the skeleton's mass is renewed [1]. After the age of 35-40 processes of bone destruction begin to prevail over bone formation and so called skeletal atrophy happens, the speed of which increases with menopause. Bone tissue metabolism, it's structural and functional characteristics are largely determined by the hormonal state, changes in which during the whole life of a woman – in prepuberty, puberty, reproductive period, perimenopause and menopause influence the condition of organs and systems, including bone tissue [11]. Main attention is on postmenopausal osteoporosis in women, since lower levels of sex hormones in menopause are accompanied by the highest fracture risk [11]. It is necessary to mention that osteoporosis can be seen in all age groups. Recent years have shown this condition in younger groups and it is most worrisome to see it in children and adolescents. Kids are predictably going to have lower bone density, since they move around less, spend a lot of time sitting in front of the computer, don't spend enough time out in the fresh air and frequently do not follow the right diet, consuming fast foods. According to different sources, osteopenia frequency in the general population varies from 15% [8] to 30 and even

40-60% of children in school [4,6]. Osteoporosis prevention needs to begin in childhood by presenting children with the right diet, sufficient physical activity, walks in fresh air because ultraviolet stimulates vitamin D synthesis in our skin which is needed for bone development.

Today one of the main healthcare issues is pregnant women healthcare. Connection between a negative calcium balance and different complications during pregnancy and further fetus development is now established. It is well known that insufficient calcium and vitamin D intake in pregnancy leads to hypertension, and late gestosis [3]. Clinical trials have shown that bone density in pregnant women is decreased with pregnancy progression and the number of osteopenic syndrome due to calcium deficiency is increased [3]. Pregnancy occurring at insufficient peak of bone mass leads to progressive bone metabolism disorders [15,21]. Compensatory mechanisms to support calcium homeostasis in pregnant and lactating women are vast, but the overall calcium level in pregnant women is 8% lower nonetheless compared to such in the absence of pregnancy [6]. 17% cases of uncomplicated pregnancies develop nonspecific signs of osteopenic syndrome 2-3 months prepartum, such as paresthesia, muscle cramps, pain in the pelvic bones, vertebrae and along the tubular bones, different stages of osteomalacia, gait changes, caries exacerbation, tooth enamel hypoplasia [4]. Pregnant women with gestosis experience these symptoms more often, in about half of the observed women. The amounts of calcium needed during pregnancy is increased by 1.5 and with insufficient intake with diet or when calcium absorption is impaired and also with vitamin D deficiency; calcium is mobilized from the bone depot of a pregnant patient to maintain its stable plasma concentration [7]. Calcium losses in this process occur mostly due to its trancplacental transport to the growing fetus, which needs calcium for bone and teeth development, nervous system and heart and muscle formation. The fetus accumulates about 30 g of calcium over the course of pregnancy, all of it from the mother's skeleton, mostly for fetal development in the third trimester [18,25]. Osteopenic syndrome is seen in 20-35% of pregnant women [19]. The group with the most risks among the pregnant patients should include healthy pregnant women aged under 20 and over 35, subsequent pregnancies with less than 2 years of interval in between, women with more than 3 children as well as pregnant women with gestosis and signs of osteopenic syndrome. Additionally, women with prolonged and intensive lactation form a risk group among the lactating patients [4,17]. Despite the bones being a large depot of calcium, they only contain about 99% total calcium, 85% total magnesium and future mothers should take care to have enough calcium in the diet since normal formation of the child's skeleton largely depends on it as well as normal functions of the mother's systems. Women of childbearing age should receive 1000 mg of calcium daily [1]. Literary sources show data on the dose-related effect of calcium on bone remodeling processes [19]. Dietary calcium deficit, absorption disturbances and increased excretion are important factors of osteoporosis development, femoral bone geometry changes, which increases risk of fractures in all age groups as well as possibility of pathological fractures in pregnant women due to osteopenia [13,23,24]. The need for calcium is significantly higher that its possible dietary intake and calcium absorption is insufficient in all ages especially in patients

with gastrointestinal conditions [10]. According to different sources, calcium intake in Ukraine does not correspond the recommended dose of 700-1500 mg per day and is about 450 mg a day in 50% of women [9]. Not depending on the mechanisms of development of the calcium deficient state, the most important preventive and treatment methods are vitamin and mineral supplements, calcium medications, including treatment of pregnant women in doses 25% higher than medium [7]. A vast number of obstetricians and pediatricians consider it necessary to prescribe complexes of calcium and vitamin D to pregnant women with gestosis and pronounced signs of calcium insufficiency [2,3,5]. Recent clinical studies have shown the need for administering calcium for osteopenic syndrome not only in the third trimester of gestation in pregnant patients with gestosis, but also in osteopenia diagnosed in the first trimester [5,20]. It is necessary to combine calcium with vitamin D3 which acts as a regulator of calcium homeostasis. Calcium supplements administration in combination with vitamin D increases life expectancy, improves quality of life and lowers the risk of gestational complications by 13-54% [2,3,5,14].

Our country is coming to understand and implement family medicine into primary medical help. One of the important functions of a general practitioner is early detection of hidden conditions and dynamic follow-up on the patient's health. Determining the risk factors for osteoporosis can be compared by its prognostic relevance to blood pressure measurement for coronary and cerebral events prognosis. A family doctor should conduct screening for osteoporosis among his patients. All of the risk factors can be divided into modifiable factors and nonmodifiable [16,17]. The nonmodifiable factors include sex (female), age over 65, Caucasian heritage, family history of osteoporosis and/or fractures with minimum traumatic force in blood relatives aged over 50, history of fractures, late menarche (over the age of 16), early or untimely menopause (under 40-45 years of age), anovulatory menstrual cycles, amenorrhea and/or oligomenorrhea in reproductive age, inability to reproduce, prolonged immobilization. Modifiable factors include low physical activity or excessive physical exertion, smoking, alcohol abuse, inadequate calcium and vitamin D intake, lactose intolerance, excessive caffeine consumption, use of some medications: corticosteroids, anticonvulsants, prolonged heparin treatment, thyroxin, antacids, containing aluminum, low body mass index (BMI lower than 19 kg/m^2) [1,15,17]. Finding at least one of these risk factors in the subclinical stage of osteoporosis allows us to put this patient in a risk group and should be the indicator to conduct a more thorough examination and determine the course of treatment. It is necessary to remember that osteoporosis doesn't have its own distinct clinical picture [17]. For a long period of time, the disease progresses latently, hidden and usually manifests with fractures, especially ones with low physical impact, that occur with insignificant external force and are accompanied by prolonged pain, leads to immobility and depression [1,17]. Unfortunately, in early stages of bone density loss, radiological method is not informative, since X-ray signs of osteoporosis are evident only when there is more than 30% bone mass lost. Bone densitometry is one of the most distinctive methods in the diagnosis of osteoporotic changes in the bone tissue [17]. Introduction of ultrasound bone densitometry into clinical practice, which is

now considered to be a screening measure, allows us to diagnose osteopenia also in pregnant patients in early terms of gestation.

Our clinic conducts follow-up observation on pregnant women. We diagnosed osteopenia in 51.7% of 116 healthy women after conducting ultrasound bone densitometry.

Early diagnostics of bone tissue changes at a subclinical stage allows us to prevent development and progression of osteoporosis and its complications. These issues should be taken into consideration by the family practitioner in his work while conducting the necessary preventive and treatment measures to optimize quality of life in his/her patients. It is the family doctor who is intimately familiar with the particulars of life situations of all family members in his care and can therefore provide preventive and treatment measures for the whole family.

References

1. Боневоленская Л.И. , Лесняк О.М.Остеопороз. – 2-е изд.-М.: ГЭОТАР-Медиа, 2009.-272 с.

2.Головач И.Ю. Лечение остеопороза (VI Национальный конгресс ревматологов) // Здоров'я України. - 2013. - №6 (31) тематичний номер.- С. 49-50

3.Джалатова В.С. Исследование уровня кальция и витамина D в сыворотке крови беременных женщин в зависимости от их дополнительного потребления в составе витаминно-минеральных комплексов (V Российский конгресс по остеопорозу) // Новости медицины и фармации. - 2013. - №20-22.- С. 4-5

4.Делягин В.М. Снижение костной плотности в разные возрастные периоды (многогранность проблемы)//Медицинский совет.-2012.-№2.-С.1-4

5.Живоглазова Л.Н. Течение беременности у женщин и состояние новорожденных в зависимости от обеспеченности микронутриентами// Автореф. дисс. к.мед.н., Саратов. - 2010. - 140 С.

6.Мальцев С.В., Архипова Н.Н., Богданова А.В. Частота снижения костной плотности у девочек-подростков// Акушерство и гинекология.-2009.-№02(09).-С.3-7

7.Махова А.А., Максимов М.И. Коррекция витаминного статуса у беременных// Русский медицинский журнал.-2014.-№14.-С.1014-1018

8.Орленко В.Л. Остеопороз и эндокринная система витамина D : некоторые аспекты патогенеза и диагностики // Здоров'я України. - 2012. - №6 (25) тематичний номер.- С. 65-67

9. Поворознюк В.В. Роль кальция и витамина Д в профилактике и лечении заболеваний костно-мышечной системы// Новости медицины и фармации. - 2010. - №5(311). - С. 16-19

10. Поворознюк В.В. Остеопороз у молодых женщин и мужчин (V Российский конгресс по остеопорозу) //Новости медицины и фармации. - 2013. - №20-22. - С.5-6

11. Поворознюк В.В. Современные возможности лечения остеопороза // Здоров'я України. - 2011. - №5 (20) тематичний номер.- С. 71-72

12. Поворознюк В.В. Результаты совместных швейцарско-украинских исследований по изучению возможностей применения TBS в клинической практике (V Российский конгресс по остеопорозу)//Новости медицины и фармации. - 2013. - №20-22. - С.4-5
13. Поворознюк В.В. Особенности метаболизма костной ткани в течение всей жизни человека – от раннего детства до старости// Боль. Суставы. Позвоночник.-2012.-№1.-С.30-31
14.Рудакова Е.Б., Пилипенко М.А., Бурова О.И. Роль витаминно-минеральных комплексов в профилактике осложнений беременности// Лечащий врач.-2008.-№5.-С.72-74
15. Риггз Б.Л., Мелтон III Л.Дж. Остеопороз. -М.: БІНОМ , 2000. - 558 С.
16. Рожинская Л.Я. Системный остеопороз /Практическое руководство для врачей. - Москва. Издатель Мокеев, 2000. - 195 с.
17.Струков В.И Актуальные проблемы остеопороза. Монография.-Ростра-2009.-342с.
18.Судаков Д.С., Зазаерская И.Е. Диагностика и профилактика снижение минеральной плотности костной ткани при беременности// Акушерство и гинекология.-2011.-12.-С.5-11
19. Судаков Д.С., Зазаерская И.Е., Галкина О.В. Факторы риска развития нарушений костного обмена во время беременности// Журнал акушерства и женских болезней.-2011.-T.LX,вып.1.-С.66-75
20. Щербавская Э.А., Кочеткова Е.А., Гельцер Б.И. Ультразвуковая костная денситометрия в диагностике остеопенического синдрома у беременных женщин// Эхография. - 2010. - Т. 2. - № 4. - С. 423-427.
21. Щербавская Э.А. Функционально-метаболическая оценка костной ткани в динамике беременности и лактации (клинико-экспериментальное исследование) // Автореф.дис.д.мед.н., Иркутск – 2004.- 46С.
22. Czerwinski E. Остеопоретические переломы : актуальность, клиническое значение, вопросы лечения (V Российский конгресс по остеопорозу) //Новости медицины и фармации. - 2013. - №20-22. - С.4
23.Sun Juan Alvarez M., Marguez Garrido G., Rodriguer Bestos C. et al Hip fracture during pregnancy in a woman with transient osteoporosis//Rev. Esp. Anestesiol/ reanim.-2010.-Vol.57,№5.-P.319-320
24.Silvia L., Sampaio L., Pinto G. et al. Osteoporotic fractures in pregnancy-conjunction of factors?// Acta Reumatol. Port.-2009.-Vol.34,№4.-P.641-645
25. Wieringa F.T.Combined Iron and Zinc supplementation in infants// G Nutr.2007. Febr; 137 (2):466-71

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