

PERIPHERAL BONE MINERAL DENSITY - NORMAL VALUES FOR HEALTHY BULGARIAN WOMEN IN THE BLACK SEA REGION

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In the last three years in Bulgaria it became possible to determine the peripheral bone mass by x-ray absorptiometry (Osteometer DTX 100/200) and to perform screening examinations among women at risk of developing postmenopausal osteoporosis. As a reference database in our everyday practice we used the established criteria for Danish population. Keeping the study protocol of Osteometer A/S we summarized our data in order to define the age related variations of bone mineral density (BMD) and to determine normal values for healthy Bulgarian women. A total of 234 women aged 20-70 years were included in the study. They were informed about the trial and gave their written consent to participate. BMD was measured by dual x-ray absorptiometry at distal (D-BMD) and ultradistal (U-BMD) sites of forearm with Osteometer DTX 200. The attained peak bone mass in youth (at the age of 30) declined normally slowly and after the menopause the loss accelerated - both D-BMD and U-BMD. The accelerated bone loss after menopause changed the ratio (normal BMD: osteopenia: osteoporosis) and with age the number of women with osteoporosis increased. Screening the women near menopause and monitoring the postmenopausal bone loss is important to identify patients at risk (the so-called fast bone losers). It will enable to start early preventive therapy. The established normal values for age-related changes in BMD can be used as reference base for healthy Bulgarian women and will help for correct interpretation of the results.

Key-words: Bone mass density, osteoporosis, absorptiometry, screening, Bulgarian women

Osteoporosis is characterized by a reduction in bone mass that often results in fracture. Bone loss is multifactorial and it is influenced by many risk

factors such as race, heredity, physical activity, and diet. However, ageing and declining ovarian activity are risk factors of great importance in women. True premenopausal loss is small and probably not of clinical relevance (1) but, after the menopause a five- to tenfold acceleration has been proved. In the last

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Keeping the study protocol of Osteometer A/S (2) we summarized our data in order to define the age related variations of bone mineral density (BMD) and to determine normal values for healthy Bulgarian women.

MATERIAL AND METHODS

A total of 234 women aged 20-70 years were included in the study. They were informed about the trial and gave their written consent to participate. From the study were excluded: a) patients with a history of fractures as a result of minor trauma.; b) patients with overweight defined as weight more than 30 % above the ideal body; c) patients who have undergone medical treatment for more than one year with fluoride, bisphosphonates, anabolic steroids, glucocorticoid steroids, estrogens, calcitonin or other drugs known to interfere with calcium metabolism; d) patients with secondary osteoporosis caused by malignancy, glucocorticoid steroid treatment, thyroid or parathyroid diseases, malnutrition or other diseases; e) patients with renal failure, and f) heavy

smokers (more than 20 cigarettes per day), alcoholics (more than 50 g ethanol per day), and drug abusers (2). All women filled a questionnaire for the standard risk factors for osteoporosis.

Bone mineral density was measured by dual x-ray absorptiometry at distal (D-BMD) and ultradistal (U-BMD) sites of forearm with Osteometer DTX 200.

RESULTS AND DISCUSSION

The attained peak bone mass in youth (at the age of 30) declines normally slowly and after the menopause the loss accelerates - both D-BMD and U-BMD (Fig.1). The mean menopausal age is $47,98 \pm 3,6$ years. The attained mean peak bone mass (D-BMD) is lower in comparison with Danish reference database. The accelerated bone loss after menopause changes the ratio (normal BMD: osteopenia: osteoporosis) and with age the number of women with osteoporosis (BMD - T-score $< -2,5$ SD) (Fig. 2) increases. Low bone mass may be a result of the low bone mass at skeletal maturity (peak bone mass) and/or a subsequent fast or long lasting loss of bone.

Many factors that contribute to osteoporosis can be reversed, once they have been identified. In order to build-up a strong skeleton and to attain an optimal peak bone mass, young women must be educated to have appropriate life habits - adequate calcium supply, regular exercise, absent smoking.

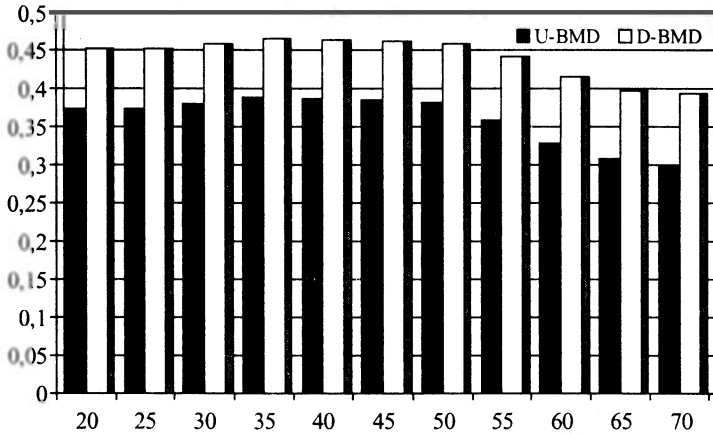


Fig. 1. Normal values of peripheral BMD for healthy women in Black Sea region

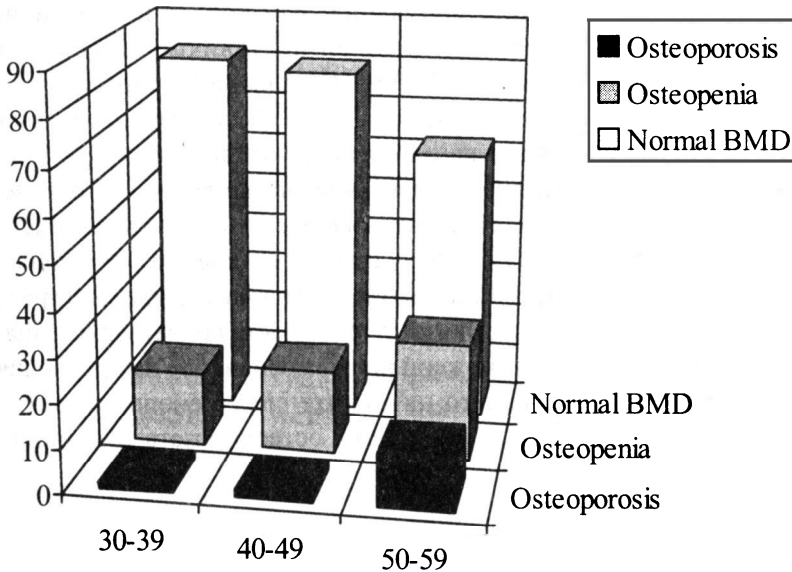


Fig. 2. Results from screening for osteoporosis among healthy women in Varna region

Screening the women near menopause and monitoring the postmenopausal bone loss is important to identify patients at risk (the so-called fast bone losers) and will enable to start early preventive therapy.

The established normal values for age-related BMD changes can be used as reference base for healthy Bulgarian women and will help for correct interpretation of the results.

REFERENCES

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Определяне норми за периферната костно-минерална плътност при здрави жени в Черноморския регион

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Определяне на периферната костно-минерална плътност (КМП) с Osteometer DTX 100/200 се извършва в България от три години. До сега са използвани норми на страната производител - датската популация. Въз основа на 3-годишен опит от проведен масов скрининг за остеопороза си поставихме за цел да определим нормалната възрастова динамика на КМП на 234 здрави български жени на възраст от 20 до 70 г., като са спазени условията за участие, указани по протокол на фирмата Osteometer. Проучихме влиянието на най-честите рискови фактори за остеопороза (индивидуални и фактори, свързани с начина на живот), както и честотата на заболяването остеопороза сред изследваните жени с помощта на остеодензитометрия на *radius* и *ulna* с Osteometer DTX. Резултатите от средно изчислената КМП са представени по декади. Установената пикова костна маса в млада възраст се запазва почти постоянна величина до 50 год. възраст, след което кривата придобива низходящ стръмен ход. Броят на изследваните жени ни дава основание да предложим норми на периферната КМП. Мониторирането на жените след менопауза е от значение за ранната диагноза, профилактика и лечение на остеопорозата и за намаляването на броя на патологичните фрактури.