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Relationship between dietary calcium with CTX and bone mineral density in non active post-menopausal women

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ABSTRACT

Osteoporosis is a public health problem that can affect on life in postmenopausal women. Irreparable consequences and prevalence of inactive people are also more than ever active. Evidence indicating a protective effect of calcium on bone mineral density in growing old. In this study the association between dietary calcium, and bone mineral density in postmenopausal women and disable administrative CTX markers we examined. In this study, 117 postmenopausal women 52 to 62 years participated voluntarily. Assessed by food frequency questionnaires. Bone mineral density areas by dual X-ray absorptiometry of 2 to 4 lumbar spine, a third of the distal forearm and femoral neck, and the C-terminal telopeptide of collagen type (CTX) were measured by ELISA. A no significant association between dietary calcium and bone mineral density of the lumbar spine and forearm were observed. But between dietary calcium and bone mineral density of the femoral neck, there was a significant relationship ($P < 0/05$, $r = 0/6$). Also, there wasn't found significant relationship between dietary calcium and urinary CTX.

Key words: calcium, CTX, menopause, inactive, bone density

INTRODUCTION

Osteoporosis is nowadays brought up as a big problem in health all over the world. It affects on the menopause women's life quality and includes various factors [1]. low compression in the center of the bones that is one of the main high risk factors in osteopathy [2]. Having determined the extent of compression one can identify the possibility of breakage and undesired consequences [2]. According to the definition of the global health organization when compression density of the bones is more than or equal with 2/5 index diversity below the average amount estimated for young women osteoporosis appears [1]. Except than the density there are also other indicators like osteoclecin, alkaline phosphate serum and CTerminal telopteid type one collagen (CTX) the indexes of the possible osteopathy or osteoporosis [3-5]. Among the indexes CTX is one of the most accurate factors identifying the amount of density and the possibility of appearance of osteoporosis [5].

The last studies show that high density in bones is for several factors such as puberty, hormonal changes, and environmental factors like physical activities and nourishment [6-9]. Also it has been said that to prevent suffering from osteoporosis gaining the maximum amount of density of bones in youth ages and the time of forming the bone

structures [6-9]. There are so many reveals suggesting the effect of preserve of calcium on the disorders in osteopathy raised from aging. In a research that studies the results of more than 30 cases, there has been a report of a direct relationship between the amount of calcium and density of the bones in teenagers [10].

There are few studies on the effect of calcium in diet and the density of the bones in adulthood. Regarding the increasing number of osteoporosis cases that increase even more in oldness age and also menopause appearance and considerable reduction of sexual hormones in menopausal women and regarding to the increasing number of osteoporosis in Iran[11,12] and the appearance of 4 times more in women[13], and also the influence of low physical activities regularly affects strongly on the process of being suffered by osteoporosis, having enough studies is critical in such a society and this age. This study has been done for identifying the relationship between the amount of taking calcium in the diet and the density of the bones and the sensitive indicator CTX resulted from bone recycling in menopausal women and the low active ones.

MATERIALS AND METHODS

In this study there were 186 menopausal women volunteer to be tested. There were face to face interview and the women who had any background of any disorders of shortage of calcium like early menopausal picking up the ovaries, or Diabetes were out of the study. Also the persons who had abnormal level of serum calcium or taking medicines influencing on the metabolism of calcium like calcium pills, estrogen and vitamin D were eliminated from the study. Among the volunteers those who didn't have monthly period since 12 month before were considered as menopause and the persons with any time less than 12 month were out of study. At the end of the study and collecting information needed totally 117 persons were chosen for to be tested in the study. All the participants filled in a satisfaction form and signed that to attend the study.

Measurements

The density of marrow was measured via X-ray through the second to fourth bonds in waist, neck bone and one third part of the end of the arm. CTX was used to testing urinary CTX. In measuring the indexes of weight and height by means of weighting device. The interview was done by the interviewer. The information of the amount of calcium in diet were gathered through the questionnaire. 53 cases were under study before by the associations of nourishment of Iran and analyzed through a well designed plan.

Statistical Analysis

The data distribution was tested through a test. Parametric data was tested through at student test and regression test was used for determining the relationship between dietetic calcium with the index for density of the marrows. An index of 0.05 with the SPSS analyze program were used to have 15 cases of statistical analyzes cases.

RESULTS

The studies all showed that the average of calcium menopause woman takes daily is 512mg each day (Table 1). In addition there no certain relationship between the amounts of calcium we take daily and age or weight. The results showed that there is a significant relationship between the amount of calcium we take daily and the density of the marrows. Especially in the neck part of the thigh bone (p less than 0.05, $r=0.06$). Table 2. But this relationship wasn't seen in one third part of the end of arm bone. Also there were no Significant relationship between the calcium in diet and the urinary CTX. When women were studied regarding the amount of calcium received daily there were a significant difference between the maximum and minimum amount of taking calcium regards to the density of marrow in neck part of thigh bone.(1.32 gr/centimeter versus 0.56 gr/centimeter). These differences were not so significant in the part of one third in the end part of arm bone and the waist bonds and easily neglected.

Table 1: anthropometric indexes

Variable	Mean \pm SD
Energy (kcal)	1875 \pm 89
Calcium intake (milligrams per day)	512 \pm 271
Age (years)	57 \pm 5
Weight (kg)	69 \pm 8
Height (m)	158 \pm 6
BMI	27.5 \pm 1

Table 2: bone mineral density and urinary markers

Bone mineral density	kilograms per square centimeter
Distal third of the forearm bones	0.52±0.09
Femoral neck	*0.94±0.39
Spine	
Vertebral2	1.01±0.05
Vertebral3	0.91±0.03
Vertebral4	0.87 ± 0.08
CTX (ng ml)	0.21±0.09

DISCUSSION

In the present study according to the statistic analysis show that there is a significant relationship between the calcium received and the density of morrows. Especially in the neck of menopause women's thigh that are fairly low active in terms of physical activities. All the findings match with the ideas of Saleimian and the team [14]. The results show that the calcium received affects only on the thigh bone and no effect on the arm bone or bonds in waist. In an old study also this was proved. In that study calcium was used as a medicine in the under test case versus control group not dealing with physical activities [15]. The signals were seen in the form of increasing the density of morrows only in thigh bone area. in the study of Monroe, recommending calcium in diet program as a medicine to the women whose amount of receiving were less than 500mg led to preventing from density reduction in thigh compared with the control group [16,17].in this study there were a significant relationship between calcium received and the density of the bones in the neck

Part of the thigh, but no relationship in that of bonds in waist that maybe because of the extent of recycling of bones or physical features of the sponge parts and central parts of the skeleton bones [18, 19]. On the other hand in other studies there were no report of any certain relationship in the calcium received and the density of the bones in inactive persons [20, 21]. Maybe the difference in the result is because of the difference in the amount of calcium the persons received, also genetic differences and individual differences in taking the medicine should be regarded [22].

In the present study there were no certain relationship between CTX as an index and calcium received daily. It seems like the reduction of CTX is just seen in that kind of research that calcium is taken in high dozes, and in form of medicine [23]. From the results of the research it could be found that taking calcium can act as a protective factor again stosteoporosis in menopause women and low active ones. Regarding that the observatory studies don't prove any theory and just suggest possible mechanisms so more studies is recommended with control group to determine the influences of calcium in diet on the extent of density in marrows and other indexes.

It is suggested that this study be done on the people working in the different groups and active and inactive persons compare together.

REFERENCES

- [1] Taisum H, David B. *Am J Clin Nutr*, **2004**; 80:715-21.
- [2] Marshall D, Johnell O, Wedel H. *BMY*, **1996**; 312: 1254-9.
- [3] New SA. *Proc Nutr Soc*, **2002**; 61: 151-64.
- [4] New SA. Impact of food clusters on bone. (Nutritional aspects of osteoporosis, Academic Press, **2001**). 379-397.
- [5] Frassetto L, Todd K, Morris RC jr, et al. *Am j Clin Nutr*, **1998**; 68: 576-83.
- [6] Anderson JJ, Tylavsky FA, Halioua L, et al. *Osteoporosis Int*, **1993**; 3: 32-6.
- [7] Heyse SP, Sartori L, Crepaldi G. *Calcif Tissue Int*, **1990**; 46: 289-93.
- [8] Obrant KJ, Bengner U, Johnell O, et al. *Calcif Tissue Int*, **1989**, 44: 157-67.
- [9] Sowers MR, Galuska DA.(1993). *Epidemiol Rev*; 15: 374-98.
- [10] Welten DC, Kemper HC, Post GB, et al.(1995). *J Nutr*; 125: 2802-13.
- [11] Jamshidian Tehrani M, Kalantari N, Azadbakht L, Rajaie A, Hooshir-rad A, Golestan B et al . *Iranian Journal of Endocrinology and Metabolism*, **2003**; 5 (4):271-276.
- [12] Mojibian M. MD, Owlia M.B. MD, Beiki Bandarabadi O. MD, Kochak Yazdi L. *Iran,Journal of Surgery*, **2006**;Volume 14, Number 1.,

- [13] John J. Nutrition and bone health(WB Saunders Co, **2004**),642-65
- [14] Suleiman S, Nelson M, Li F, et al. *Am J Clin Nutr*, **1997**; 66:937-43.
- [15] Heaney RP. *Am J Clin Nutr* , **2006**; 75: 609 –10.
- [16] Ganpule A, Yajnik CS, Fall CHD, et al. *J Clin Endocrinol Metab*, **2006**; 91: 2994-3001.
- [17] Cooper C, Fall C, Egger P, et al. *Ann Rheum Dis*, **1997**; 56: 17–21.
- [18] Nelson ME, Fisher EC, Dilmanian M, et al. *Am J Clin Nuir*, **1991**; 53: 1304-10.
- [19] Winzenberg T, Oldenburg B, Frendin S, et al. *BMC Public Health*, **2006**; 6 12.
- [20] Riggs BL, Wahner HW, Melton L J, et al. *J Clin Invest*, **1987**; 80: 979-82.
- [21] Rozen GS, Rennert G, Rennert HS, et al. *J Am Coll Nutr*, **2001**; 20: 219-24.
- [22] Lips MA, Syddall HE, Gaunt TR, et al. *J Rheumatol*, **2007**; 34: 769–75.
- [23] Guillemant J, Le H, Maria A, et al. *Am J Nephrol*, **2000**; 20: 48-52.