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Study of Decrease in Plasma Antioxidants in Aged Osteoporotic Women in Vidharbha Region- Cross-Sectional Study

Gangaram Bhadarge Tutor Dept. of Biochemistry Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences Sawangi (Meghe), Wardha-442001

Ranjit Ambad Associate Professor Dept. of Biochemistry Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre Nagpur-441110 (Datta Meghe Institute of Medical Sciences)

Roshan Kumar Jha Tutor Dept. of Biochemistry Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences Sawangi (Meghe), Wardha-442001

Address for Correspondence
Ranjit Ambad
Associate Professor Dept. of Biochemistry
Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre
Nagpur-441110 (Datta Meghe Institute of Medical Sciences).
Email.id. ambad.sawan@gmail.com Mob No. 9890959395

ABSTRACT

INTRODUCTION: Vitamin C is an essential antioxidant that also functions as a cofactor in the production of healthy collagen in both increasing and mature tissues. Due to extreme vitamin C deficiency, scorbutic has an uneven and narrow growth layer, a thin trabecular network, poor collagen production, and a reduction in the differentiation of osteoblasts in mesenchymal cells. Insufficiency. pre-osteoblastic and osteoblastic cell lines, vitamin C increases collagen production, regenerated expression of vitamin D of alkaline phosphatase, and general mineral synthesis. When paired with vitamin C, TGF can stimulate osteoblast dissociation and, as a result, bone formation.

AIM: study of plasma antioxidants in aged osteoporotic women in vidharbha region.

MATERIAL AND METHOD: The articles were recruited consecutively between September and February 2020-21 among approximately 300 women who underwent orthopaedic tests in Geriatric patients focused on Observed Treatment Short-course at Dept. of OBGY

RESULT: The blood levels of vitamin C, vitamin E, vitamin A, and uric acid were always lower in osteoporotic patients than in controls (Table 2). Apart from that, none of the participants in the two groups had vitamin C or E levels that were significantly higher than the median. This supports the notion that, at least in terms of dietary antioxidants, all groups have sufficient nutritional status. Furthermore, antioxidant enzyme activities in plasma (SOD and GPx) and erythrocytes.

CONCLUSION: Osteoporotic women have weaker antioxidant defense than or mal age-matched control group. Further research into the pathways underlying antioxidant degradation and their relation to the pathogenesis of osteoporosis is required.

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KEY WORDS: Vitamin C, Osteoporotic, MDA, Vit-D, BMD

Introduction:

Vitamin C is an essential antioxidant that also functions as a cofactor in the production of healthy collagen in both increasing and mature tissues. Due to extreme vitamin C deficiency, scorbutic has an uneven and narrow growth layer, a thin trabecular network, poor collagen production, and a reduction in the differentiation of osteoblasts in mesenchymal cells. Insufficiency.**1**

In pre-osteoblastic and osteoblastic cell lines, vitamin C increases collagen production, regenerated expression of vitamin D of alkaline phosphatase, and general mineral synthesis. When paired with vitamin C, TGF can stimulate osteoblast dissociation and, as a result, bone formation.**2**

Furthermore, guinea pig experiments have shown that vitamin C deficiency in a developing animal is linked to a higher bone rate than average.**3**

Several epidemiological studies have discovered a connection between vitamin C intake and bone mineral density in postmenopausal women (BMD). For first-time postmenopausal women who have never used estrogen and eat at least 500 mg of calcium a day, the evidence is good. Most interestingly, a diet deficient in vitamins C and E (another antioxidant vitamin) has recently been linked to a higher incidence of hip fractures in smokers.**4**

A analysis of flavones, which have been shown to have significant antioxidant properties in studies performed in vitro in sperm and lymphocytes and in vivo in low density lipoprotein oxidation in humans, provides evidence of a connection between antioxidants and bone health.**5**

Considering the experimental and new evidence about antioxidant vitamins and osteoporosis as well as the possibility of fractures, there are no details on vitamin C or other plasma antioxidant levels in osteoporotic research. Our goal was to see whether older osteoporotic women's plasma antioxidant protectors were lower than controls. Both nonenzymatic (plasma vitamin C, vitamin A, vitamin E, and uric acid) and enzymatic (plasma superoxide dismutase (SOD) in plasma and erythrocytes, and plasma glutathione peroxidase (GPx)) antioxidants were tested in a proper sample of postmenopausal people. We also looked at plasma levels of malondialdehyde (MDA), a lipid peroxidation agent, in both groups to see whether there were any other signs of oxidative stress in osteoporosis.**6**

More than 75 million people worldwide suffer from osteoporosis, with postmenopausal women accounting for 80% of cases (44 million). Osteoporosis is just the second most prevalent heart disease as a major health concern, according to the World Health Organization. In the country, women have a 30 to 40% risk of having bone fractures over their lifespan. Osteoporosis strikes Indians ten years earlier than it does in the West. It affects one out of every three women and one out of every five men over the age of 50. Osteoporosis and fractures are a major public health concern that may result from sickness, accident, a decline in quality of life, or death.**7**

Since it signifies the completion of the menstrual cycle and the breakdown of ovarian function, menopause is one of the most significant hormone functions. Osteoporosis is becoming more

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common among the elderly, particularly among postmenopausal women. Premenstrual refers to a woman's reproductive or pregnant life from the first menstrual cycle to the last. Menopause is described as a time of at least one year after menopause. When menopause occurs, certain postmenopausal health threats emerge, such as osteoporosis, ischemic stroke, and ovarian cancer. In the other hand, later menopause is linked to an elevated risk of endometrial and breast cancer.**8**

Aim :

study of decrease in plasma antioxidants in aged osteoporotic women in vidharbha region. results of a cross-sectional study

Material and method:

The articles were recruited consecutively between September and February 2020-21 among approximately 300 women who underwent orthopaedic tests in Geriatric patients focused on Observed Treatment Short-course at OBGY Department.

Inclusion criteria:

The osteoporotic community's criteria were 60 years or older, female gender, postmenopausal age, autonomic mobility, and female T level 3.5 or less. This cut-off was used to find subjects with further osteoporosis. The control group was made up of elderly women who went through the same procedure as the research subjects who with a female T-neck of one or more. Many of the patients ate an uncontrolled diet.

Exclusion criteria:

In both categories, secondary osteoporosis, oxidative stress-related diseases (dementia, cardio- and cerebrovascular illness, asthma, renal failure, or inflammation), malnutrition, prior or ongoing care with replacement hormone replacement therapy, bisphosphonates, or other anti-retroviral medications, and the use of antioxidant vitamins in the previous six months were all common. Based on these criteria, 197 participants (100 osteoporotic and 97 control subjects) were chosen and invited to participate in the study. A total of 150 women gave their informed consent and were later enrolled in the study (75 osteoporotic and 75 control subjects, or 76 percent of those chosen).

Sample Collection:

Fasting 20-ml heparinized tubes were used to receive blood transfusions on the day of the bone marrow transplant. Blood was preserved in ice and centrifuged within 30 minutes. Plasma aliquots (500 l) were frozen at 80 C before the sample. To store vitamin C, the plasma aliquot was reduced to 10% meta phosphoric acid and high concentrations were retained at 80 C. Using HPLC and electrochemical detection, Kutnink et al's technique was used to obtain vitamin C and uric acid.**9** Vitamin A and vitamin E were tested using HPLC after extraction with ethanol and hexane and UV exposure at 280 nm. The frequency of vitamins and uric acid is estimated in micromoles per liter. With no impact on the findings, the data are seen as plasma values of these compounds from the ratio of plasma vitamin E or vitamin A to total cholesterol. The concentrations of SOD (units

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per milliliter) and GPx (NADPH micromolar concentrations per minute per milliliter) in plasma were determined using the methods To measure the SOD function in erythrocytes, the same red blood cells are immersed in sterile cold water and diluted with a mixture of ethanol/chloroform, as described by L'Abbé and Fisher11 and Flohé and Gunzler12 (1: 1). Winterbourn and colleagues described a method for measuring SOD activity (units per gram of hemoglobin) in the supernatant. Individuals' plasma MDA levels were measured using HPLC with fluorescence detection.**14**

Result : Descriptive characteristics of the study subjects (means ± SD)

	Osteoporotics	**Controls**	**P-valve**
Number	75	75	
Age (yr)	70.1 ± 7.8	69.1 ± 2.96	P=0.3009
BMI	24.9 ± 2.7	27.8 ± 2.8	P<0.0001
Years since menopause	21.8 ± 8	20.87 ± 7.8	P=0.4721
Subjects with self-reported previous fractures (%)	13.7	7.2	P=0.2297
Smokers (%)	11	13	P=0.0026
Drugs (n)	1.5 ± 2.0	1.2 ± 0.8	P<0.0001
Comorbidities (n)	1.0 ± 0.8	0.6 ± 0.8	
Femoral BMD (g/cm^2)	0.54 ± 0.09	0.74 ± 0.06	

Over the course of six months, 150 women were included in the study, evenly divided between the two cohorts. The identities and clinical characteristics of the two classes are seen in Table 1: In terms of age, menopause age, smoking and drinking habits, the number of drugs and disorders, or occupational activities, there were no differences between the groups. Many of the participants drove their own ambulances and had little or no conditions. In this case, only five osteoporotics

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and four controls are affected by one disability, but it affects some of the most important daily activities. As a result, the study omitted the elderly's frailer participants. (Bathing, getting out of bed, cooking, going to the toilet, bowel control, and eating) With the exception of BMD, which discriminated against test subjects being assigned to one of these two groups, the only significant distinctions were the number of previous fractures and BMI. We measured 11 fractures in the osteoporotic group (4th wrist, 4 vertebral, 1 hip, 1 humerus, and 1 ankle fractures) and 5 in the control group (1 elbow, 2 wrist, and 2 ankle fractures). based on x-ray evaluations With the exception of one (1 wrist fracture), the majority of the fractures in the research study were caused by severe trauma (2 car accidents, 1 skeletal fracture, and 1 fall from above the height).

Table 2. Antioxidants and MDA plasma levels in the study subjects

	Osteoporotics	**Controls**	**P-valve**
Plasma vitamin A (µmol/liter)	1.90± 0.66	2.73 ± 0.11	P<0.0001
Plasma vitamin C (µmol/liter)	29.1 ± 4.2	54.9 ± 14.2	P<0.0001
Plasma vitamin E (µmol/liter)	45.9 ± 6	63.1 ± 9.76	P<0.0001
Plasma uric acid (µmol/liter)	230.8±33.9	385.4± 62.8	P<0.0001
Plasma GPx (mmol NADPH/min./ml)	0.08 ± 0.02	0.12 ± 0.01	P<0.0001
Plasma SOD (U/ml)	23.22 ± 4.0	32.34 ± 3.4	P 0.0001
Erythrocyte SOD (U/g hemoglobin)	2270± 311.9	3408±502.7	P<0.0001
Plasma MDA (µmol/liter)	0.33 ± 0.40	0.35±0.14	

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However, there were no substantial differences in MDA, a lipid oxidative marker of trauma, between osteoporotic studies and controls (Table 2). The blood levels of vitamin C, vitamin E, vitamin A, and uric acid were always lower in osteoporotic patients than in controls (Table 2). Apart from that, none of the participants in the two groups had vitamin C or E levels that were significantly higher than the median. This supports the notion that, at least in terms of dietary antioxidants, all groups have sufficient nutritional status. Furthermore, antioxidant enzyme activities in plasma (SOD and GPx) and erythrocytes.

Discussions:

Several forms of plasma antioxidants are investigated in osteoporosis in this review. The sum of all natural antioxidants measured in the population of older osteoporotic women was always smaller than controls, according to our findings. This disparity was important across a panel of exogenous (dietary vitamin A, vitamin C, and vitamin E) and organic disruptive molecules (uric acid, superoxide dismutase, and glutathione peroxidase). Vitamin C, a primary antioxidant, has a lot of evidence that it can help with bone growth and bone loss. The hydroxylation of proline, a metabolic variable containing vitamin C, is a cofactor in collagen maturation, and its triple helix stability is dependent on it. **15** According to evidence from several laboratory trials, vitamin IC appears to play a positive role in preventing age-related bone decline in women in their early to mid-postmenopausal years, particularly if they were deficient in calcium but not estrogen depleted.**16,17**. Furthermore, a group of women smokers chosen from the most well-followed women over a 5-year period found that dietary vitamin C and vitamin E consumption were healthy for hip fractures.**18**

These diets are rich in calcium and vitamin D, as well as vitamin A, which is contained in cod liver oil, dairy products, and milk that is also supplemented with vitamins A and D, in comparison to the rest of Europe.**19**

Since we discovered low levels of vitamin A in osteoporotic patients, our vision also opposes this perception. Furthermore, in an osteoporotic culture, vitamin A was a dietary antioxidant linked to bone density. Apart from our results, very high levels of vitamin A can have a detrimental impact on bone, according to a report conducted **by Rancho Bernardo. 20**

This prospective research not only indicates that more retinol patients have a higher chance of female osteoporosis, but it also demonstrates that participants who take high vitamin A supplements but don't turn up in supplementation may have an advantage in terms of bone preservation. The authors conclude by stating that a positive balance can be struck between preserving sufficient vitamin A intake and increasing age-related bone deterioration due to excessive retinol addition. In this study, we measured plasma MDA as a marker of radical-mediated free lipid peroxidation and found no substantial variations between the groups. This observation is in line with that of a recent study that looked at elevated MDA levels in a small group of osteoporotic postmenopausal women. However, osteoporotic patients were paired with a small number of healthy controls in the previous study, making it impossible to differentiate between the effects of ageing and osteoporosis.**21**

More research has recently been related to increased oxidative stress and osteoporosis, especially in the case of osteoporotic syndrome, which is more frequent in younger males. 22 Due to a lack of oxidative phosphorylation, an inactive electron transport chain, and free oxygen intake, increased oxidative pressure is linked to a slight 3.7-kb elimination of mitochondrial DNA. Hyperlactemia and a high lactate/pyruvate ratio mean that both latter are involved, which can affect bone metabolism by mediating chronic to extreme acidosis. 23 Our findings did not apply to the general adult community because weak adults and older adults were excluded from the sample. Finally, we were unable to confirm a correlation between low antioxidant levels and low BMD, which hindered our research.

Conclusions:

Finally, we propose that elderly osteoporotic women have weaker antioxidant defense than or mal age-matched control group. Further research into the pathways underlying antioxidant degradation and their relation to the pathogenesis of osteoporosis is required.

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