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A study to assess the role of Biochemical Markers in pre and post menopausal women at selected Hospitals in Indore

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Introduction

Around 80 percent of postmenopausal women worldwide have osteoporosis, and 48 million of them live in the United States. Over the next decade, the number of people living with osteoporosis is expected to rise from 31 million in 2015 to 38 million by 2025.Ovarian function and the reproductive cycle come to an end when menopause sets in, making it an important physiologic event. Osteoporosis is becoming more common among postmenopausal women due to the growing global population. Between the beginning of a woman's menstrual cycle and the end of her fertile years is the pre-menopause period. At least a year without a menstrual cycle is considered post-menopause.

Women who go through menopause early are more likely to develop osteoporosis, ischemic disease, and ovarian cancer, whereas women who go through menopause later are more likely to develop breast and endometrial cancer.The abnormal quantity and/or quality of bone is the cause of osteoporosis, which manifests as brittle bones.Quantity is measured using BMD. Quality is influenced by a slew of variables, including mineralization and bone remodelling rate.

Bone trabeculae connectivity, collagen fibre quality, and bone cell health are all considered. Osteoblasts, osteoclasts, and osteocytes are the three types of bone cells. As a result, it is critical to understand the production of osteoblasts and osteoclasts. After the menopause, oestrogen deficiency and the ageing process are the two most common causes of bone loss in women.

There is a clear link between osteoporosis and a woman's inability to produce enough oestrogen after menopause. It's common knowledge that bone resorption (decomposition), which occurs after menopause, outpaces bone building (construction), causing an imbalance in bone remodelling. As a result, women's risk of osteoporosis rises after menopause. Bone turnover markers have been shown to be linked to bone loss and fracture risk. As a result, it is important to study a variety of markers, including os-teocalcin, urinary hydroxyproline, and biochemical parameters such as vitamin C, calcium, phosphorus, alkaline phosphatase, and acid phosphatase, in depth. A bone formation marker, osteocalcin, was studied in pre- and post-menopausal women, as was urinary hydroxyproline, a marker of bone resorption. Osteocalcin (OC), a biochemical marker of bone turnover, is useful for this purpose. It is only found in bone tissue that contains osteocalcin. Because of an increase or decrease in bone turnover, osteocalcin levels may also be elevated in postmenopausal osteoporosis patients. Hypoparathyroidism and long-term corticosteroid therapy have both been linked to decreased osteocalcin levels. Since it is so specific and widely available, osteocalcin can be used to measure bone turnover in clinical settings. Bone resorption markers, including urinary hydroxyproline, hydroxylysine and its glycosides, total or free pyridi-noline cross links, and cross-linked N or C telopeptides, all measure collagen degradation products from osteoclast activity.

99% of the body's calcium is found in the skeleton, making calcium an essential mineral for bone formation. Phosphorus, on the other hand, is an essential component of bone formation because it is necessary for the proper mineralization of the skeleton. This suggests that calcium-phosphorus intake is more important for bone health than phosphorous intake in and of itself.

Vitamin C is required for the cross-linking of collagen fibrils in bone because it is a cofactor in the hydroxylation of lysine and proline. Osteoblast formation is monitored by the activity of alkaline phos- phatase, a vitamin C-stimulated enzyme . Vitamin C deficiency can lead to cortices that are thinner and the loss of trabeculae architecture.ALP (osteoblast) and tartrate-resistant acid phosphatase (osteoclasts) are enzyme levels in the serum that arise from osteoblast or osteoclastic activity, respectively. The aim of this study is to compare the levels of biochemical markers in women before and after menopause.Bone metabolism in premenopausal and postmenopausal women can be studied with the help of these biochemical markers.

Methods and Materials

In this Prospective and observational study, 200 women were divided into two groups: 100 post-menopausal women and 100 pre-menopausal women. A total of 5 millilitres of venous blood were drawn in an unsterile environment, allowed to clot, and then centrifuged at 3000 revolutions per minute. To study the following parameters, a clean, dry, and plain bulb was used to collect the serum samples.The Beckman Coulter AU480 autoanalyzer was fed calcium, phosphorus, and alkaline phosphatase for analysis. In the morning urine samples, which were used to determine bone resorption markers,

osteocalcin, tartrate resistance acid phosphatase, vitamin C, and urinary hydroxyproline were all found in the thawed serum samples stored at -20°C.Students' t-tests were used to compare the differences in the mean values of various parameters. Software SPSS window was used to perform the statistical analysis.

Results

The result revealed that the estimated and mean values of all the biochemical parameters compare Serum Total Calcium and Phosphorous decreased significantly in postmenopausal women (p 0.001). Serum ALP and Serum Osteocalcin levels as well as bone resorption markers AciPhosphatase and Hydroxyproline excretion were found to be significantly higher in postmenopausal women (p0.001) when compared to premenopausal women . While osteocalcin and urinary hydroxyproline have a significant correlation (p0.05), the study found that ALP and urinary hydroxyproline have a highly significant correlation (p0.0001).

Conclusion

We found that osteocalcin, a bone turnover marker, was elevated in pre- and postmenopausal women in our study, providing clues to bone turnover and bone loss. Osteoporosis is common in women after menopause, when oestrogen production and bone remodelling are reduced. Osteoporosis is on the rise among postmenopausal women, and this trend is expected to continue.

Bone health can be monitored using biochemical parameters, which could be used as a screening tool for early intervention against excessive bone loss. Osteoporosis must also be brought to the public's attention because of the growing body of scientific evidence.

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