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RESEARCH ARTICLE

URINARY HYDROXY-PROLINE ESTIMATION IS CHEAP BIOCHEMICAL MARKER OF BONE TURNOVER IN POST MENOPAUSAL WOMEN

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ABSTRACT:

Aim: To estimate urinary hydroxy- proline in pre and post menopausal Women as a marker of bone resorption.
Materials and methods: This is a prospective, observational study of 25 healthy post menopausal women with 25 healthy premenopausal women as control conducted at Gandhi Hospital Secunderabad. The study period was between June 2008 to June 2010. 24 hours urinary Hydroxyproline was measured in both cases and controls.
Results: The mean urinary Hydroxyproline in Post menopausal women was 31.64 with standard deviation of 3.37. The mean urinary Hydroxyproline in Pre menopausal women was 19.61 with standard deviation of 2.34. It has got the statistical significance with p value of <0.0001
Discussion: Fibrillar collagens are rich in the amino acid hydroxyproline, which is excreted in the urine after collagen degradation and are considered to be markers of bone resorption. The urinary excretion of hydroxy proline is increased in states of physiologically high turnover, such as somatic growth, during menopause and high turnover osteopathies.This increased excretion is due to increase in bone loss which was a characteristic feature of the postmenopausal period.Our results show that urinary hydroxy proline was increased in postmenopausal women compared to premenopausal controls and also urinary hydroxy proline levels were increased more in late postmenopausal women than in early postmenopausal women.
Conclusion: In Postmenopausal women with osteoporosis biochemical markers of bone formation decrease and biochemical markers of bone resorption increases. This is because there is more osteoclastic activity.In our study in post-menopausal women urinary hydroxy proline level was found to be elevated when compared to pre-menopausal group.
Key words: Post menopausal women, Pre menopausal women, Hydroxyproline, Osteoporosis.

INTRODUCTION:

Fibrillar collagens are rich in the amino acid hydroxy proline, which is excreted in the urine after collagen degradation and are considered to be markers of bone resorption. The urinary excretion of hydroxy proline is increased in states of physiologically high turnover, such as somatic growth, during menopause and high turnover osteopathies[1].This increased excretion is due to increase in bone loss which was a characteristic feature of the postmenopausal period.

Estrogen deficiency at the menopause increases the rate of bone remodelling, which results in high turnover bone loss. There are recognized receptors on the osteoblast which do not function optimally due to lack of Estrogen. This is reflected by a significant increase in the mean value of markers of resorption from premenopause to postmenopause[2]. Thus simple, direct urinary assay of hydroxy proline to measure bone resorption have clinical applications as part of screening programs to assess the risk of osteoporotic fractures.

Aim:To estimate urinary hydroxy- proline in pre and post menopausal Women as a marker of bone resorption.

MATERIALS AND METHODS:

This is a prospective observational study conducted at Gandhi hospital, during the period between June 2008 to June 2010. 25 healthy post menopausal women were selected as cases and 25 healthy pre menopausal women were selected as controls.

Inclusion criteria wasHealthy women who had ceased menstruation for 3 to 5 years and not started taking hormone replacement therapy, non obese and without regular use of calcium supplementations or any other medications known to affect bone metabolism was selected as cases. 25 healthy women in the age group

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of 30-40 years who were regularly menstruating and not pregnant and not on oral contraceptives were selected as controls.

Exclusion criteria is Women with history of known osteoporotic fractures, diabetes mellitus, renal failure, major liver diseases or those on hormone replacement therapy and oral corticosteroid were excluded from the study among both cases and controls.

Urinary hydroxy proline was estimated after collecting 24 hours urine by calorimetric technique using the Modified Neuman and Logan method[3,4]. All the reagents used in the estimation were of analytical grade.

RESULT:

The age distributions among cases were between 50-71years with mean of 54.84 ±6.1in the menopausal women. In controls (pre menopausal) women age was between 21-41 with the mean of 31.96 ±7.1. The mean urinary hydroxy proline excreted in cases (Post menopausal women) was 31.64mg/24hrs with standard deviation of 3.37. The mean urinary hydroxy proline in controls was19.61mg/24hrs with standard deviation of 2.34.It has got statistical significance with p value of < 0.0001.Hydroxy proline excretion in urine was positively correlated with age. This correlation is statistically significant with p value of < 0.01.

DISCUSSION:

Osteoporosis leads to considerable morbidity and mortality in postmenopausal women. The mean age at menopause was observed to be 49.66 years[5]. Bone mass decreases with ageing, and it is now well established that a low bone mass is the major determinant of all osteoporotic fractures. The dramatic increase in the bone turnover rate with an imbalance between bone formation and bone resorption in the first year after the cessation of ovarian function is responsible for the accelerated rate of postmenopausal bone loss. High bone turnover rate seems to play an increasing role as a determinant of bone mass with increasing postmenopausal age.As Hydroxy proline forms 16% of bone matrix, the increase in bone turnover after menopause will show increase in urinary excretion of Hydroxy proline which is proved in our study and consistent with other studies.[6,7]

CONCLUSION:

Osteoporosis is a systemic skeletal disease characterized by low bone mass and micro-architectural deterioration of bone tissue.Postmenopausal women are more prone for osteoporosis. In our study Urinary hydroxy proline level was increased in post menopausal women when compared to premenopausal women. We conclude that Urinary Hydroxy proline estimation is cheap biochemical marker to detect osteoporosis in post menopausal women

Table showing urinary levels of Hydroxy proline in Post & Pre Menopausal women

Sl.No	Cases	Controls
1	28.70	19.70
2	23.60	20.78
3	38.50	21.10
4	33.50	20.52
5	27.08	16.87
6	30.32	19.28
7	28.80	20.08
8	35.21	17.14
9	30.43	17.89
10	33.69	24.10
11	33.50	18.64
12	33.00	18.85
13	32.67	16.71
14	34.60	17.67
15	31.85	16.92
16	33.20	26.25
17	30.65	17.41
18	31.52	17.67
19	32.00	21.53
20	30.52	20.89
21	25.08	18.21
22	33.04	18.96
23	31.08	21.96
24	37.50	21.53
25	31.08	19.73
Total	**791.12**	**490.39**
Mean	**31.64**	**19.61**
S.D	**3.37**	**2.34**
p. value	**<0.0001**	

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