GYNAECOLOGY

Osteoporosis in Various Menopausal Status

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ABSTRACT

Objective   To assess the prevalence of osteoporosis in women with different menopausal status.

Design   Descriptive study.

Setting   Menopause clinic, Chulalongkorn Hospital.

Subjects   From January 1992 to December 1995, 1,047 healthy women undergone bone mass measurement at Chulalongkorn Hospital were recruited for the analysis.

Main outcome measures   The measurement was performed at lumbar spines (LS ; L1-4) and hip (H) using dual energy X-ray absorptiometer, Hologic QDR 2000. The value of bone mineral density more than 2.5 standard deviation below the young adult mean is considered osteoporosis.

Results   It was found that the prevalence of osteoporosis of lumbar spines and hip was significantly higher in the postmenopausal (Post) than in the premenopausal women (Pre) (LS : Post vs Pre = 22.5% vs 5.3% ; H : Post vs Pre = 11.9% vs 4.7, $P < 0.05$). Moreover, the prevalence in the late postmenopausal group (L-Post) (more than 5 years since menopause) was much higher than that of the premenopausal women. (LS : L- Post vs Pre = 37.1% vs 5.3%, $P < 0.05$; H : L-Post vs Pre = 19.4% vs 4.7%, $P < 0.05$)

Conclusion   Eventhough there are racial differences in osteoporotic fracture rates, this study showed the rising problem of osteoporosis in Thai women who lived longer after menopause.

Key words :   prevalence of osteoporosis, premenopause, postmenopause

Menopause is the last spontaneous menstrual period that occurs as a result of the loss of ovarian function. However, the term "climacteric" defines the span of the entire transition from the reproductive to the postreproductive interval of a woman's life.[1] Between this period,

the reduction of ovarian function is associated with a cessation of ovulation and a decline in ovarian estrogen production. The decline of estrogen is associated at least some acceleration in the development of osteoporosis.[1]

A consensus development conference statement defined osteoporosis as "a disease characterized by low bone mass and microarchitectural deterioration of bone tissue, leading to enhance bone fragility and a consequent increase in fracture risk."[2,3] According to World Health Organization (WHO), osteoporosis is defined as the value of bone mineral density (BMD) that is more than 2.5 standard deviation below the young adult mean.[4] From clinical point of view, the latter is more applicable for diagnosis.

The clinical significance of osteoporosis lies in the fractures that occur.[5] Fracture risk is increased when bone density is reduced.[6] Using WHO's criteria for diagnosis of osteoporosis, we assessed the prevalence of the disease in various menopausal status. This may serve as a basic information concerning the magnitude of this problem in our society.

Materials and Methods

From January 1992 to December 1995, 1,047 women undergone bone mass measurement were recruited for the analysis at the menopause clinic, Chulalongkorn Hospital. Bone densitometry was performed using dual energy X-ray absorptiometer, Hologic QDR 2000. Long term precision is 1.5%. The measurement, including anterior lumbar spines (LS : L_1 - L_4) and hip at the nondominant side were scanned. Subjects with severe osteoarthritic changes or compression of vertebrae were excluded from the study.

According to World Health Organization (WHO), osteoporosis is defined as the value of BMD that is more than 2.5 standard deviation below the young adult mean.[4] In this study, we assessed the prevalence of osteoporosis in women with different menopausal status, i.e. premenopause, postmenopause and those in late postmenopause (more than 5 years since menopause).

Descriptive statistics were used where it was appropriate. To compare quantitative data, unpaired t-test was used. P-value of less than 0.05 is considered statistically significant.

Results

In this studied population, 34.4% were premenopausal and 65.6% were postmenopausal. Postmenopause was defined as having no vaginal bleeding during the last 6 months and measurements of serum gonadotropin and estradiol level were in the menopausal range. In the latter group, the mean time since menopause was 4.78 ± 4.16 years. Demographic characteristics of the studied population are shown in Table 1. The age range were 92.7% between 41-60 years, 4.8% above 60 and 2.5% ≤ 40 years old. The prevalence of osteoporosis comparing between premenopausal and postmenopausal women is revealed in Table 2. It shows significantly higher prevalence of osteoporosis of lumbar spines in (L1-L4) and different parts of hip (femoral neck, trochanter, intertrochanter, ward's triangle and the total hip) in postmenopausal women. When comparing the prevalence of osteoporosis between premenopausal women and those in late postmenopause (> 5 years since menopause), there is much more difference between the two groups as shown in Table 3.

Discussion

Kanis et al reported the prevalence of osteoporosis of the femoral neck in men and

Table 1. Demographic characteristics of the studied population (N = 1,047)

Characteristics	Mean ± SD/Percentage
1. Age (yr)	50.51 ± 5.70
2. BMI (kg/m^2)	23.78 ± 3.35
3. Parity	1.94 ± 1.64
4. Menopausal status	
Premenopause (N = 360)	34.4%
Postmenopause (N = 687)	65.6%
TSM (yr)	4.78 ± 4.16
Late postmenopause* (N = 216)	20.6%
5. Educational background	
Above university/college	4.8%
University/college	45.9%
Below university/college	49.3%
6. Income (Baht)	
< 20,000	47.3%
20,000-50,000	38.6%
> 50,000	14.1%

BMI = Body mass index
TSM = Time since menopause
* More than 5 years since menopause

Table 2. Prevalence of osteoporosis of lumbar spines and different parts of hip in premenopausal and postmenopausal women (N = 1,047)

Measurement sites	BMD					
	Normal %		Osteopenia %		Osteoporosis %	
	Pre.	Post.	Pre.	Post.	Pre.	Post.
1. Lumbar spines (L$_1$ - L$_4$) (LS)	54.4	31.4	40.3	46.1	5.3*	22.5*
2. Hip						
2.1 Femoral neck (FN)	33.9	23.5	53.3	49.9	12.8*	26.6*
2.2 Trochanter (T)	43.8	28.8	50.0	52.3	6.2*	18.9*
2.3 Intertrochanter (I)	46.4	37.9	48.6	49.6	5.0*	12.5*
2.4 Ward's triangle (W)	32.0	19.6	48.9	37.7	19.1*	42.7*
2.5 Total hip (H)	47.8	36.4	47.5	51.7	4.7*	11.9*

Pre. = Premenopause
Post. = Postmenopause
* P < 0.05

Table 3. Prevalence of osteoporosis of lumbar spines and different parts of hip in premenopausal women (N = 360) and those in late postmenopause (N = 216) (more than 5 years since menopause)

Measurement sites	BMD					
	Normal %		Osteopenia %		Osteoporosis %	
	Pre.	> 5 yr.	Pre.	> 5 yr.	Pre.	> 5 yr.
1. Lumbar spines (L_1 - L_4) (LS)	54.4	17.1	40.3	45.8	5.3*	37.1*
2. Hip						
2.1 Femoral neck (FN)	34.0	13.0	53.3	48.6	12.7*	38.4*
2.2 Trochanter (T)	43.8	19.1	50.0	53.2	6.2*	27.7*
2.3 Intertrochanter (I)	46.4	26.9	48.6	55.1	5.0*	18.0*
2.4 Ward's triangle (W)	32.0	11.1	48.9	28.2	19.1*	60.7*
2.5 Total hip (H)	47.8	27.4	47.5	53.2	4.7*	19.4*

Pre.　　= Premenopause

> 5 yr. = Those of more than 5 years since menopause

* $P > 0.05$

women aged 50 years or greater in England and Wales.[5] The figures showed higher prevalence of osteoporosis with increasing age range. For instance, after aged 85, the prevalence is over 10 times higher than that in the age range of 50-54 years.[5]

In this study, we compared the prevalence of those with normal bone density, osteopenia and osteoporosis of women in various menopausal status. Focusing on osteoporosis, it was found that the prevalence at the lumbar spines was four times higher in postmenopausal women than those in the premenopause. For the different parts of the hip, it revealed two to three times higher of the prevalence in the postmenopausal subjects. Moreover, when compared the prevalence of

osteoporosis in premenopausal women with those in late postmenopause the prevalence at the of lumbar spines was seven times higher in the postmenopausal group. And for the different parts of the hip, the prevalence was shown to be three to four times higher.

Following attainment of peak bone mass the average annual rate of bone loss is 1% to 2% in postmenopausal women.[7] The rate of bone loss is highest in the early years after menopause. Annual loss of 3-5% are not uncommon during the 5 to 8 years following menopause.[7] This study showed significantly higher prevalence of osteoporosis in postmenopausal women particularly those in late postmenopause. The fast-paced socio-economic development of Asian

countries, rising living standards and improved health care, has resulted in the ageing of Asian populations,[8] and Thailand is no exception. With increasing in life expectancy, women will spend more time in the postmenopausal period, thus exposing them to greater risk of developing osteoporosis. Although this study provides a basic information of this kind in our population, there might not represent the true epidemiology of osteoporosis of our country, since this study was conducted in Bangkok, the capital city where the life style of the people are different from those in the rural areas.

However, these figures revealed the prevalence of osteoporosis in a broad sense and may be used as a database for future study.

Acknowledgement

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