Skin Thickness in Different Menopausal Status

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Abstract

It is well known that skin thickness will decrease in the years after menopause. Women may have climacteric symptoms including those associated with skin alterations as early as during the perimenopausal period. This study was performed to compare the skin thickness of women in their premenopause (N=31), perimenopause (N=35) and early postmenopause (N=46). The mean skin thickness in each group was 2.28 ± 0.39 mm., 2.18 ± 0.35 mm. and 2.02 ± 0.36 mm. respectively. The skin thickness of women in the early postmenopausal group was significantly lower than those in the premenopausal group, but no difference was found between premenopausal and perimenopausal group nor between perimenopausal and early postmenopausal group. Furthermore, we found no correlation between skin thickness and chronological age. In conclusion, the decline in skin thickness of women entering menopause requires a period of time to undergo significant alterations and the study revealed a significant reduction of skin thickness as early as in the course of the early postmenopausal period.

Key word : Menopause, Skin Thickness

The skin is the target organ responding to estrogenic stimulation. Estrogen stimulates the epidermal mitotic rate and influences the dermal connective tissue by promoting the formation of collagen and hyaluronic acid which increase the turgor and vascularization of the skin[1,2]. Following the decline in a woman's estrogen levels as a result of menopause, the epidermis becomes thinner and the dermal fibroblastic production of collagen also decreases, resulting in atrophic skin[3-6]. Skin collagen gradually decreases in the years after menopause[7-9]. Skin thickness measurements mostly indicate dermal thickness and the dermis is largely composed of type I collagen[10,11]. Therefore, the

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Table 1. Characteristics of the population studied $\bar{x} \pm SD$.

Character	Premenopause (N=31)	Perimenopause (N=35)	Postmenopause (N=46)	p-value
Age (years)	47.5 ± 2.6	49.9 ± 2.3	51.7 ± 3.2	<0.001
Weight (kg)	56.7 ± 7.2	57.6 ± 7.5	57.9 ± 8.7	NS
Height (cm)	156.3 ± 4.5	154.3 ± 3.4	154.8 ± 5.6	NS
BMI (g/cm^2)	23.2 ± 2.5	24.2 ± 2.9	24.3 ± 3.1	NS

BMI = Body mass index

skin thickness will become thinner after menopause as a result of the decline in collagen content[12]. Furthermore, it has been shown that hormonal changes which take place during the climaterium are of fundamental importance for the physiology of the skin and that the skin collagen content decreases rapidly in the years immediately after menopause, irrespective of chronological age[13]. However, no study has demonstrated the changes of skin thickness during the perimenopausal period in Thai women. This study was conducted to evaluate skin thickness in three groups of women, premenopause, perimenopause and early postmenopause, and to assess the correlation of skin thickness and chronological age in these periods of life.

MATERIAL AND METHOD

One hundred and twelve women between 40 and 58 years of age, visiting the menopause clinic, Chulalongkorn Hospital, were included in the study. The patients were divided into three groups : premenopause, perimenopause and early postmenopause. The term "premenopause" is defined as having regular menstruation during the previous 12 months and serum follicle-stimulating hormone (FSH) on the third day of the period below 10 IU/L, "perimenopause" is defined as having menstrual irregularities during the previous 12 months and serum FSH above 10 IU/L and "early postmenopause" is defined as natural cessation of menstruation between 1 and 5 years. None of the subjects had any current skin disorders such as extensive burns, scars or psoriasis, niether were they taking drugs known to effect skin alterations or had received any hormonal treatment before enrolment in this study. Skin thickness was measured by ultrasonography using an Acuson 128 with a linear 7.5 MHz probe adjusted for thyroid resolution at the right great trochanter area. All tests were performed by the same radiologist. Each measurement was made six times before the mean was calculated.

Table 2. Skin thickness of the population studied $\bar{x} \pm SD$.

Population	Skin thickness (mm) $\bar{x} \pm SD$
Premenopause (N=31)	2.28 ± 0.39
Perimenopause (N=35)	2.18 ± 0.35
Postmenopause (N=46)	2.02 ± 0.36

The data (presented as mean ± SD) were analyzed by one-way analysis of variance (ANOVA). When the overall comparison of groups in the ANOVA was significant, the differences between the pairs of groups were calculated using the *t*-test. The p-values were adjusted according to the Bonferroni method. The correlation of skin thickness and chronological age was analysed using linear regression analysis.

RESULTS

Of the 112 women studied, 31 (27.7%) were premenopausal, 35 (31.2%) perimenopausal and 46 (41.1%) early postmenopausal. In the third group, the mean time since menopause was 34.8 ± 17.5 months. The characteristics of all three groups comprising the population studied are shown in Table 1.

The skin thickness at the right great trochanter area was measured and the mean ± SD of all three groups are presented in Table 2. The data in Table 3 compare the mean skin thickness between pairs of groups.

Table 3. Comparison of skin thickness between pairs of groups.

	Premenopause *versus* Perimenopause			Premenopause *versus* Postmenopause			Perimenopause *versus* Postmenopause		
	Mean difference	95%CI*	p Bonferroni	Mean difference	95%CI*	p Bonferroni	Mean difference	95%CI*	p Bonferroni
Skin thickness	0.11	-0.11-0.32	NS	0.27	0.06-0.47	0.006	0.16	-0.04-0.36	NS

95% CI* = 95% Confidence interval for mean difference

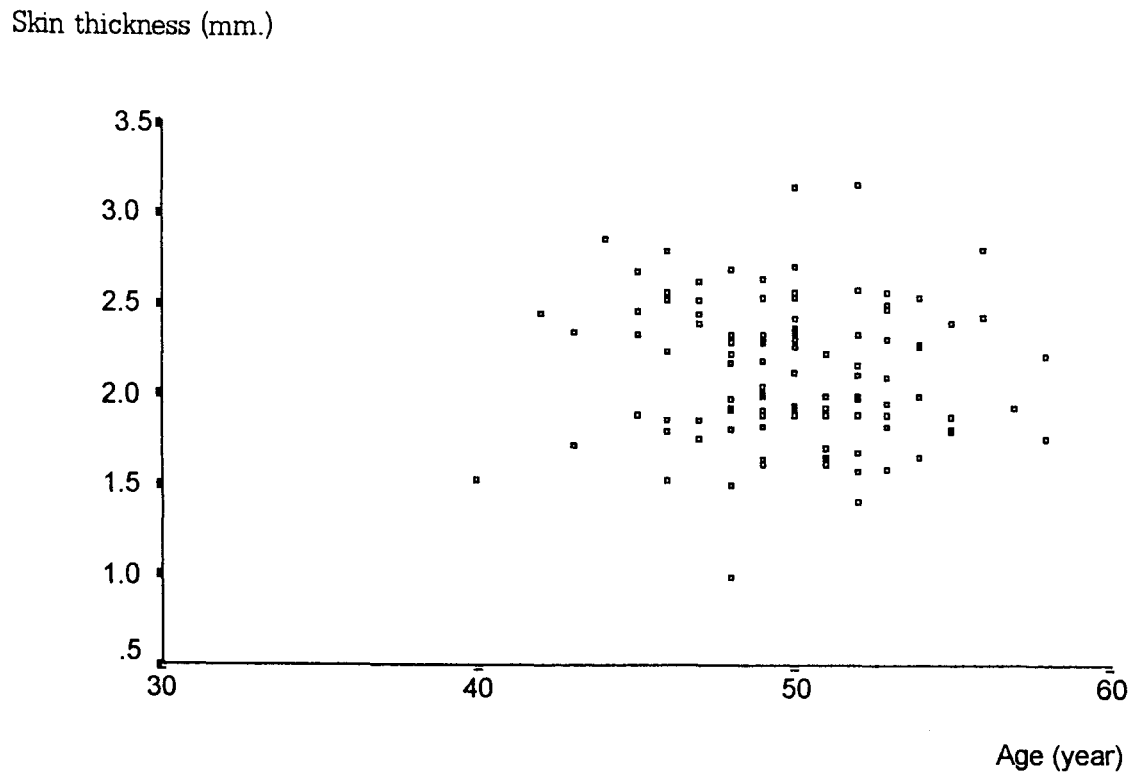

Fig. 1. Correlation of skin thickness with chronological age.

The correlation between skin thickness and chronological age of the participants is shown in Fig. 1. (r = 0.06, p = 0.50)

DISCUSSION

It has been shown that skin collagen decreases by 2.1 per cent during each postmenopausal year,[13] the process being most rapid in the years immediately after menopause with some 30 per cent lost in the first five years[7,8]. It has been well known that skin thickness is closely related with skin collagen content[12]. Hence, this study was conducted to measure skin thickness instead of skin collagen which requires a more invasive in-

vestigative method (punch biopsy)[14]. Moreover, it has been reported that ultrasonography has a higher precision than radiography in measuring skin thickness[15]. The results of this study revealed that there was no statistically significant difference of skin thickness between premenopausal and perimenopausal groups, and none between the perimenopausal and early postmenopausal groups. However, the skin had a tendency to decline in thickness during the perimenopausal period, though it did not reach statistical significance. Comparison of the premenopausal group with the early postmenopausal group showed the skin thickness in the early postmenopausal group to be significantly reduced. These results demonstrate the decrease in skin thickness to require a period of time and thus a woman might have thin, atrophic skin as early as the early postmenopause. Regarding the correlation between skin thickness and chronological age, this study did not show any correlation between these two parameters. Evidence from a study conducted among postmenopausal women (aged 51.1±8.7 years) by Brincat et al also demonstrated no relationship between skin thickness and chronological age[14]. Similar results have been shown in other prospective studies[6,16].

In conclusion, there was a tendency of skin thickness to decrease during the perimenopausal period. However, the thinning of the skin could be detected as early as in the course of the first five years of the postmenopausal period.

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การเปลี่ยนแปลงความหนาของผิวหนังในสถานภาพของการหมดระดูที่แตกต่างกัน

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เพื่อเปรียบเทียบความหนาของผิวหนังในสตรีอายุ 40-58 ปี จำนวน 112 ราย ที่มารับการตรวจรักษาที่คลินิกวัยหมดระดู โดยแบ่งสตรีเป็น 3 กลุ่ม กลุ่มแรกคือสตรีวัยก่อนหมดระดู 31 ราย กลุ่มที่สองคือสตรีวัยกำลังเข้าสู่วัยหมดระดู (มีระดูไม่สม่ำเสมอ) 35 ราย และกลุ่มที่สามคือสตรีวัยหมดระดูระยะต้น (1-5 ปีแรก) 46 ราย ทำการตรวจวัดความหนาของผิวหนังที่ตำแหน่ง Great trochanter ข้างขวา โดยใช้เครื่องตรวจคลื่นเสียงความถี่สูง Acuson 128 นอกจากนี้ยังศึกษาถึงความสัมพันธ์ของความหนาของผิวหนังกับอายุของสตรีที่ศึกษาด้วย ผลการศึกษาพบว่าสตรีกลุ่มที่สองมีความหนาของผิวหนังน้อยกว่าสตรีกลุ่มที่หนึ่ง และมากกว่าสตรีกลุ่มที่สาม แต่ไม่มีนัยสำคัญทางสถิติ เมื่อเปรียบเทียบความหนาของผิวหนังของสตรีกลุ่มที่หนึ่งและสาม พบว่าสตรีกลุ่มที่สามมีความหนาของผิวหนังน้อยกว่าสตรีกลุ่มที่หนึ่งอย่างมีนัยสำคัญทางสถิติ ($p = 0.006$) อย่างไรก็ตามพบว่าความหนาของผิวหนังของสตรีกลุ่มที่ศึกษาทั้งหมดไม่มีความสัมพันธ์กับอายุ ($r = 0.06$, $p = 0.50$) กล่าวโดยสรุป ความหนาของผิวหนังของสตรีมีแนวโน้มจะบางลงเมื่อเข้าสู่วัยหมดระดู โดยมีการเปลี่ยนแปลงอย่างมีนัยสำคัญทางสถิติในวัยหมดระดูระยะต้นเมื่อเปรียบเทียบกับระยะก่อนหมดระดู

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