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Ovarian Volume Assessment by Transvaginal Ultrasonography in Postmenopausal Women

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ABSTRACT

Objective To assess normal ovarian volume in healthy postmenopausal women.

Methods A prospective descriptive study consisted of 32 healthy post menopausal women without previous hormonal replacement therapy recruited from the menopausal clinic. They were assessed by single transvaginal ultrasound examination to measure ovarian volume at the first visit.

Result Duration of postmenopausal state ranged from 1-25 years (mean $\pm$ SD = 7.1 $\pm$ 5.9 years). Either left or right ovaries could be measured in 26 from 32 cases and mean ovarian volume was 1.8 $\pm$ 0.9 cm^3 and 1.7$\pm$ 0.9 cm^3.

Conclusion These data represent the normal ovarian volume in healthy post menopausal women in our population. It seems to be smaller than that reported in the western series. Either left or right ovary could be detected by transvaginal ultrasound in about 81.3 % of all subjects.

Key words: Ovarian volume, Transvaginal ultrasound, Postmenopausal women

To our knowledge, the incidence of ovarian abnormality was higher in postmenopausal period especially ovarian cancer.[1] Palpable ovaries in postmenopausal women have been suggested for screening ovarian malignancy.[2] However, the detection of ovarian enlargement, and early malignant lesion by clinical signs/symptoms or by pelvic examination is not reliable and depends on various factors such as equivocal clinical presentation, fatty abdomen and the nature of ovarian shrinkage after menopause.[3,4]

Currently, transvaginal ultrasound, noninvasive technique, has become available for ovarian assessment in all age groups and can assess the pelvic structure better than clinical examination.[5] It has been suggested that ultrasound may be used as a screening test for early ovarian carcinoma.[6-10] Campbell[11] demonstrated that all ovaries assessed to be of normal morphology by ultrasound were found to be normal at the time of laparotomy and there was good correlation between ovarian volume as determined by ultrasound and by direct measurement at the time of laparotomy. Likewise, Rodriguet,[12] demonstrated that transvaginal ultrasound had the sensitivity of 90 % and the specificity of 100% when compared with the direct ovarian measurement at the time of surgery. However, in the diagnosis of ovarian enlargement or abnormality, it is necessary to determine the normal

range of ovarian volume in specific age group. The purpose of this study was to assess the normal ovarian volume in healthy postmenopausal women.

Material and Methods

Thirty two healthy postmenopausal women were recruited into the study from the menopausal clinic. Every woman was healthy and had no history of previous hormonal replacement therapy. The postmenopausal period was determined by accurate last menstrual period. All subjects had intact bilateral ovaries. Transvaginal ultrasound was performed after emptying bladder by the same author, using transvaginal transducer of 5 MHz, (Aloka SSD 1700 model, Japan). Only one assessment was done for each subject.

The maximal transverse (D1), anteroposterior (D2), and longitudinal (D3) diameters of the ovary were measured. Ovarian volume was calculated using the formula as follows: ovarian volume = (π/6 x D1 x D2 X D3 = 0.523 x D1 x D2 x D3).

Results

The baseline characteristics of the subjects were demonstrated in Table 1. The average age of the subjects was 53.3 $\pm$ 6.8 years (range 42-72 years). The average age at menopause was 47.3 $\pm$ 5.0 years (range 39-59 years) and the duration of postmenopausal period was 7.1 $\pm$ 5.9 years (range 1-25 years). The left and right ovaries could be visualized by transvaginal ultrasonography in 26 from 32 cases (81.3%).

Left ovarian volume was slightly larger than right ovarian volume but not significantly different. The mean ovarian volume of the left and right side were 1.8 $\pm$ 0.9 cm^3 and 1.7 $\pm$ 0.9 cm^3 respectively. Whereas, mean endometrial thickness was 3.1 $\pm$ 1.8 mm as shown in Table 2.

Table 1. Baseline characteristics of the subjects

	Mean $\pm$ SD	**range**
Age (years)	53.3 $\pm$ 6.8	42 – 72
Age of menopause (years)	47.3 $\pm$ 5.0	39 – 59
Duration of menopause (years)	7.1 $\pm$ 5.9	1 - 25

Table 2. Ovarian volume and endometrial thickness

	Mean $\pm$ SD	**range**
Left ovarian volume (cm^3)	1.8 $\pm$ 0.9	0.5 – 3.9
Right ovarian volume (cm^3)	1.7 $\pm$ 0.9	0.4 – 3.9
Endometrial thickness (mm)	3.1 $\pm$ 1.8	0 – 7.0

Discussion

Ultrasonographic study is extensively used for assessment of female pelvis in all age groups including postmenopausal women. As stated by Granbery[13] ultrasound examination of the ovaries is a much more reliable method for evaluation of the ovaries than gynecologic palpation. Because of its better demonstration of the pelvic structures than transabdominal ultrasound, transvaginal ultrasound is the first option for ovarian assessment in postmenopausal women.

To detect early abnormalities of the ovary, it is

important to know the normal ovarian volume and normal appearance for each age group. The normal ovarian size of women in the reproductive years might be abnormally large for those in postmenopausal women. Therefore, it is necessary to establish the normal value of the ovarian volume for each age group.

Based on this study, the ovarian volume of both sides were nearly the same (left = 1.8 $\pm$ 0.9 cm^3 and right = 1.7 $\pm$ 0.9 cm^3). The mean ovarian volume in postmenopausal women is varied among different study population. For example, Tepper[14] reported that the mean ovarian volume in postmenopausal women more than 15 years was 2.2 $\pm$ 1.4 cm^3. Whereas Goswamy[15] showed that the mean ovarian volume in 2221 healthy post-menopause of left and right side were 3.57 cm^3 and 3.58 cm^3, respectively. Merz[16] found that mean ovarian volume of left and right ovaries in postmenopausal women of more than 5 years were 2.5 cm^3. From these studies, the mean ovarian volume was larger than in our study. This difference may be due to the difference background, race, body weight and other factors. In the study of Goswamy[15], the women with hormonal replacement therapy and previously diagnosed of breast cancer was not excluded. These factors may influence the ovarian volume. It was confirmed that parity, body weight, age at menopause, history of hormonal replacement therapy and previously diagnosed of breast cancer have an effect in ovarian volume.[15] However, Merz[16] found that parity had no effect on ovarian volume.

The study of postmenopausal Thai women (Ramathibodi hospital)[17] demonstrated mean ovarian volume in postmenopausal women $\leq$ 5 years and > 5 years were 2.6 $\pm$ 2.7 cm^3 and 1.7 $\pm$ 1.5 cm^3 in the left side, respectively, 3.0 $\pm$ 2.6 cm^3 and 1.5 $\pm$ 0.8 cm^3 in the right side, respectively. The mean ovarian volume in our study (1.7 cm^3, with the mean duration of postmenopausal period of 7.1 $\pm$ 5.9 years) is quite similar to that in Ramathibodi's series, in the group of postmenopauasal period of more than 5 years. This strongly suggests that racial factor may play an important role in the difference of the volume between the Thai and western series.

The left and right ovarian volume were not different[16,18], the detection rate of ovary in postmenopausal period by ultrasonography was varied from 82–99%.[11,15,18,19] In our study the detection rate was 81.3 %. It was varied from studies to studies because of the experience of the examiner, resolution of the machine, time devoted for searching ovaries and size of the ovary itself. It was possible that the smaller ovary, the greater chance of missing it by ultrasonography.

However, the study in a larger number of postmenopausal subjects should be carried out to assess the mean ovarian volume. This study has a limited number of subjects and we did not divide subjects into subgroups of year-period after menopause. However, as a whole, our data provide normal mean ovarian volume of the postmenopausal women and may be used as baseline data in assessment of ovarian volume especially in case of suspected early ovarian tumors in postmenopausal women.

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