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Transvaginal ultrasonography assessment of ovarian volumes in postmenopausal women

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The authors evaluated ovarian volumes by transvaginal ultrasonography at different periods after menopause. Ninety-eight postmenopausal women with an average age of 51.9 years and a one- to eight-year postmenopausal period were studied. The control group consisted of 40 women during menacme with an average age of 31.8 years, who were also submitted to transvaginal ultrasonography to evaluate ovarian volume. There was no significant difference between right and left ovarian volumes in the study groups. There was a significant decrease in measure and standard deviations of the volumes after the first year of menopause (mean volume - 2.2 ± 0.9 cm^3) when compared to the control group (mean volume - 6.3 ± 2.0 cm^3), followed by a slow and gradual shrinking after this phase. Decrease in ovarian volume became significant after the fourth postmenopausal year. Transvaginal ultrasonography demonstrated great importance as an investigative method of ovarian diseases in postmenopausal women.

UNITERMS: Ovary. Ultrasonography. Menopause.

INTRODUCTION

Ovarian cancer is an important cause of death due to difficult detection and diagnosis of its initial lesions. The prognosis for women who are in an advanced stage of the disease remains poor, with a survival rate of 15 percent after a period of 5 years; while women in stage I of the disease have a much better prognosis, with a survival rate of 95 percent in 5 years.[1]

The difficulty in initially diagnosising ovarian cancer has been attributed to its poor clinical presentation in stages I and II, and to the almost impossible detection of ovarian enlargements in postmenopausal women by bimanual pelvic examination. Therefore, it is imperative to develop adequate detection methods, which would unarguably have a great impact on survival rates, especially in postmenopausal women, in whom the incidence of ovarian cancer is higher.[2]

Ultrasonography has been used in postmenopausal women for detection of ovarian enlargements and neoplasic lesions.[3] Transvaginal assessment, a recently developed ultrasonography technique, allows for better visualization of the ovary than conventional abdominal ultrasonography, and seems more efficient in detecting ovarian tumors.

It is a know fact that ovarian size decreases progressively throughout menopause. This shrinking is most evident in the ovarican cortical, as a consequence of the acentuated decrease in the growth and maturation of follicles.[4] Obliterate arteriolar sclerosis and cortical fibrosis also contribute to the decrease in ovarian size.[5] As a consequence, ovarian weight decreases 30 percent, according to Block.[6] Iwamoto et al. assessed ovarian volume by abdominal ultrasonography and observed a regressive curve that appears after menopause.[7]

Since transvaginal ultrasonography is more accurate in evaluating the ovarian volume, in this study we evaluated the ovarian volume of women at different periods after

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menopause, in order to establish normal parameters of ovarian volume in the postmenopausal period.

PATIENTS AND METHODS

We studied 98 women during menopause with an average age of 51.9 years, and a 1- to 8-year period of menopause.

Women over 40 years old, with an amenorrhea period of at least one year and high FSH levels, were considered postmenopausal.[8,9] Race and number of gestations were not considered. All patients presented normal clinical and laboratorial conditions. Patients with previous gynecological surgeries, and those with pelvic masses (detected either clinically or ecographically) were excluded. No patient was undergoing hormonal replacement therapy.

Control groups consisted of transvaginal ultrasonograms of 40 clinically normal women during menacme (age 20-40 years, mean: 31.8 years) treated as outpatients at the Department of Obstetrics and Gynecology of the College of Medical Sciences of the Santa Casa of São Paulo.

Ultrasonography was performed with a Toshiba SAL-38D and a mechanical endovaginal sector transducer of 5.0 MHz. Ovaries were assessed in three planes and their size calculated with the simplified elliptic formula: length x height x depth x 0.523.[10] The ovaries and vessels were identified in all cases and did not show any texture or surface alterations. Statistical analysis was done by the t test with coupled samples; the Kruskall-Wallis test for independent samples; and a regression analysis of variance.

RESULTS

The average volumes of right and left ovaries for control and studied groups are listed in Table 1. There was no significant difference between right and left ovarian volumes. Therefore, we used randomly, the average right ovarian volume of both study groups for analysis.

After comparing the right ovarian volume of both groups, a significant difference could be noted in relation to the average and standard deviation of both groups (Table 2). This difference was present in the first year after menopause and is shown in Chart 1.

Ovarian volume in relation to postmenopausal period is shown in Chart 2 and Table 3. After a sharp decrease in the first year, the difference in ovarian volume once again became significant after the fourth year, as demonstrated by the variance analysis and indicated by a straight line.

Table 1
Average volume of right and left ovaries in the control and study groups.

		Ovaries (cm^3)	
Group	N	Right	Left
Control	40	6.3±2.0	6.5±2.2
Study	92	2.2±0.9	2.4±0.7

Table 2
Average and standard deviation of ovarian volumes in the control and study groups.

Group	N	Ovarian Volume (RO - cm^3)
Control	40	6.3±2.0
Study	98	2.2±0.9*

* Kruskall-Wallis test
p>0.05 RO: right ovary

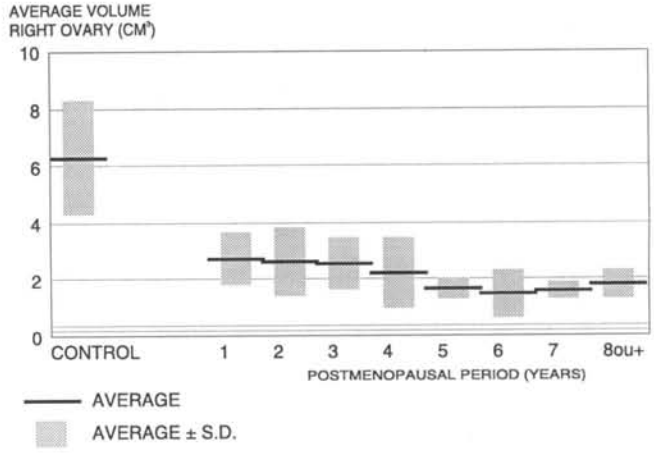

Chart 1 - Average volume and standard deviation of right ovary at menacme (control) and after menopause.

DISCUSSION

Ultrasonographic study of the female pelvis is an invaluable method of genital assessment after menopause. Abdominal pelvic ultrasonography was first used in early detection of ovarian cancer[11] and endometrial thickness.[12]

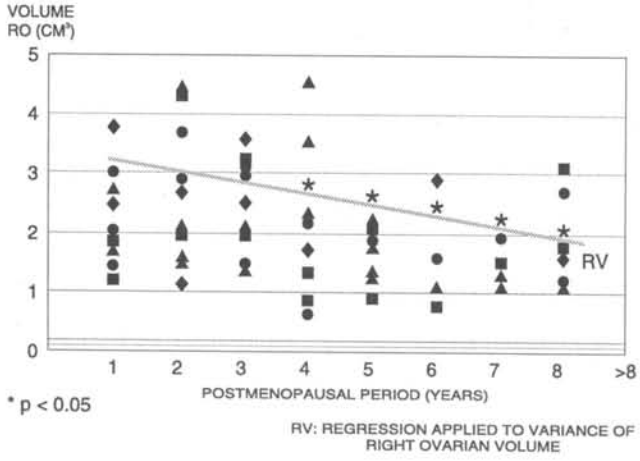

Chart 2 - Volume of right ovary in relation to postmenopausal period.

Table 3
Average and standard deviation of ovarian volumes according to period after menopause

Period after menopause	N	Ovarian Volume (RO - cm³)
1	15	2.6±0.8
2	22	2.5±1.1
3	19	2.4±0.8
4	11	2.1±1.1*
5	10	1.7±0.4*
6	4	1.5±0.9*
7	6	1.5±0.3*
8 and up	11	1.8±0.6*

* Kruskall-Wallis test
p>0.05 RO: right ovary

The recently introduced transvaginal ultrasonography has improved image resolution through higher frequency transducers and proximity to the pelvic organs, without the limitations of the abdominal technique.[13] High frequency (5-7.5 MHz) endovaginal transducers produce clear images that are easier to interpret, and may effectiveley complement the routine bimanual pelvic exam.[14]

Establishing the limits of measurement of ovarian volume for each period after menopause is of great importance. With such, increases in ovarian volumes or the appearance of anomalous images would require other methods offering a better investigation.[11,15]

In our study, there was no significant difference between right and left ovaries. However, we noted a significant decrease in ovarian volumes between the studied groups that began in the first year after menopause. These findings coincide with the morphorologic studys of postmenapausal ovaries.[4,16] We would also highlight that, after the initial decrease in ovarian size, the shrinking slows down until the fourth year, when it becomes significant, as demonstrated by the regressive analysis of ovarian volume and postmenopausal period.

Malignant tumors of the ovary have a significantly elevated frequency amongst postmenopausal women over 50 years old.[2] Small tumors (diameter < 5.0 cm) are rarely detected palpably during a bimanual pelvic examination. BJORKHOEM & SILLFVESWAR report that 31 percent of Stage I ovarian carcinomas presented a diameter below 5.0 cm, and that survival rates for granulosa tumors of this size was 100 percent;[17] while in those with diameters between 5-15cm it was 57 percent.[18]

In the past few years, much has been discussed about the role of ultrasonography in ovarian cancer detection. According to VAN NAGELL et al.,[19,20] ovaries may be visualized transvaginally in 95 percent of the cases during menacme and in more than 85 percent of the postmenopausal cases. The same authors, in a study of 1300 asymptomatic postmenopausal women, detected 33 abnormal ovaries, of which 2 were cancers in an early stage.

Our results show that the ovarian volume before menopause can be predicted. Therefore, the routine use of transvaginal ultrasonography in climacteric women assumes an important role in finding volume and structure modifications, and could reduce in mortality through early diagnosis.

RESUMO

Os autores avaliaram através da ultra-sonografia transvaginal as medidas dos volumes ovarianos em diferentes períodos de tempo de pós-menopausa. Foram estudadas 98 mulheres menopausadas, com idade média de 51,9 anos e tempo de pós-menopausa variando de 1 a 8 anos. Como grupo controle foram consideradas 40 mulheres no menacme, com idade média de 31,8 anos também submetidas à ultra-sonografia transvaginal para aferição do volume ovariano. Não houve diferença significativa entre os volumes ovarianos direito e esquerdo nos grupos estudados. Encontraram decréscimo significativo entre as médias e desvios padrão dos volumes ovarianos a partir do primeiro ano de pós-menopausa (volume médio de 2,2 ± 0,9 cm^3), quando comparadas com grupo controle de pacientes no menacme (volume médio de 6,3 ± 2,0 cm^3), seguindo-se de diminuição lenta e gradual a partir desta fase. Especificamente na pós-menopausa, a diminuição do volume ovariano tornou-se significativa a partir do quarto ano. Salientam a importância da ultra-sonografia transvaginal na pós-menopausa, como método propedêutico na detecção das patologias ovarianos nessa faixa etária.

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