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CLINICAL ARTICLE

Endometrial volume as predictor of malignancy in women with postmenopausal bleeding

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Endometrial volume;
Postmenopausal bleeding;
Three-dimensional ultrasound;
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Abstract

Objective: To assess endometrial volume as a predictor of endometrial malignancy in women with postmenopausal bleeding. *Methods:* Endometrial volume was measured by virtual organ computer-aided analysis in 170 women with postmenopausal bleeding, and histopathologic results of endometrial biopsies were obtained for all. A group of 100 women without postmenopausal bleeding was used for control. *Results:* There were 90 cases of benign disease, 53 cases of atypia, and 27 cases of endometrial cancers in the study group. Whereas endometrial thickness was 9.61 ± 5.12 mm (range, 5–20 mm) and endometrial volume was 3 ± 1.1 mL (range, 1.8–5.4 mL) in women with atypia or cancer, they were 4.87 ± 3.43 mm (range, 2–8 mm) and 1.52 ± 0.82 (range, 0.6–2.2 mL), respectively, in women with benign disease. In the control group, endometrial volume was 1.15 ± 0.14 mL (range, 0.6–1.3 mL). Volume was more sensitive than thickness for predicting malignancy, and a cutoff value of 1.35 mL was found to provide the best sensitivity. *Conclusion:* An endometrial volume of 1.35 mL or greater may predict malignancy in women with postmenopausal bleeding.

1. Introduction

Uterine cancer is the most common malignant neoplasm of the female genital tract and the fourth most common cancer in women. It was reported that 6000 women died of the disease in the United States in 1997 [1], and an annual incidence of 19.5 cases per 100,000 women was recorded in Canada in 1993 [2]. Postmenopausal bleeding with endometrial atypia carries a risk of progression to cancer [3], but

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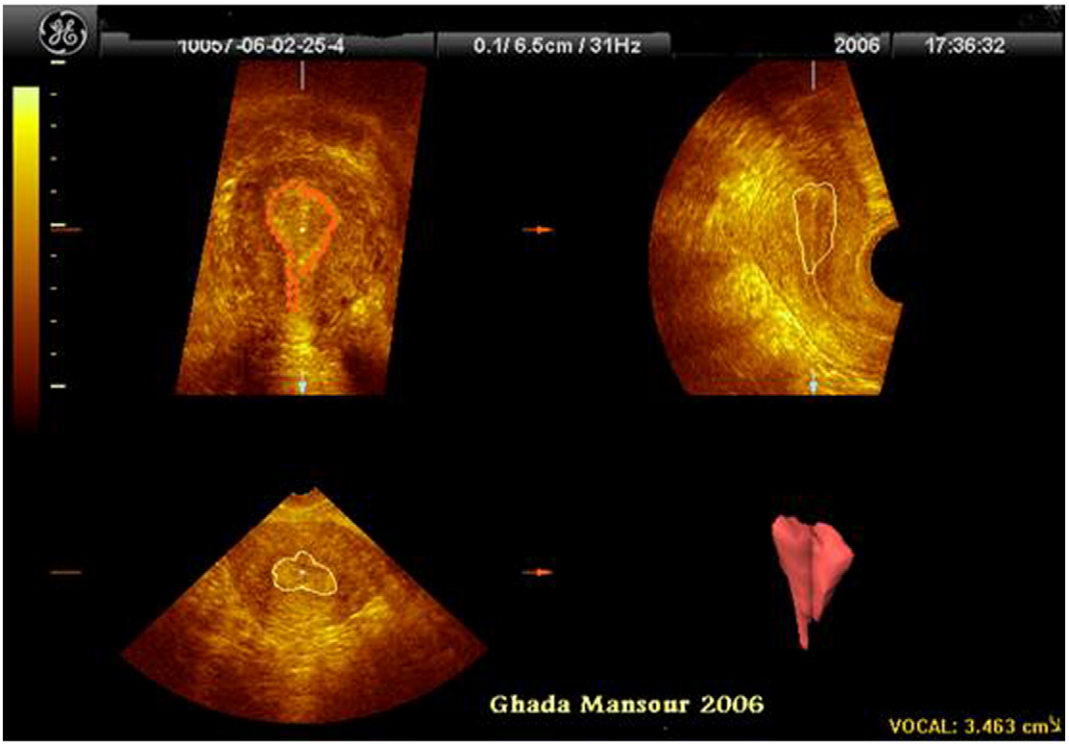

Figure 1 Multiplanar view of endometrium. Endometrial volumes were manually calculated in the coronal plane with 30° rotation steps and 1-mm shell thickness (12 mm thickness by 2D and 3.5 mL volume by 3D).

the risk of atrophic endometritis developing into cancer is minimal.

Endometrial thickness has been used as an indicator of risk for endometrial carcinoma in asymptomatic menopausal and postmenopausal women. In 2-dimensional (2D) ultrasound, the thickest anteroposterior diameter of the endometrium is measured using the 2 endometrial layers, and a cutoff value of 4 to 5 mm has been found to be predictive of pathologic changes [4–7]. However, the same thickness does not express the same endometrial volume in different endometria because uterine lengths may be different and endometrial irregularities may exist.

Volume estimation is more reliably obtained by 3-dimensional (3D) than by 2D ultrasound [8]. The smallest unit of a 2D image is called a pixel and the smallest unit of a 3D image is called a voxel [9].

Although the interobserver and intraobserver reproducibility of endometrial volume estimation by VOCAL is well established [10–15], no cutoff value has been proposed for the endometrial volume of postmenopausal women who may be at risk for malignancy. The present study was conducted to determine the cutoff value for endometrial volume, as measured by VOCAL, that could be considered a predictor of malignancy in women with postmenopausal bleeding.

2. Patients and methods

A total of 170 women presenting to the outpatient clinics of Ain Shams University Maternity Hospital with complaints of postmenopausal bleeding were recruited between January 2005 and August 2006, and 100 healthy postmenopausal women acted as controls. Neither study patients nor controls were taking hormone replacement at the time of the study.

The study was approved by the hospital ethics committee and informed consent was obtained from all participants. History taking included age, years since menopause, smoking and hormone therapy status, and presence or absence of any medical disorders such as diabetes mellitus or hypertension. Body mass index (calculated as weight in kilograms divided by the square of height in meters) was calculated for all.

Patients with associated gynecologic lesions were not included in the study; nor were those with bleeding tendencies or general or local causes for bleeding, or those taking anticoagulants.

The endometrial thickness of patients with suspected endometrial disease was assessed transvaginally by both 2D and 3D exploration using the Voluson Pro 730 machine (General Electric Medical Systems, Waukesha, Wisconsin, USA).

Table 1 Endometrial thickness and volume in women tested for endometrial atypia or cancer and in healthy controls [a]

Group studied	Thickness, mm	Volume, mL
All study women (n=170)	8.75±4.05 (2–20)	2.74±0.9 (1–5.4)
Those positive for atypia or cancer (n=80)	9.61±5.12 (5–20)	3±1.1 (8–5.4)
Those negative for atypia or cancer (n=90)	4.87±3.43 (2–8)	1.52±0.82 (0.6–2.2)
Controls (n=100)	2.7±1.2 (1–5)	1.15±0.14 (0.6–1.3)

[a] Values are given as mean±SD (range).