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The Role of Transvaginal Ultrasonography in Predicting the Postmenopausal Endometrial Pathology

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Abstract

Sixty postmenopausal (PM) women were subjected to pelvic ultrasonic examination (Abdominal and vaginal) at Al-Azhar University Hospitals from July 1992 to October 1993. Their ages ranged from 49 to 71 years. The vaginal sonography was more tolerable by the patients and more accurate in detecting the endometrial thickness and echotexture pattern. Five mm as an actual thickness of the both endometrial layers, was found to be a cut-off point, equal or below which dilatation and curettage (D and C) is not necessary. The specificity of this test to detect normal PM endometrium was 100% and the sensitivity to detect abnormal PM endometrium was 92.85%.

Introduction

PELVIC sonography is the imaging modality of choice to evaluate the endometrium [1]. Several articles have recently advocated the use of transvaginal sonography (TVS) in women with postmenopausal bleeding (PMB), for early detection of endometrial carcinoma and for screening and follow up of postmenopausal (PM) women undergoing replacement therapy [2,3]. Transvaginal ultrasound scanning permits the use of higher frequency ultrasound with greater proximity to the uterus. The endometrial-myometrial interface can be seen more clearly than with the full bladder transabdominal technique and accurate measurement of the endometrium with detailed analysis of endometrial echotexture may be performed.

Disadvantages of TVS are the field of view especially for patients with extensive adenexial lesions. The endometrium may not appear as a continuous line in patients with uterovaginal descend and abnormal position of the uterus. Also the empty bladder may lead to miss diagnosis of bladder lesion [1].

This study was designed to determine the value of TVS in predicting the postmenopausal endometrial pathology and the correlation of sonographic findings (thickness and echotexture), with the microscopic examination.

Patients and Methods

This study comprised 60 postmenopausal women who had ultrasonic examination before dilatation and curettage or hysterectomy at Al-Azhar University Hospitals from July 1992 to October 1993. Their ages ranged from 49 to 71 years. None was receiving hormone replacement therapy.

The sixty cases were divided into two groups:

Group A: Included 30 cases without PMB.

Group B: included 30 cases with PMB, (defined as vaginal bleeding at least one year after cessation of menses).

Transabdominal sonography (TAS) was performed with full bladder technique while patient was in supine position using 3.5 MHz sector transducer. The pelvis was viewed in both longitudinal and transverse planes.

Transvaginal sonography (TVS) was performed using 4.5 MHz transducer while the patient was in supine position with empty bladder. Sagittal and coronal images were obtained. Endometrial thickness was measured from the highly reflective interface of the junction of the endometrium and myometrium. This measurement represents two layers of endometrium [4].

The actual thickness of each endometrial wall was taken as half of the total linear distance measured, assuming there was no significant separation of the most superficial layers of endometrium by intracavitory fluid.

The surrounding low amplitude echo layer was not included in the measurement, as this represents the inner layers of compact and vascular mymetrium [5]. This layer is symmetrical and intact in all normal psotmenopausal uteri and also in all those with endometrial polyps and simple and atypical hyperplasia. It is absent or irregular in uteri with invasive endometrial carcinoma [6,7].

The endometrial line was measured at its maximum thickness in both vertical and horizontal planes. The average thickness was taken as an accurate representation. Endometrial echotexture was also analysed for homogenity, the presence of cysts and fluid within the endometrial cavity.

To localize the uterus in the presence of uterovaginal descend, the probe should be inserted mid-way in the vagina. Each examination took between 5 and 10 minutes. Indications for D and C or hysterectomy for cases of group A were adenexial masses (11 cases), uterine proplaps (7 cases), uterine fibroids (5 cases), cervical polyps (4 cases) and uterine polyps (3 cases).

Histopathological examination was done at the pathology Department, Al-Azhar University.

Results

Endometrial thickness measured by the abdominal transducer was identical to that measured by the vaginal transducer, but TVS was well tolerated by all patients, avoiding the discomfort associated with the transabdominal full bladder techinque. Endometerial echotexture analysis was more clear by the TVS, while TAS was better for evaluation of the pelvic masses especially the extensive lesions.

The present study showed that the sonographic endometrial echotexture could be classified into 5 patterns:

0- Thin (≤ 5 mm) endomertrium.

1- Thick (> 5 mm) homogenous echogenic endometrium.

2- Thick echogenic endometrium with small anaechoic cysts.

3- Thick inhomogenous endometrium.

4- Thick endometrium with fluid in the endometrial cavity.

Table 1 shows the relationship between the sonographic patterns of the endometrium to its thickness and histologic patterns in cases of group A. Out of group A, six cases yielded insufficient endometrium for diagnosis, three showed pattern 0 echotexture and three showed pattern 4. All cases of atrophic endomterium were of pattern 0 echotexture with endometrial thickness ≤ 5 mm thickness and value of 3.4 mm. Three cases showed pattern 1 endometrium, one case was of 6 mm thickness and prolifirative histologic pattern and two cases were of 8 and 10 mm thickness with mean value of 9 mm and adenomyomatous polyp. One case of endocervical polyps was not diagnsed by ultrasound.

Four cases presented pattern 2 endometrium, two of then were of 6 and 8 mm thickness and the curettage removed endometrium with cystic atrophy and benign polyp, the other 2 cases showed endometrium of 7 and 9 mm thickness and cystic atrophic changes. The small cysts appeared as anaechoic areas with 1.5 mm size. One case presented pattern 3 endometrium with 10 mm thickness and atypical hyperplasia. Four cases presented pattern 4 endometrium with 11-15 mm thickness and scanty atrophic histology in one case and insufficent material in three cases. The actual endometrial thickness of the case presented artophic type was 2 mm.

The ultrasound and histologic findings in group B (Women with PMB) are shown in table 2. There was no endometrial tissue on curettage in 5 cases. All cases of the inactive endometrium were of ≤ 5 mm thickness and of pattern 0 echotexture with 2-5 mm thickness.

Seven cases showed pattern I echotexture with 6-9 mm thickness. Histology revealed proliferative endometrium in 5 cases and adenomatous hyperplasia in 2 cases. Eight cases showed pattern 2 echotexture with endometrial thickness of 7-12 mm and histologic pattern of cystic glandular hyperplasia in 5 cases, cystic atrophy in 2 cases and benign polyp with cystic glandular hyperplasia in one case.

Pattern 3 echotexture was demonstrated in 3 cases with endometrial thickness of 8,9 and 11 mm and histologic pattern of atypical endometrium in 2 cases and atrophic endometrium with metaplastic changes in one case. The endometrial thickness of the three cases of pattern 4 was of 6-9 mm range. There was no tissue on curettage in two cases and atrophic endometrium was obtained from the third case in which the actual endometrial thickness was 2 mm.

Out of the sixty cases of both groups, the curettages obtained endometrium for histopathological studies in 49 cases. Out of them 23 showed atrophic or incative endometrium (46.9%) and pattern 0 echotexture with endometrial thickness < 5 mm (without intra-cavitory fluid).

If a cut off limit of 5 mm had been used in this study, the predictive value of TVS in detecting normal post menopausal endometrium (Specificity) was 100% (23/23), when the endometrium is ≤ 5 mm thickness.

The predictive value of TVS in detecting abnormal endometrium (sensetivity) was 92.85% (26/28) when the endometrium is > 5 mm thickness.

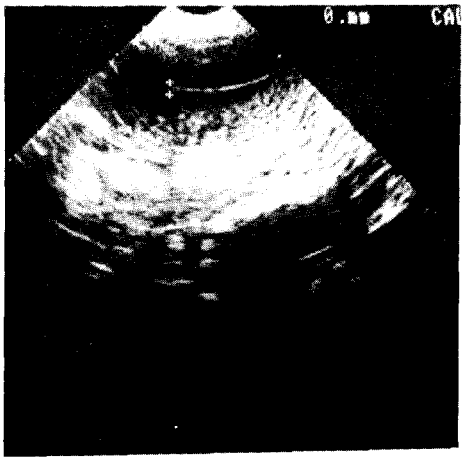

Fig. 1 (A)

Fig. 1 (B)

Fig. (1) A: Vaginal ultrasonography of a 58-year-old patient who had postmenpausal bleeding. The endometrial echo line is thin (2 mm), with surrounding hypoechoic halo. B: Histopathology of the same case revealed arrophic endometrium. The glands are small, few in number and the stroma is loose and oedematous.

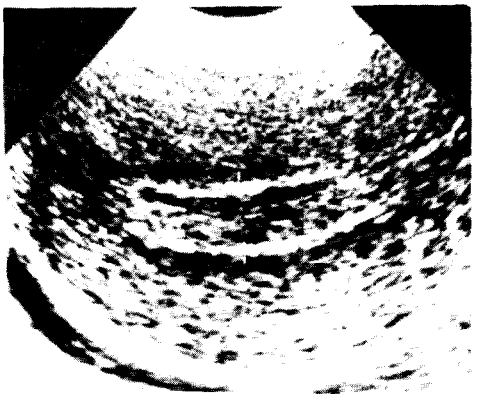

Fig. 2 (A)

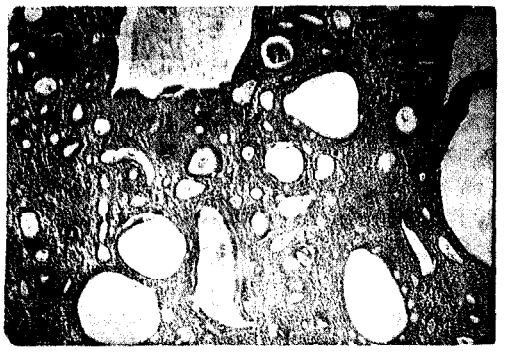

Fig. 2 (B)

Fig. (2) A: Vaginal ultrasonography of a 49-year-old patient with postmenpausal bleeding showed thickened endometrium (10 mm), with small cystic areas. B: Histopathology of the same case revealed cystic hyperplasia of the endometrium. the glands are numerous and some are dilated.

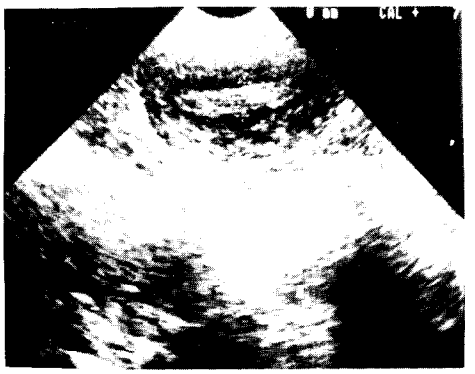

Fig. 3 (A)

Fig. 3 (B)

Fig. (3) A: A 53-year-old patient, without bleeding. Vaginal ultrasonography revealed an endometrial polyp. B: Histopathology of the same case revealed benign adenomyomatous polyp.

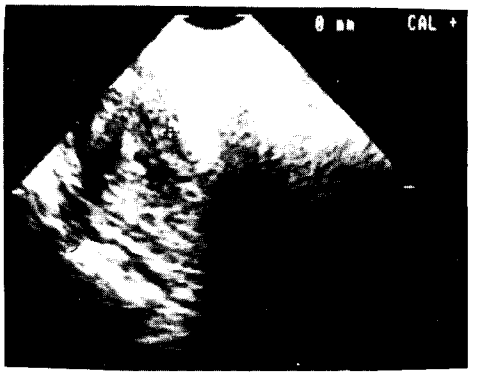

Fig. 4 (A)

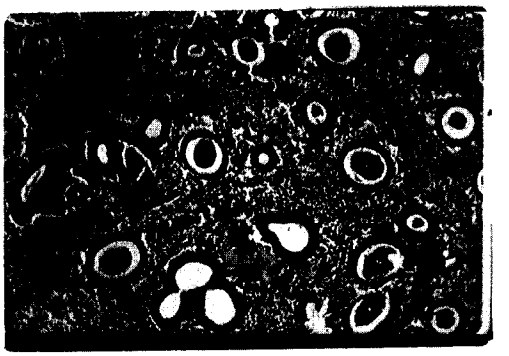

Fig. 4 (B)

Fig. (4) A: Vaginal ultrasonography of a 70-year-old patient who had postmenpausal bleeding. It showed endometrial hyperplasia. The endometrium is thickened (9 mm). B: Histopathology of the same case revealed proliferative glands, with intraluminal projection.

Table (1): Sonographic and Histologic Correlation in Cases of Group A.

Grade	Number of cases	Endometrial thickness in mm by U.S.		Histological diagnosis
		Mean	Range	No.
0	18 (60%)	3.4	(2-5)	15 Atrophic endometrium 3 No materials
1	3 (10%)	8	(6-10)	1 proliferative endometrium 1 Benign adenomyomatous polyp 1 Benign adenomyomatous polyp+cervical polyp
2	4 (13.3%)	7.5	(6-9)	2 Benign polyp+cystic atrophy 2 Cystic atrophy
3	1 (3.33%)	10		1 Atypical hypperplasia
4	4 (13.33%)	13	(11-15)	1 Scant atrophic 3 No materials
	30 cases			

Table (2): Sonographic and Histologic Correlation in Cases of Group B.

Grade	Number of cases	Endometrial thickness in mm by U.S.		Histological diagnosis
		Mean	Range	No.
0	9 (30%)	3.7	(2-5)	6 Inactive endometrium 3 No materials
1	7 (23.33)	7.8	(6-9)	5 Proliferative endometrium 2 Adenomatous hyperplasia
2	8 (26.67%)	12.4	(7-12)	1 Benign polyp with cystic glandular hyperplasia 5 Cystic glandular hyperplasia 2 Cystic atrophy
3	3 (10%)	9.3	(8-11)	2 Atypical hyperplasia 1 Atrophic endometrium with metaplastic changes
4	3 (10%)	7	(6-9)	1 Scant atrophic 1 No materials 1 Mucous
	30 cases			

Discussion

The proximity of transvaginal probe to the endometrium and the absence of the full bladder compressing the endometrium revealed an accurate measurement of endometrial thickness and excellent visualization of its echotexture.

Our finding in the present study revealed that a 5 mm actual endometrial thickness of both layers appeared to be a

distinct cut-off point equal or below which all post-menopausal endometria were inactive and normal. This result was proved by other authors [6,15,8]. The specificity of this test to exclude any endometrial pathology was 100%. Care should be taken not to include the hypoechoic subendometrial halo which is thought to represent the innermost vascular layer of myometrium [4]. Group A showed higher incidence of cases with pattern 0 endometrium than group B, the result which was proved by Nasri and Coast [6].

Diagnosis of the endometrial abnormalities is usually made by means of microscopic examination of biopsy. Up to 75% of women with PMB have a histologically benign endometrium [9]. In fact, atrophic endometrium, as well as a variety of benign endometrial processes, is found more often than endometrial carcinoma in postmenopausal women presenting by bleeding [6,10,11].

Pattern 2 endometrium showed small cysts in an otherwise regular echogenic endometrium. Cystic glandular hyperplasia and cystic atrophy are relatively common in postmenopausal women, it is also termed simple hyperplasia, results from prolonged unopposed estrogenic stimulation of the endometrium [12].

Microscopically, there is proliferation of the endometrial glands which are cystically dilated and often display outpouching into the stroma [13]. Like cystic hyperplasias, cystcic atrophy results in a thickened endometrium, but the cells lining the dilated glands are flat or cuboidal and the stroma is fibrotic [9]. In both cystic hyperplasia and cystic atrophy, the glands are markedly dilated perhaps because of mechanical obstruction and the appearance of the endometrium has been likened to Swiss chesse.

The high resolution afforded by TVS allows visualization of the cystically dilated glands in atrophy or hyperplasia and these conditions can be distinguished from other causes of endometrial thickening, if small endometrial cysts are present within otherwise echogenic endometrium [14]. Pattern 3 showed inhomogenous endometrium with irregular hypoechoic areas within it. These hypoechoic areas could be readily distinguished from the cysts in pattern 2 by the irregular outline and the absence of enhanced through transmission. These areas may correspond to haemorrhage or necrosis within the tumor.

Apparent endometrial thickening may also be caused by fluid destending the endometrial cavity (Pattern 4). The fluid is recognizable at TVS and if the endometrial lining is thin and regular, underlying endometrial abnormalities are rare [1].

In some patients, however, a dilemma arises when the endometrial sampling yields scant tissue sufficient for diagnosis. We suggest that careful analysis of the endometrium may be of great help.

Recommentations:

From the above results and the results of other authors [8,15,9], we recommend the routine use of TVS for evaluation of PM endometrium. It is simple, non invasive technique, well tolerated by most older women and is particularly helpful in the obese patients, when the uterus is retroverted, or if the endometrium is distorted by leiomyomas.

Actual endometrial thickness of 5 mm for both layers, may be used as a distinct cut-off point, equal or below which D and C is not necessary.

Endometrial echotexture patterns are of great help for evaluation of endometrial abnormalities and may be used to avoid unnecessary D and C for cases of pattern 0 and some cases of pattern 4.

Both the cut-off point of the endometrial thickness and the echotexture patterns may be used as a screening program for endometrial abnormalities.

Also, we recommend the evaluation of the echotexture patterns in postemenopausal women using hormone replacement therapy.

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