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Original Research Article

Evaluation of the Diagnostic Role of Transvaginal Ultrasound Measurements of Endometrial Thickness among Postmenopausal Women

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Abstract:

Introduction: Menopause is the permanent cessation of menstruation resulting from the loss of ovarian follicular activity without an obvious intervening cause and is confirmed only after 12 consecutive months of amenorrhea. Endometrial atrophy is the most common cause of postmenopausal bleeding, accounting for 60 - 80 % of the cases. Asymptomatic endometrial thickening is defined as endometrium ≥ 5 mm thick on ultrasonographic examination in postmenopausal women who have no complaints of bleeding. Transvaginal ultrasonography is routinely performed as part of a pelvic sonogram in postmenopausal women, and images of the endometrium, including a measurement of the endometrial thickness (ET) are frequently obtained.

Materials and Methods: This is a prospective study conducted among all Postmenopausal Women attending Gynecology OPD in The Department of Obstetrics and Gynecology Kasturba Hospital, BHEL Bhopal. Women who reported at least 12 months of amenorrhea after the age of 40 yrs. provided that the amenorrhea was not explained by medication or disease. All asymptomatic postmenopausal women having endometrial thickness >/= 5mm. Transvaginal sonography; the measurement of the endometrium is made at its maximal thickness on a midline sagittal image of the uterus obtained by transvaginal ultrasound. It is a bilayer measurement combining the width of both the anterior and the posterior layers of the endometrium. It has been suggested that the normal endometrial thickness in a postmenopausal woman is 5 mm.

Results: Out of 100 patients, 17% of the women had an Irregular menstrual cycle in the past. Out of 100 patients, 14% of the women had increased menstrual flow. Out of 100 patients, 20% of the women had dysmenorrhea. Distribution of Per speculum showed that the majority of the women had cervix flushed with vagina and vagina healthy (43%) followed by cervix and vagina - healthy (33 %) whereas 15 % had cervix – hypertrophied and vagina – healthy. The Majority of the patients had endometrium thickness (mm) of 9 mm (23%) followed by 8 mm (22%) and 10 mm (14%). In the majority of the patient's atrophy (62 %) was observed, 19% had an endometrial polyp, 10% had hyperplastic hysteroscopy. In 2% of women ca endometrium diagnosed and 19% of the women endometrial polyp was diagnosed, 16% had endometrial hyperplasia without atypia and 1% of patients had endometrial hyperplasia with atypia.

Conclusion: The results of our study highlight the need for routine use of transvaginal ultrasound as a screening test for endometrial cancer. We should consider the rising incidence of endometrial cancer, and the requirement for more and larger prospective trials with surrogate criteria for thickened endometrial stripe in postmenopausal women in TVS for both symptomatic and asymptomatic women.

Keywords: Transvaginal Ultrasound, Endometrial Thickness, Postmenopausal Women.

Introduction

In general, natural menopause occurs between 45 and 55 years of age. In India, the range of mean age at menopause reported in different studies appears to be rather young, between 41.9 and 49.4. [2] With regard to menopause, according to the Indian National Family Health Survey (NFHS-3) 3 carried out during 2005-2006, about 18 percent of currently married women in the age group of 30-49 yr. had reached menopause; a very similar finding of 17.7 percent was reported in an earlier survey round (NFHS-2, 1998-99). [4] Age at menopause is associated with several factors such as smoking, educational attainment, marital status, employment status, family history, parity, diet, age at menarche, abortion and body mass index. [5] However, there is no consistent association between the above factors and the onset of menopause. Previous research using NFHS-2 data showed significant influences of educational attainment, standard of living, number of children, age at first and last

birth, use of contraception, body mass index and anaemia. [6] However, as the sample included women who had undergone hysterectomy, the findings could not be attributed to natural menopause.[7]

Endometrial atrophy is the most common cause of postmenopausal bleeding, accounting for 60 - 80 % of the cases. Asymptomatic endometrial thickening is defined as endometrium ≥ 5 mm thick on ultrasonographic examination in postmenopausal women who have no complaints of bleeding. This condition presents a clinical-management dilemma and is a frequent reason for referral by family physicians, often after routine ultrasonographic examinations undertaken for non- gynecologic reasons. [8] In 2009, the American College of Obstetricians and Gynecologists stated that there was no evidence to recommend routine investigation for asymptomatic endometrial thickening. [9] However, the extent of endometrial thickening that constitutes a potential biomarker of estrogen status in postmenopausal women is still a matter of debate.

Transvaginal ultrasonography is routinely performed as part of a pelvic sonogram in postmenopausal women, and images of the endometrium, including a measurement of the endometrial thickness (ET) are frequently obtained. A thickened endometrium (usually >4 mm) is seen as an indication to proceed to further, more invasive investigations. In women without vaginal bleeding, the threshold separating normal from abnormally thickened endometrium is not known. Transvaginal ultrasonography is a reasonable alternative to endometrial sampling as a first approach in evaluating a postmenopausal woman with an initial episode of bleeding. If blind sampling does not reveal endometrial hyperplasia or malignancy, further testing, such as hysteroscopy with dilation and curettage, is warranted in the evaluation of women with persistent or recurrent bleeding. In the present study, we tried to evaluate endometrial pathology in asymptomatic postmenopausal women with endometrial thickness > 5 mm on transvaginal ultrasound.

Materials and Methods

This is a prospective study conducted among all Postmenopausal Women attending Gynecology OPD in The Department of Obstetrics and Gynecology Kasturba Hospital, BHEL Bhopal.

Inclusion Criteria:

- Women who reported at least 12 months of amenorrhea after the age of 40 yrs. provided that the amenorrhea was not explained by medication or disease.
- All asymptomatic postmenopausal women having endometrial thickness >/= 5mm.

Exclusion Criteria:

- Women with bleeding diathesis and cardiac diseases.
- Women with abnormal Pap Smear report / grossly abnormal cervix.
- Women with diagnosed genital tract malignancy.

Intervention: transvaginal sonography; The measurement of the endometrium is made at its maximal thickness on a midline sagittal image of the uterus obtained by transvaginal ultrasound. It is a bilayer measurement combining the width of both the anterior and the posterior layers of

the endometrium. It has been suggested that the normal endometrial thickness in a postmenopausal woman is 5 mm.

Descriptions of the endometrium on ultrasound examination include global thickening, heterogeneity, thickening, focal areas of thickening, fluid collections, increased vascularity, and myometrial associated findings such as myometrial cysts, and submucosal fibroids.

Method of collection of data: All Postmenopausal Women whether symptomatic or asymptomatic who fulfill the inclusion and exclusion criteria and were willing to participate in the study were selected on the basis of purposive sampling. A detailed history was taken. Systemic examination and routine Pap smear were done. Informed & written consent of all cases for routine transvaginal sonogram was taken after explaining the procedure. All patients were initially undergo transvaginal sonogram. Patients with endometrial thickness >/=5mm were subjected to pap smear and diagnostic hysteroscopy directed biopsy.

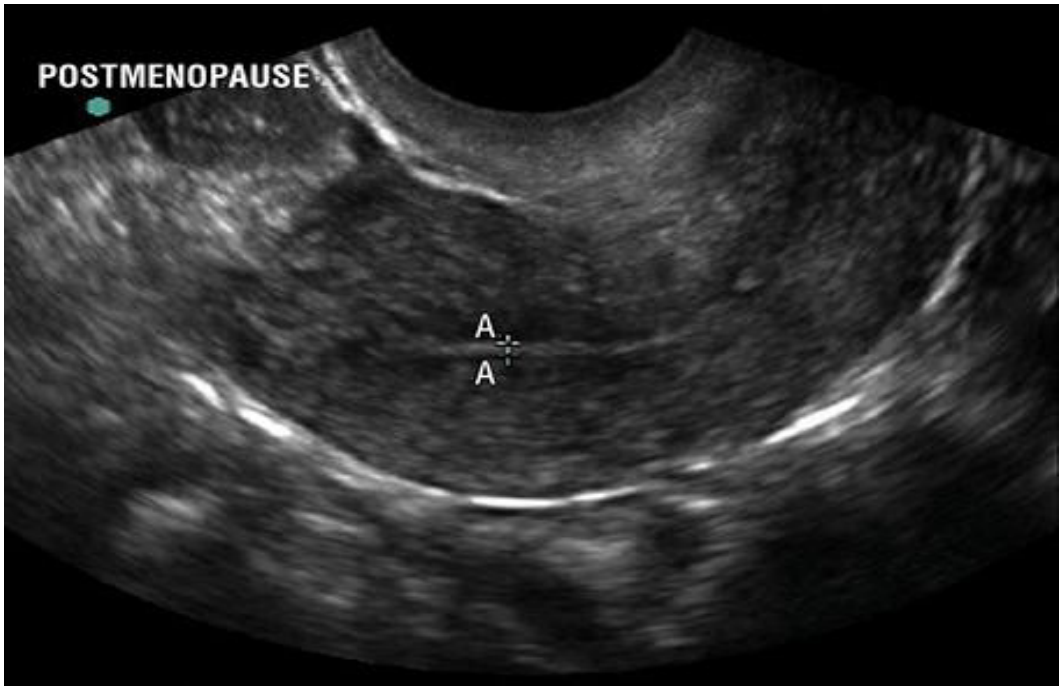
TVS procedure:

Scan Technique: Once the probe and the patient were prepared, the transducer is gradually inserted while monitoring the ultrasound image. The urinary bladder is normally in a consistent position in the pelvis relative to the much more variable position of the uterus and the ovaries makes it a good landmark to use when making initial assessment of the transducer orientation.

Three basic scanning maneuvers of the probe are useful to scan the pelvic organs comprehensively:

a) Sagittal imaging with side-to-side movements.
b) 90° rotation to obtain semi-coronal images with angulation of the probe in the vertical plane.
c) Variation in the depth of probe insertion to bring different parts within the field of view/focal zone.

Endometrial thickness is measured as the maximum anterior-posterior thickness of the endometrial echo on a long-axis transvaginal view of the uterus.



TVS image of normal endometrium

Hysteroscopy: Hysteroscopy is a procedure that involves direct visual inspection of the cervical canal and uterine cavity. Hysteroscopy replaced blind D&C as a standard procedure for precise diagnosis of intrauterine pathologies. Hysteroscopy done by a flexible or rigid hysteroscope. In hysteroscopy distention media like Carbon dioxide, Dextran 70, 1.5 % glycine, 0.9% normal saline, ringer lactate, sorbitol, mannitol use for creating minimum pressure of 40 mm Hg on muscle of uterine walls to distend the cavity.

Results

Table 1: Age distribution of patients

Age group	Frequency	Percentage
45-50	3	3.0
51-55	14	14.0
56-60	39	39.0
61-65	24	24.0
66-70	17	17.0
71-75	3	3.0
Total	100	100.0

The Majority of the patients were in the age group of 56-60 years (39 %) followed by 61-65 years (24%) and 66 -70 years (17 %).

Table 2: Distribution of presenting complaints of patients

Presenting complains	Frequency	percentage
UTI	45	45.0
Abdominal Pain	21	21.0
Vaginitis	14	14.0
Back Pain	12	12.0
screening	8	8.0
Total	100	100.0

UTI; Urinary Tract Infection

The most common presenting symptom was UTI in 45% patients followed by Abdominal Pain (21 %), Vaginitis (14 %) then back pain (12 %).

Table 3: Distribution according to duration of Menopause in years

Duration of Menopause in years	Frequency	Percentage
1-5 year	6	6.0
6-10 year	27	27.0
11-15 year	38	38.0
16-20 year	21	21.0
21-25 year	8	8.0
Total	100	100.0

The Majority of the patients having duration of menopause 11 - 15 years (38 %) followed by 6– 10 years (27%) and 16 - 20 years (21 %).

Table 4: Menstrual history (Flow)

Flow	Frequency	Percent
Increased	14	14.0
Normal	86	86.0
Total	100	100.0

Out of 100 patients, 14% of the women had increased menstrual flow.

Table 5: Distribution of dysmenorrhea

Dysmenorrhea	Frequency	Percent
No	80	80.0
Yes	20	20.0
Total	100	100.0

Out of 100 patients, 20% of the women had dysmenorrhea.

Table 6: Distribution according to Per speculum (PS)

PS	Frequency	Percentage
Cx Flushed with Vagina, Vagina - healthy	43	43.0
Cx, Vagina - healthy	33	33.0
Cx Hypertrophied, Vagina - healthy	15	15.0
Cx- High-up, Vagina - healthy	9	9.0
Total	100	100.0

Distribution of Per speculum showed that the majority of the women had cervix flushed with vagina and vagina healthy (43%) followed by cervix and vagina - healthy (33 %) whereas 15 % had cervix – hypertrophied and vagina – healthy.

Table 7: Distribution according to Endometrium Thickness (MM)

Endometrium Thickness (MM)	Frequency	Percent
6	7	7.0
7	13	13.0
8	22	22.0
9	23	23.0
10	14	14.0
11	10	10.0
12	5	5.0
13	2	2.0
14	1	1.0
16	2	2.0
17	1	1.0
Total	100	100.0

The Majority of the patients had endometrium thickness (mm) of 9 mm (23%) followed by 8 mm (22%) and 10 mm (14%).

Table 8: Distribution according to hysteroscopy

Hysteroscopy	Frequency	Percent
Atrophy	62	62.0
Polyp	19	19.0
Hyperplastic	10	10.0
Submucous myoma	6	6.0
Endometrial Growth	2	2.0
Polypoidal Endometrium	1	1.0
Total	100	100.0

In the majority of the patient's atrophy (62 %) was observed, 19% had an endometrial polyp, 10% had hyperplastic hysteroscopy.

Table 9: Distribution of hysteroscopy directed biopsy

Hysteroscopy directed biopsy	Frequency	Percent
No	11	11.0
Yes	89	89.0
Total	100	100.0

In 89% of the women hysteroscopy directed biopsy was done.

Table 10: Distribution according to histopathological report

Histopathological Report	Frequency	Percent
Atrophy	28	28.0
Proliferative Endometrium	20	20.0
Polyp	19	19.0
Endometrial Hyperplasia Without Atypia	16	16.0
Insufficient Sampling	10	10.0
Unremarkable	4	4.0
Carcinoma Endometrium	2	2.0
Endometrial Hyperplasia with Atypia	1	1.0
Total	100	100.0

In 2% of women ca endometrium diagnosed and 19% of the women endometrial polyp was diagnosed, 16% had endometrial hyperplasia without atypia and 1% of patients had endometrial hyperplasia with atypia.

Discussion

The endometrium consists of the basalis and functionalis layers. In women with a menstrual cycle and those on sequential HRT, the functionalis proliferates under the influence of estrogen. After ovulation, progesterone or, in the case of sequential hormone therapy, progesterone causes the functionalis to become secretory. When no pregnancy ensues, this is shed as menses. In postmenopausal women, there is no estrogenic stimulation and the functionalis is inactive, lacking mitotic activity and referred to as atrophic. [10] On TVS, atrophic endometrium should yield a thin distinct echo, sometimes inappropriately referred to as a stripe, and this explains the physiological basis of why a thin endometrium has high reliability in excluding EC. [11] Our study tried to find out the significance of incidental thickness of endometrium echo on transvaginal ultrasound. Endometrial cancer is usually associated with vaginal bleeding and the risk of cancer is very low in women without bleeding. [10] Nowadays, screening for endometrial cancer is only recommended in women with Lynch syndrome, whose lifetime endometrial cancer risk is 40–60%. [11] But as the life expectancy increases, there is a change in this understanding as well as the case with other solid organ cancers. In the end there is no consensus to which is the optimal endometrial thickness that should trigger the appropriate investigations in order to rule out endometrial malignancy.

In present study we found that majority of the patients had endometrium thickness of 9 mm (23%) followed by 8 mm (22%) and 10 mm (14%). That means 59% of the patients had endometrium thickness of ≥8 mm.

Intrauterine pathologies in postmenopausal women without symptoms are quite common up to 13% [12] and appear mostly as polyps. In these cases, no treatment is actually needed. In another study based on ultrasound screening of postmenopausal women without bleeding, a cut-off of 5mm had a positive predictive value of 1.4%, and for 10mm, the positive predictive value was 4.5% and the negative predictive value was 99.9% for both cut-offs. [13] However, in present study we found that 2% of women carcinoma endometrium, 16% had endometrial hyperplasia without atypia and 1% of patients had endometrial hyperplasia with atypia. Another retrospective study of 1750 woman reported only 1 patient with an endometrial cancer diagnosis, with an endometrial measurement greater than 6mm, but it also had a diagnosis of cancer and 4 cases of atypia with an endometrial measurement less than 6mm. [14]

Conclusion

The results of our study highlight the need for routine use of transvaginal ultrasound as a screening test for endometrial cancer. We should consider though the rising incidence of endometrial cancer, and the requirement for more and larger prospective trials with surrogate criteria for thickened endometrial stripe in postmenopausal women in TVS for both symptomatic and asymptomatic women.

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