

## STUDY ON ENDOMETRIAL THICKNESS BY TRANSVAGINAL ULTRASONOGRAPHY AND ITS HISTOLOGICAL CORRELATION IN PATIENTS WITH POSTMENOPAUSAL BLEEDING

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### ABSTRACT

#### BACKGROUND

Objective- To diagnose the causes of post-menopausal bleeding and to correlate endometrial thickness by transvaginal sonography and histopathology by dilatation and curettage.

#### MATERIALS AND METHODS

This study was carried out in the Department of Obstetrics and Gynaecology, PMCH, Patna, Bihar, over a period of 2 years, from October 2014 to September 2016. A total of 100 postmenopausal women complaining of vaginal bleeding were included in the study. These women were subjected to Transvaginal ultrasonography (TVS) and Dilatation & Curettage (D&C) to obtain endometrial tissues for histopathological examination.

#### RESULTS

Mean endometrial thickness was  $8.72 \pm 6.77$  mm. Majority of patients (48%) had endometrial thickness  $\leq 4$  mm followed by 19% who had 11-15 mm, 14% had 5-10 mm, 10% had  $>20$  mm and 9% had 16-20 mm endometrial thickness. Histopathologically, 48% had atrophy, 16% had endometrial hyperplasia, 12% each had proliferative and endometrial carcinoma, 9% had endometrial polyp while 3% had endometritis.

#### CONCLUSION

A conservative approach may be offered to women with post-menopausal bleeding showing endometrial thickness of  $<4$  mm, thereby avoiding the need for curettage in large number of women.

#### KEYWORDS

Postmenopausal Bleeding, Transvaginal Sonography, Endometrial Thickness, Histopathology, Dilatation and Curettage.

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#### BACKGROUND

Postmenopausal bleeding is a common gynaecological presentation and represents 5% of all gynaecologic outpatient attendances.<sup>1</sup> In postmenopausal women, any vaginal bleeding is considered abnormal and requires evaluation.<sup>2</sup> Menopause occurs when a woman's ovaries stop producing hormones, resulting in the end of her menstrual periods. It is defined as having no menstrual period for 12 months.<sup>3</sup> The changes in the genital tract at the menopausal transition are primarily due to changes in circulating sex hormones and partly due to ageing process. The corpus: cervix ratio returns to 1:2 as in childhood. The stroma of endometrium becomes fibrous and the endometrium becomes atrophic, though cystic glands may persist for years.

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However, high oestrogen produced endogenously in some women may keep the endometrium proliferative and even hyperplastic. Most women globally experience natural menopause between the ages of 40 and 58, with the average age of onset around 51 years of age. The average age of menopause in India is 47.5 years. Even without amenorrhea or irregularity, menstruation continuing after the age of 55 years should be investigated.

#### Important causes of Postmenopausal bleeding are

- Vaginal atrophy -the most common cause of PMB.<sup>4</sup>
- Use of HRT.
- Endometrial hyperplasia; simple, complex, and atypical.
- Endometrial cancer.
- Endometrial polyps or cervical polyps.
- Cervical cancer.
- Ovarian cancer, especially oestrogen-secreting (theca cell) ovarian tumours.
- Vaginal cancer (very uncommon).
- Vulval cancer may bleed, but the lesion should be obvious.
- Uterine sarcoma (rare).
- Non-gynaecological causes including trauma or a bleeding disorder.

The risk of endometrial cancer increases with age and presence of risk factors. Transvaginal ultrasonography is an important screening tool for evaluation of post-menopausal bleeding.<sup>5</sup> Transvaginal ultrasonography is superior to Transabdominal ultrasonography as it has permitted the use of higher frequency ultrasound at greater proximity to the uterus and the endometrial - myometrium interface can be seen clearly.

Measurement of endometrial thickness using Transvaginal ultrasonography is helpful in diagnosis of endometrial pathology, including endometrial cancer and in assessment of myometrium invasion.

**MATERIALS AND METHODS**

This observational study was carried out in Department of Obstetrics and Gynaecology at Patna Medical College and Hospital, Patna between October 2014 and September 2016. 100 postmenopausal women complaining of vaginal bleeding were included in the study.

**Inclusion Criteria**

The postmenopausal women with bleeding per vaginum were included in the study.

**Exclusion Criteria**

The postmenopausal women who were:

- On hormone replacement therapy.
- Taking tamoxifen for breast cancer.
- Having local causes of bleeding (Vaginal, vulval or cervical causes).

Transvaginal ultrasonography was done using 8 MHz an endovaginal probe fitted in GE LOGIQ P3 model ultrasonography machine. The endometrial thickness was reported as double-thickness measurement in midsagittal view.

Dilatation and curettage to obtain tissue for histopathological examination was done in each case. The curetted material was placed in 10% formalin solution, labelled properly and sent for histopathological examination.

**Statistical Analysis**

Descriptive data were presented as mean ± SD and range values. Multiple group comparisons were done by Chi square test. For all the tests, the probability value (p-value) of less than 0.05 was considered statistically significant.

**RESULTS**

100 women with postmenopausal bleeding were investigated and were subjected to transvaginal sonography to measure endometrial thickness and endometrial biopsy was performed. The correlation between endometrial thickness and histopathology of endometrial tissue was done.

Sl. No.	Characteristics	Women(n=100)
1.	Mean age(years)	53.95 ± 6.79
2.	Mean duration of menopause(years)	6.4 ± 4.59
3.	Mean parity	4.46 ± 1.93
4.	Hypertension	20%
5.	Obesity	16%
6.	Diabetes mellitus	12%

**Table 1. Characteristics of Study Women**

Maximum no. of cases was in the age group of 45-50 years i.e. 48 cases (48%). Mean age was 53.95 ± 6.79 years and range was 45 to 75 years. Maximum no. of cases had parity above 4 i.e. ≥P5 (59%). Mean parity was 4.46 ± 1.93 and median parity was 5 with range of 0 to 8. In this study, maximum no. of cases had attained menopause 1-5 years back. The mean duration of menopause was 6.4 ± 4.59 years and the range of distribution was 1 to 20 years.

The mean BMI was 25.08 ± 4.336 Kg/m<sup>2</sup> and 16% patients were obese i.e. BMI ≥ 30 Kg/m<sup>2</sup>. The mean Systolic BP was 124 ± 16.53 mmHg and mean Diastolic BP was 78.2 ± 11 mmHg. Majority of cases had BP less than 120/80 mmHg (53%), while 20% of cases were hypertensive. Diabetes mellitus was present in 12% patients, while 88% were non-diabetic.

ET (mm)	AE	PE	EH	EP	EC	Endometritis	Total
≤ 4	48	0	0	0	0	0	48
5-10	0	9	1	2 2 2 2	0	2	14
11-15	0	3	10	4	1	1	19
16-20	0	0	4	3	2	0	9
> 20	0	0	1	0	9	0	10
<b>Total</b>	<b>48</b>	<b>12</b>	<b>16</b>	<b>9</b>	<b>12</b>	<b>3</b>	<b>100</b>
<b>Mean ET</b>	<b>3.1</b>	<b>8.6</b>	<b>14.1</b>	<b>12.9</b>	<b>21.2</b>	<b>8.3</b>	<b>8.72</b>

**Table 2. Distribution of Cases According to Endometrial Thickness in Relation to Histopathology**

ET-Endometrial Thickness, AE-Atrophic Endometrium, PE-Proliferative Endometrium, EH-Endometrial Hyperplasia, EP-Endometrial Polyp, EC-Endometrial Carcinoma

Mean Endometrial thickness was 8.72 ± 6.77 mm. Majority of patients (48%) had endometrial thickness ≤ 4 mm followed by 19% who had 11-15 mm, 14% had 5-10 mm, 10% had >20 mm and 9% had 16-20 mm endometrial thickness. Histopathologically, 48% had atrophy, 16% had endometrial hyperplasia, 12% each had proliferative and endometrial carcinoma, 9% had endometrial polyp while 3% had endometritis.

All 48 cases with endometrial thickness ≤4 mm had atrophic endometrium. When ET was <11 mm, no endometrial carcinoma was seen, whereas when ET was 16-20 mm, 18% (2 out of 9) had endometrial carcinoma. There were 10 cases having endometrial thickness greater than 20 mm and 9 out of these 10 cases (90%) had endometrial carcinoma on histopathology.

Mean ET was 3.1 mm for atrophic changes while it was 21.2 mm in case of carcinoma.

**DISCUSSION**

PMB is the presenting complaint in approximately 90% of women with endometrial carcinoma.<sup>6</sup> The main aim of investigating these women is to rule out endometrial cancer and its precursor lesion and endometrial hyperplasia. The probability of endometrial cancer in women presenting with postmenopausal bleeding is approximately 10%.

In our study, the range of distribution of age was 45 to 75 years. The mean age ± SD was 53.95 ± 6.79 years. This correlates with study done by Indu Kaul et al (2012)<sup>7</sup> where they found mean age of patients as 54.0 ± 6.64 years and range was 41 to 70 years. I Bano et al (2013)<sup>8</sup> observed mean

age as 52 years, and age range as 46-76 years. M Viswanathan et al (2014)<sup>9</sup> observed mean age as  $55.5 \pm 6.4$  years.

In our study, mean parity  $\pm$  SD was  $4.46 \pm 1.93$ . Median parity was 5 (range 0 to 8). This correlates with study done by I. Bano et al (2013)<sup>8</sup>, who also found median parity as 5, and range 0 to 10.

The mean duration of menopause in our study was  $6.4 \pm 4.59$  years and the range of distribution was 1 to 20 years, which was similar to the findings of M Viswanathan et al (2014)<sup>9</sup> who observed mean duration of menopause to be  $4 \pm 6.5$  years and range to be 1-40 years.

In our study, 16 out of 100 (16%) patients had obesity i.e. BMI  $\geq 30$  Kg/m<sup>2</sup>, which was not in accordance with the results of the study by Nirupama V et al (2015)<sup>10</sup> where 45% of their cases were obese, whereas M Vishwanathan et al (2014)<sup>9</sup> found obesity in 6.6% and overweight in 63.3% which was not in accordance with the findings of present study. Obesity, diabetes and hypertension are important risk factors for endometrial carcinoma.<sup>11</sup>

In present study, mean Systolic BP was  $124 \pm 16.53$  mmHg and mean Diastolic BP was  $78.2 \pm 11$  mmHg. Majority of cases had BP less than 120/80 mmHg (53%) while 20% of cases were with BP >140/90 mmHg i.e. hypertensive, which correlates with results of study by Indu Kaul et al (2012)<sup>7</sup> who also found hypertension in 20% cases. Diabetes mellitus was present in 12% cases, which correlates with observation of Nirupama V et al (2015)<sup>10</sup> who found 13% diabetic patients in their study group.

An atrophic endometrium generally not exceeds 3 mm ET. It was found that the endometrium of less than 4 mm thickness as seen by ultrasonography was well correlated with endometrial characteristics of decreased oestrogen stimulation. Among patients of postmenopausal bleeding, 48% had atrophic endometrium, while Indu Kaul et al (2012)<sup>7</sup> found 50% atrophic endometrium in their study. 12% endometrial carcinoma cases were observed in the our study, while G Conoscenti et al (1995)<sup>12</sup> found 13.4%, Indu Kaul et al (2012)<sup>7</sup> found 10%, and Myrvete Pacaradaet al (2009)<sup>13</sup> observed only 5% cases of endometrial carcinoma in their study.

In our study, mean ET on TVS for atrophy was 3.1 mm, while Indu Kaul et al (2012)<sup>7</sup> observed  $4.00 \pm 1.12$  mm and Karlsson B et al (1996)<sup>14</sup> found  $3.9 \pm 2.5$  mm. Similarly, for endometrial carcinoma mean ET was 21.2 mm, while Indu Kaul et al (2012)<sup>7</sup> observed  $25.00 \pm 5.09$  mm and Karlsson B et al (1996)<sup>14</sup> found  $21.1 \pm 11.8$  mm.

Among the patients with endometrial carcinoma, majority (11 out of 12, 91.7%) had endometrial thickness > 16 mm. Patients of postmenopausal bleeding with endometrial thickness >20 mm, majority (9 out of 10, 90%) had endometrial carcinoma (P value - 0.001). Indu Kaul et al (2012)<sup>7</sup> showed that 75% cases with endometrial thickness more than 20 mm were diagnosed as endometrial carcinoma. Thus, incidence of endometrial carcinoma was high when endometrium was >20 mm thick. Hence, endometrial thickness measurement by transvaginal ultrasonography is very important for further evaluation of postmenopausal bleeding patients. Endometrial thickness <4 mm does not require further evaluation by invasive procedure while

thickness more >11 mm requires definitive diagnostic invasive procedure.

## CONCLUSION

In all cases of postmenopausal bleeding, evaluation should be done to rule out malignancy. It requires careful evaluation and timely assessment for making correct diagnosis. As initial evaluation, transvaginal sonography is used and according to endometrial thickness histopathological correlation is also done. Transvaginal sonography is an effective procedure to exclude endometrial and intrauterine abnormalities. It is relatively easy, cheap, non-invasive and without any side effects and does not require anaesthesia.

Endometrial thickness by transvaginal ultrasonography can be used as a reliable method for excluding malignancy. No case of endometrial cancer was found when endometrium was less than 4 mm thick.

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