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Original Research Article

Co-relation of endometrial thickness by transvaginal sonogram with histopathology pattern in abnormal uterine bleeding: a study from South India

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ABSTRACT

Background: Under normal circumstances, a woman's uterus sheds a limited amount of blood during each menstrual period (around 80 ml). Bleeding that occurs erratically or excessive menstrual bleeding is called abnormal uterine bleeding (AUB). The causes of AUB are many and varied. Initial investigations include transvaginal ultrasound and histopathologic assessment of the endometrium. Objective of this study was to evaluation of endometrial thickness with trans-vaginal ultrasound and its correlation with histopathology by dilatation and curettage in abnormal uterine bleeding. To determine the efficacy of transvaginal ultrasound in evaluating the endometrial thickness. To correlate the endometrial thickness by transvaginal ultrasound with endometrial histopathology in women with AUB.

Methods: It is a retrospective observational study. All reproductive and perimenopausal age group women who underwent dilatation and curettage for abnormal uterine bleeding during the period June 2014-June 2016 was taken and analyzed and correlated with their endometrial thickness measured with Transvaginal ultrasound.

Results: Around 478 patients who underwent endometrial sampling over a period of two years were analyzed. Maximum number of patients were in the fourth decade and the overweight category 36.6%. Proliferative endometrium was the most common histopathologic picture (44.76%). Detection of precancerous lesions were-5.87% and endometrial cancer was 1.05%.

Conclusions: An ET of 8 mm and above gave 100% sensitivity and negative predictive value for precancerous and cancerous lesions.

Keywords: Abnormal uterine bleeding, Dilatation and curettage, Endometrial hyperplasia and cancer, Endometrial thickness, Transvaginal ultrasound

INTRODUCTION

Abnormal uterine bleeding is one of the most common gynecological problems in patients approaching the outpatient clinics in the country. These complaints definitely affect the quality of life of the patient. The etiology of AUB varies with the age group of the patient. There is the PALM COEIN classification for AUB by FIGO.¹ There are many diagnostic modalities for

evaluating endometrial pathologies in women who have AUB. Transvaginal sonogram (TVS) has permitted the use of higher frequency ultrasound waves at greater proximity of the uterus. It is a relatively cheap and non-invasive diagnostic modality for studying the endometrial pattern and its thickness and at the same time to exclude organic pathology in case of AUB while dilatation and curettage gives us a definitive histopathologic picture. This study attempts to correlate the USG findings and histopathology in patients with AUB. The gold standard

for diagnosing AUB is hysteroscopy and directed biopsy but it is expensive when compared to the simple endometrial sampling.

According to the PALM COEIN classification the causes of AUB can be divided into structural and non-structural cause which is given in detail in Table 1.

Table 1: PALM COEIN classification for AUB.¹

Structural	Non structural
Polyps	Coagulopathy
Adenomyosis	Ovulatory dysfunction
Leiomyomas	Endometrial hyperplasia
Malignancy	Iatrogenic
	Not yet specified

Aims and objectives of this study were

- Evaluation of endometrial thickness with transvaginal ultrasound and its correlation with histopathology by dilatation and curettage in abnormal uterine bleeding.
- To determine the efficacy of Transvaginal ultrasound in evaluating the endometrial thickness.
- To correlate the endometrial thickness by Transvaginal ultrasound with endometrial histopathology in women with AUB.

METHODS

Retrospective observational study included all reproductive and perimenopausal age group women who underwent dilatation and curettage for abnormal uterine bleeding during the period June 2014 to June 2016.

Inclusion criteria

- AUB in all reproductive and perimenopausal women
- Only gynecological indications for dilatation and curettage.

Exclusion criteria

- Unmarried women
- Pregnancy and related causes of bleeding
- Postmenopausal bleeding
- Puberty menorrhagia.

From minor and major OT registers, list of all D and Cs which were done during 2014 June to 2016 June was taken. Cases which satisfied the inclusion and exclusion criteria was taken and analyzed

Statistical analysis

Chi square test was used for the statistical analysis.

RESULTS

All the patients with abnormal uterine bleeding, fitting the inclusion criteria, who underwent endometrial sampling was taken for analysis. There were around 478 patients. All of them had a premenstrual ultrasound before the procedure. The age distribution, parity, BMI, presenting complaints, the histopathology and the endometrial thickness by TVS was evaluated. The results are given below:

Of the 478 patients, the youngest patient was 22 years old and the oldest was 55 years, the mean age was 38.5 years. Maximum number of patients were in the 41-50 years age group which was 60.25% and the least in the 20-30 years group and was 4.6% (Table 2).

Table 2: Age distribution of patients with AUB.

Age	No. of cases	%
20-30	22	4.60%
31-40	117	24.48%
41-50	288	60.25%
51-60	51	10.67%
Total	478	100%

Majority of the patients were multiparous i.e. 79.71% and 2.93% was nulliparous as seen in (Table 3).

Table 3: Parity of the patients with AUB.

Parity	No. of cases	%
Nullipara	14	2.93%
Primipara	83	17.36%
Multipara	381	79.71%
Total	478	100%

A total 35.8% of the patients under analysis were of the normal BMI and maximum numbers of patients were overweight-36.6% and the least number of patients were underweighted i.e. 3.3% as given in Table 4.

Table 4: BMI of patients with AUB.

BMI	No. of cases	%
Underweight	16	3.3%
Normal	171	35.8%
Overweight	175	36.6%
Obese	116	24.3%
Total	478	100%

A total 98.3% had heavy menstrual bleeding among the 478 patients and 72.4% had undergone tubal ligation. Among the other USG findings, adenomyotic changes were found in 11.1%, fibroids seen in 18.6%, while simple ovarian cysts were found in 11.7% and PCO in 4.2%.

There were 42 cases of hormone induced changes, 25 menstrual endometrium, 17 were inadequate and 2 were TB endometritis which were all entered under others. 44.7% were having proliferative phases (Figure 1), of which 29.7% was disordered proliferative (Figure 2). 30.33% showed secretory changes (Figure 3) endometrial adenocarcinoma (Figure 4) was found in 1.05% of the cases and hyperplasia was seen in 5.86% (Table 5).

Table 5: Histopathology findings in study population.

HPR	No. of cases	Percentage
Disordered proliferative	142	29.7%
Proliferative	72	15.06%
Secretory	145	30.33%
Endometrial hyperplasia	28	5.86%
Endometrial carcinoma	5	1.05%
Others	86	17.99%
Total	478	100%

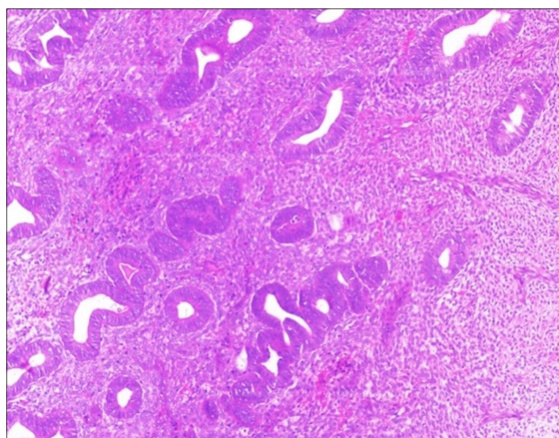


Figure 1: Proliferative endometrium.

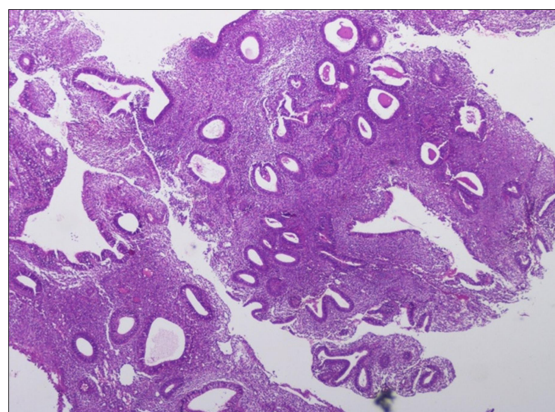


Figure 2: Disordered proliferative.

Among the hyperplasia, 50% was simple hyperplasia without atypia. Atypical hyperplasia (Figure 5) was found in 12 cases. Complex hyperplasia was found in 13 out of

the 28 cases of hyperplasia of which complex atypical was 11 cases (Table 6).

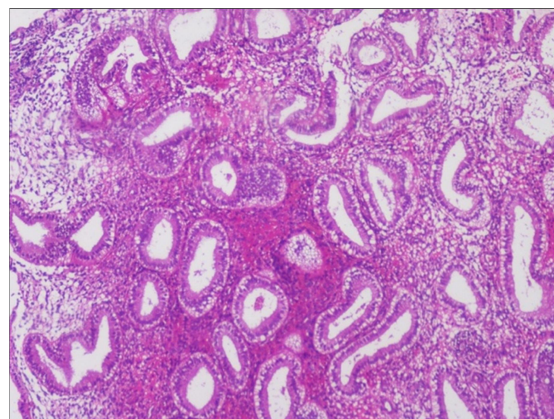


Figure 3: Secretory endometrium.

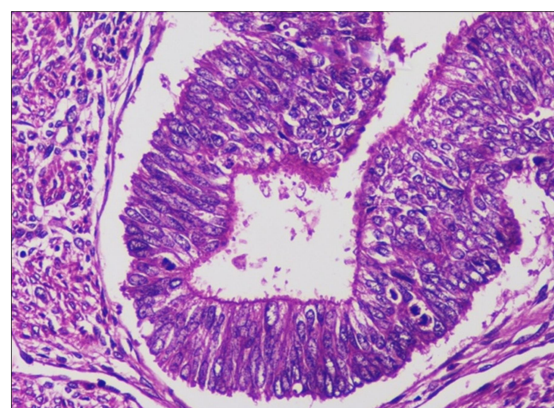


Figure 4: Adenocarcinoma.

Table 6: Cases of endometrial hyperplasia.

Type of hyperplasia	Number	%
Simple hyperplasia without atypia	14	50%
Simple hyperplasia with atypia	1	3.57%
Complex hyperplasia without atypia	2	7.14%
Complex hyperplasia with atypia	11	39.29%
Total	28	100%

Endometrial thickness was 8mm and above up to 15 mm in majority of cases of AUB-54.81%. ET less than 8mm was found only in 19.3% of the study population. ET 15 mm and above was also less which was 25.5% (Table 7). ET less than 4mm in AUB was very less-only 1.67%. One ET was not measured due to diffuse adenomyosis. Out of the 477 patients whose endometrial thickness were measured, all the five cases of endometrial carcinoma was found with an ET ≥ 15 mm among the 28 cases of endometrial hyperplasia 12 cases of hyperplasia were also found with ET ≥ 15 mm and the rest 16 cases had ET $\geq 8-15$ (Table 8). Surprisingly all the five cases of carcinoma was endometrioid adenocarcinoma.

It was found in this study that proliferative and secretory endometrium was maximum when the endometrial thickness was ≥ 8 -15 mm and least with an ET less than 4 mm (Table 9).

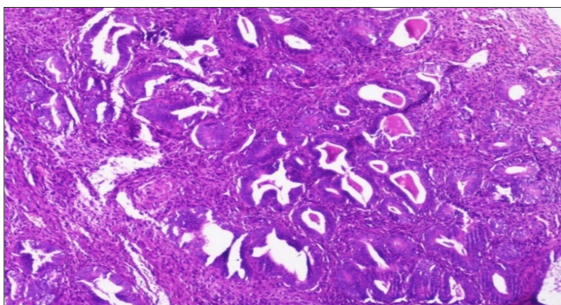


Figure 5: Atypical hyperplasia.

Table 7: Endometrial thicknesses by transvaginal ultrasound.

ET IN mm	Number	%
<4	8	1.67%
4-8	85	17.78%
≥ 8 -15	262	54.81%
≥ 15	122	25.52%
Not measured	1	0.22%
Total	478	100%

If we take 8 mm as the cut off, we can see that in this study population all the cases of hyperplasia and malignancy had an ET ≥ 8 mm. Out of the 384 cases with ET ≥ 8 mm 28 cases had hyperplasia and five patients had endometrial carcinoma i.e. 8.59% (Table 10).

Table 8: Co-relation of et with endometrial hyperplasia and carcinoma.

ET in mm	Number	Endometrial hyperplasia	%	Endometrioid carcinoma	%
≥ 15	122	12	9.84%	5	4.46%
≥ 8 -15	262	16	6.11%	0	0%
4-8	85	0	0%	0	0%
<4	8	0	0%	0	0%
Total	477	28	5.87%	5	4.46%

Table 9: Co-relation of et by TVS and histopathology.

ET	Number	Proliferative	Secretory	EH	Carcinoma	Others
<4 mm	8	3	3	0	0	2
4 - <8	85	34	29	0	0	22
≥ 8 -15	262	121	86	16	0	39
≥ 15	122	56	27	12	5	22
Total	477	214	145	28	5	85

Table 10: Co-relation of endometrial thickness with hyperplasia and malignancy.

ET in mm	Number	Hyperplasia and carcinoma	%
≥ 8	384	33	8.59%
<8	94	0	0%

Table 11: Co-relation of endometrial thickness with HPR.

ET in mm	Number	Hyperplasia and carcinoma	Not having carcinoma
≥ 8	384	33 (a)	351 (b)
<8	94	0 (c)	94 (d)

Sensitivity, specificity, the positive and negative predictive value for an ET of ≥ 8 mm was calculated. 94 patients with ET less than 8 and 351 patients with ET ≥ 8 mm did not have carcinoma (Table 11).

- Sensitivity = $a/a + c = 33/33 = 100\%$
- Specificity = $d/b + d = 94/445 = 21.12\%$
- Positive predictive value = $a/a + b = 33/384 = 8.59\%$
- Negative predictive value = $d/c + d = 94/94 = 100\%$

DISCUSSION

Abnormal uterine bleeding is a very common diagnosis in the op population. According to this study the maximum age groups of the patients were in the perimenopausal age of 41-50 years-around 60.25%. This is similar to the study by Shobitha et al -68.1% in the same age group while it was 38% in a study by Mahapatra M et al where the study group was less.^{2,3}

The youngest patient was a 22-year-old primary infertility patient with heavy menstrual bleeding for which diagnostic curettage was done and had an ET of 6 mm and secretory endometrium.

In this study, 79.7% were multiparous while 2.93% were nulli, in almost all the studies this is similar. This is in accordance to the study by Nidhi et al, where 88% were multipara and 1.2% were nulliparous.⁴ In a study by Betha K et al 81% were multipara.⁵

BMI was in the overweight category in 36.6% and obese in 24.3% in this study which is similar to the study in Iran by Kazamijalezah et al, where it was 33% and also with the study by Sahai A et al, where 56.2% were in overweight category and obese was 25%.^{6,7}

There was heavy menstrual bleeding in 98% of patients.

Of these 478 patients only 39 had diabetes as risk factor and out of 39 one had endometrial carcinoma.

When we analyze the histopathologic findings of the 478 cases 44.5% was proliferative endometrium, of this disordered proliferative endometrium seems to be the commonest, in a study by Elavarasan et al, where disordered proliferative endometrium seems to be the commonest pattern observed i.e. 31.1%.⁸ The term disordered proliferative endometrium refers to proliferative phase that does not seems to be appropriate for any one time in the menstrual cycle and mimics simple hyperplasia, but the process is focal rather than diffuse. Histologically there shows mild disorganization of architecture, with focal dilated glands, with normal gland to stromal ratio. In this study 30% was secretory endometrium; endometrial hyperplasia was found in 5.8% and endometrial cancer in 1%.

Transvaginal ultrasound was done to assess the endometrial thickness and it was done in the premenstrual phase, of the 478 cases 54.8% had an ET of ≥ 8 -15, 25.5% had ET more than 15 mm. In a study by Jikki et al, 57% had ≥ 8 mm which is similar to this study of 54%.⁹

In the study by Jikki et al, the endometrial hyperplasia was seen in 96.4% cases when ET was more than 8 mm and in this study 100% of the patients with endometrial hyperplasia had ET ≥ 8 mm.⁹ In this study 100% cases of endometrial carcinoma occurred with ET ≥ 15 and all cases of hyperplasia had ET ≥ 8 mm.

Simple hyperplasia without atypia was 50% in this study which was comparable to 62% in a study by Tabata et al.¹⁰

Complex endometrial hyperplasia was 14.8% in a study conducted by Idris et al, while their atypical hyperplasia was only 2% whereas atypical hyperplasia was 42.4% in this study.¹¹ This may be because of the fact that most of the patients in the study group were in the fourth decade (60%) and in their study was in the third decade (80%).

Of the 384 cases with ET ≥ 8 mm, 33 had endometrial hyperplasia and carcinoma, and 351 did not have e/o hyperplasia and carcinoma, none of the cases below 8mm

had any e/o hyperplasia or carcinoma. Sensitivity and negative predictive value was 100% for an ET of ≥ 8 mm. This is similar to studies by Chatpavit Getpook an ET of 8 mm showed optimal sensitivity and specificity -83.9% and 58.8% respectively and 90.4% negative predictive value for an abnormal endometrium.¹² They concluded that an ET of 8mm or less is less likely to be associated with malignant pathologies. In this study the negative predictive value was 100% and sensitivity was 100% but the specificity was only 21.1%. According to a study by Ozdemir S et al, there was negative predictive value of 95.6%, sensitivity and specificity of 83.6 and 56.4% respectively for an ET of 8 mm.¹³

Kurman et al, classified hyperplasia in to simple and complex and subcategory as atypical.¹⁴ The 2014 revised WHO classification simply separates endometrial hyperplasia into 2 groups-hyperplasia without atypia and atypical hyperplasia.¹⁵ According to the EIN classification all atypical endometrial hyperplasia is classified as endometrial intraepithelial neoplasia.¹⁵ Progesterone was found to cause regression in 90% cases with hyperplasia.

The RCOG cutoff of ET is less than 7 mm below which there is no endometrial hyperplasia in a prospective study of 56 women with pcos.^{11,16} In studies by Gianella et al, 11 mm was taken as the cut off.

The most common presenting symptoms of endometrial hyperplasia is abnormal uterine bleeding. According to studies, the risk of progression of simple hyperplasia to carcinoma is 1% and complex hyperplasia with atypia is 29%.¹⁸

CONCLUSION

The clinical importance of endometrial hyperplasia is because of its progression to endometrial carcinoma. An ET of 8 mm in this study gives a 100% negative predictive value for hyperplasia and carcinoma and can be taken as a cut off for deciding the patients for dilatation and curettage especially in low risk patients.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of PSGIMSR

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