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Original Research Article

Evaluation of endometrial thickness with transvaginal ultrasonography in perimenopausal women presenting with abnormal uterine bleeding and correlation with its histopathological findings

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ABSTRACT

Background: Abnormal uterine bleeding is the most common presenting menstrual complaint in women of perimenopausal age group. Most frequently used diagnostics tests to investigate the causes of abnormal bleeding are Transvaginal ultrasonography (TVS) and endometrial biopsy. Uterine curettage is an invasive procedure and is performed with anaesthesia. TVS is a non-invasive method that has been used to evaluate the endometrium and uterine cavity. The objectives of this study were to measure and evaluate the role and accuracy of endometrial thickness by transvaginal ultrasonography study to detect endometrial pathology in perimenopausal women presenting with Abnormal Uterine Bleeding. To correlate the transvaginal sonographic results with the Histopathological findings to discriminate normal from pathological endometrium.
Methods: Prospective study including 150 perimenopausal women with abnormal uterine bleeding. Endometrial thickness was measured by TVS and then D and C was performed for all the patients.
Results: Out of 150 women, 128 (85.3%) had normal and 22 (15%) had an abnormal endometrium. 43.3% were of 41-45 years and 65.3% patients presented with complaint of heavy menstrual bleeding. Majority of the patients in the study group were para 2 or more. Fibroid uterus (24%) was the commonest uterine pathology detected on TVS. 53.3% of patients had endometrial thickness in the range 10-14.9 mm. Most common finding on HPE was secretory endometrium (44.6%). Endometrial carcinoma was found in 3%. Endometrial thickness <14mm was associated with least abnormal endometrial pathology.
Conclusions: Endometrial thickness of less than 14 mm need not be indicated for D and C in perimenopausal abnormal uterine bleeding. In perimenopausal women with AUB, TVS should be the investigation of choice due to its convenience, accuracy and non- invasiveness.

Keywords: Abnormal uterine bleeding, Dilatation and curettage, Endometrial thickness, Perimenopause, Transvaginal ultrasonography

INTRODUCTION

Abnormal Uterine Bleeding is leading cause for gynaecologist referral; it is a well defined condition, bleeding that is unlike normal menstrual flow in terms of frequency, duration and quantity. It includes oligomenorrhoea, polymenorrhoea, menorrhagia, metrorrhagia, menometrorrhagia and spotting.[1] This bleeding of unexpected origin not only affects their day-to-day life, but, if left without care can pose serious consequences. This complaint is taken more seriously when it occurs in women of late reproductive age due to some probable malignant cause.[2]

The accuracy of etiological diagnosis of abnormal uterine bleeding in perimenopausal patients is important for the subsequent therapeutic management. In time the diagnostic techniques have progressed from the classical uterine curettage to immuno histochemical markers, transvaginal ultrasonography, hysteroscopy, magnetic resonance imaging.[1]

Diagnostic curettage has been the method of choice for many years for endometrial abnormalities, although it is a simple technique it is an invasive and uncomfortable procedure not without danger. Non- invasive techniques like transvaginal ultrasonography and color doppler of uterine artery have shown good accuracy in detecting normal endometrium from abnormal.[3]

Endometrial thickness and homogeneity has been used as markers of endometrial pathology using trans-vaginal sonography have shown as an effective procedure for evaluating abnormal uterine bleeding and have reduced the use of invasive procedures for women with abnormal uterine bleeding.[4]

However, together with TVUS the DandC still remains a very cost effective, practical and dependable approach for investigating AUB. In addition, accurate histopathological diagnosis also facilitates the implementation of optimal treatment strategies. The present study aims to correlate the clinical findings with sonographic assessment and histopathology of the endometrium.

METHODS

This study was a prospective observational study conducted at Adichunchungiri Institute of Medical Sciences hospital - a tertiary level teaching hospital in Mandya, Karnataka, India. Thus time bound study included a sample of 150 women in the perimenopausal age group of 39 to 51 years. These women reported with AUB during the period November 2016 to May 2018.

Detailed history of menstrual abnormalities, duration of complaints, obstetric, medical, surgical history and details of previous treatment taken were noted. All the women were clinically evaluated - general, systemic and gynaecological examinations were carried out. All relevant investigations and pre-anaesthetic check-ups were done.

Transvaginal ultrasonography was performed using Siemens Acuson *300 5 - 9 M Hz TVS probe. Ultrasound was done only by the transvaginal route. Ultrasound variables studied included endometrial thickness, endometrial echogenicity, endometrial-myometrial interface and myometrium.

Endometrial thickness measured in the sagittal plane of the uterus, at the thickest part of the endometrium. Any abnormal pathology such as polyps, abnormal growth was noted. Uterus was completely assessed longitudinally and transversely for myometrial pathology. Colour Doppler ultrasound was used where required - to distinguish adenomyosis and leiomyoma, endometrial hyperplasia and endometrial polyps.

Procedure of dilatation and curettage

The patients are given intravenous sedation with diazepam and atropine to prevent vasovagal shock then proceeded further. Patient placed in dorsal lithotomy position, parts painted and draped. Sims posterior vaginal wall speculum and anterior vaginal wall retractor inserted in the vagina to expose the cervix. Cervix stabilized by holding its anterior lip with a vulsellum. Cervical canal was dilated with Hegar's metal dilator of serially increasing sizes upto no.8. Curette was introduced into the uterine cavity and through curettage done on all uterine walls. The material obtained was sent in 10% formalin for histopathological examination.

Statistical analysis

All data collected was organized in MS Excel sheet. XLSTAT in MS excel was used for data analysis. Data collected was analyzed by descriptive statistics, chi-square test for association of two categorical variables and student t test for quantitative data as applicable. $P < 0.05$ was considered significant.

RESULTS

A total of 150 patients, aged between 39 to 51 years were included in the study.

Table 1: Distribution of patients according to age.

Age group of patients	No. of patients (%)
36-40 years	38 (25.33)
41-45 years	65 (43.33)
46-50 years	47 (31.33)
Total	**150 (100)**

Among 150 patients in the study group, most of the patients were between 41-45 years (43.33%). Mean age of patients was 44.04±3.33 years. Mean age of menarche was found to be 12.89±1.30 years (Table 1).

Table 2: Distribution of patients according to parity.

Parity of the patients	No. of patients (%)
Para 1	10 (6.67)
Para 2	85 (56.67)
Para 3	36 (24)
Para ≤ 4	19 (12.67)
Total	**150 (100)**

Majority of the women were multiparous (94.4%) in the study. Among them 56.6% were para 2, 24% were para 3

and 12.6% were with parity more than 4. Only 6.67 % of women were para 1 (Table 2).

Table 3: Distribution of patients according to menstrual complaints.

Menstrual complaints	No. of patients (%)
Menorrhagia /HMB	98 (65.33)
Polymenorrhoea	26 (17.33)
Polymenorrhagia	12 (8)
Oligomenorrhagia	6 (4)
Metrorrhagia	5 (3.33)
Menometrrhagia	2 (1.33)
Oligomenorrhoea	1 (0.67)
Total	**150 (100)**

Majority of women (65.33%) presented with HMB followed by (17.33%) polymennorhoea, (8%) Polymennorhagia, (4%) oligomennorhagia, (3%) metrorrhagia, (1%) menometrorhagia, (1%) oligomennorhoea (Table 3).

In the study group majority had fibroid uterus (24%) followed by adenomyosis (15.3%), endometrial hyperplasia (8.6%), ovarian cyst (3.33%), endometrial polyp (2.67%), one case each of endometritis, cervical polyp, ovarian dermoid, ovarian functional tumour, PCOS, endometrial cyst, hydrosalpinx, cystitis (Table 4).

Table 4: Distribution of patients according to uterine pathology detected on TVS.

Pathology	No. of patients	% of patients
Normal	58	38.6
Fibroid uterus	36	24
Adenomyosis	23	15.33
Endometrial hyperplasia	13	8.6
Ovarian simple cyst	7	3.33
Endometrial polyp	4	2.67
Papillary growth from endometrium	1	0.67
Endometritis	1	0.67
Cervical polyp	1	0.67
Ovarian dermoid	1	0.67
Ovarian functional tumour	1	0.67
Bilateral PCOS	1	0.67
Hydrosalphinx	1	0.67
Endometrial cyst	1	0.67
Cystitis	1	0.67
Total	**150**	**100**

In the study 34.6% patients had endometrial thickness between 5 and 9.9 mm, 53.3% patients had endometrial thickness between 10 and 14.9 mm,8% had Endometrial thickness between 15-19.9mm, 4% had Endometrial thickness >20mm (Table 5).

Table 5: Distribution of patients endometrial thickness on TVS.

Endometrial thickness (mm)	No. of patients	% of patients
5 - 9.9	52	34.6
10 - 14.9	80	53.3
15 - 19.9	12	8
≤ 20	6	4
Total	**150**	**100**

Secretory endometrium (44.6%) was the most common histological pattern followed by 40.6% proliferative endometrium. Endometrial carcinoma was 3%, endometrial hyperplasia 8% endometrial polyps were 3% and endometritis was 1%. Disordered proliferative endometrium considered as an intermediate step between normal proliferative endometrium and endometrial hyperplasia was detected in 1.33% of the patients (Table 6).

Table 6: Distribution of patients histopathological examination report after D and C.

Pathology	No. of patients	% of patients
Proliferative Endometrium	61	40.6
Secretory Endometrium	67	44.6
Simple hyperplasia with/ without atypia	8	5.33
Complex hyperplasia with atypia	3	2
Disordered proliferative endometrium	2	1.33
Endometrial carcinoma	4	3
Endometritis	1	0.67
Endometrial polyp	4	3
Total	**150**	**100**

Authors found that 46 patients (30%) who presented with HMB had secretory endometrium and 38 (25.3%) showed proliferative endometrium, thus making secretory endometrium the most common finding in HMB. Most of the patients with endometrial carcinoma and endometrial hyperplasia had HMB as presenting symptom. Only one patient presented with oligomenorrhoea had complex hyperplasia (Table 7).

In this study found that among 150 patients in the study, 128 cases (85.3%) of women with abnormal uterine bleeding had endometrial thickness range of 5-14mm. For all these patients the histopathological report was either proliferative endometrium or secretory endometrium.

In the remaining 22 cases (15%) with endometrial abnormality, the endometrial thickness was found to range from 15mm in a case with simple hyperplasia without atypia to 22mm for complex atypical hyperplasia to 21mm for a case with endometrial carcinoma.

Table 7: Comparison of presenting menstrual complaints of the patients with their histopathological examination.

Histopathology findings	Menstrual complaints							
	Menorrhagia	Polymenorrhoea	Polymenorrhagia	Oligomenorrhagia	Metrorrhagia	Menometrorrhagia	Oligomenorrhoea	Total
Proliferative Endometrium	38	13	5	3	1	1	0	61
Secretory Endometrium	46	11	6	1	3	0	0	67
Simple hyperplasia without atypia	5	2	0	0	0	0	1	8
Complex hyperplasia with atypia	3	0	0	0	0	0	0	3
Disordered proliferative endometrium	2	0	0	0	0	0	0	2
Suspicious of adenocarcinoma	1	0	0	0	0	0	0	1
Adenocarcinoma clear type	1	0	0	0	0	0	0	1
Well differentiated adenocarcinoma	1	0	0	0	0	0	0	1
Adenocarcinoma papillary type	1	0	0	0	0	0	0	1
Endometritis	1	0	0	0	0	0	0	1
Endometrial polyp	1	2	0	0	1	0	0	1
Total	**98**	**26**	**12**	**6**	**5**	**2**	**1**	**150**

Table 8: Comparison of TVS with HPE.

Histopathology findings	Endometrial thickness				
	5.0-9.9mm	10-14.9mm	15-19.9mm	≥20mm	Total
Proliferative endometrium	32	29	0	0	61
Secretory endometrium	20	46	1	0	67
Simple hyperplasia with/without atypia	0	1	5	2	8
Complex hyperplasia with/ without atypia	0	0	1	2	3
Disordered proliferative endometrium	0	2	0	0	2
Suspicious of adenocarcinoma	0	0	0	1	1
Adenocarcinoma clear type	0	0	1	0	1
Well differentiated adenocarcinoma	0	0	1	0	1
Adenocarcinoma papillary type	0	0	0	1	1
Endometritis	0	1	0	0	1
Endometrial polyp	0	1	3	0	4
Total	**52**	**80**	**12**	**6**	**150**

Table 9: Endometrial thickness cut off value.

Endometrium	< 14mm	>14mm (Hyperplasia)	Total	p value
Normal histology	128	1	129	
Abnormal histology	5	16	21	< 0.05
Total	**133**	**17**	**150**	

In this study 85% of women with normal endometrium had an endometrial thickness of less than 14mm below which there was no endometrial pathology except for 1 case of simple hyperplasia 1 case of endometrial polyp 1 case of endometritis. Above this cutoff level were found to associate with endometrial pathology except for 1 case of secretory phase (Table 8).

Table 9 shows in perimenopausal women with AUB, when endometrial thickness of 14mm on trans-vaginal ultrasound was taken as cut off, the modality had sensitivity of 96.24% and specificity of 94.12 %, positive predictive value 99.2%, negative predictive value 76.19%. P-value with chi square test was found to be <0.05.

DISCUSSION

Perimenopausal women are the majority of patients that present to gyanecologists with abnormal uterine bleeding. A careful diagnostic approach is necessary in perimenopausal women with abnormal uterine bleeding because of potential malignant conditions.

Uterine curettage or endometrial sampling is usually performed to demonstrate the underlying causes of abnormal bleeding. Because this conventional approach is invasive and not convenient to the patient.[5] Transvaginal sonography has been reported as efficient in detecting pathology in the uterine cavity in postmenopausal bleeding.[6-10] However, there are limited studies for endometrial thickness measurement in perimenopausal women with abnormal uterine bleeding.

In the Present study, the age of the patients ranged from 39 to 51 years. According to the study majority of the cases of AUB is between 41-45 years of age, which is comparable with Upadhyaya and Malla et al (43.15 years) and Dasgupta et al (46.2 years).[11,12]

The reason for increased incidence of AUB in this age group 41-50 years may be due to the fact that these patients are their climacteric period. As women approach menopause, cycles shorten and often become intermittent anovulatory due to decline in the number of ovarian follicle and the estradiol level.

Most of our patients were in the multiparous category. Most of the studies reported higher incidence of AUB with increase in parity correlated with the studies of Devi et al and Babbar K et al.[11-13]

Most common clinical features among study patients is HMB constituting 65.33% comparable with other studies Agarwal S et al (49%), Ara and Roohi et al (49.06%), Muzafar et al (51.9%). The incidence of polymenorrhoea is 26% in our study comparable with the other studies Babbar K et al (11.6%), Muzafar et al (13%). The incidence of metrorrhagia in our study is 5% which is comparable with other studies Babbar K et al (7.3%), Bhosle et al (6.5%) and Patil et al (5%).

Histopathological examination of the endometrial curettage revealed secretory (44.6%) endometrium is the most common histological pattern detected followed by proliferative endometrium (40.6%) which correlated with Jetley et al where secretory endometrium was the most common finding at 42.4% followed by proliferative endometrium 34.3%.[14]

Endometrial hyperplasia is 8%. Among the endometrial hyperplasia simple cystic hyperplasia is the most commonly encountered endometrial hyperplasia (6%) which is almost similar to the study done by Doraiswami et al, Sheetal et al.[15]

Present study showed 2% cases of complex hyperplasia which is comparable with study done by Sheetal et al. The endometrial hyperplasia is commonly seen in perimenopausal age group because of failure of ovulation. Persistent unripe follicle exposes the endometrium to an abnormal excessive and prolonged estrogen action. Endometrial carcinoma cases were 3%, Endometrial carcinoma was reported in 2.63% of cases which is similar to the other author 2% (Shazia et al) and 3.3% (Hameed et al) respectively.[15,16]

Incidence of endometrial polyp in the present study is 3% comparable with other studies Agarwal S et al (2.5%), Noshin et al (3.21%) and Muzaffar et al (1.20%). In the study Endometritis was 1%. Disordered proliferative endometrium was detected in 1.33% of the patients which is comparable with the study Hoon N et al.

In the present study 128 cases (85%) of women with perimenopausal bleeding had normal endometrium by transvaginal sonogram and had endometrial thickness range of 5-14mm. For all these patients the histopathological report was either proliferative endometrium or secretory endometrium. These findings are consistent with similar studies carried out by Veena A et al.[17]

In the study in the remaining 22 cases (15%) with endometrial abnormality, the endometrial thickness was found to range from 15mm in a case with endometrial hyperplasia to 23mm for a case with endometrial carcinoma.

There is no clear definition of what constitutes an abnormal endometrial thickness in the still menstruating perimenopausal woman. The upper limit for normal endometrial thickness remains controversial.[18] In the perimenopausal cycles, there is unopposed estrogen stimulation which leads to hyperplasia of the endometrium which can progress to endometrial cancer. History of irregular cycles, polycystic ovarian syndrome, and anovulatory cycles are risk factors in the progression of endometrial hyperplasia.

In the present study, complex hyperplasia with atypia or malignancy was not noted at endometrial thickness less than 14.9mm. All the 22 cases that showed abnormality on histopathological evaluation had endometrial thickness greater than 15mm. This study thus corroborated the findings of similar study done by Aslam A et al.[19] Their study found that no major endometrial pathology is detected when endometrial thickness is less than 14mm.

53.3% of patients had an endometrial thickness between 10-14.9mm on ultrasonography similar to the study conducted by Sur D (42.3%).[20] Archarya V et al in their study categorised endometrial thickness based on TVS. In most of the patients the endometrial thickness were

within 10- 12mm (20%) which coincides with this study four cases of endometrial polyps by TVS in this study.[21]

CONCLUSION

Abnormal uterine bleeding is a common and sometimes a debilitating condition in women of perimenopausal age. Primary goal in evaluation of abnormal uterine bleeding is to establish specific diagnosis in the most efficient and in a stepwise approach in a least invasive manner possible.

Trans-vaginal sonogram is a simple, non-invasive, easily acceptable, cost - effective, convenient way to indirectly visualize the endometrial cavity and a better diagnostic tool for the evaluation of AUB as an initial procedure.

In this study authors conclude that on trans-vaginal sonogram with endometrial thickness cut-off of <14mm the dilatation and curettage can be avoided in 85% women. Thus trans-vaginal ultrasound, as a diagnostic method using endometrial thickness, may be accurately used to discriminate between normal and pathological endometrial conditions in patients with perimenopausal abnormal uterine bleeding.

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