

Endometrial Study by TVS and It's Correlation with Histopathology in Abnormal Uterine Bleeding.

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Abstract: Abnormal Uterine bleeding (AUB) is a common reason for women of all ages to consult their gynecologist and is the direct cause of a significant health care burden for women, their families and society as a whole. It affects 10-30% of reproductive age women and upto 50 % of perimenopausal women. The most probable etiology of abnormal uterine bleeding relates to the patients reproductive age, as does the likelihood of serious endometrial pathology. The specific diagnostic approach depends on whether the patient is premenopausal, perimenopausal or post menopausal³. In Premenopausal women with normal findings on physical examination the most likely diagnosis is dysfunctional uterine bleeding secondary to anovulation and the diagnostic investigation is targeted at identifying the etiology of anovulation. In perimenopausal women, endometrial biopsy and other methods of detecting endometrial hyperplasia or carcinoma must be considered early in investigations. Uterine pathology particularly endometrial carcinoma is common in postmenopausal women with AUB. Thus in this group endometrial biopsy or transvaginal sonography is included in the initial investigation. [Endometrial sampling could be effectively used as the first diagnostic step in AUB, although at times its interpretation is quite challenging to the practicing pathologist]. In perimenopausal women with DUB, dilation and curettage is the most widely used method to obtain a histopathological specimen and detect endometrial pathology. Although in post menopausal women, dilation and curettage is the key investigation to obtain specimen for histopathological study of the endometrium, only 10% of women show significant endometrial pathology. As it is an invasive blind procedure with sampling errors and risk of complications⁴ there is a need for noninvasive or minimally invasive technique to study the endometrial pathology. TVS is one such modality which fulfills the above criteria with better visualization of small changes in the endometrium. In this study we tried to correlate the efficacy of TVS i.e. Transvaginal Sonography in relation to histopathology of endometrium. Endometrial thickness being taken as the parameter for excluding endometrial abnormalities. Objectives of the study: To determine the efficacy of TVS in depicting the pattern of endometrium and to correlate the endometrial pattern and thickness by TVS with the endometrial histopathology in perimenopausal women with AUB and thereby to reduce the need of invasive procedure. Material & methods: This was a prospective study done at Gynaecology department of Siddhartha Medical College, Vijayawada, Andhra Pradesh, India, on 55 patients of perimenopausal women with abnormal uterine bleeding from April 2012 to March 2013. Transvaginal ultrasound was performed independent of phase of menstrual cycle using 7.5 MHz transvaginal transducer taking the maximum endometrial thickness in the sagittal plane as parameter. Later histopathological study of the endometrium was done by dilatation and curettage and results were compared with chi square test and kappastatistics. Analysis of results were done on Ms excel and Epiinfo and results were tabulated. Conclusion: Abnormal uterine bleeding is a common and sometimes a debilitating condition in women of reproductive age. Standardization of related terminology, a systemic approach to diagnosis and investigation and stepwise approach to intervention is necessary. Here in this study we made an effort to compare the efficacy of TVS with endometrial study by Dilatation and curettage in perimenopausal age group of women with AUB. Perimenopause or climacteric phase generally refers to the time period in the late reproductive years usually late 40's to early 50's. In the study by Treloar, the average age for entry into the perimenopausal transition was 45.1 yrs. This study showed that with an endometrial thickness cutoff of ≥ 8 mm, we can avoid dilation and curettage in 40% of women. Further TVS is non invasive, easily accepted by the women without any complications and further we can see the myometrium, endomyometrial junction, adnexae and ovaries in TVS. Thus TVS can be tried as the most cost effective initial test in women with abnormal uterine bleeding especially in perimenopausal age group. The main disadvantage of TVS is technique of measuring the endometrium and experience of the operator, which will affect the measurements.

Keywords: Abnormal uterine bleeding(AUB), Endometrium, Transvaginal Sonography (TVS), Dilatation and Curettage (D&C), Dysfunctional Uterine Bleeding(DUB), histopathology, endometrial thickness, Perimenopausal women, endometrial hyperplasia, endometrial carcinoma.

I. Introduction

Menstruation is a cyclical bleeding from the uterine endometrium in response to ovarian hormones which is under the control of hypothalamo pituitary ovarian axis. Abnormal uterine bleeding (AUB) is any

variation in the normal menstrual cycle and includes changes in the regularity and frequency of menses, in duration of flow or amount of blood loss^[6]. Menstrual disorders are a common indication for medical visits among women of reproductive age and menstrual bleeding affects 30% of women throughout their reproductive life time^[3]. These complaints may significantly affect the quality of life, result in time off work, lead to surgical intervention intending hysterectomy and ultimately have a significant impact on the health care system.

A Through history and physical examination will often indicate the cause of abnormal uterine bleeding and direct the need for further investigation and treatment. The most probable etiology of abnormal uterine bleeding relates to the patient's reproductive age, as does the likelihood of serious endometrial pathology^[3]. The specific diagnostic approach depends on whether the patient is premenopausal, perimenopausal or postmenopausal. In premenopausal women with normal findings on physical examination the most likely diagnosis is dysfunctional uterine bleeding secondary to anovulation and the diagnostic investigation is targeted at identifying the etiology of anovulation^[3]. Dysfunctional uterine bleeding is diagnosed by excluding pregnancy, iatrogenic causes, systemic conditions and genital tract pathology. In perimenopausal women endometrial biopsy and other methods of detecting endometrial hyperplasia or carcinoma must be considered early in investigation. An international expert consensus from the FIGO Menstrual Disorders working group has proposed a standardized classification system for AUB to facilitate greater appreciation of the complexities of this clinical entity^[4]. This classification allows the characterization of more than one etiology in the same patient. There are 9 main categories within the classification system named for the acronym PALM-COEIN. Women with what was previously called "Dysfunctional Uterine Bleeding" are likely to have one or more of coagulopathy, disorder of ovulation, or primary endometrial cancer. The PALM side of the classification refers to structural causes that could be evaluated and diagnosed on imaging and or biopsy. The COEIN side allows consideration of underlying medical disturbances that could result in AUB.

PALM- COEIN Classification of AUB ^[7]	
Structural	Non Structural
Polyps	Coagulopathy
Adenomyosis	Ovulatory dysfunction
Leiomyomas	Endometrial (Primary disorders of Mechanism regulating local endometrial hemostasis).
Malignancy	Iatrogenic
Hyperplasia	Not yet specified

Imaging studies are indicated when examination suggests structural causes for bleeding or when conservative management has failed or when there is a risk of malignancy. (Obesity, diabetes, null parity, history of PCOS, family history of hereditary non-polyposis colorectal cancer [HPNCC])^[8].

In post menopausal women with AUB, Uterine pathology, particularly endometrial carcinoma is common. Thus in this age group EB or transvaginal sonography is included in the initial investigation.

If imaging is indicated, Transvaginal Ultrasound should be the first one of imaging modality for AUB^[11]. Saline infusion sonography and diagnostic hysteroscopy could be used in the diagnosis and characterization of discrete intrauterine abnormalities such as sub mucosal fibroid^{[10][12]}.

Dilatation and curettage is no longer the standard of care for the initial assessment of endometrium, It is a blind procedure with sampling errors and risks of complications similar to hysteroscopy^[12-14].

Hence in the present study we tried to correlate the efficacy of transvaginal ultrasound with histopathology of endometrium by dilatation and curettage. Endometrial thickness was selected as a parameter for excluding endometrial abnormalities.

Aims and objectives of the study:

Aims: Evaluation of endometrial thickness with transvaginal ultrasound and its correlation with histopathology by dilatation and curettage in abnormal uterine bleeding

II. Objectives:

1. To determine the efficacy of Transvaginal ultrasound in depicting the pattern of endometrium.
2. To correlate the endometrial pattern and thickness by transvaginal ultrasound with endometrial histopathology in women with AUB.
3. To reduce the need of invasive procedures.

TVS in evaluation of AUB: Sokamoto^[15] described in 1985 some of the sonographic images noted during the normal menstrual cycle. Fleisher^[16], 1986 reported the sonographic depiction of endometrium in normal menstrual cycle and in abnormal uterine bleeding. Dodson 1994^[17] evaluated the etiology of menorrhagia using vaginal sonography.

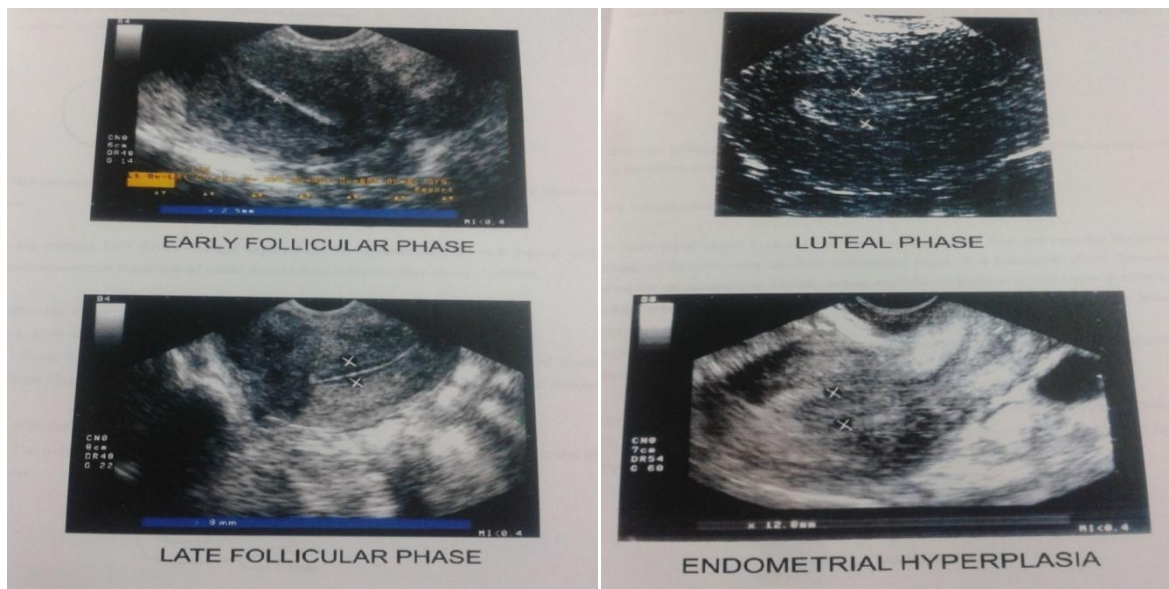
Endometrial Thickness: According to Melvin G. Dodson^[17]

Menstrual Phase	Endometrial Thickness (Full Thickness) in mm
Menstrual (Late)	0.5 - 1
Proliferative (follicular)	4 - 8
Periovulatory	6 - 10
Secretory (Luteal)	10 - 12
Post Menopausal	1 - 3

Endometrium is identified in the longitudinal axis of the uterus and the plane where the endometrial cavity is to be followed from cervical canal to the upperfundal border of the uterine cavity is identified and endometrial thickness is measured. In the longitudinal view of the uterus three layer are apparent the myometrium, inner myometrium and the endometrium. The Caliper of the ultrasound machine is placed on the outer border of highly echogenic endometrium often surrounded by a hypoechoic area representing the inner hypo vascular compact layer of the myometrium. The endometrium is measured from basalis anterior to the contra lateral basalis (posterior) Fleisher et al., suggested that these measurements should be divided by two^[16]. In the present study full thickness of the endometrium is used and the thickest position of the endometrium should be measured. The best plane for evaluating and measuring the endometrium is the AP pelvicplane.

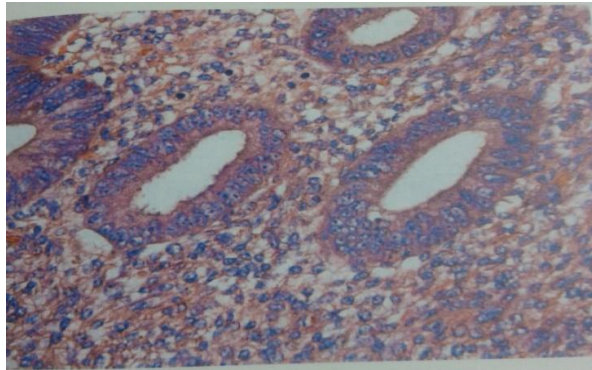
Correlation of Normal menstrual cycle anatomy and physiology with transvaginal ultrasound endometrial patterns, Melvin G. Dodson¹⁷.

Anatomy / Physiology	Ultra Sound Pattern
Menses Early	Hyper echoic: Resembles a luteal phase endometrium with anechoic areas indicating endometrial breakdown.
Mid Menses	Mixed pattern with hyperechoic and anechoic areas indicating blood and tissue endometrium per se noted
Late	As two thin hypoechoic lines outlining the endometrial cavity. Single line: Thin line representing the endometrial cavity
Follicular phase Early	Three line: The two outer hyperechoic lines represent the endometrial myometrial junction. The central line is the endometrial cavity.
Late	Three line: Thickening of the anechoic endometrial layer between the hyperechoic three lines.
Luteal phase Early	Transitional : Thickening of the hyperechoic three lines and irregular hyper echoic filling of the previously anechoic endometrial layers
Late	Hyperechoic: Uniform hyperechoic (White) endometrium
Premenstrual	Hyperechoic: With small anechoic collections.

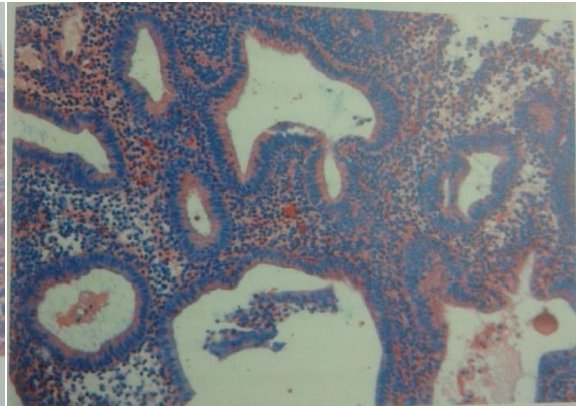


Atypical Patterns	Sonographic findings
Atrophic endometrium	Uniform thin echogenic line
Cystic atrophic endometrium	Abnormally thickened endometrium with multiple small cystic spaces (Swiss cheese endometrium)
Endometrial Hyperplasia a. Focal, b. Diffuse	Thickening of the endometrial stripe and often appears homogeneously echogenic
Cystic hyperplasia	Echogenic endometrium with detectable small cysts
Atypical hyperplasia	Inhomogenous, Irregular endometrial stripe
Endometrial carcinoma	Thick, Solid, Heterogenous ill defined endometrial tissue.

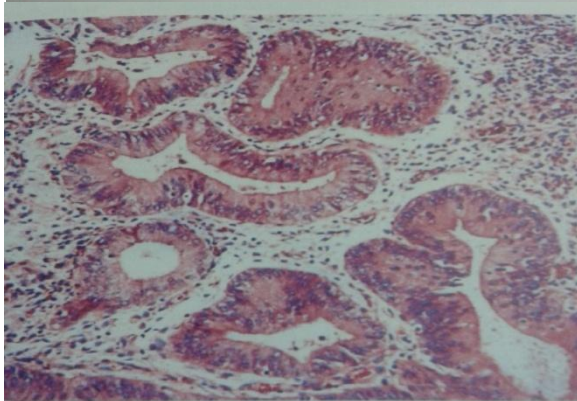
	<p>Enlarged uterus from 2-5 cm (AP Uterine Diameter) to 9-14 cm (cervical- fundal uterine diameter) Distended Uterine Cavity Lobular Uterus Loss of incomplete central hyperechoic line, Hypo or hyper echogenic uterine body preservation of endo metrial halo indicates superficial invasion, Absence of halo indicates deep invasion.</p>
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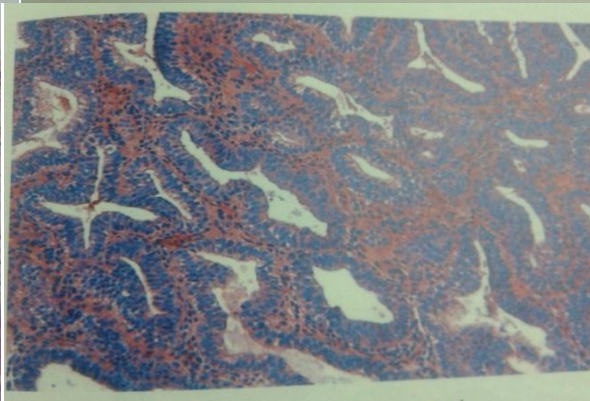
Photograph : simple hyperplasia with atypia



Photograph : simple hyperplasia without atypia



Photograph : complex hyperplasia with atypia



Photograph : complex hyperplasia without atypia

Clinical Trials:

- Smith^[18] etal (1991) observed that endometrial cut off point of ≥ 4 mm precluded any missed malignancies giving sensitivity of 100% and specificity of 61%, the positive productive value and negative productive value were 39% and 100%. In premenopausal women ≥ 8 mm endometrial thickness gave sensitivity of 67% , Specificity 75% , positive predictive value 14 % and negative predictive value 97%.
- Tong song^[19] and co workers suggested that endometrial thickness of < 7 mm gave 100 % sensitivity and 46% specificity with normal histopathology.
- Vakiani M^[20] etal conducted a study in 1996 on histopathological findings of the endometrium in patients with DUB. 7,000 endometrial curettages from patients with abnormal uterine bleeding were studied. Among these 1282 cases were defined as DUB. Endometrial curetting revealed an anovulatory cycle in 984 (77%) of the patients and 446 (47.5%) showed endometrial hyperplasia. 412 (41.8%) showed abnormal proliferation due to prolonged persistence of a follicle while 106 showed deficient endometrial proliferation. 71.67% of (10.77%) endometrial hyperplasia were simple (cystic hyperplasia), 26.6% were complex (adenomatous) and 1.71 % were atypical hyperplasia.
- A study by mark H. Emanuel^[21], MD etal., AMJ Obstet Gynecal 1995 TVS demonstrated a sensitivity of 96% and a specificity of 89%. They studied 260 patients of which 139 patients have normal ultrasonographic findings. After comparison with hysteroscopy 135 patients sonograms were true negative, Abnormal sonograms found in 121 patients out of which only 105(86%) were abnormal hysteroscopically. In only 16 patients with false positive abnormal sonograms, hysteroscopy revealed no endometrial abnormality.
- Lubnapal, MD.^[22] etal, 1995-1996 a total of 54 women with AUB evaluated by TVS, endometrial biopsy, followed by office hysteroscopy. The sensitivity & specificity of TVS compared with results of

hysteroscopy are 60 % and 88%. The sensitivity and specificity of endometrial biopsy of 40% and 83% respectively.

- Ivan Fistrionic ^[23], M.D. M.Sc., et al, 1997. They studied 103 women with AUB by TVS for endometrial abnormality. ET of 5mm or more had a sensitivity & NPV of 100% in predicting malignancy.
- Igal wolman ^[24], M.D. et al, 2 examiners measures the ET of 25 patients by TVS on two separate occasions 30 mins apart. The reliability test performed for each examiner was statistically less significant for the intra observer variation for each observer (r=0.95 and r= 0.93) then between both examiners (r= 0/85). A mean maximum difference of 2.1 ± 1.3 mm was found between the observations.
- Anjali singh ^[25], Saroj singh, Veena Mathur, Kalpana singh (2001) have done a study in S.M.Medical college, Agra,India. 100 patients, out of which 50 were of DUB and 50 of reproductive age group with normal menstrual cycles were for the study. Age group was between 21 and 52 years. TVS followed by endometrial biopsy was done and studied for histopathological correlation. In this study polymenorrhoea was the major menstrual irregularity, uterus was bulking in DUB cases. Mean length and thickness of endometrial canal was 47.30 mm & 3.72 mm respectively in DUB cases. On histopathology normal endometrium was present in 60% cases, endometrial hyperplasia was in 28% cases. Histopathological findings were well correlated with TVS findings in all cases except four.
- HKCOG ^[26] guidelines, women under the age of 40 with AUB should undergo investigations. They mentioned that in patients with menorrhagia the uterine cavity should initially be investigated by TVS. The cut off for endometrial carcinoma by endometrial thickness was 20 mm (2001).
- Janesh K. Gupta ^[27] et al. 2002. They evaluated 57 studied with 9031 patients. The commonest cut offs were 4 mm (9 studies) and 5 mm (21 studies) measuring both endometrial layers. A negative result at ET \leq 5 mm cut off level measuring both endometrial layers rules out endometrial pathology with good certainty.
- Ilan Bruchim ^[28], MD et al, 2004. They studies 95 women with AUB by sonographic measurement of endometrial thickness. A cut off point of 5 mm had the highest sensitivity (100%) but a lower specificity (33%), for normal histopathology of endometrium.
- Chapavit Get pook ^[29], et al 2007 they studied 110 women with abnormal uterine bleeding. They concluded that with an endometrial thickness cut off of 8 mm showed sensitivity of 83.9%, specificity of 58.8 %, NPV 90.4 % for abnormal endometrium on histopathology.
- Kauram ^[30] et al, 2010 Total of 112 patients observed from 2006 to 2008 with AUB, with a cut off value of 4 mm for ET, TVS showed a sensitivity of 100% and specificity of 73.33 % PPV of 76.47 %, NPV of 100 % with postmenopausal bleeding.

III. Material And Methods

This was a prospective study done on 55 patients of perimenopausal age group presenting with abnormal uterine bleeding in the department of obstetrics and gynecology, in collaboration with Pathology department, in Siddhartha Medical College, Vijayawada, Andhra Pradesh, India from April 2012 to March 2013. 55 cases of perimenopausal women with AUB, attending the outpatient department planned for dilatation and curettage were examined by transvaginal sonogram for endometrial thickness before doing dilation and curettage. TVS was performed independent of the phase of menstrual cycle using 7.5 MHZ transvaginal transducer. The ultrasound finding that was taken is the maximum endometrial thickness measured in the sagittal plane.

Type of study: Hospital based comparative study.

Sample method: Simple random sampling.

Inclusion criteria:

1. Women of more than 39 years age, before menopause (i.e. between 39 years to before menopause) with menstrual irregularities,
2. With no detectable pelvic pathology.

Exclusion criteria:

1. Patients with abnormal uterine bleeding in other age groups,
2. Carcinoma of genital tract,
3. Active Genital tract infection,
4. Severe medical conditions precluding study like uncontrolled Hypertension, Diabetes mellitus,
5. Pregnancy and related causes of bleeding PV.

Materials required for DXC

- Vaginal Speculum
- Vulsellum
- Uterine Sound
- Mathew Duncan dilators
- curette
- sterile bottles filled with 10% formalin.

Procedure:

- Informed consent was taken
- Thorough clinical examination was done and followed by routine investigations
- Then transvaginal sonography with empty bladder was done using 7.5 MHZ intravaginaltransducer
- Two layer thickness of endometrium in A-P dimension at maximum thickness area was taken, If blood/ fluid is present, Thickness of 2 layers taken separately and added.
- Finally D&C was done and endometrial curetting, sent for histopathological examination.

Procedure of dilation and curettage

Patient was given Fortwin and phenergan sedation, Bladder was emptied. Under strict aseptic precaution pelvic examination was done to know the position of cervix, size and position of the uterus. Posterior wall of the vagina retracted with Sim's bivalved vaginal speculum. Anterior lip of cervix was caught with the vulsellum. Uterine sound passed to know the position and length of the uterus. The cervical canal was serially dilated with Mathew duncan's metal dilators of increasing size from 6-10 mm as required, and curettage was done with sharp curette from all the walls of the uterus including fundus. The material obtained was sent for histopathological examination in 10 % formalin.

Time schedule for uterine curettage:

- (a). For Cyclical bleeding cases
 - (i) Menorrhagia - Premenstrual (25-27 days)
 - (ii) Irregular shedding - Post menstrual (5-6 days)
 - (iii) Irregular ripening - Soon after menstruation
- (b). Atypical bleeding cases - Soon after the period starts
- (c). Continuous bleeding - any time

Post operative management: Vitals were monitored and were given tablet Cifran 500 mg bid, tablet Metronadazole 400 mg bid for 5 days after the procedure.

Complications that can be encounter are

- Injury to the cervix, perforation of the corpus by the uterine sound, cervical dilator or endometrial curette. Post wall perforation occurs in anteverted uterus and anterior wall perforation in retroverted uterus.
- Injury to intra abdominal structures if curettage is continued after perforation.
- Pelvic infection, - Hecmorrhage, - Ashermans syndrome.
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IV. Results

Results were compared by chiquare test and kappa statistics. Analysis of results were done on Ms excel and Epi info and results were tabulated. In the present study 55 patients of perimenopausal dysfunctional uterine bleeding, endometrial thickness wad obtained by transvaginal ultrasound with 7.5 MHZ and histopathological study of endometrium was done and results were summarized as follows.

Table-1: Clinical Presentation

Menstrual cycle pattern	No. of cases	Percentage
Menorrhagia(MH)	22	40
Metropathia Haemorrhagia(MPH)	17	30
Polymenorrhagia(PM)	14	25.4
Oligpmenerrhoea(OM)	2	3.6
Total	55	100.00

Among 55 patients with DUB most of the patients have menorrhagic cycles (40%)

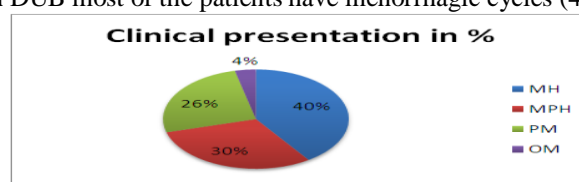


Table -2: Age distribution of patients

Age in Years	No.of Cases	Percentage
35-40	15	27.3
41-45	20	36.4
46-50	18	32.7
50-55	2	3.6
Total	55	100.00

Most of the patients in the study were between 41-45 years (36.4%)

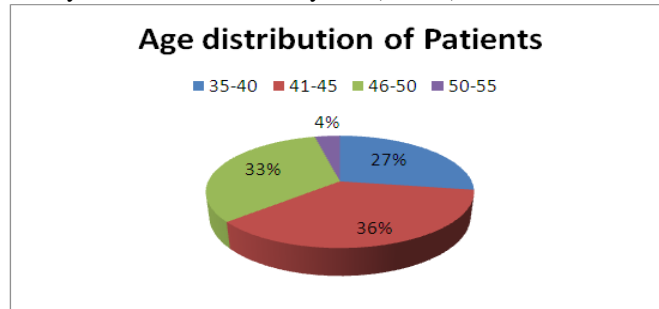


Table-3: Parity

Parity	No. of Cases	Percentage
Nulliparous	3	5.5
Primipara	6	10.6
Multiparous	46	83.6
Total	55	100.00

Majority of the women are multiparous (83.6%)

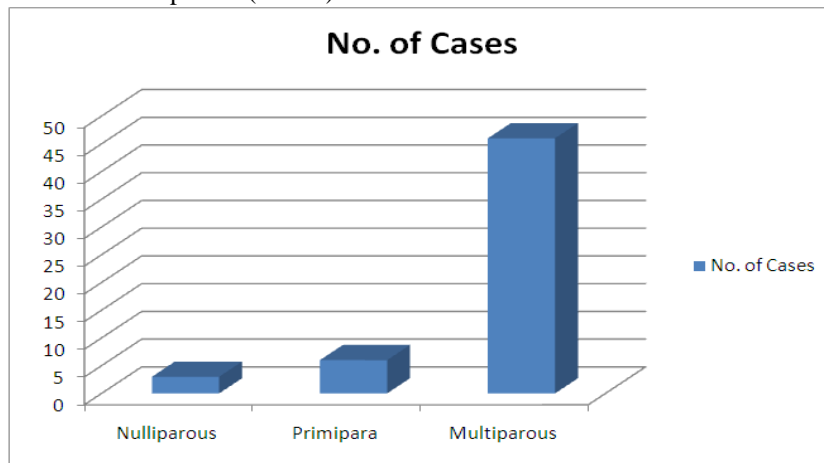


Table 4: Thickness of endometrium

Thickness Endometrium (mm)	No. of cases	Percentage
Less than 4 mm	2	3.60
4-8 mm	19	34.50
8-15 mm	25	45.50
≥ 15 mm	9	16.40
Total	55	100.00

25 patients (45.5%) have thickness between 8-15 mm followed by 19 patients (34.5%) have thickness between 4-8 mm

Table 5: Correlation of endometrial thickness with endometrial hyperplasia

Endometrial Thickness (mm)	No. of cases	Endometrial hyperplasia	Percentage
>15	9	9	100.00
8-15	24	14	58.30
4-8	19	02	10.50
<4	2	0	0.00
Total	55	25	45.45

Table 6: Histopathology of Endometrium

Histopathology of Endometrium	No. of Cases	Percentage
Proliferative endometrium	17	30.9
Secretory endometrium	11	20
Endometrial hyperplasia	25	45.45
Atrophic endometrium	01	01.8
Endometrial cancer	01	01.8
Total	55	100.00

Most of the patients have endometrial hyperplasia. Among 55 patients in the study 25 (45.5%) patients had endometrial hyperplasia followed by proliferative endometrial in 17 patients (30.9%)

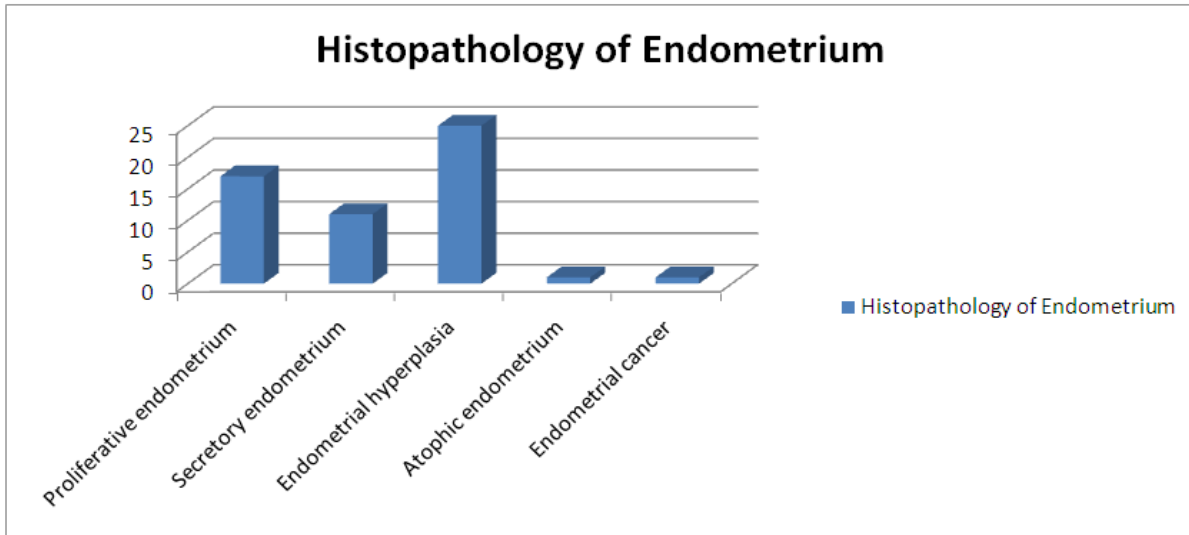


Table 7: Types of endometrial hyperplasia

Types of endometrial Hyperplasia	No. Of Cases	Percentage
Simple Hyperplasia	16	64
Complex Hyperplasia	8	32
Atypical Hyperplasia	1	4
Total	25	100.00

Among 25 patients with endometrial hyperplasia 16 (64%) had simple hyperplasia.

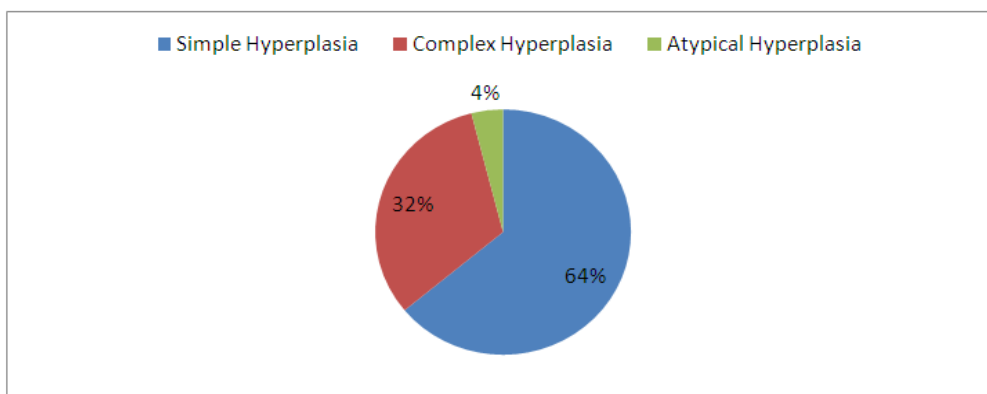


Table-8 Comparing endometrial thickness by transvaginal sonography with endometrial histopathology

Endometrial Thickness (mm)	No. of cases	Proliferative Endometrium	Secretory endometrium	Endometrial Hyperplasia	Atrophic endometrium	Endometrial cancer
< 4mm	2	2	0	0	0	0
4-8 mm	19	13	3	2	1	0
8-15 mm	25	02	8	14	0	1
15 and above	09	0	0	09	0	0
Total	55	17	11	25	2	1

$X^2 = 68.33: P < 0.001 = S$

- Correlation of TVS result with endometrial thickness 4-8 mm with histopathological examination of proliferative endometrium shows substantial agreement between both studies. TVS also has high sensitivity and negative predictive value of 76.47% and 88.88% respectively. Kappa statistics=0.72, substantial agreement.
- The sensitivity is poor in detecting endometrial hyperplasia with TVS endometrial thickness of 8-15 mm. Sensitivity is 56% only specificity 66.66% only. There is poor agreement between both studies. Kappa statistics=0.19, Poor agreement
- TVS endometrial thickness ≥ 15 mm should moderate agreement with endometrial hyperplasia. TVS endometrial thickness ≥ 15 mm showed 100% specificity & 100 % positive value. It showed concordance level of 70.9% between both studies.Kappa statistics=0.44, substantial agreement.
- With endometrial thickness more than 8 mm the sensitivity of TVS in detecting endometrial hyperplasia is 92% and NPV is 90.9%. Both tests showed concordancelevel of 78.18%.
- TVS endometrial thickness between 8-15 mm showed 100% sensitivity and 100% negative predictive value when compared with dilatation and curettage. Both tests showed slight agreement and concordance level of 56.36%.Kappa statistics = 0.10, Slight agreement.

V. Discussion

Perimenopausal bleeding is a common disorder and for many years diagnostic curettage is required to exclude endometrial abnormalities. Although the incidence of carcinoma increases with age, other causes of AUB like anovulatory bleeding and atrophic endometrium are much more common.

In cases of perimenopausal and postmenopausal bleeding for many years the widely used techniques for obtaining endometrial sample was dilatation and curettage. However this procedure has many limitations, The false negative rate of 2%-6% has been reported in diagnosing endometrial carcinoma and hyperplasia with dilation and curettage^[4]. Only 10% of women undergoing dilation and curettage are found to have endometrial pathology as with other procedures of getting endometrial sampling by vabra aspirator or pipelle. The main reason being the sampling error associated with these procedures and a single curettage will not remove all the surface of the endometrium completely from uterine cavity.

To overcome these limitations a noninvasive, diagnostic modality with no risk of complications has been sought. Diagnostic vaginosonography is a good method for the evaluation of endometrial growth in peri and post menopausal women. Despite the phasic variation in endometrial thickness, the endometrium can be easily visualized by ultrasonography and measurements of its thickness can be used as a screening method to avoid unnecessary curettage in these women.This study with vaginosonography suggests that it may be possible to exclude endometrial carcinoma or those at risk for endometrial hyperplasia with this technique and thus reduce the number of patients requiring dilatation and curettage. This study suggests endometrialthickness of 8 mm or less in perimenopausal women with vaginosonogrphy do not require dilatation and curettage as no abnormal endometrium noted in this group. A measured thickness of atleast 8 mm should be considered as an indication for diagnostic curettage. The difference of 1 mm is taken as the Inter observer variation. In this study only 2 cases showed endometrial hyperplasia with endometrial thickness less than 8 mm.

The suggested cutoff value was the endometrial thickness below which no pathology was found, but the difference between the non pathological and possible a pathological endometrium was always sharp without any margin of safety.However because this sample size is very small to get the conclusions and results further studies are needed to safely establish and endometrial thickness cutoff point for excluding endometrial abnormalit

Table 9: Endometrial thickness & the percentage of reduction in no. of curettings in various studies

Study	Year	E.T (mm)	% of reduction in no. of curettings
Smith e t al ^[18]	1991	4	50
Tong song e t al ^[19]	1994	7	40
Prashanth ^[32]	1999	7	45
Present study	2010	8	40

Age incidence of patients with DUB in the present study are between 41-45 years as against the study by solter land 1949.

Menorrhagia constitutes the majority of cases 40% followed by metropathis harerrhagica 30%, polymenorrhoea 25.40 %. As against the study by Anjali singh^[25] et al, 2001 where in polymenorrhagia was the major clinical entity.Majority of the patients are multiparous 83.60% followed by 10.9% of primipara and 5.4% of multiparous women.

Out of 55 cases of AUB, endometrial hyperplasia is found in 45.45% of cases, proliferative endometrium in 30.9% of cases and secretory endometrium in 20% of cases. Among them simple hyperplasia

was seen in 64% of cases, complex hyperplasia 32% of cases and atypical hyperplasia in 4% of cases as against these study by Vakiani M^[20] et al., (1996) where in endometrial hyperplasia constituted 41.86% and among these cystic hyperplasia formed 71.67%, Adenomatous 26.6% and atypical hyperplasia 1.75%.

Out of 55 cases 3.6% had endometrial thickness less than 4 mm,

34.5% had endometrial thickness between 4-8 mm,

45.5 % had endometrial thickness between 8-15 mm,

16.3 % had endometrial thickness more than 15 mm.

As against the study conducted by Vasantha lakshmi(1996), 50% had endometrial thickness 4-7 mm, 44 % had > 8mm and <4 mm in 6% of cases.

In the present study when endometrial thickness is < 4mm, two cases showed endometrial hyperplasia. When endometrial thickness is between 4-8 mm -10.5 % of the cases showed endometrial hyperplasia. When the endometrial thickness is between 8-15 mm, 56% of the patients showed endometrial hyperplasia. When endometrial thickness was > 15 mm, all the patients showed endometrial hyperplasia. Endometrial thickness of 5 mm by TVS was associated with endometrial hyperplasia-Bender^[37]. Endometrial thickness ≥ 5 mm had an 88% sensitivity, 21% specificity by laila D.devrics. TVS sensitivity with biopsy 75%, specificity 90% ,PPV 40%, NPV 98% DCC Hunter^[33], et al., (2001). No significant pathological changes were detected by Veena^[38] et al., 2003 when endometrial thickness was < 14 mm. According to Mohammed Aslam^[34] et al., (2007) ET was abnormal if 8 mm was noticed by TVS. It showed a sensitivity of 71.4 % and specificity of 67.7%. An endometrial thickness of 8mm showed optimal sensitivity, 90.4% negative predictive value(NPV) for abnormal endometrium. Dr.Amna Wajeeh^[36] et al., showed an endometrial thickness cutoff of 8 mm in perimenopausal for detecting benign and malignant lesions of endometrium. In the present study TVS had sensitivity 92.3% specificity of 68.96% with an endometrial thickness cut off of 8 mm for endometrial hyperplasia.

Summary:

55 patients with abnormal uterine bleeding in the perimenopausal age group (39-52) underwent transvaginal ultrasonography with 7.5 MHZ transducer/probe and followed by dilatation and curettage and endometrium was sent for histopathological examination.

- Age group of patients ranged from 35-55 and most common age group is 41-45(36.4%)
- Most of the patients (40%) presented with menorrhagia cycles followed by metrorrhagia (30%)
- Among 55, 46 are multiparous women(83.6%)
- Transvaginal sonogram showed > 8 mm endometrial thickness in 3 women (61.8%) and < 8 mm in 21 women (38.1%)
- In dilatation and curettage endometrial hyperplasia is noticed in 25 women(45.45%) and endometrial carcinoma in 1 woman(1.8%)
- Among normal endometrium proliferative endometrium accounts for 30.9%
- The sensitivity, specificity, PPV, NPV for TVS is 93.2%, 68.96%, 72.72%, 90.9% respectively in detecting endometrial hyperplasia with an ET cut off of 8mm.
- The most common among endometrial hyperplasia is simple hyperplasia in 16 women (64%) followed by complex hyperplasia in 8 women of about 32%.
- The endometrial carcinoma in 1 patient showed endometrial thickness of 8 mm.
- For 2 patients with endometrial hyperplasia in dilatation and curettage the endometrial thickness is less than 8 mm.
- 10 patients had endometrial thickness more than 8 mm but among them 8 women had secretory endometrium and 2 women had proliferative endometrium.
- In the present study 80% of results are in agreement between TVS and D&C.

VI. Conclusion

This study shows that in perimenopausal women with abnormal uterine bleeding the first investigation should be transvaginal sonogram. If endometrial thickness with ≥ 8 mm on transvaginal sonogram, they can be further subjected to dilatation and curettage, as this study shows that with an endometrial thickness cutoff of ≥ 8 mm the dilatation and curettage can be avoided in 40 % women. In this study no complications were found with dilatation and curettage.

TVS is noninvasive, easily acceptable by the women and without any complications and is a better diagnostic tool for the evaluation of AUB as an initial procedure. If needed we can subject women to further invasive tests like hysteroscopic guided biopsy, saline infusion sonogram. One more advantage of TVS is we can also see the myometrium, endomyometrial junction adnexae and ovaries in the TVS.

The main disadvantage of TVS is the technique of measuring the endometrium and experience of the operator which will affect the measurements.

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