A PROSPECTIVE COMPARATIVE STUDY BETWEEN TRANSVAGINAL SONOGRAM AND HISTOPATHOLOGICAL EXAMINATION IN PERIMENOPAUSAL AND POSTMENOPAUSAL BLEEDING A BRIEF STUDY ABOUT HYSTEROSCOPIC EXAMINATION & GUIDED HISTOPATHOLOGICAL EXAMINATION

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INTRODUCTION

Dysfunctional uterine bleeding is one of the most frequently encountered conditions in gynaecologic practice and forms about 10% of all gynaecological admissions.

In Government Raja Sir Ramasamy Mudaliar Lying – In Hospital in the year 2005-2006, 520 cases of the 2200 admissions in the department of gynaecology were for Dysfunctional uterine bleeding giving an incidence of 23.6% of these

5% - < 20 years (Pubertal age group)
57% - 20 - 40 years (Reproductive age group)
38% - > 40 years (Perimenopausal & Postmenopausal bleeding)

The main concern in permenopausal bleeding and postmenopausal bleeding is, that the bleeding could be the only external manifestation of a hidden serious pathology such as endometrial carcinoma. Also, endometrial hyperplasia which is a forerunner of endometrial carcinoma is a common finding in women with perimenopausal bleeding.

The incidence of endometrial carcinoma is rising both relative to cancer cervix and in absolute terms and the disease which was formerly confined to the postmenopausal women is now occurring with increased frequency in middle age and perimenopausal women (Arthur et al)[1]. Also with the advent of hormone replacement therapy

postmenopausal women require constant surveillance of their endometrium.

Curettage has long been considered to be the gold standard for the diagnosis of perimenopausal and postmenopausal uterine bleeding. But dilatation and curettage has many shortcomings.

Dilatation and curettage has a failure rate of 12-29% (Arthur et al). Undirected sampling whether through curettage or suction aspiration is fraught with error in cases in which the abnormality is not global but focal.

Hysteroscopy is the endoscopic technique of visualizing the interior of the uterus directly. Improvements in instrumentation, optics and addition of operative capabilities, have led to a resurgence of interest in hysteroscopy worldwide.

Histerscopic guided biopsy gives more reliable and accurate diagnosis than blind dilatation and curettage procedure.

With the advent of transvaginal sonogram gynaecologists now have a simple outpatient method of studying the endometrium for detecting malignant lesions or their precursors at an earlier stage.

The thickness and internal echo texture of the endometrium in the various phases of the menstrual cycle as seen in Transvaginal Sonogram correlates well with endometrial histology.

The echogenicity of the endometrium has certain characteristics during the various phases of the menstrual cycle, thus enabling the histology to be evaluated with precision by examining with TVS.

During the early proliferative phase the endometrial thickness is 2-4 mm. Endometrium functionalis is hypoechoic or isoechoic and endometrium basalis echogenic.

During the periovulatory phase the endometrium has trilaminar appearance or Triple sign-lumen is echogenci surrounding which there is hypoechoic endometrium functionalis and the echogenic endometrium basalis. The thickness ranges from 6-12 mm.

During the secretory phase, the whole endometrium from basalis to lumen is very echogenic. The greatest thickness is achieved during secretory phase measuring upto 14 mm in width.

In postmenopausal patients less than 4-5 mm or a thin pencil line echo is usually associated with Tissue insufficient for Diagnosis. Normal thickness in postmenopausal patients is 4-8 mm.

Endometrial carcinoma is diagnosed at an earlier stage by loss of the subendometrial halo and later myometrial invasion is accurately documented.

Other pathologic conditions of the endometrium and myometrium such as myomatous polups, endometrial polyps and Adenomyosis are also well visualised.

Thus with transvaginal sonogram the endometrial pathology can be visualized whereas Dilatation and curettage is a blind procedure. Thus the transvaginal sonogram can be used as an initial diagnostic procedure and it supplements the shortcomings of Dilatation and curettage.

This study proposes to correlate the findings of the two diagnostic modalities used in the evaluation of women with peri and postmenopausal bleeding namely transvaginal sonogram and histopathological examination.

REVIEW OF LITERATURE

History of Ultrasound

The word SONAR stands for sound navigation and Ranging. Sonar utilises a frequency of 3.5 MHz to 10 MHz beyond the range of human audibility limit. ultrasound travels at a speed of 1560 m/second in human
tissue.

"Sergal sokolovin" a Russian Scientist is called as the "Father of ultrasound". He emphasized the potential importance of Sonar in 1929.

Dr.Karl Dussik in Austria applied ultrasound in medical diagnosis.

In 1951, wild and Reig reported a 90% accuracy in the diagnosis of cystic versus solid lesions of various organs using the scan technique.

In 1955, Ian Donald and Tom Brown designed the contact scanner.

In 1961, Biparietal diameter was first measured by Ian Donald. About this time, Campbell began working on the growth patterns of fetus as measured by serial Biparietal diameter. In 1973 - gray scale presentation was introduced. Piezo electric effect was first discovered by Pierre Curie in 1880.

Transvaginal ultrasound was first introduced in 1984 by Schwimer S.R. and Lebovic J who used a 5 MHz, 13 mm transducer that was not specifically designed for vaginal work.

PERIMENOPAUSAL AND POSTMENOPAUSAL BLEEDING

In both western and Asian studies the mean age of menopause is fairly constant at 50-51 years (Frommer 1964, Boulet *et al* 1990).

Perimenopause is that interval around menopause that is associated with menstrual and endocrinologic alterations chronologically it taken as the above 40 age group.

2.1 THE MAIN CAUSES OF PERIMENOPAUSAL BLEEDING INCLUDE

Endometrial Hyperplasia	-	15-25%
Benign lesion of the uterus – myomas	-	10%
Dysfunctional uterine bleeding	-	15-20%
Malignancies of the Reproductive tract	-	10-15%
Cancer cervix	-	10-12%
Cancer endometrium	-	2-4%
Adenomyosis	-	20-25%
Exogenous estrogen therapy		
Miscellaneous causes as:		
Endometrial polyps		
End9metritis	-	10%
Cervical polyp and erosion		

Rarely pregnancy related causes

The main causes of postmenopausal bleeding include

Endometrial atrophy	-	60-80%
Endometrial polyps	-	2-12%
Endometrial Hyperplasia	-	5-10%
Estrogen Replacement Therapy	-	15-25%
Endometrial Cancer – Sarcoma	-	10%
Cancer Cervix	-	10%
Atrophic Vaginitis	-	5-10%

Endometrial Hyperplasia

In the perimenopausal period, the menstrual cycles tend to become anovulatory and acyclical, with unapposed estrogen secretion leading to
hyperplasia of the proliferative endometrium (Treolar *et al* 1967).

Classification	Risk of Progression to cancer (Percentage)
Simple (cystic without atypia)	1
Complex (Adenomatous without atypia)	3
Atypia : Simple (cystic with atypia)	8
Complex (adenomatous with atypia)	29

Fibroids are an important cause of perimenopausal bleeding. If a woman in the premenopausal and postmenopausal age group complains of irregular or continuous vaginal bleeding, the possibility of coincident uterine cancer should be excluded.

Adenomyosis the disease often coexists with uterine fibromyomas and endometrial carcinoma.

Endometrial atrophy is the most common endometrial finding in women with postmenopausal bleeding (60-80%) Endometrial biopsy often yields insufficient tissue or only blood clots and usually there is no additional bleeding after biopsy.

Endometrial polyps account for 2-12% of postmenopausal bleeding. The diagnosis of polyps are often rissed by dilatation and curettage or office endometrial' biopsy. Malignant transformation in an endometrial polyp is estimated to be as high as 0.5% (Arthur *et at).* Unrecognised and untreated polyps may be a source of continued or recurrent bleeding leading eventually to unnecessary hysterectomy.

Endometrial cancer: Premenopausal women with endometrial carcinoma invariably have abnormal uterine bleeding which is often characterized as menometrorrhagia or metropathia haemarrhagica.

Recently certain factors had led to an increasing awareness of and emphasis on diagnosis and treatment of endometrial cancer. These include prolonged life expectancy, earlier diagnosis and postmenopausal use of hormone replacement therapy, the availability of easily applied diagnostic tools and a clearer understanding of the premalignant lesions of the endometrium. The incidence of endometrial carcinoma in India is 1.6% (Ratnam *et al.*

Hormone replacement therapy: In postmenopausal women on hormone replacement therapy, it has been suggested that endometrial sampling is indicated in any bleeding that occurs beyond the expected time of withdrawal following progestin therapy. In patients on classic sequential
method bleeding before or on day ten is associated with endometrial proliferation and needs biopsy. A significant change in withdrawal bleeding prompts endometrial sampling.

TRANSVAGINAL SONOGRAM

Transvaginal sonogram may be an useful adjunct for evaluating patients with perimenopausal and postmenopausal uterine bleeding and selecting patients for additional testing.

As the endometrial histology can be predicted with accuracy depending on the endometrial thickness and internal architecture of the endometrium, it actually become "Sono Microscopy" wherein structures that is not discernible with the naked eye can be appreciated.

Normal anatomy of the corpus varies with age and parity. Length of uterus in various age groups are:

Postpubertal	Reproductive	Postmenopausal
5-6 cm	7 -8 cm	4-6 cm

The echogenicity and thickness of the normal endometrium will vary depending on the phase of the menstrual cycle.

The normal endometrial thickness during the various phases of the menstrual cycle and during the postmenopausal period are given in the following table. The thickness is measured in the long axis from basalis to contralateral basalis. The measurement should include only tissue and not fluid.

Phase	**Thickness** (mm)
Menstrual	2-4
Early proliferative	4-6
Periovulatory	6-8
Secretory	8-14
Postmenopausal	4-8
Postmenopausal with hormone replacement therapy	4-10
Tissue insufficient for diagnosis	< 4-5 mm

Not only the thickness, the echogenicity of the endometrium has certain specific characteristics during the various phases of the menstrual cycle, thus enabling the histology of the endometrium to be evaluated with precision by
examining with transvaginal sonogram.

During the menstrual phase - the endometrium appears as an echogenic uninterrupted layer of 1-4 mm in the total anteroposterior width.

Grunfeld in 1991 has described three patterns in evaluating the changes in the normal endometrium.

Follicular phase

Pattern I : During the early proliferative phase the thickness is 2-4 mm. Endometrium functionalis is hypoechoic or isoechoic and endometrium basalis is some what echogenic.

Pattern II : Ultrasound appearance of late follicular endometrium is characterised by three layers. Trilaminar appearance or triple sign.

Middle layer represents the lumen of the endometrial cavity. The lumen is echogenic because the endometrium is coated with mucous that acts as an interface and reflects ultrasound.

Surrounding the lumen is the hypoechoic endometrium functionalis and the echogenic endometrium basalis. There is increase in echogenicity from the basal layer upwards but the inner layer still has some hypoechogenic changes.

The endometrium functionalis is hypoechoic in the follicular phase because of the homogenity of the odematous stroma and the lack of arteriole invasion. The basalis is always echogenic because of increased odema and vascularity of the basalis. **In** a normal cycle, the endometrial thickness ranges from 6.12 mm in the late follicular phase. Endometrium grows in the late proliferative phase at a rate of 0.5 mm/day.

The trilaminar appearance is characteristic of the peri ovulatory endometrium and was present in 92% of the late proliferative phase biopsies performed by Forrest *et ai.* Transmission of the ultrasound and posterior acoustic enhancement are also characteristic of follicular phase and is present in 90% of cases.

Pattern III: In the secretory phase, the whole endometrium froin basalis to lumen is very echogenic. The increase in echogenicity, most probably is due to increase in luteal phase secretions and vascularity. The increase in echogenicity is seen due to the elevations of progesterone but may precede the rupture of follicle. Cul-de-sac fluid is often seen behind the uterus on ultrasound and helps to confirm that ovulation has occurred. The endometrium achieves its greatest width in the mid secretory phase measuring upto 14 mm in width.

In postmenopausal patients the endometrial thickness is usually 4-8mm. The American college of Obstetrics and gynaecology has published a technical bullettin (No.215, November 1995) on gyaecologic ultrasound. This sets additional guidelines and expectations for transvaginal sonogram.

Below a cutoff of 4-5 mm in the anteroposterior thickness of the endometrium for women with postmenopausal bleeding, there may not be significant associated pathology. Lessthan 4-5 mm or a thin pencil line echo is usually associated with tissue insufficient for diagnosis.

Those more than 5 mm may need endometrial sampling. Thus transvaginal sonogram may be helpful in distinguishing patients with minimal endometrial tissue caused by postmenopausal atrophy and patients with significant amount of endometrial tissue or polyps and are in need of further evaluation.

Pathologic conditions

Recent studies with transvaginal ultrasound suggest that this modality may be of use in detecting endometrial abnormalities like polyps, endometritis, hyperplasia and carcinoma.

Leiomyoma are seen as echodense defects within the myometrium. They are typically so dense that shadowing is apparent distal to the fibroid. Endovaginal sonography offers the opportunity to visualise the relationship of the fibroid to the endometrial cavity.

Adenomyosis do not have clear borders and are less dense than leiomyoma. They do not shadow like fibroids and are commonly cystic. They are seen as mottling within the myometrium. They may present as a myometrial mass or if the glands begin secreting as cystic structures within
the inner myometrium.

Endometrial filling defects - endometrial polyps are seen as endometrial filling defects. Scanning for endometrial contour defects should be done in the follicular - phase because the hypoechoic endometrium serves to contrast against echogenic masses. The presence of a filling defect is 70% sensitive and 95% specific when compared with hysterosalphingo gram (Blumen feld and Turner 1996).

In patients with endometrial carcinoma myometrial invasion can be determined. Loss of the subendometrial halo, consisting of compact nyometrium is the first ultrasonographic feature of invasion seen lonographically. With more advanced myometrial invasion a distinct tumor – myometrial interface can be visualised. Schoenfeld *et al* measured invasion from the endometrial lumen to the most distant tumor interface. This measurement divided by the total thickness of the uterine myometrium (or). Total anteroposterior uterine distance is divided by the total endometrial width. If this ratio exceeds 30%, myometrial invasion is suspected.

According to the latest FIGO classification the depth of myometrial invasion distinguishes stage IB of endometrial carcinoma' from stage IC. Gordon *et al* determined preoperative assessment of myometrial invasion by
transvaginal sonogram in a group of 25 patients with histologically proven endometrial cancer and found that in 84% of cases, transvaginal sonogram correctly predicted the depth of myometrial invasion within 15% of the actual measurement.

Transvaginal sonogram was accurate in 16 cases over diagnosis in 3 cases. Therefore sensitivity of transvaginal sonogram in detecting deep invasion was 100%. Specificity morethan 80%, accuracy 84%.

Cacciatore *et al* used preoperative ultrasonogram to stage 93 patient with endometrial cancer and were able to predict correctly myometrial invasion in 80%. Songraphic staging was accurate in 90% of cases.

Endometrial volume: An endometrial. volume can be calculated by multiplying its length by long axis, with anteroposterior and transverse dimensions. This determination has clinical application in the prediction of the amount of decidua or abnormal endometrial tissue that is present and can be removed by dilation and curettage.

Ovarian volume: Premenopausal ovarian volume is influenced by the stage of the menstrual cycle.

Preovulatory volume is 5.1 - 6.2 cm^3
Postovulatory volume is 3.2 $\pm$ 1.7 cm^3

By applying the formula for a prolate ellipse ovarian volume is calculated by

$$\text{Ovarian volume} = \frac{\pi}{6} \times D_1 \times D_2 \times D_3$$

Premenopausal ovaries on average measure 3.5 x 2.x 1.5 cm.

Postmenepausal ovaries on average measure in

Early menopause = 2 x 1.5 x 0.5 cm.
Late menopause = 1.5 x 0.75 x 0.5 cm
Trans vaginal sonogram allows accurate assessment of ovarian volume as well as intemal echotexture or morphology in these patients. Hence transvaginal sonogram enables early detection of ovarian cancer.

Since long gynaecologists have felt the need for a simple safe noninvasive method which could be employed as a screening procedure for detecting endometrial abnormalities and neoplasia. A routine pap smear detects only 50% of cases with endometrial cancer.

Curettage has long been considered to be the gold standard for the diagnosis of peri menopausal and postmenopausal uterine bleeding. It was first described by RecEmrier in 1843 for the removal of uterine fungosities. But dilatation and curettage has many shortcomings.

Dilatation and curettage has a failure rate of 12-29% (Arthur *et al).* Stoch and Kanbour in a study of curettage before hystrectomy found that in 16% of specimen less than one fourth of the cavity was curetted, in 60% of specimens less than one half of the cavity was curetted. In 84% of specimens
less than three - fourth of the cavity was effectively curetted.

In 1970's various suction curettage devices were introduced which allowed sampling without anaesthesia in an office setting. In 1974's Goldchmit *et al* performed pipelle aspiration biopsy in 135 premenopausal patients before curettage. 10% had different histologic results on pipelle biopsy as compared with curettage. In 39% of patients, hyperplasia was missed. 3 of 5 polyps were missed, thus understanding the focal nature of the pathologic processes.

Rodriguez *et al* did a pathologic study of 25 hystrectomy specimens. Pipelle's device sampled only 4% of the endometrial surface. Vabra aspirator sampled 41% of the endometrial surface.

Guidoet al studied the specimens of 65 patients with known carcinoma undergoing hystrectomy. The surface area of endometrial cavity in volved by cancer in this study was less than 5% in 5% of patients, 5-25% of surface area was involved in 18% of patients, 26% - 50% of the "surface area involved in 31% of patients and more than 50% involved in 46% of patients. These results tell us a-great deal about the way endometrial carcinoma can be distributed over the endometrial surface or confined to a polyp. Thus tumors localised in a polyp or a small area of endometrium may go undetected by endometrial sampling or even with dilatation and curettage. Hence transvaginal sonogram can enhance the anatomic diagnosis and supplement the shortcomings of Dilatation and curettage.

Procedure of transvaginal sonogram

Until recently, the primary method for detecting gynaecologic pathology was bimanual pelvic examination, with confirmatory or additional information supplied by transabdominal ultrasound.

Despite technical advances, transabdominal ultrasound imaging of the female reproductive tract was limited by attenuation of the sound beam by issues of the anterior abdominal wall, distended urinary bladder, precluding he use of high frequency transducers (5 MHz) and the inability to correlate areas of visible pathology with direct palpation. Image resolution has improved dramatically with the introduction of transvaginal sonogram. The transducer is closer to the pelvic organs, so higher frequencies can be used, reducing attenuation of the sound beam resulting in improved overall image quality.

Patient preparation

Patient informed about the procedure. She is asked to empty her bladder completely. This contributes greatly to patient comfort and acceptance of this technique. The best position is the dorsal position employed for vaginal examination. A transabdominal sonogram is done prior to vaginal study to exclude large masses and if uterus is more than 10 cms as in such conditions, the vaginal study will be suboptimal due to its limited field of view. In all other cases, transvaginal sonogram can be performed in lieu of abdominal scanning.

Transducer preparation

Vaginal transducer are between 5-7.5 MHz in frequency. The size of the sector image is usually between 900 and 1150. The image is produced from an end firing transducer or a transducer that is angled upto 30° off axis. Focal zones range from 1-8 cm. The transducer should be covered by a condom filled with approximately 5 ml of ultrasonic gel. Condoms that contain spermicidal agents should be avoided in cases of infertility.

Additional gel may be applied to the outside of the condom prior to its insertion, but this should be omitted in cases of infertility. Following completion of examination, the transducer assembly should be immersed in disinfectant for ten minutes.

Probe manipulation

Uterine corpus is an important structure in transvaginal sonogram and serves as a useful anatomical land mark for targeted organ imaging. Transducer orientation is unique in vaginal scanning, with the longitudinal (sagittal) plane directed from the patient's feet towards her head. Transverse scans are obtained in a coronal plane by rotating the transducer ninety degrees counterclockwise. Adnexa are optimally imaged by positioning the transducer somewhat obliquely towards the contralateral side of the pelvis.

Confusion can also occur because the actual position of the ultrasound beam is 90° off axis from the image on the monitor. This results in the longitudinal images being displayed on the monitor in a ninety degree counter clockwise direction from their actual orientation.

Ultrasound transducers have a reference mark. With the reference mark pointing up, left side of the screen represents a cephalad orientation and the top of the screen represents the anterior abdominal wall. With this view, an anteverted uterus points up and to the left whil~ a retroverted uterus points down and to the right.

Anatomic changes due to scanning with an empty bladder must also be considered when performing vaginal ultrasound. The uterine fundus becomes much more anteverted. In addition the ovaries often change position following bladder decompression.

Sliding test: It may be helpful to place one hand on the patient's lower abdomen while performing transvaginal sonogram in an effort to optimally position the ovaries in the transducer's field of view. Also areas of focal tenderness can be elicited with the movement of the transducer. Transvaginal sonogram can also be used in the followup of women on tamoxifen therapy for breast cancer and women on hormone replacemept therapy after menopause.

AIM OF THE STUDY

1. To determine the value of transvaginal sonography in detecting endometrial pathology especially endometrial polyps, myomatous polyps and abnormal endometrial architecture especially hyperplasias and endometrial carcinoma in perimenopausal an dpostmenopausal bleeding.

2. To correlate the thickness of endometrium in patients with perimenopausal and postmenopausal bleeding with their histopathology reports and evaluate the technical and practical difficulties and diagnostic accuracy of the procedure.

3. To correlate the endometrial volume as obtained by transvaginal sonogram in these women with postmenopausal bleeding with their histopathology reports.

4. For accurate assessment of mean ovarian volume as well as its internal exhotexture and morphology in these women with postmenopausal bleeding.

5. to determine the value of hysteroscopy in visualising the interior of uterus directly hysteroscopic guided biopsy gives more reliable and accurate diagnosis than doing blind dilatation and curettage. Also the addition of operative channel to the hysteroscope can be done as local therapeutic procedure. Improvements in instrumentation, optics and addition of operative capabilities, have led to a resurgence of in interest in hysteroscopy world wide.

MATERIALS AND METHODS

This is a prospective study of 100 women carried out during the period 2005 - 2006 Fifty women with postmenopausal bleeding and fifty women with perimenopausal bleeding.

Group A: Comprised of 50 women with postmenopausal bleeding.

Selection criteria were:

All patients were above the age of 40 years.
All patients had attained menopause with amenorrhoea of one year duration
Patients were not on any hormone replacement therapy.
Clinically there was no mass perabdomen and on bimanual pelvic examination, uterus was found to be of normal size or atrophic and cervix was found to be healthy on speculum examination.
Patients with cancer cervix, fibroid polyps which is visualised by speculum examination and adnexal swelling were excluded from this study.

Group B: comprised of 50 perimenopausal women with abnormal uterine bleeding.

Selection criteria were:

The patients were all over 40 years of age

Not yet attained menopause

Uterus was normal size to 12 week size adnexa were clinically normal. On speculum examination cervix was healthy

Cancer cervix and other benign pathological lesions of cervix were excluded.

All the patients were from government Raja Sir Ramasamy Mudaliar lying - In Hospital Chennai.

All these patients were subjected to transvaginal sonography prior to dilatation and curettage.

Method

A 7.5 MHz Elcot transvaginal sector probe with phased array and endfiring potential used.

- All the patients were asked to empty their bladder prior to the examination.
- The probe is covered with a sterile sheath or condom containing the acoustic gel

The scan was performed with the patient in a supine position
The transducer was introduced into the posterior vaginal fornix.

The uterus was scanned in long axis and coronal views with special emphasis on endometrium. The scanning of the u~erus done first in the sagittal plane from fundus to the internal os. Regularity of the uterus noted. The length, anteroposterior measurements and transverse dimensions of the uterus were noted and endometrial volume calculated.

Anteroposterior measurements of endometrial thickness were taken from basalis to contralateral basalis in the long axis of the endometrium. Oblique semi coronal views should be avoided as this may cause the endometrium to appear thicker.

Uterine cavity examined systematically in both sagittal and coronal views for the presence of submucous fibroid polyps, endometrial polyps, adenomyosis or abnormal endometrial architecture.

If there is suspicion of endometrial carcinoma, evidence and extent of myometrial invasion when present were noted. Now the probe angled to the right or left of midline in the sagittal plane to image the ovaries. The three dimension were measured and ovarian volume calculated. The internal echo texture of the ovaries were also imaged and any abnormalities were noted.

The entire pelvis was additionally examined to rule out any other pathology.

The results of the transvaginal sonogram were interpreted as

Normal endometrium

Thickened endometrial echo or abnormal endometrial architecture

Myomas

Adenomyosis

Polypoid lesions

Pyometra

Endometrial carcinoma

Dilatation and curettage was performed in all these patients as in-patient. Patients were taken to the operation theatre and placed in lithotomy position. The surgeon then performed antiseptic cleaning and draping. A routine pervaginal examination carried out. Endocervical curettings taken. Uterus was then sounded and its length noted. After serial dilatation of Cx, a blunt curette was introduced and all quadrants curetted thoroughly. The curettings sent for histopathological examination in formalin. The biopsy reports were studied.

About 5 cases in each perimenopausal & post menopausal group were underwent hysteroscopic guided direct visualization of uterine cavity and guided biopsy.

Technique :

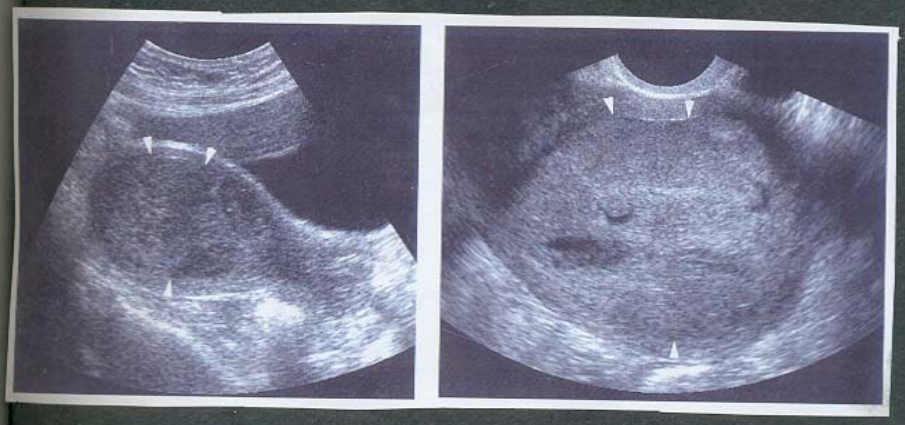
The patients is placed in lithotomy position. The positional of the uterus confirmed by bimanual examination. The cervix exposed with the help of a bivalve speculum, the cervix cleaned with saline and

the external os cleaned with Betadine. The anterior lip of the cervix grasped and steadied with a vulsellum or tenaculum. A uterine sound passed to confirm the axis of the uterus, the cervix may be dilated to about 4 mm. The distension medium used here is Ringer's lactate solution.

Complications :

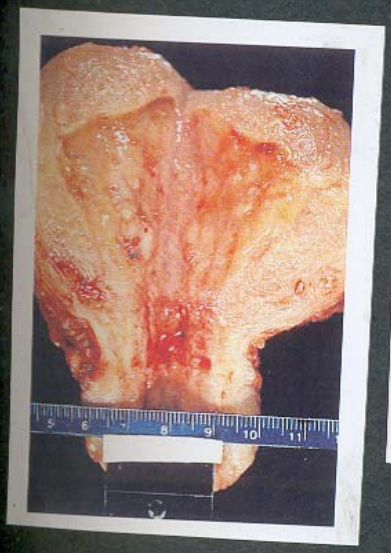
Infection, Perforation, Bleeding diatheses, Vascular hypotonicity, Allergic reations, Fluid overload and electrolyte disturbances, Gas embolism.

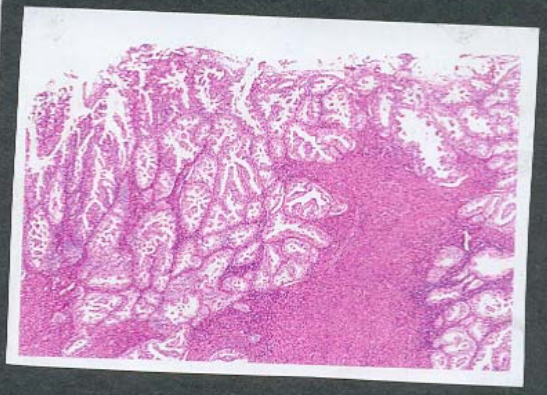
Endometrial pattern studied in transvaginal sonogram were correlated with histopathological reports. Almost all of these patient underwent hysterectomy either vaginal or abdominal.



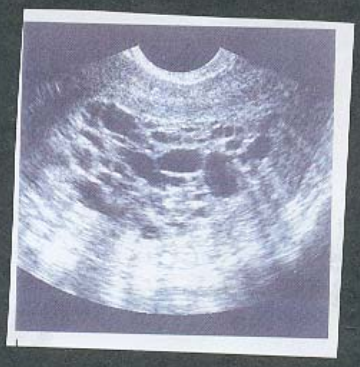
ENDOMETRIAL CARCINOMA LARGE HETEROGENOUS

ENDOMETRIAL MASS LOCALIZED IRREGULAR ENDOMTRIAL THICKENING

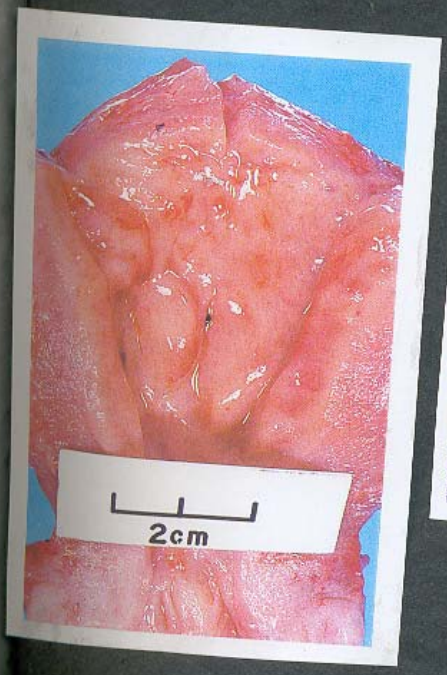




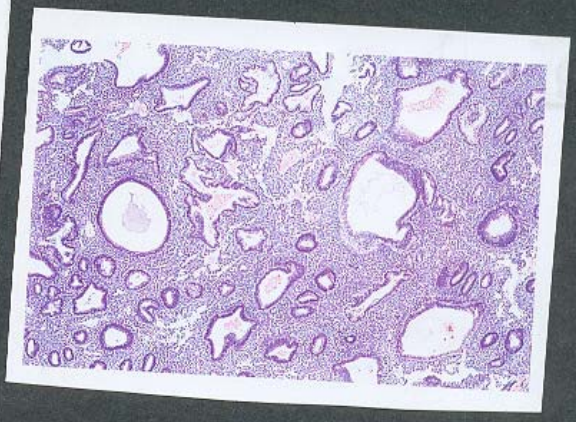
ENDOMETRIAL ADENOCARCINOMA



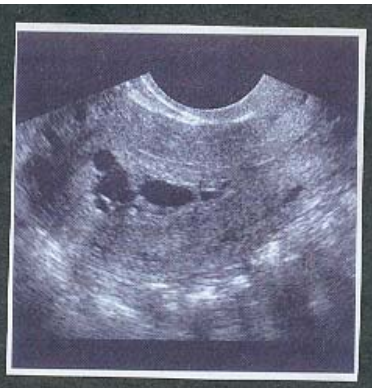
THICKENED ENDOMETRIUM HYPERPLASIA



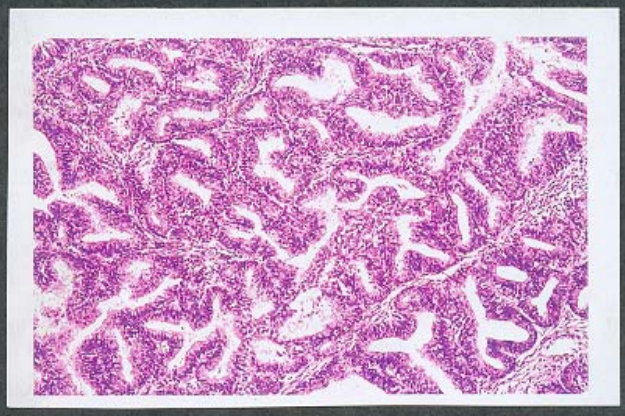
ENDOMETRIAL HYPERPLASIA



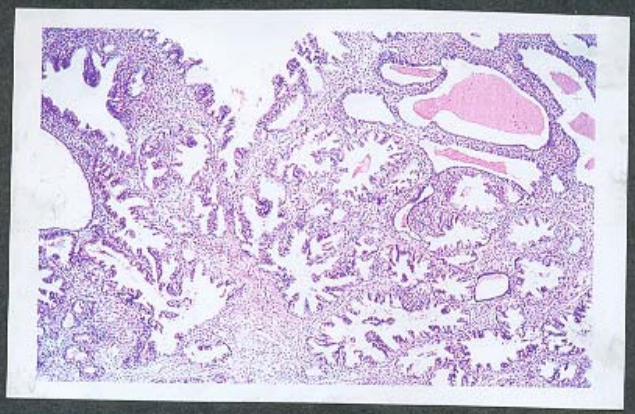
SIMPLE HYPERPLASIA



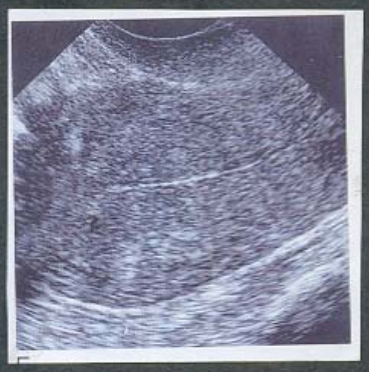
ENDOMETRIAL HYPERPLASIA



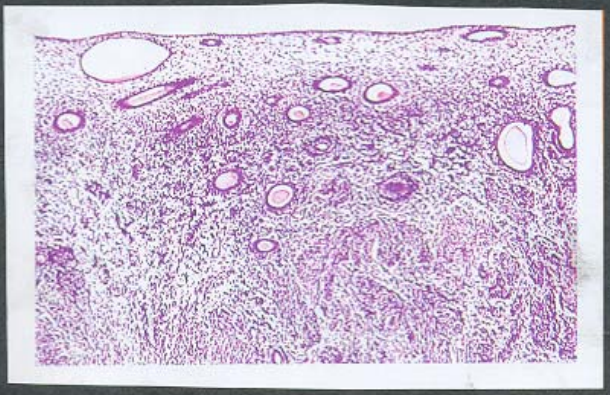
COMPLEX ENDOMETRIAL HYPERPLASIA



ATYPICAL HYPERPLASIA



ATROPHIC POSTMENOPAUSAL ENDOMETRIUM



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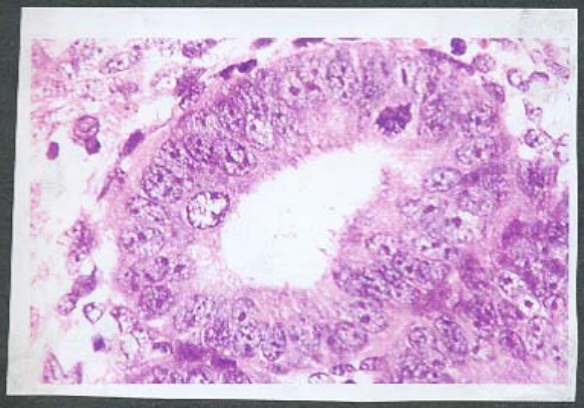


ATYPICAL HYPERPLASIA

ANALYSIS AND OBSERVATIONS

Table 1 : Comparison of histopathology with vaginosonographic measurement of endometrial thickness in Group A – Women with Post menopausal bleeding.

No.	Histopathology Report	No. of Cases	Mean endometrial thickness in mm	Percentage
1.	Atrophic endometrium	18	3.87mm (2-5mm)	36%
2.	Tissue insufficient for diagnosis (TIFD)	8	3.58mm (2.6-4mm)	16%
3.	Cystoglandular hyperplasia	7	13.57mm (11-17mm)	14%
4.	Nonsecretory endometrium	3	7mm (6-8mm)	6%
5.	Secretory endometrium	6	9.16mm (8-10mm)	12%
6.	Pyometra / Endometritis	4	9mm (8-11mm)	8%
7.	Endometrial carcinoma	4	17.2mm (16-18mm)	8%

Note : 50% of women with Atrophic endometrium or TIFD had a mean endometrial thickness <5 mm and 50% of patients with endometrial pathology had a thickness > 5mm

36% of women had atrophic endometrium with a mean endometrial thickness of 3.87mm. 16% of patients had tissue insufficient for diagnosis with a mean endometrial thickness of 3.58mm.

The incidence of endometrial hyperplasia was 14% with a mean endometrial thickness of 13.57mm. The incidence of nonsecretory endometrium was 6% with a mean endometrial thickness of 7mm. The incidence of secretory endometrium was 12% with a mean endometrial thickness of 9.16mm. In 4 cases of pyometra the mean endometrial thickness was 9mm. 8% of cases had endometrial carcinoma with a mean endometrial thickness of 17.2mm.

Thus it can be seen that 50% of women with atrophic endometrium or tissue insufficient for diagnosis had a mean endometrial thickness less than 5 mm and 50% of patients with endometrial pathology namely proliferative phase, hyperplasia, carcinoma of the endometrium and pyometra had a mean endometrial thickness more than 5 mm.

This is comparable with the following studies.

i) Narsi and associates at St.Bartholomew's hospital studies 111 women with postmenopausal bleeding – results were published in obstetric and gynaecologic survey 1991.

51 patients (45.9%) had normal ultrasound findings and endometrial thickness was 1-5mm. The remaining 54.1% of patients had an endometrial thickness of ≥ 6 mm. In 11 patients (10%) ultrasound was suggestive of hyperplasia. In 6 women ultrasound correctly predicte carcinoma of endometrium. In 16 patients fibroids were diagnosed. Narsi et al suggested that an

endometrial thickness of 5 mm or less is associated with endometrial atrophy and curettage is unnecessary in this group.

ii) Mahlinova and pahlivanov conducted a prospective study of one hundred and eighteen patienst with postmenopausal bleeding. They compared transvaginal sonogram and endometrial thickness to histopathological reports in these women. (Published in the European Journal of obstetrics and gynaecology 1995 February).

In 47.0% of women with histopathological diagnosis of atrophic endometrium the mean endometrial thickness was 3.1 ± 1.7 mm whereas in the remaining 53% of women with endometrial abnormalities the endometrial thickness ranged from 10.2mm – 26.8 mm. The mean endometrial thickness for patients with endometrial carcinoma was 18.4 ± 8.2 mm.

No endometrial carcinoma was diagnosed in endometrial thickness less than or equal to 5 mm. The sensitivity was 100% and specificity 64% if a cut off of 5 mm was used.

Table 2 : Comparison of ultrasonographic findings with histopathologic diagnosis of Dilatation and curettage and hysterectomy specimen in women with postmenopausal bleeding

No.	Ultrasonographic findings	No. of Cases	D&C – HPE report	Hysterectomy HPE report
1.	Thin distinct pencil line echo ≤ 5 mm	26	8-TIFD 18-Atrophic endometrium	6-Atrophic endometrium 15-Atrophic endometrium 5-Lost for followup
2.	Endometrial echo > 5mm	16	7- C.G.H. 3-N.S.E. 6-S.E.	5 - C.G.H. 2 - N.S.E. 4 - S.E. 5 – Lost for followup
3.	Fibroid	2	Not diagnosed	1 – Fibroid Antr. Wall 2x2 cm seen in association with endometrial carcinoma 2 – Ass. With C.G.H 2x3cm Antr. Wall Fibroid
4.	Endometrial carcinoma	4	4-Endometrial carcinoma	4-well differentiated adeno Carcinoma Gr.I Myometrial invasion < 1/3
5.	Endometrial Polyp	2	1-atrophic endometrium 1-N.S.E. Polyp not diagnosed	1 - An endomentrial polyp 1x1 cm seen N.S.E. 1 - lost of followup
6.	Pyometra	4	Pus letout endometritis	3 – Endometritis 1 – Secretory endometrium

TIFD : Tissue insufficient for diagnosis

C.G.H : Cysto Glandular Hyperplasia

N.S.E. : Non secretory endometirum

S.E. : Secretory Endometrium

D.C. : Dilatation & Curettage

Note : The findings of the transvaginal sonogram correlated well with the final histopathologic diagnosis after hysterectomy giving a sensitivity and specificity of 100%. There were no false negative and false positive findings. D&C missed 2 fibroid polyps and 2 endometrial polyps.

In 25 patients transvaginal sonogram showed an endometrial thickness of ≤ 5 mm and the histopathology report after hysterectomy report was atrophic endometrium. Endometrial abnormality was suggested in the remaining twenty – five cases. In these twenty – five patients, there were 2 cases of fibroid, 2 cases of endometrial polyp, 4 cases of endometrial carcinoma 4 cases of pyometra, 16 cases with endometrial echo > 5 mm were associated with endometrial hyperplasia including one case with atypical hyperplasia. All these patients underwent hysterectomy and the histopathology findings of the hysterectomy specimen correlated well with the findings of transvaginal sonogram giving a sensitivity and specificity of 100%.

The findings of the present study are comparable with that of the following studies (i) Dubinsky TJ, Parvey HR and Maklad N has evaluated the role of transvaginal sonography and endometrial biopsy in the evaluation of postmenopausal bleeding published in the American Journal of Roentgenology 1996 July.

They have evaluated the reliability of TVS in diagnosing intrauterine disease by comparing it with hysterectomy specimen.

In 259 women transvaginal sonogram was done. The findings were endometrial thickness ≤ 5 mm 107 women (40%)

Endometrial thickness > 5 mm 39 (20%)

Enlarged uterus 64

Endometrial carcinoma 18 patients

Final pathologic diagnosis was

Atrophic endometrium 107

Endometrial hyperplasia 39

Endometrial carcinoma 18

of the women with Enlarged uterus

57 - had fibroids

3 - Adenomyosis

4 – Sarcoma

In their study the correlation between transvaginal sonogram and histopathological report of hystrectomy specimen was very good giving a sensitivity of 96%, and specificity of 86%, positive predictive value 91% and negative predictive value 94%).

(ii) Alkazar and Laparte in their study of transvaginal sonogram in 28 women with postmenopausal bleeding found that 14 patients had normal sonogram with an endometrial thickness $ 5 mm and 14 patients had endometrial thickness ≥ 5 rom with endometrial abnormalities. All these patients underwent hystrectomy and findings correlated with a transvaginal sonogram giving sensitivity 100% specificity 100% positive predictive value 100% and negative predictive value 100%.

Table 3 : Comparison of histopathology with vaginosonographic measurement of endometrial volume in Group A – women with postmenopausal bleeding.

No.	Histopathology Report	No. of Cases	Mean endometrial volume cm^3	Percentage
1.	Atrophic endometrium	18	12.72 (8.46-14.20 cm^3)	36%
2.	Tissue insufficient for diagnosis	8	11.50 (10.45-12.46 cm^3)	16%
3.	Cystoglandular hyperplasia	7	59.34 (28.86-95.70 cm^3)	14%
4.	Nonsecretory endometrium	3	43.87 (43.16-45.3 cm^3)	6%
5.	Secretory endometrium	6	48.78(34.61-63.40 cm^3)	12%
6.	Pyometra / Endometritis	4	49.33 (26.8-68.54 cm^3)	8%
7.	Endometrial carcinoma	4	136.03 (102.8-175.84 cm^3)	8%
	Total	50		

Note : When the mean endometrial volume was < 13 cm^3 the histopathological report is atrophic endometrium. An endometrial volume > 13 cm^3 is associated with endometrial pathology.

Campbell, Savvos and Tailor in the year 1996 October had analysed the endometrial volume in 103 patients with postmenopausal bleeding not on hormone replacement therapy. 71 patients (69%) with atrophic endoemtrium had a mean endometrial volume 5.47 cm^3, 8 cases with endometrial hyperplasia and endometrial polyps had a mean endometrial volume of 39 cm^3 and 10.8% of patients with endometrial cancer had a mean endometrial volume of 69 cm^3.

Hence they concluded that with the cutoff value of the endometrial volume of 13cm^3 (i.e.) when the endometrial volume was less than 13cm^3 the histopatholoy report was that of atrophic endometrium (69%). When the endometrial volume was more than 13cm^3, the histopathology report of curettage was found to be active endometrium.

In the present study, the mean endometrial volume with Atrophic endometrium was 12.72cm^3, with tissue insufficient for diagnosis was 11.50cm^3. In women with endometrial hyperplasia the mean volume was 59.34cm^3. With nonsecretory endometrium the mean endometrial volume of 43.87cm^3, and withsecretory endometrium the mean endometrial volume of 48.78cm^3. With pymetra the mean endometrial volume was 49.33cm^3.

Hence from this study it is seen that with endometrial volume less than 13.0cm^3 the histopathology report has come as atrophic endometrium or tissue insufficient for diagnosis. If the endometrial volume is more than 13.0cm^3, the histopathological report is that of active endometrium. But this study needs still further evaluation before it can be applied in practice.

Table 4 : Comparison of ovarian volume calculated by ultrasonogram with the histopathology report of the hysterectomy specimen Group A women with postmenopausal bleeding.

No.	**Postmenopausal ovarian volume**	**No. of Patients**	**Mean Ovarian volume**	**Comparison with pathology reports after hysterectomy**
1.	Normal ovarian volume	48	2.58 cm^3 ($1.1cm^3$-$4.8cm^3$) All of uniform internal exhotexture	All ovaries atrophic / normal
2.	Cystic ovaries with uniform echotexture	2	$6.45cm^3$ (2.3-$10.34cm^3$) echotexture	Follicular cyst
3.	Suspicious of malignancy	-	-	-

The mean postmenopausal ovarian volume was found to 2.58 cm^3 with a range of 1.1-4.8cm^3. After hysterectomy the distopathological report of al these patients were atrophic or normal ovaries. No other pathology were detected, giving a sensitivity and specificity of 100%. These results were comparable with that of the following studies.

Higgins et al determined mean normal postmenopausal ovarian volumes to be 2.9cm^3 but with a very wide range of 0.4-7-8cm^3 (gynaecologic oncology 1989).

Goswamy, Campbell and Rovston JP et al published an article on the ovarian volume in postmenopausal women (British Journal of obstetrics and gynaecology 1988).

They calculated the ovarian volumes on 2246 postmenopausal women and found the right ovarian volume to average 3.58cm^3 (Range 0.8-10.9cm^3) and left ovarian volume to average 3.57cm^3 (range 0.88-10.9cm^3).

Group B : 50 women with perimenopausal bleeding.

Table 5 : Comparison of Histopathology with vaginosonographic measurement of endometrial thickness. Group B - women with Perimenopausal bleeding.

No.	Histopathology Report	No. of Cases	Mean endometrial thickness in (mm)	Percentage
1.	Nonsecretory endometrium	26	8.73 (6-11)	52%
2.	Secretory endometrium	4	10.25 (9-12)	8%
3.	Proliferative Endometrium	4	8.75 (8-10)	8%
4.	Cystoglandular hyperplasia	11	15.36 (13-18)	22%
5.	Adenomatous hyperplasia	1	22mm	2%
6.	Atypical hyperlasia	1	24mm	2%
7.	Endometritis	1	18mm	2%
8.	Endometrial carcinoma	3	25.5 mm (25-28)	4%
	Total	50		

Note : With an endometrial thickening ≤ 13 mm the histopathology report is normal endometrium. When the endometrial thickening ≥ 13 mm the histopathology report is hyperplasia/carcinoma.

In this group, those with a nonsecretory endometrium have a mean endometrial thickness of 8.73mm, secretory endometrium of 10.25mm, with cystoglandular hyperplasia of 15.36mm, with adenomatous hyperplasia the thickness was 22mm, with atypical hyperplasia was 24 mm, with endometritis 18 mm and with 2 cases of endometrial carcinoma it was 25.5mm.

34 cases (68%) of women with perimenopausal bleeding had normal endometrium by transvaginal sonogram and had a mean endometrial thickness of 9.29 mm with a range of 6-12 mm. For all these patients the histopathological report was either nonsecretory or secretory endometrium.

In the remaining 16 cases (32%) with endometrial abnormality, the endometrial thickness was found to range from 13 mm in a case with cystoglandular hyperplasia to 24mm for Atypical hyperplasia to 25.5. mm for a case with endometrial carcinoma.

Therefore it can be seen that below an endometrial stripe thickening less than 13 mm the histopathology report was normal endometrium either secretory or nonsecretory. An endometrial stripe thickening more than are equal to 13mm has been found to be associated with hyperplasia including one adenomatous and one atypical hyperplasia.

The results of this present study are compared with the results of the following study.

(i) Emmanuel, Mark, Marion, Verdel and Lammes in the American Journal of Obstetrics and gynaecology have determined the diagnostic value of transvaginal sonogram for endometrial and intrauterine abnormalities in women with perimenopausal bleeding.

279 consecutive perimenopausal women with abnormal uterine bleeding were subjected to transvaginal sonogram. Though a cut off value for endometrial thickness in premenopausal patients is not available in the literature, they have found that in their study population a cut off level of 12 mm for normal premenopausal endometrium was adequate with no false negative or false positive results.

135 patients with normal sonogram were confirmed to be true negative by histopathological examination. The mean thickness of the endometrium was 5.8 ± 2.8 mm (range 1-12). Abnormal sonograms found in 121 patients had a mean thickness 14.3 ± 2.3 mm (range 13 20). The "thinnest" endometrial hyperplasia was found to be 13 mm. With these findings a cut off level of 12 mm was found to be adequate in this study population with a sensitivity and specifity of 100%

(ii) Towbin, Gnazda and March published in the American Journal of obstetrics and gynaecology June 1996, examined 131 patients with perimenopausal bleeding by transvaginal sonogram. As the maximum thickness of the endometrium is 14 mm an endometrial echo complex is considered thickened if it is more than or equal to 15 mm.

They have found that a thickened endometrial stripe ≥ 15 mm is a better predictor of intracavitary pathologic disorders in the follicular phase than in the luteal phase. 59 patients had a normal sonogram with endometrial stripe ≤ 15 mm. Rest of the patients had endometrial stripe ≥ 15 mm. Of these 6 patients with endometrial stripe ≥ 15 mm with no other structural abnormalities were found to have hyperplasia of endometrium. 52 patients had ultrasonography results consistent with leiomyomas 11 had thickened uterine wall and 2 had polypoid lesion. No case of endometrial carcinoma was reported.

Hence they have suggested that a thick endometrial echo complex in the follicular phase ≥ 15 mm correlates strongly with the presence of intracavitary pathologic disorders and endometrial abnormalities.

The results of this study are found to be comparable with that of the present study.

Table 6 : Comparison of transvaginal sonographic findings with histopathologic diagnosis of dilatation and curettage and hysterectomy in women with perimenopausal bleeding

No	Ultrasonographic findings	No. of Cases	D&C – HPE report	Hysterectomy HPE report
1.	Normal endometrium endometrial thickness ≤ 13 mm	23	18- N.S.E. 2 – S.E. 3 – Proliferative	18- N.S.E. 2 – S.E. 3 – Proliferative
2.	Endometrial stripe thickened ≥ 13 mm	13	11 – C.G.H 1 – Adenomatous hyperplasia 1 – Atypical hyperplasia	11 – C.G.H 1 – Adenomatous hyperplasia 1 – Atypical hyperplasia
3.	Adenomyosis	7	3 – N.S.E 2 – C.G.H. 2 – Secretory Endometrium	7 – Adenomyosis
4.	Myomatous polyp	4	2 – N.S.E 1 – Proliferative 1 – Atypical Hyperplasia	4 - Myomatous polyp
5.	Endometrial polyp	1	1 – N.S.E.	1 – endometrial polyp
6.	Endometrial carcinoma suspsected due to abnormal thick endometrial stripe 25mm. Loss of subendometrial halo. And with myometrial invasion	2	2 - Adeno carcinoma	1 – Adenocarcinoma of endometrium well differentiated Gr. I myometrial invasion < 1/3 1 – Lost for followup
7.	Endometritis	1	Endometritis	Endometritis

Note : Findings of transvaginal sonogram correlated well with histopathological report after hysterectomy. 7 cases of adenomyosis, 4 cases of myomatous polyp and 1 case of endometrial polyp were missed by dilatation and curettage.

Out of 50 perimenopausal patients, 23 had normal endometrium both by transvaginal sonogram and hysterectomy specimen. 13 cases with endometrial thickness > 15 mm and no other abnormal intracavitary pathology were found indeed to have endometrial hyperplasia as per hysterectomy specimen. 7 cases of adenomyosis, 4 cases of myomatous polyp and 1 case of endometrial polyp were all diagnosed by transvaginal sonogram which correlated well with the pathological diagnosis after hysterectomy giving a sensitivity of 100%, specificity 100%, positive predictive value 100% and negative predictive value 100%.

This compared with the following studies.

i) March and Tombin evaluated 149 consecutive patients with perimenopausal bleeding by transvaginal sonography and the findings were compared with specimen obtained from hysterectomy used to represent the true diagnosis. The findings after transvaginal sonogram was normal sonogram in 59 patients, intramural myoma 52 patient, thickened uterine wall 11, polypoid lesion 2 patients. The final pathological diagnosis after hysterectomy was hyperplasia 6 patients, adenomyosis 11 patients, myoma 52 patiens, polyps in 72 patients and normal in 7 patients. It is seen that myomas and Adenomyosis correlated well with the final pathological diagnosis 15 edometrial polyps were missed by transvaginal sogoram. Normal pathology was seen only in 7 patients all these giving a sensitivity of 54%, specificity

90%. They concluded that the limiting factory with transvaginal sonogram is the high frequency of" equivocal" scans.

(ii) Emmanual *et al* in their analysis of 279 women with perimenopausal bleeding subjected to transvaginal sonogram and compared with final pathological diagnosis at hystrectomy. They found that 135 patients with normal sonogram when compared with final pathological diagnosis endometrial polyps were not visualised in 4 premenopausal patients marked by very hyperechodense late secretory endometrium. These would have been visualised well if carried out during proliferative phase. 54 submucous myomas were diagnosed correctly. 5 endometrial hyperplasia diagnosed correctly. 6 women with endometrial carcinoma diagnosed correctly. Transvaginal sonogram was in conclusive in 19 women giving 96% sen~itivity, specificity 61% and positive predictive value 39%.

Table 7 : Comparison of ovarian volume calculated by vaginal ultrasonogram with hisopathological report of hysterectomy specimen in women with premenopausal bleeding

No.	Ultrasonographic findings	No. of cases	Mean Ovarian volume	Histopathology report
1.	Normal ovarian volume	43	3.8 cm^3 (2.3-8.4cm^3)	All were normal
2.	Cystic ovaries with uniform echotexture	7	10.8cm^3 (6.2-13.86)	Follicular cysts no evidence of malignancy
3.	Suspicious of malignancy	-	Nil	Nil

Granberg Wikland et al in the journal of ultrasound medicne 1987 measured ovarian volume in about 806 premenopausal women found that the permenopausal ovarian volume is influenced by the stage of the menstrual cycle. Preovulatory volume varies between 5.1 and 6.2cm^3 while the postovulatory volume averages about 3.1 ± 1.7 cm^3.

In this present study in 86% the mean ovarian volume was normal and found to be 3.8 cm^3 (2.3-8.4cm^3). All these were found to be normal after hysterctomy. In 14% of women the ovaries were found to be uniformly cystic with normal echotexture with a mean ovarian volume of 10.8cm^3 (6.2-13.86cm^3). The pathological diagnosis is follicular cysts. No evidence of malignancy seen.

Diagnostic Hysteroscopy

Table 8 : Comparison of Hysteroscopic guided biopsy with Transvaginal ultrasonogram and hysterctomy specimen in perimenopausal and postmenopausal bleeding.

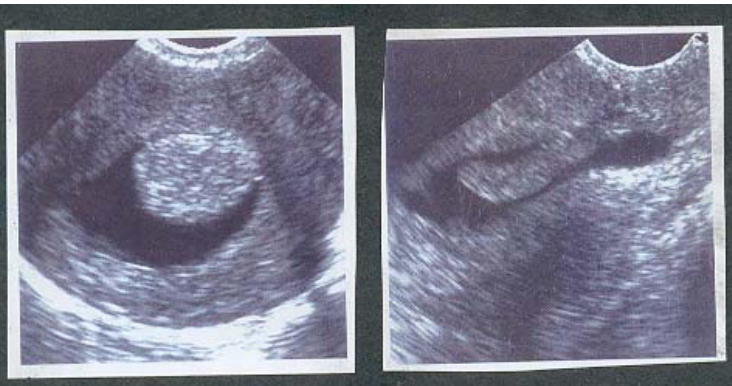
I. Perimenopausal Bleeding :

No.	Ultrasonographic findings	No. of cases	Hysteroscopic diagnosis	Hysterectomy histopathology report
1.	Endometrial polyp	1	1	Lost for followup
2.	Submucosal myomatus polyp	1	1	Lost for followup
3.	Adenomyosis	1	1	Adenomyosis
4.	Endocerival polyp	1	1	Endocerival polyp
5.	Normal endometrium	1	1	Normal endometrium
	Total	5		

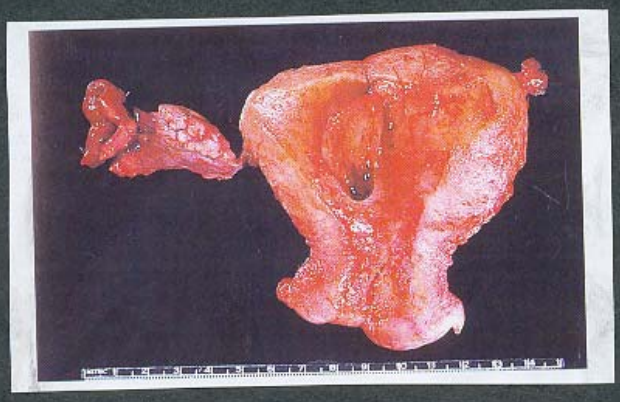
II. Postmenopausal Bleeding :

No.	Ultrasonographic findings	No. of cases	Hysteroscopic diagnosis	Hysterectomy histopathology report
1.	Atrophic endometrium	3	3	3-Atrophic endometrium
2.	Endometritis	1	1	Lost for followup
3.	Submucosal myomatus polyp	1	1	1-Submucosal myomatus polyp
	Total	5		

Instead of doing blind procedure of dilatation and curettage hysteroscopic guided biopsy and direct visualization of uterine cavity gives more accuracy in taking specimen and diagnosis. It is well correlated with hysterectomy specimen and Transvaginal ultrasonogram.



ENDOMETRIAL POLYP



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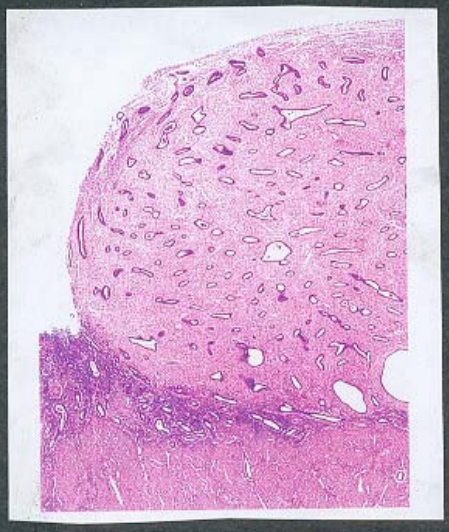
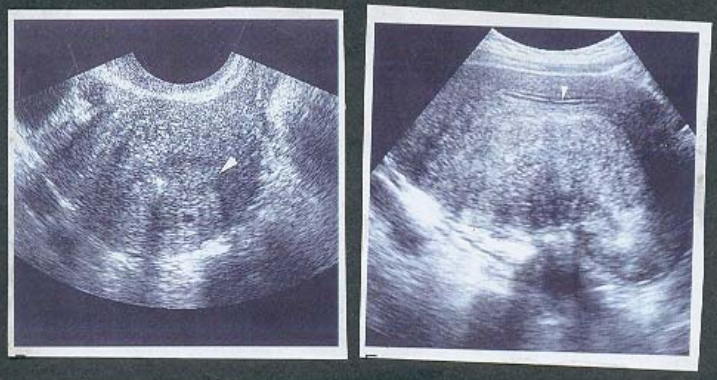
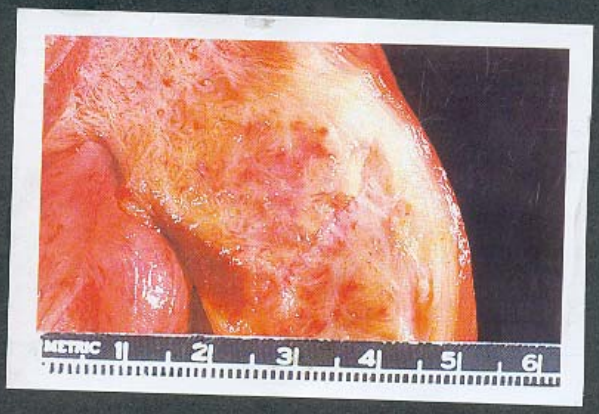


ENDOMETRIAL POLYP



ADENOMYOSIS



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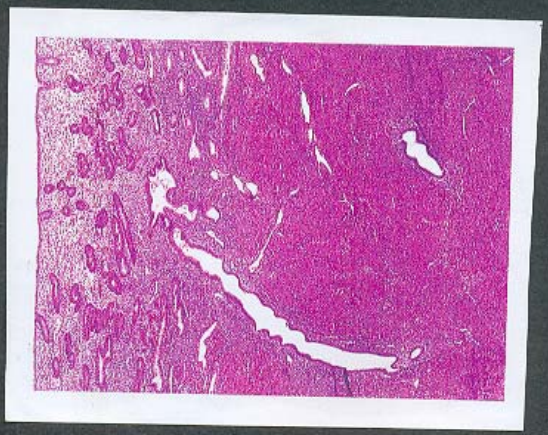

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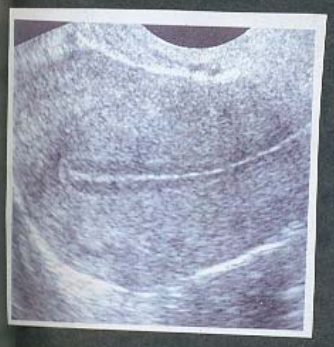
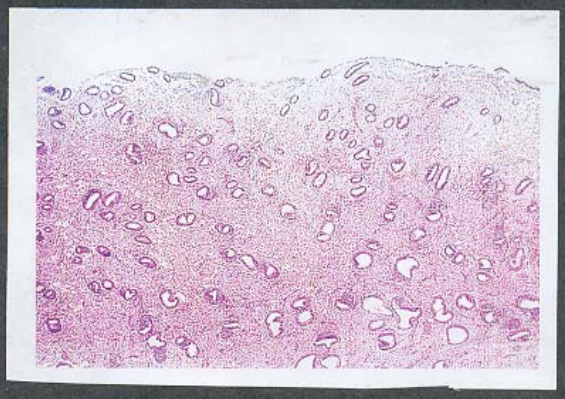
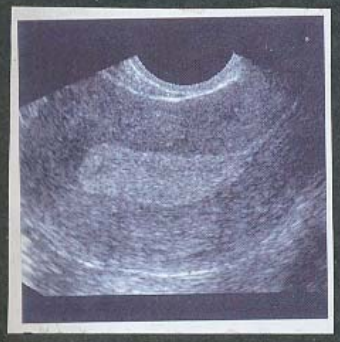
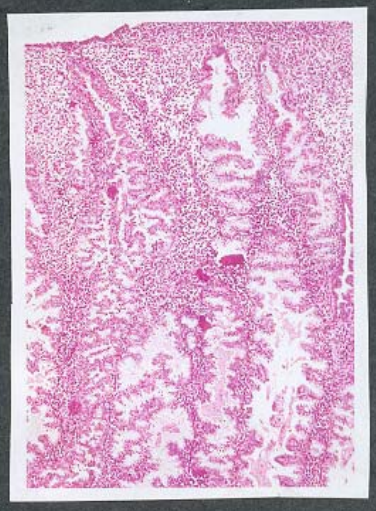


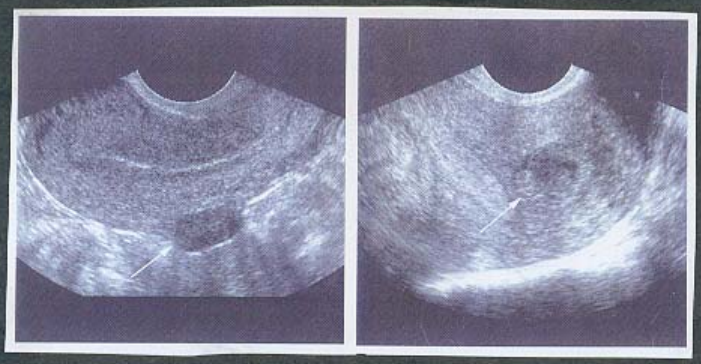


PROLIFERATIVE PHASE

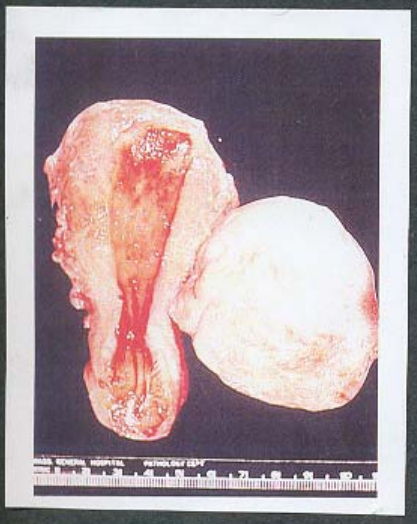




SECRETORY PHASE ENDOMETRIUM



FIBROID UTERUS



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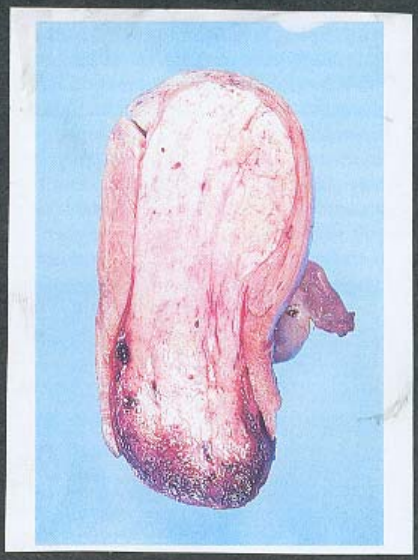
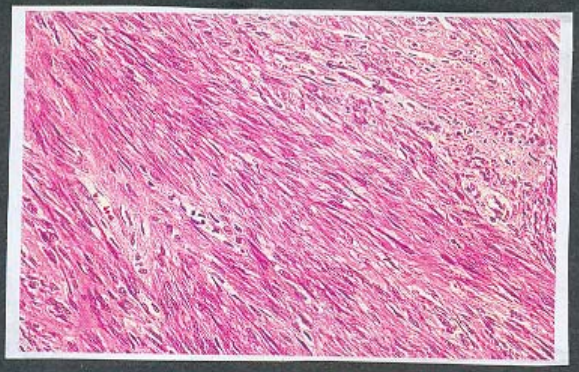


FIBROID POLYP



LEIOMYOMA UTERUS

DISCUSSION

In the group with postmenopausal bleeding the thickness of endometrium ranged from 2mm in a woman with atrophic endometrium to 18 mm in a woman with well differentiated stage I endometrial carcinoma.

The percentage of carcinoma endometrium was 8 and the percentage of endometrial hyperplasia 14%. 50% of women were found to have an atrophic endometrium or tissue insufficient for diagnosis.

Of 50 women with normal sized uterus on examination 2 myomatous polyps, 2 endometrial polyps and 4 cases of pyometra were diagnosed by ultrasonogram. These findings correlated with pathological diagnosis after hysterectomy.

A transvaginal ultrasound measured endometrial thickness of 5 mm and less was associated with an atrophic or in active endometrium or tissue insufficient for diagnosis in the histopathological report.

Endometrial pathology and abnormalities were found only among those women whose endometrial thickness was greater than 5 mm.

Various studies have been conducted in the last five years and the results of some are compared with the present study.

Table 8: Endometrial thickness as m,easured by endovaginal sonography for identifying endometrial abnormality in women with postmenopausal bleeding. A comparison of various study groups

Study group	No. of patients	Cut of point mm	Specificity %	Sensitivity %	PPV %	NPV %
Granberg *et al*	205	6	96	100	87.3	100
Goldstein *et al*	500	5			35	100
Osmer *et al*	155	4	81	89		
Schmitt *et al*	135	5	98.2	100		
Vanden Bosch *et al*	140	4mm	98.0	80.0	76.7	84.8
Dorum & Colleagues	50	6mm	80	60	26	94.4
Present study	100	5mm	100	100	100	100

The purpose of the study of Granberg *et al* was to evaluate endometrial thickness as the only parameter for excluding endometrial abnormalities. In this study no endometrial abnormality was found if the endometrium was < 6 mm thick. This was in agreement with N asari and Coast, as well as Fleischer *et al.* In this study 70% of the curettage could have been avoided if the 5 mm limit had been used.

Goldstein *et al* in their study of 500 postmenopausal women with bleeding reported that endometrial thickness of less than 5 mm is uniformly associated with minimal tissue obtained by sampling or an atrophic endometrium. They had one malignancy in this series. They described it as a
very sensitive but not a very specific technique.

Osmers *et al* in a prospective pilot study of 155 postmenopausal women not on hormone replacement therapy reported that an endometrium of > 4 mm was associated with abnormality. They found vaginal sonography to be a highly specific and sensitive method for the detection of endometrial pathology.

Van den Bosch *et al* in their analysis of one hundred and forty, consecutive postmenopausal women found that the sensitivity of vaginal ultrasonography for endometrial disease was 98.2 if 4 mm was used as the cut off point for endometrial thickness.

In the **present study** of 50 women with postmenopausal bleeding using 5 mm as a cut offlimit, vaginal sonography successfully diagnosed endometrial abnormality. The specificity and sensitivity were both 100%. There were no false negative or false positive with a positive predictive value of 100% and negative predictive value of 100%.

The endometrial volume in women with postmenopausal bleeding ranged from 8.46cm^3 in atrophic endometrium to 175.84cm^3 in a patient with endometrial carcinoma. Less than 13 cm^3 was associated with an atrophic or inactive endometrium and more than 13cm^3 was associated with endometrial pathology.

The mean ovarian volume in women with postmenopausal bleeding was found to be 2.58cm^3 (1.1 – 4.8cm^3). The findings were found to correlate well with hysterectomy specimen.

Group B Women with perimenopausal bleeding

In women with perimenopausal bleeding the percentage of endometrial carcinoma was 4%, the percentage of endometrial hyperplasia was 26%, the percentage of women with adenomyosis was 14% myoma uterus 8% and 2% of women had endometrial polyps of 2% had endometritis.

In 50 women with normal pelvic examination adenomyosis was diagnosed in 7 cases, myoma was dignosed in 4 cases and endometrial polyp diagnosed in 1 case. Endometrial carcinoma was correctly diagnosed in 2 cases. The ultrasonographic findins correlated well with the pathological report of the hysterectomy specimen giving a sensitivity and specificity of 100% with no false positive or false negatives. Dilatation and curettage missed the diagnosis of adenomyosis, myomatous polyp and endometrial polyps.

In this study 68% of women with normal endometrium had an endometrial thickness of less than 13mm below which there was no endometrial pathology. Above this cut off level of 13mm were found to associated with endometrial pathology. The sensitivity and specificity was found to be 100%. There were no false positive or false negatives.

Table 9 : Endometrial thickness as measured by endovaginal sonography for identifying endometrial abnormality in women with perimenopausal bleeding – A comparison of various study groups

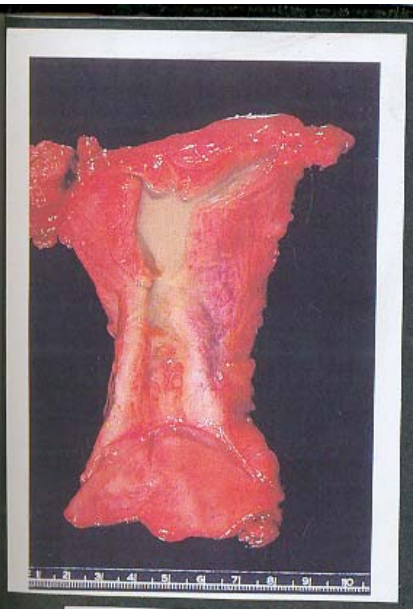
Study Group	No. of patients	Cut off points (mm)	Sensitivity %	Specificity %	PPV %	NPV %
Towbin, March et al	131	15 mm	100	86	91.7	94
Emmanuel et al	279	12 mm	79	93	-	-
Present study	50	13 mm	100	100	100	100

(i) Towbin, March et al had found that in their analysis of 131 patients with perimenopausal bleeding, a thick endometrial stripe of ≥ 15 mm were found to correlate strongly with the presence of intrauterine pathology and endometrial abnormalities. Sensitivity 100%, specificity 86%, positive predictive value 91.7% and negative predictive value 94%.

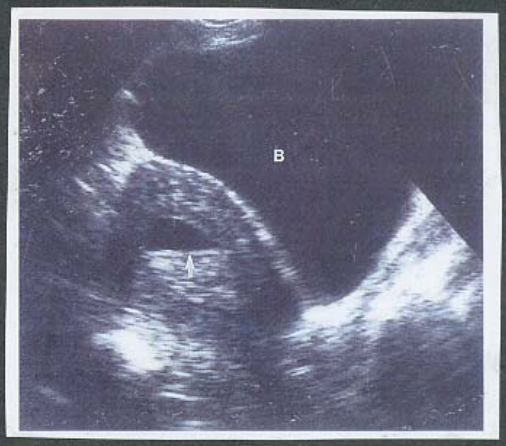
(ii) Emmanuel, Mark, et al in the year 1995 in their analysis of 279 women with perimenopausal bleeding have found a cut off value of 12 mm for endometrial thickness below which the report was normal endometrium and above which it was associated with endometrial pathology.

Emmanuvel et al have also stated that though in the literature, normal cutoff levels for premenopausal endometrial thickness were not available, he concludes from his study that such a cutoff level can be assigned to the premenopausal patients for exclusion of endometrial abnormalities as is available in postmenopausal patients.

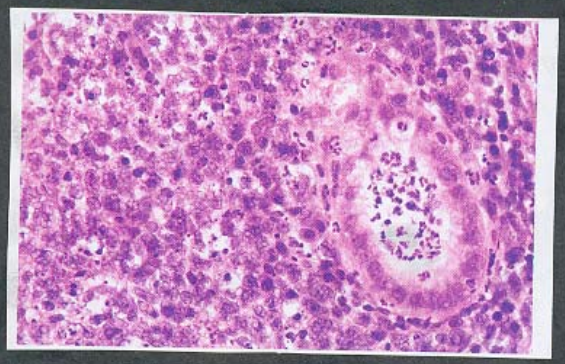
The normal mean premenopausal ovarian volume was found to be 3.8cm^3 (2.3-6.4cm^3). 7% of ovaries were found to be cystic with normal internal echotexture and the findings were found to correlate well with hysterectomy specimen.



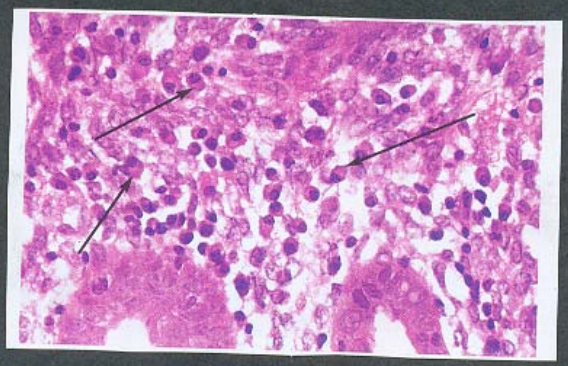
PYOMETRA



ENDOMETRITIS FLUID – FLUID LEVEL

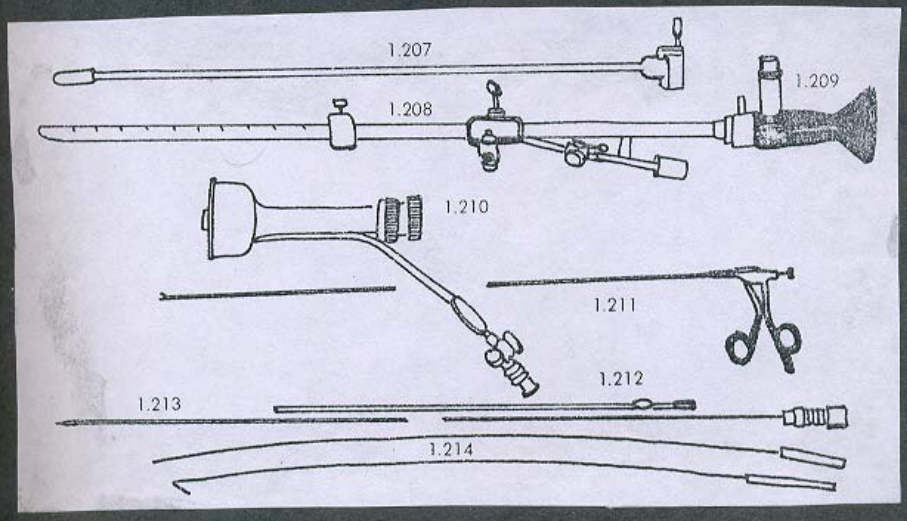


ENDOMETRITIS



ENDOMETRITIS

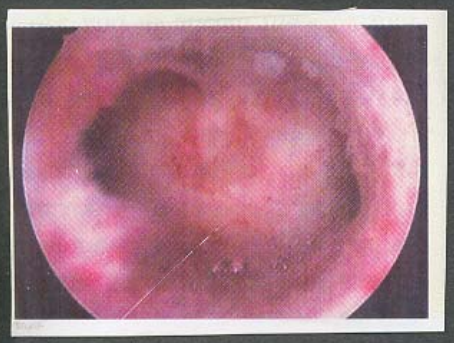
HYSTERO SCOPE

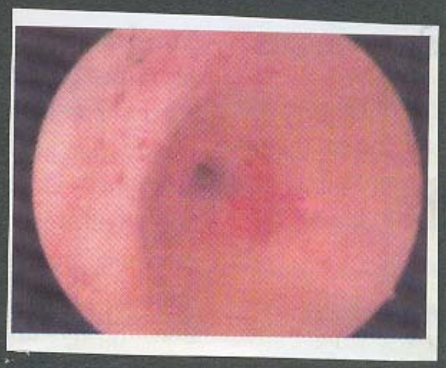


1. OBTURATOR 2. SLEEVE 3. HYSETEROSCOPE 4. ADAPTER

5. BIOPSY FORCEPS 6. SUCTION CANNULA 7. THERMO REGULATOR

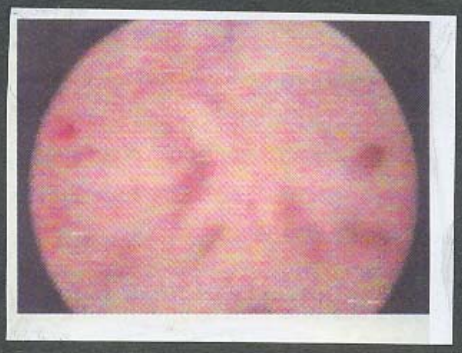
8. TUBAL PROBES



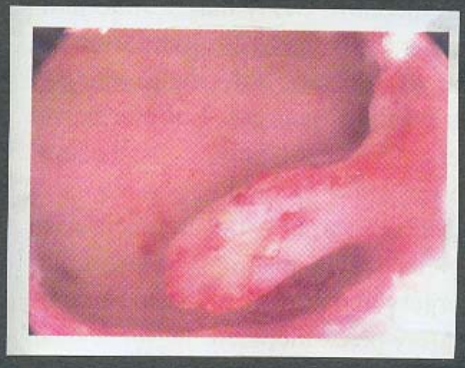


DIAGNOSTIC HYSTEROSCOPY

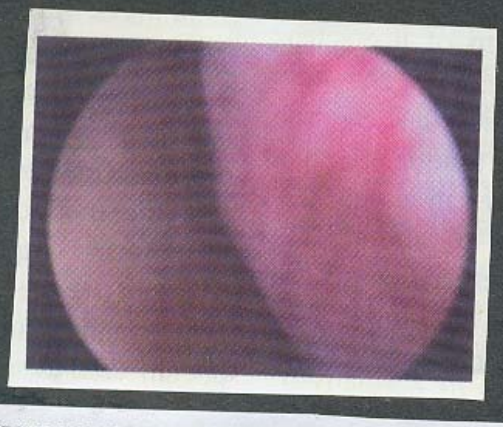
PANORAMIC VIEW OF UTERINE CAVITY



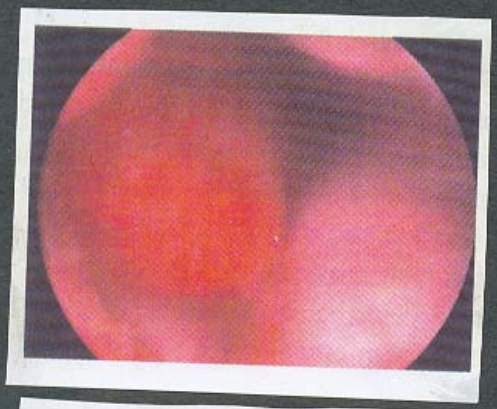
APPEARANCE OF UTERINE WALL IN ADENOMYOSIS



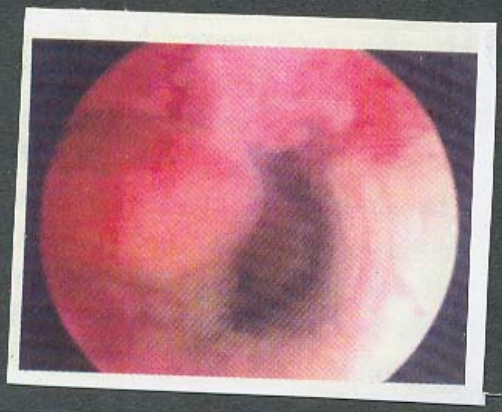
ENDOMETRIAL POLYP



SUBMUCOUS FIBROMYOMATOUS POLYP IN UTERINE CAVITY



POLYP PROTRUDING INTO THE ENDOCERVICAL CANAL



POLYP RESTRICTED TO ENDOCERVIX

SUMMARY

1. Study consist of 100 patients, 50 patients with perimenopausal bleeding and 50 patients with postmenopausal bleeding.

2. In women with postmenopausal bleeding, when the endometrial thickness ≤ 5 mm in transvaginal sonogram the histopathological report was atrophic endometrium. When the endometrial thickness was more than 5 mm it was associated with endometrial pathology. The sensitivity and specificity of this cut off value was 100% and there were no false negatives or false positive giving a positive predictive value of 100% and negative predictive value of 100%.

3. In women with perimenopausal bleeding, when the endometrial thickness was ≤ 13mm in transvaginal sonogram, the histopathological report was proliferative or secretory endometrium and no endometrial hyperplasia or carcinoma were reported. When the endometrial thickness was ≥ 13 mm the report was endometrial hyperplasia or carcinoma. There were no false negatives or false positives giving a sensitivity 100% specificity 100%.

4. In women with postmenopausal bleeding, a mean endometrial volume of ≤ 13cm^3 was associated with atrophic endometrium and no endometrial pathology was reported. When the mean

endometrial volume of ≥ 13cm^3, it was associated with endometrial pathology.

5. The mean ovarian volume in women with postmenopausal bleeding was found to be 2.58cm3 with a range of 1.1-4.8cm3. The histopathological diagnosis after hysterectomy was normal or atrophic ovaries. Transvaginal sonogram has a 100% sensitivity and 100% specificity in assessing eh ovarian volume in postmenopausal women. There were no false negatives or false positives.

6. In both groups of women with perimenopausal and postmenopausal bleedings, intrauterine abnormalities of endometrium and myometrium as adenomyosis, myomatous polyps and endometrial polyps were diagnosed with 100% sensitivity and 100% specificity as per correlation with pathological diagnosis of the hysterectomy specimen.

7. Cases with endometrial adenocarcinoma were diagnosed with precision by transvaginal sonogram and myometrial invasion was also predicted.

8. In women with perimenopausal bleeding, transvaginal sonogram picked up 7 cases of Adenomyosis, 4 cases of myomatous polyps and 1 case of endometrial polyp which were missed by dilatation and curettage.

9. In women with postmenopausal bleeding transvaginal sonogram picked up 2 cases of myomatous polyps and 1 case of endometrial polyps which were missed by dilatation and curettage.

10. About 10 cases studied with hysteroscopic visualisation of uterine cavity and hysteroscopic guided biopsy which gives more reliable and accurate diagnosis than doing blind D&C. Also it is used as local therapeutic procedure.

CONCLUSION

Transvaginal sonogram is a simple, non-invasive convenient way to indirectly visualise the endometrial cavity.

The vaginal probe examination if incorporated into the gynaecology office setting and when combined with bimanual pelvic examination can enhance our anatomic diagnosis.

Transvaginal sonography is useful as a first step diagnostic procedure in the evaluation of peri and postmenopausal bleeding.

When combined with dilatation and curettage it can supplement the shortcomings of dilatation and curettage.

This study proves that this diagnostic tool correlates well with the histopathology findings.

Intrauterine pathology of the endometrium and myometrium were well delineated and endometrial carcinoma detected with precision. It can find out associated ovarian pathology.

Instead of doing blind procedure of dilatation and curettage hysteroscopic guided biopsy and direct visualization of uterine cavity gives more accuracy in taking specimen and diagnosis. It is well correlated with hysterectomy specimen and Transvaginal ultrasonogram.

In future it appears that the ultrasonogram will continue to take the role of a stethoscope for the gynaecologist. To be able to see the lining of the uterine cavity and the information obtained seems worthwhile.

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GROUP A : WOMEN WITH POSTMENOPAUSAL BLEEDING

Sl. No.	Name I.P. No.	Provisional Diagnosis	Age, Parity	Menopause associated risk factors	Trans-vaginal Sonogram Findings					Histopathology Report
					Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
1.	Kannammal 9779	PMB	65,P5L5	8 yrs	4.2x2.7x1,3	12.15	3.2	1.6	3	D&C Atrophic H Endometrium
2.	Muniammal 1138	PMB	56, P4L4	2 yrs back	7.2x4.2x3 R. ovary cystic normal echotexture	70.53	2.3	8.6	14	D&C cystoglandular H Hyperplasia
3.	Venkatamma 1769	PMB	50, P3L2	1 yr back	5.4x3.2x3	45.98	4.2	2.8	8	D&C Secretory H Endometrium
4.	Egavalli 5077	PMB	55, P4L4	2 yrs back	3.4x2.3x1.4 Endometrial polyp 1x1.5cm	10.56	1.6	1.5	4	D&C Atrophic H Endometrium
5.	Anjalai 6916	PMB	65, P4L3	10 yrs back	3.6x1.7x1.6	8.46	2.0	2.4	6	D&C Atrophic H Endometrium
6.	Nayagam 1047	PMB	50, P3L3	3 yrs back	3x2.6x1.4	11.6	2.3	1.8	4 pencil-line Echo	D&C TIFD H Atrophic Endometrium
7.	Ellammal 1438	PMB	60, P2L2	3 yrs back	5x4.2x4 pyometra	56.43	3.4	3.6	11	D&C pus poured out H Endometritis
8.	Kanniammal 1732	PMB	52, P2L2 DM	2 yrs back	4.2x2.6x1.6	12.46	2.8	1.8	3 pencil-line Echo	D&C TIFD H Atrophic endometrium
9.	Lalitha 4424	PMB	53, P3L3	4 yrs back	4.1x2.6x1.1	11.43	3.0	2.8	5 pencil-line Echo	D&C Atrophic Endometrium H
10.	Nagarathinam 674	PMB	51, P4L4	3 yrs	7.5x4.3x2.5	76.06	4.02	3.5	12	D&C Cystoglandular H Hyperplasia
Sl.	Name I.P. No.	n a l D	Age,	Menopause	Trans-vaginal Sonogram Findings					Histopathology Report

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
11.	Sundari, 681	PMB	54, P3L3	4 yrs	5.3x2.4x1.2	14.2	3.6	2.7	4 pencil-line Echo	D&C Atrophic H Endometrium
12.	Mangalakshmi 664	PMB	52, P1L1	2 yrs	4x2.5x1.4	13.6	3.0	1.6	4 pencil-line Echo	D&C Atrophic Endometrium H
13.	Chokkammal 665	PMB	64, P4L3	8 yrs	9.2x4.8x5.3 Assymetrical thickening of endometrial echo loss of subendometrial halo with invasion of myometrium < one third. Break in uterine contous (R) corneal region. (L) side small hypoechoic lesion 2x3cm	175.84	2.8	3.5	16	D&C Endometrial H Adenocarcinoma hysterectomy – papillary adenocarcinoma Gr.I. myometrial invasion less than one third fibroid 2x3 cm in anterior wall (L) side.
14.	Jayalakshmi 2785	PMB	64, P4L3	8 yrs	5.6x3.2x3.8	48.96	4.2	2.6	8	D&C Secretory H Endometrium
15.	Raji 1639	PMB	58, P2L2	3 yrs	4.8x2.8x1.8	10.6	3.2	2.4	4	D&C Atrophic Ednometrium H
16.	Alagammal 4591	PMB with white discharge	58, P4L4	3 yrs	4.2x2.3x1.6	10.45	3.4	2.8	3	D&C TIFD H Atrophic Endometrium
Sl.	**Name I.P. No.**	**Mode of PMB**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
17.	Chellammal 6306	PMB	63, P3L3	7 Yrs	6x3.4x2.6 pyometra	26.8	1.8	1.3	8	D&C pyometra H Endometritis
18.	Victoria 3242	PMB	52, P2 L2 HT, DM	3 yrs	5x3.4x2.6	41.4	3.4	2.8	11	D&C cytoglandular H hyperplasia
19.	Lakshmi 1395	PMB	59, P1L1	4 yrs	4.6x3.8x2.4	34.61	3.2	2.2	10	D&C Secretory endometrium H
20.	Savithiri 4505	PMB	57, P4L3	3 yrs	8.1x4x5.2 minimal obliteration subendometrial less than one third invasion	120.24	1.8	2.7	17	D&C Adenocarcino ednometrium H Well differentiated Adenocarcinoma Endometrium less than one third myometrial invasion tubes and ovaries healthy.
21.	Devaki 4896	PMB	54, P3L3	2 yrs	3.8x2x1.3	12.28	2.6	2.2	4 pencil-line Echo	D&C TIFD H Atrophic Endometrium
22.	Rajapushpam 781	PMB	58, P3L3	6 yrs	4.1x2.6x1.8	10.48	2.3	2.6	4 pencil-line Echo	D&C Atrophic Endometrium H
23.	Sakunthala 858	PMB	56, Nalli para	2 yrs	3.6x2.9x1.2	14.16	2.3	1.8	3 pencil-line Echo	D&C Atrophic Endometrium H
24.	Fathima 1094	PMB	59, P2L1	4 yrs	5x4.2x3.1	13.16	2.2	2.4	5	D&C Atrophic Endometrium H
25.	Radhammal 2068	PMB	55, P3L3	3 yrs	6x4.8x2.4	11.48	2.6	1.6	4	D&C Atrophic Endometrium H
26.	Thulukkanam 3061	PMB	61, P2L2	9 yrs	4x2.8x1.6	12.16	2.1	1.4	4	D&C Atrophic Ednometrium H
Sl.	**Name I.P. No.**	**Date**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
27.	Saraswathy 4301	PMB	63, P3L3	10 yrs	8x4.3x2.1	63.4	3.6	2.1	12	D&C H Secretory Endometrium
28.	Kamala 4691	PMB with white discharge	70, P4L3	15 yrs	5.2x3.8x1.8	14.16	2.8	1.4	3	D&C H Atrophic Endometrium
29.	Kumari 5392	PMB	67, P4L4	12 yrs	4.1x3.2x2.5	10.84	2.6	1.2	4	D&C H TIFD Atrophic Endometrium
30.	Rameeza Bee 6046	PMB	57, P3L3	7 yrs	7.4x5.6x4.5 Myometrium less than one third invasion. Loss of subendometrial halo.	145.24	4.5	2.6	18	D&C H Well differentiated adenocarcinoma Adenocarcinoma -< one third invasion tubes and ovaries normal
31.	Vasuki 9126	PMB	51, P2L2	3 yrs	5.8x3.6x2.8 Hypoechoic lesion fibroid polyp 2x3cm within uterine cavity	35.68	3.7	3.2	13	D&C Cystoglandular Hyperplasia H Fibroid anterior wall 2x3 cm
32.	Kanga 9426	PMB	52, P2L2	2 yrs	4.8x3.4x1.2	13.46	2.1	1.6	2	D&C H Atrophic Endometrium
33.	Senthamarai 9475	PMB	56, P1L1	3 yrs	8x4.6x2.8	43.16	2.8	1.4	8	D&C H Non-secretory enometrium
34.	Angammal 9817	PMB	59, P4L4	4 yrs	4x2.8x2.1	13.12	2.4	1.6	5	D&C H Atrophic Endometrium
Sl.	**Name I.P. No.**	**Diagnosis**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
35.	Santhanamary 9821	PMB with white discharge	62, P3L3	10 yrs	3.6x2.8x1.4	11.56	2.1	1.8	4	D&C TIFD H Atrophic Endometrium
36.	Yasodha 7626	PMB	68, P5L4	15 yrs	6.8x3.6x3.4 pyometra	68.54	3.8	1.64	7	D&C Pus poured out endometritis H Endometritis
37.	Devanbu 1357	PMB	60, P3L3	5 yrs	4.2x2.8x1.2	12.19	2.4	2	2.6	D&C TIFD H Atrophic Endometrium
38.	Vatchala 3095	PMB	52, P2L2	2 yrs	8.4x5.6x3	95.7	4.8	2.13	16	D&C Cystoglandular hyperplasia H Adenomyosis
39.	Kasthuri 2742	PMB	50, P2L2	1 yr.	5x3.8x2.3 endometrial polyp 1x2 cm	45.3	2.6	1.7	7	D&C Non-secretory H Endometrium
40.	Saroja 1658	PMB	53, P3L3	2 yrs	3.8x2.1x1.2	11.08	2.3	1.1	2.8	D&C Atrophic H Endometrium
41.	Ranganayagi 1049	PMB	50, Nalli Para, HT	4 yrs	9x6.2x4.1 Myometrium less than one third invasion. Loss of subendometrial halo.	102.8	4.6	5.3	18	D&C Well differentiated adenocarcinoma H Adenocarcinoma -< one third invasion tubes and ovaries normal
42.	Gowri 1553	PMB	58, P4L4	6 yrs	4.6x3.1x2	10.6	2.8	1.3	4 pencil-line Echo	D&C TIFD H Atrophic Endometrium
Sl.	**Name I.P. No.**	**PMB**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
43.	Subbulakshmi 3965	PMB	62, P4L4	8 yrs	6.7x3.8x3.6	74.08	3.6	1.8	10	D&C Secretory H Endometrium
44.	Thilagavathy 4946	PMB	48, P3L3	2 yrs	5.3x3.9x1.8 L ovary cystic echotexture (N)	28.86	10.34	4.56	17	D&C Cystoglandular hyperplasia H Follicular cyst L. ovary
45.	Dhanam 3979	PMB	60, P4L4	5 yrs	4x2.6x1.4	12.53	2.3	1.4	3	DSC Atrophic H Entometrium
46.	Chandra 5640	PMB	58 P2L2	5 yrs	6x4.2x2.1myomat. polyp 2x1 cm	54.18	2.4	1.6	7	D&C Secretory H Endometrium
47.	Sampooranam 6785	PMB	55, P1L1	3 yrs	7.2x4.3x2.4	67.13	2.6	2.8	12	D&C Secretory H Endometrium
48.	Kanchana 6781	PMB	56, P3L3	2 yrs	3.8x2.4x1.2	14.16	2.3	1.2	4 pencil-line echo	D&C Atrophic H Endometrium
49.	Saroja 7519	PMB	59 P2L2	6 yrs	6x3.8x2.2	43.16	2.4	1.8	8	D&C Secretory H Endometrium
50.	Kuppammal 6778	PMB	66 P4L4	16 yrs	6.3x4.2x3	45.58	3.4	2.3	10	D&C Endometritis pus poured out H Secretory endometrium

PMB - Post Menopausal bleeding
NSE - Non Secretory Endometrium
TIFD - Tissue insufficient for diagnosis
D&C - Dilatation and curettage
H - Hysterectomy

GROUP B : WOMEN WITH PERIMENOPAUSAL BLEEDING

Sl. No.	Name I.P. No.	Provisional Diagnosis	Age, Parity	Menopause associated risk factors	Trans-vaginal Sonogram Findings					Histopathology Report
					Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
1.	Kalaiselvai 5372	DUB	41, P2L2	-	1.2x2.3x2.6	18.16	3.6	5.8	6	D&C N.S.E H
2.	Dhanam 5387	DUB	40, P3L3	-	6.3x4.8x2.2	58.14	4.3	3.6	8	D&C N.S.E H
3.	Aruna 7623	DUB	44 P2L2	-	6.6x7.2x2.3Small intramural fibroid posterior wall	67.12	5.1	2.8	9	D&C N.S.E. H
4.	Rajeswari 7627	DUB with white discharge	43 P4L4	-	4x5.2x4.1	135.43	3.4	4.7	15	D&C Cystoglandular H Hyperplasia
5.	Punitha 7628	DUB	42, P2L2	-	6.40x5.7x2.8	28.16	2.8	2.4	12	D&C N.S.E. H
6.	Mahalakshmi 8022	DUB	45 P1L1	-	7.1x4.2x1.8	37.68	3.6	4.2	10	D&C Proliferative phase H
7.	Chitra 8451	DUB	46, P2L2	-	8x3.8x2.4 Adenomyosis	43.18	2.6	2.3	9	D&C Secretory H
8.	Thulasi 8024	DUB	40 P3L3	Hypertension	6x4.8x3.6	125.05	2.5	3.2	14	D&C cystoglandular H Hyperplasia
9.	Jothi 720	DUB	47, Nalli para	-	6.4x3.8x2.6	48.16	4.2	5.36	18	D&C Endometritis H
Sl.	Name I.P. No.	n a l D	Age,	Menopause	Trans-vaginal Sonogram Findings					Histopathology Report

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
10.	Kalayani 718	DUB	43 P3L3	-	7.6x3.4x2.2x Adenomyosis R ovary cystic	36.43	3.84	10.26	10	D&C Secretory Endometrium H Adenomyosis
11.	Umayal 1686	DUB	45 P2L2	-	8x4.6x3.2	120.14	4.2	3.8	16	D&C Cystoglandular H Hyperplasia
12.	Sudha 1672	DUB	40 P4L4	-	7.2x4.8x2.6	56.18	3.6	4.8	11	D&C N.S.E H
13.	Ponmani 2009	DUB	42 P3L2	-	5.3x4.6x2.1 R ovary cystic	52.19	3.6	13.86	8	D&C N.S.E H Submucous myomatous polyp 2x3.2cm R ovary follicular cyst L ovary normal
14.	Rohini 6363	DUB	44 P3L3	-	7.6x6.2x2.3 Adenomyosis R ovary cystic	110.48	3.2	8.3	7	D&C N.S.E H
15.	Banumathy 1302	DUB	40 P2L2	Diabetes	6x4.3x2.2	54.92	4.2	2.8	6	D&C N.S.E H
16.	Poongavanam 1633	DUB	43 P2L2	-	6.8x5.2x2.2	67.19	2.9	3.4	13	D&C Cystoglandular H Hyperplasia
17.	Padma 1619	DUB	49, Nalli parous	Hypertension	6x4.3x3.2	68.18	4.7	3.2	12	D&C N.S.E H
18.	Durga 2275	DUB	40 P2L2	-	7.2x6.2x2.6 Adenomyosis both ovaries cystic normal echotexture	102.64	7.6	12.58	18	D&C Cystoglandular hyperplasia H Adenomyosis both ovaries follicularcyst
Sl.	**Name I.P. No.**	**Gravida**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
19.	Ponmathi 1314	DUB	42 P3L3	-	4.8x3.6x2	36.74	3.6	5.8	9	D&C N.S.E
20.	Mari 2595	DUB with white discharge	40 P3L3	-	7x4.6x2.8	38.16	2.8	4.3	8	D&C N.S.E. H
21.	Vijaya 1904	DUB	41 P2L1	-	8x4.3x3.8	45.86	2.3	2.2	7	D&C N.S.E H
22.	Bakir 2818	DUB	45 P1L1	-	8.4x5.6x3.2	67.18	5.2	4.6	13	D&C cystoglandular H Hyperplasia
23.	Chitra 4901	DUB	48 P2L2	-	8.2x4.8x3.6	116.86	2.8	2.4	8	D&C N.S.E H
24.	Sagayam 6949	DUB	42 P2L2	-	6.2x4.2x2.8	152.18	3.6	4.2	12	D&C Secretory H Endometrium
25.	Mohana 8234	DUB	48 P3L3	Hypertension DM	Uterus 8.6x5.2x4 Asymmetrical thick endometrial echo 25mm loss of subendometrial halo. Myometrium less than one third invasion	160.36	3.6	4.4	25	D&C Adenocarcinoma H Adenocarcinoma Endometrium Myometrium less than one third invasion
26.	Gowri 8620	DUB	43 P4L4	-	10x5.2x3.6 Adenomyosis	152	4.78	3.8	10	D&C N.S.E H
Sl.	**Name I.P. No.**	**Diagnosis**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
27.	Unnamalai 8624	DUB	46 P4L4	-	7x4.6x3.4	94.26	4.3	3.1	7	D&C N.S.E H
28.	Vela 2070	DUB	46 P4L4	-	8.6x3.9x4.7 Submucous myomatous polyp 3x4.2cm within cavity	146.43	5.8	3.6	10	D&C N.S.E H Submucous polyp 3x4.2cm
29.	Sadeeshwari 6415	DUB	42 P3L3	-	7.2x4.3x2.8	67.98	4.2	5.6	17	D&C Cystoglandular H Hyperplasia
30.	Komala 6844	DUB	40 P4L4	Hypertension	6.7x3.8x2.6 Myomatous polyp within cavity 1.8x2cm	45.16	3.6	4.1	8	D&C N.S.E H Submucous myomatous polyp 1.6x2.2cm
31.	Malliga 7935	DUB	46 P2L2	-	5.1x4.2x2.6	58.16	3.9	5.7	10	D&C N.S.E H
32.	Shenbagavalli 8381	DUB	41 P2L2	-	4.6x4.3x2.8	50.18	3.72	5.94	7	D&C proliferative H Endometrium
33.	Maheswari 9828	DUB	48 P3L3	-	8.8x7.8x3.2 myomatous polyp 3x2.8cm with cavity	210.68	3.4	4.5	24	D&C Atypical hyperplasia H Myomatous polyp 2.6x3.2cm
34.	Devi 6308	DUB with white discharge	42, P4 L4	-	8.6x4.8x5 Adenomyosis	216.98	4.2	3.6	18	D&C cystoglandular hyperplasia H Adenomyosis
Sl.	**Name I.P. No.**	**Complaints**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
35.	Rajammal 1632	DUB	44, P3L3	-	5.4x4.3x3.2 Endometrium polyp 1 x 1cm	32.16	3.2	2.8	8	D&C N.S.E H
36.	Kala 8338	DUB	41, P2L2	-	6.2x4.6x2.3	38.3	2.4	2.8	10	D&C Secretory Endometrium H Endometrium polyp 1x2cm
37.	Ponnammal 8625	DUB	43, P2L1	-	5x4.2x3.8	47.46	4.6	3.2	9	D&C N.S.E H
38.	Sorna 2788	DUB	49, P4L3	Hypertension	7x4.6x3.4 myomatous polyp near fundus R ovary cystic	95.16	2.6	6.4	10	D&C proliferative endometrium H Leiomyomatous polyp near fundus 3x2.6cm
39.	Valliammal 1908	DUB	45, P1L1	-	7x5.6x3.2	57.18	4.6	5.3	11	D&C N.S.E. H
40.	Pappathi 2279	DUB	42, P3L3	-	6.7x3.6x2.5	58.14	3.8	4.12	16	D&C cystoglandular H hyperplasia
41.	Kannagi 1304	DUB	44, P2L2	-	7.2x5.2x4.2	52.3	5.7	3.8	11	D&C N.S.E H
42.	Kamatchi 1620	DUB	50, P3L3	DM	9x5.6x3.2 Asymmetrical thick endometrial echo 28mm loss of subendometrial halo. Myometrium less than one third invasion	134.56	3.2	4.3	28mm	D&C Adenocarcinoma H Adenocarcinoma Endometrium Myometrium less than one third invasion
Sl.	**Name I.P. No.**	**Diagnosis**	**Age,**	**Menopause**	**Trans-vaginal Sonogram Findings**					**Histopathology Report**

No.			Parity	associated risk factors	Uterine size & associated findings (cms)	Endometrial Volume (cm3)	Ovarian Volume		Endometrial Thickness (mm)	
							Lt	Rt.		
43.	Kavitha 678	DUB with white discharge	48, P2L2	-	8x5.8x4.3	65.7	4.3	2.6	8	D&C Proliferative H Hyperplasia
44.	Selvi 6048	DUB	42, P4L4	-	6.4x5.2x4.4	146.78	3.6	4.8	22	D&C Adenomatous H Hyperplasia
45.	Lakshmi 3064	DUB	43, P2L2	-	6.2x5.2x4.3	72.63	2.2	2.6	9	D&C N.S.E H
46.	Malar 860	DUB	42, P4L4	Hypertension	7.2x4.6x2.3 Fibroid posterior wall R Ovary cystic	65.76	4.76	6.8	15	D&C Cystoglangular H Hyperplasia Fibroid posterior wall R Ovary cystic
47.	Sheela 786	DUB	40, P3L3	-	7x4.3x2.2	30.13	2.3	3.6	7	D&C N.S.E H
48.	Poongodi 6845	DUB	46, P2L2	-	8x6.1x2.6 Adenomyosis R ovary cystic	125.08	4.4	6.2	10	D&C Adenomyosis H N.S.E
49.	Indirani 9464	DUB	47, P3L3	HT, DM	6x4.3x2.2	32.16	4.8	2.3	6	D&C N.S.E. H
50.	Maheswari 9822	DUB	40, P2L2	-	5.8x4.6x2.8	56.68	3.8	4.3	14	D&C cystoglandular H Hyperplasia

NSE - Non Secretory Endometrium
D&C - Dilatation and curettage
H - Hysterectomy

ABOUT 10 CASES STUDIED WITH DIAGNOSTIC HYSTEROSCOPY AND HYSTEROSCOPIC GUIDED D&C

I. PERIMENOPAUSAL BLEEDING - 5 CASES

Sl. No.	Name I.P.No.	Provisional Diagnosis	Age, Parity	Hysteroscopy Findings	HPE Report
1.	Parveen Banu 787	DUB	47, P2L2	Endometrial polyp 2x3cm	D&C N.S.E H Endometrial polyp 2 x 3cm
2.	Saroja 793	DUB	42, P3L3	Submucousal mysomatous polyp 1x2 cm	D&C Adenomatous hyperplasia H Lost for follow up
3.	Rani 1067	DUB	40 P2L2	Normal Endometrium	D&C N.S.E H
4.	Kanchana 683	DUB	45 P3L3	Proliferative Endometrium	D&C Proliferative Endometrium H Adenomyosis
5.	Ellammal 1350	DUB	41 P4L4	Endocervical Polyp 1x1cm	D&C Adenomatous hyperplasia H Endocervical polyp 1x1.5cm

I. POSTMENOPAUSAL BLEEDING - 5 CASES

Sl. No.	Name I.P.No.	Provisional Diagnosis	Age, Parity	Hysteroscopy Findings	HPE Report
1.	Rukhmani 1651	PMB	58, P4L4	Atrophic Endometrium	D&C Atrophic H Endometrium
2.	Sengammal 1218	PMB	57, P5L3	Endometritis	D&C Endometritis H Lost for followup
3.	Parimala 1313	PMB	53, P2L2	Submucous myomatous polyp 2x2cm	D&C Secretory Endometrium H Submucous polyp 2x3cm
4.	Kuppammal 1057	PMB	65 P5L5	Atrophic Endometrium	D&C TIFD H Atrophic Endometrium
5.	Kamalam 988	PMB	60, P2L2	Atrophic Endometrium	D&C Atrophic H Endometrium

PROFORMA

Measurement of endometrial thickness in women with peri and post menopausal bleeding and its correlation with histopathology.

Name : Age: I.P.No. :

D.O.A : Residence

D.G.D. :

C/o. : Bleeding pv or discharge pv.

HISTORY OF PRESENT ILLNESS

Bleeding pv since
Profuse/Moderate/scanty
H/o of passing clots
Discharge pv since.

Menstrual RIo

Age of Menarche		
Menstrual cycle	regular/irregular	/days
	Profuse/Moderate/Scanty	
Dysmenorrhoea	Present /Absent	
Inter Menstrual bleeding		
Date of L.M.P.		
Menopause	Attained/Not attained	
	Years	

Treatment H/o

Earlier Contraceptive History
Oral Contraceptive Piles
Intra uterine contraceptive device
Hormone Replacement Therapy

Obstetrical H/o

Married Life	Parity	Living children
Last child birth		Sterilisation

Past History

H/o. Tuberclosys
H/o. Diabetes Mellitus
H/o. Hypertension
H/o. Bleeding Disorders
H/o. Any D & C in the past
H/o. Any Surgery

Family History

Tuberculosis	Hypertension
Diabetes Mellitus	Carcinoma

Personal History

Obesity	Diet	Sleep	Micturition
	Appetite	Bowel	

Physical Examination

General condition	Build
Nourishment Pulse Rate	Temperature
Pallor	B.P.
Gums	Teeth
Jaundice	Thyroid
Oedema	Neck Veins
Lymph Nodes	

Per Abdomen

Vaginal Examination

Inspection of vulva
Palpation of external genitalia

P/s. Vagina
Cervix

P/v.	Cervix	Position		Discharge
	Uterus	Position	Size	Mobile/Restricted
	Fornices			

Investigations

Blood group and Rh
Hemogram
Blood urea
Serum creatinine
Blood sugar (Random)
Urine Analysis
Bleeding Time
Clotting Time
Pap Smear

Vaginal Sonography

Uterus
Endometrial Thickness
Endometrial volume
Cervix
(R) Ovary
(L) Ovary
Ovarian volume (R)
(L)
Any other abnormalities

Diagnosis

Remarks

Dilation & Curettage

Endocervical curettings
Uterine cavity sounded upto
Regular/Irregular
Technical difficulty
Specimen Amount
Biopsy Ox

Hystrectomy

Histopathology Report