EVALUATION OF SALINE INFUSION SONOHYSTEROGRAPHY IN THE DIAGNOSIS OF ABNORMAL UTERINE BLEEDING IN PERIMENOPAUSAL AND POST MENOPAUSAL WOMEN

DISSERTATION submitted for M.D (Obstetrics and Gynaecology)

Branch II

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MADURAI MEDICAL COLLEGE, MADURAI.
THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY, CHENNAI.

CERTIFICATE

This is to certify that the dissertation entitled “Evaluation of Saline infusion Sonohysterography in the diagnosis of abnormal uterine bleeding in perimenopausal and post menopausal women” submitted by Dr. R. Kavitha to the faculty of Obstetrics & Gynaecology, The Tamilnadu Dr. M.G.R Medical University, Chennai is in partial fulfillment of the requirement for the award of MD Degree Branch II (Obstetrics and Gynaecology) is a bonafide research work carried out by her under our direct supervision and guidance.

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Madurai Medical College,
Madurai.
ACKNOWLEDGEMENT

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I am thankful to our Prof & HOD Dr. Rajarajeswari MD.DGO for guiding me in this work and permitting me carry this work in our department. I also thank our other professors Dr. muthulakshmi MD.,DGO, Dr. Revathy Janakiram MD.,DGO, MNAMS., Dr. Dilshath MD.,DGO and Dr. Parvathavarthini MD.,DGO for their guidance. I am indebted to our assistant professors without whose immense help and support this work will not have ended successfully.

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I am indebted to all the patients who played major part by accepting the investigation.

Above all I pay my gratitude to the Lord almighty for blessing me in completing this work.
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INTRODUCTION
INTRODUCTION

Life expectancy is now increased and we are in the era of geriatric medicine. Geriatric gynaecological interventions are on the increase. New innovations are coming up to provide the best management option with minimum morbidity to this group of women.

Preventive medicine is gaining more importance and more women entering the climacteric, apart from facing psychological derangements, are scared by taboos about malignancies of the genital tract.

1 in 20 women of 40-49 years, consult their gynaecologist with history of excessive bleeding per vaginum at least once in their lifetime.

1 in 5 women in UK are undergoing hysterectomy before 60 years. Out of them, 50 percent women undergo hysterectomy for menorrhagia.

In 50% of hysterectomies, the uterus removed has no local pathology. Uterus is just the target organ responding to the variations in Hypothalamic pituitary ovarian axis.

But before we conclude the uterus to be a mere innocent target organ, there should be conclusive evidence. A step towards such a conclusion should be cost effective, easily available and safe.

The idea of fractional curettage for all patients with perimenopausal and post menopausal abnormal uterine bleeding is now shifting towards
hysteroscopy guided biopsy. Such sophisticated investigations demand greater technical skill and expertise which most patients cannot reach.

Mere sonography can miss early malignancies & polyps. A simple modification of saline infusion sonohysterography [SIS], has become a handy tool, an alternative to hysteroscopy in the evaluation of abnormal uterine bleeding.

SIS can rule out malignancy with 100% sensitivity. But to confirm malignancy, further biopsy and HPE are mandatory.

The combination of sonohysterography & endometrial biopsy offers high sensitivity & negative predictive values for detection of endometrial & uterine pathology in patients with abnormal bleeding.
AIM OF STUDY
AIM OF STUDY

- To evaluate the efficacy of saline infusion sonohysterography in the investigation of abnormal uterine bleeding in perimenopausal and postmenopausal women.

- To correlate the findings of saline infusion sonohysterography with histopathology of endometrium by fractional curettage and hysterectomy specimens.
MATERIALS AND METHODS
MATERIALS AND METHODS

STUDY DESIGN - prospective descriptive clinical Trial
TYPE OF ANALYSIS - qualitative analysis
NATURE OF STUDY - prospective cohort study
POPULATION UNDER STUDY - perimenopausal, post menopausal women attending gynaecological OPD in Govt. Rajaji hospital, Madurai

STUDY SAMPLE - 50 women in perimenopausal & post menopausal age group with complaints of abnormal uterine bleeding

INCLUSION CRITERIA - age 40-55 yrs

EXCLUSION CRITERIA
1. Unwilling patients
2. Suspected pelvic infection
3. Profusely bleeding patients requiring therapeutic curettage.
4. Premalignant/ malignant lesions of cervix
5. Large myomas
6. Cervical stenosis
METHODOLOGY

After detailed history, medical & gynaecological examination done. Verbal consent obtained.

Procedure is done on day 6 or 7 in patients with regular cycles or just after cessation of bleeding in those with irregular cycles.

All patients were subjected to standard TVS with empty bladder.

The TVS probe was removed & SIMS speculum was inserted to visualise the cervix, and the anterior lip was held with a volsellum.

Cervix was cleaned with povidone iodine, 8 size infant feeding tube was slowly introduced into the uterine cavity.

The probe was reintroduced into the vagina with the tube in situ. Sterile saline about 10 ml was slowly injected through the tube & cavity distended.

The uterus was scanned in longitudinal axis from one corner to other, then in transverse direction from fundus to cervix.

Those who complained of abdominal pain were given a single tablet mephenamic acid 500 mg.

All 50 patients were subjected to fractional curettage in the premenstrual phase & Histopathologic examination of endometrium done. Correlation between SIS findings and HPE studied.

35 patients underwent hysterectomy for various reasons like adenomyosis, fibroid uterus, endometrial hyperplasia, endometrial polyps. Correlation between SIS findings and cavities of uterine specimens studied.
REVIEW OF LITERATURE
The most probable etiology of abnormal uterine bleeding and the likelihood of serious endometrial pathology relates to the patients' age.

In perimenopausal and postmenopausal patients especially in those with high risk factors like obesity, hypertension, diabetes, patients on HRT, etc, endometrial carcinoma has to be ruled out.

Presence of pathological lesions like polyps, fibroids, endometrial hyperplasia has to be identified before planning appropriate modality of management. In patients who by exclusion, have been diagnosed as having dysfunctional uterine bleeding hormone therapy makes it possible to avoid surgical interventions.

ANATOMY AND HISTOLOGY OF NORMAL ENDOMETRIUM

Endometrium is the specialized form of membrane lining the uterine cavity.

It is formed by a single layer of cuboidal or columnar epithelium which dips in to form tubular glands.

Stroma is made of loosely arranged connective tissue cells, blood vessels, lymphatics and leucocytes.
Endometrium shows cyclic histological and functional changes in relation to various phases of menstrual cycle.

Functionally divided into 2 zones

1. Functional layer-forms superficial 2/3 of the endometrium. This is the cyclical portion that responds to hormonal changes of normal ovulatory cycle. Has two layers, stratum compactum and stratum spongiosum.

2. Basal layer – deep portion forming remaining 1/3 of the endometrium, not cyclical, contributes to regeneration. It does not respond to hormonal stimulation.

**ENDOMETRIAL CYCLE**


**FOLLICULAR PHASE**

At the end of menstruation- endometrium measures 1mm, glands are broken, only basal layer remains.

Regrowth commences even in the absence of hormonal stimulation on the third or fourth day evidenced by healing of the surface epithelium.

Between fifth and fourteenth day of a regular 28 day cycle there is synchronous stromal, vascular and glandular growth.
In the early part of the proliferative phase, the glands are straight and tubular.

In the later part of the proliferative phase, glands become progressively convoluted and stromal edema appears. Late proliferative phase. Endometrium measures 2-3mm at the end of this phase.

SECRETORY PHASE –14 to 28th day, secretory changes and

This is characterized by stromal maturation and glandular secretion in response to progesterone produced by corpus luteum.

The first presumptive evidence of ovulation is the appearance of subnuclear vacuoles in glandular epithelium.

During mid secretory phase, the secretion of glandular epithelial contents occur.

Stromal edema reaches a peak on day 22 or 23.

Spiral artery differentiates and predecidual cells become apparent on day 23.

During the late secretory phase there is exhaustion of glandular secretory activity. The glands become tortuous and there is reduction in endometrial height due to regression of stroma.

Endometrium measures 8-10 mm. at the end of this phase.

Just before menstruation- decreased blood flow & infiltration with leucocytes occur. Over the next 24 hours, a plane of separation becomes apparent through the spongy layer, which leads to the separation of superficial endometrium from the basalis.
HPOU AXIS & HORMONAL CYCLE

FSH $\rightarrow$ follicle maturation & estrogen production. Estrogen has positive feedback on LH $\rightarrow$ LH surge & ovulation, corpus luteum synthesises progesterone which produces secretory changes in estrogen primed endometrium in the luteal phase.

PATHOLOGICAL LESIONS CAUSING ABNORMAL UTERINE BLEEDING

1. Endometrial hyperplasia

Endometrial hyperplasia represents a spectrum of biological & morphological alteration of endometrial glands ranging from exaggerated physiological state to carcinoma in situ.

The most recent classification by the International society of gynaecological pathologists is based on both architectural and cytological features and long term studies that reflect natural history of the lesion.
Types of hyperplasia

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Typical</th>
<th>progression to carcinoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Simple hyperplasia (cystic glandular)</td>
<td>1%</td>
</tr>
<tr>
<td>2</td>
<td>Complex hyperplasia (adenomatous)</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Atypical</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Simple hyperplasia</td>
<td>8%</td>
</tr>
<tr>
<td>2</td>
<td>Complex hyperplasia</td>
<td>29%</td>
</tr>
</tbody>
</table>

[Novak et al.]

1. Simple (cystic glandular) – characterized by dilated or cystic glands with round to slightly irregular shape; increased glandular to stromal ratio with out glandular crowding and no cytologic atypia.

2. Complex (adenomatous hyperplasia) – increased no of glands, closely packed with little intervening stroma, multilayering of epithelium with budding and infolding.

3. Atypical hyperplasia – Both simple and complex hyperplasia can be associated with cytologic atypia. The nuclei are unusually large, pleomorphic, hyperchromatic. There is increased nuclear cytoplasmic ratios & prominent nucleoli with irregular clumping of chromatin and parachromatic clearing.

Most of the hyperplasia seem to remain stable (18%) or regress (74%)
Premalignant potential of hyperplasia is influenced by the following factors:

1. Age of patient
2. Underlying ovarian disease
3. Endocrinopathies
4. Obesity
5. Exposure to exogenous estrogens (Hunter J E et al 1994)

2. Atrophic endometrium - postmenopausal

There is no functionalis layer and uterus is lined only by basalis layer. Stroma becomes fibrous and stromal cellularity diminishes. This is called senile cystic atrophy.

3. Endometrial Carcinoma

Grossly, endometrial carcinoma presents as either localized polypoidal tumor or as a diffuse tumor involving the endometrial surface. Histologically 80% are adenocarcinoma, characterized by more or less well defined glandular patterns lined by malignant stratified columnar epithelial cells.

Histological classification

1. Adeno carcinoma - Usual type
   - Villoglandular
     - Secretory
     - With squamous differentiation
2. Mucinous carcinoma
3. Papillary serous carcinoma
4. Clear cell carcinoma
4. squamous cell carcinoma
5. undifferentiated carcinoma
6. mixed carcinoma

4. Endometrial polyps
A mucous polyp otherwise called true adenoma occurs with or without associated endometrial hyperplasia. Polyps can be single or multiple. The tumour is usually the size of a grape and is not larger than a pea. On section it shows endometrial glands and stroma. These may or may not respond to ovarian hormones. The cause of single mucous polyp is unknown.

Single endometrial polyps are common in the postmenopausal uterus when they are mostly symptomless. Symptoms are more likely when the tip of the polyp becomes necrotic and ulcerated. Symptoms are usually bleeding pv, discharge pv or abdominal colic.

Multiple polyps are generally a manifestation of endometrial hyperplasia with persisting background of hyperestrogenism.

- Benign - Adenoma
- leiomyoma
- Placental

- Malignant
- carcinoma
- sarcoma
- choriocarcinoma

5. Leiomyoma-

Especially intramural and submucous fibroids cause abnormal uterine bleeding due to
- increase in endometrial surface area >200 cm sq.
- Associated endometrial hyperplasia.
- interference with normal myometrial contractility.
- endometrial venule ectasia and increased vascularity.
- infection & ulceration of submucous fibroid.

6. Other differential diagnosis for Abnormal uterine bleeding

1. Infection - cervicitis
   - endometritis
   - PID

2. Ovarian/ cervical malignancy

3. Adenomyosis

4. Systemic diseases – hepatic, renal disease, coagulopathy, leukemia

6. Drugs / Iatrogenic – IUCD, OCP

INVESTIGATIONS IN ABNORMAL UTERINE BLEEDING

1. DILATATION & CURETTAGE

Initially, D & C was the diagnostic procedure used to identify the histology of the endometrium in the evaluation of Abnormal uterine bleeding.

Recaimer invented the curet in 1943.

In 1958 total of 6907 D&C were reviewed and the concept was that curettage was simple and harmless, easy to perform even by the internist (word b et al). It is therapeutic in 30% cases of Dysfunctional uterine bleeding.

Disadvantages

- Hospitalisation
- Risk of anaesthesia
- Risk of perforation
- Risk of sepsis
- Bleeding
- Frequently misses uterine polyps
- Cannot diagnose submucous myoma
- Samples only 60% of endometrial surface.

2. OFFICE ENDOMETRIAL BIOPSY

In 1924, it was recommended that a diagnostic biopsy of the endometrium could be performed without anaesthesia. (Kelly h A 1925)
Using Novak Curette/ newer silastic curette or pipette suction curette, it can be done as an outpatient procedure requiring no anesthesia as these tools need no cervical dilatation.

Suction curette is 98% accurate in evaluating high risk women with abnormal bleeding for endometrial malignant disease. (Lutz Mn et al 1977)

Disadvantages

- not sensitive for detection of structural abnormalities
- polyps & fibroids cannot be diagnosed
- samples only 5% of endometrial surface.
- risk of uterine perforation
- pain & cramping during endometrial sampling
- vasovagal reaction can rarely occur.
- bleeding
- infection

In cervical stenosis- performance of biopsy is difficult

3. HYSTEROSALPINGOGRAPHY

- Not a suited mode of investigation in abnormal uterine bleeding
- Risk of radiation
- Iodine allergy may occur
- Myometrial abnormalities/ adnexal disorders cannot be diagnosed
- Polyps cannot be differentiated from sub mucous myomas.
- Complications like pain, intravasation of dye and granuloma formation may occur.
4. HYSTEROSCOPY

It is possible to visualize the cavity of the uterus with hysteroscopes incorporating fibre-optics. Hysteroscopy is used to exclude intrauterine pathology as a cause of abnormal bleeding.

Hysteroscopic procedures were first described by Pantaleoni in 1869. It is the gold standard procedure of investigation in Abnormal uterine bleeding, because it enables selective biopsy of the areas of visualized endometrium that appear neoplastic and also facilitates diagnosis of polyps, submucous myomas, intrauterine adhesions etc.

Hysteroscopic operations in selected cases can also prove therapeutic. It offers opportunity for removal of polyps. Intrauterine synechiae can be divided. Endometrial ablation procedures can also be done with hysteroscopy.

The procedure involves dilatation of the cervix followed by introduction of the hysteroscope. It has a side channel which permits the passage of the distension medium. For operative hysteroscopy, an additional channel permits the introduction of the resectoscope, roller ball or laser fibre. An outflow tract allows the fluid passing out to be collected in a bottle.

Special collecting bags have been devised which are placed under the patient’s buttocks to collect any fluid leaking out of the vagina to allow an accurate estimation of the fluid deficit and prevent fluid overload.

Office hysteroscopy using new smaller diameter flexible or rigid hysteroscopes is coming up. This diagnostic procedure is done under local
anesthesia using a hysteroscope of smaller diameter less than 4 mm so that cervical dilatation is not required.

**Disadvantages**

- Cannot form first line of investigation in Abnormal uterine bleeding.
- Myometrial / adnexal abnormalities cannot be identified
- Expenditure
- Invasive
- Requires anesthesia for proper evaluation
- Can be done only in operation theatre set up
- Requires special expertise to handle the instrument
- Needs technical skill and knowledge to interpret
- Risk of intraoperative and postoperative bleeding
- Fluid retention
- Uterine perforation
- Gas embolism
- Infection
- Poor visibility if done with bleeding pv

5. **TRANSVAGINAL SONOGRAPHY**

Transvaginal sonography has been investigated as a screening tool in peri and post menopausal patients with Abnormal uterine bleeding. The first report of TVS is attributed to kratochwil in 1969. The transvaginal sonography probe generates waves of a higher frequency, 5.5 to 7.5 MHz.
The use of transvaginal approach for imaging endometrium, myometrium and ovaries is superior to TAS because of the close proximity of the probe to uterus and adnexa.

Measurement of endometrial thickness includes the 2 layers – anterior & posterior wall at the thickest portion in the mid saggital plane. If the endometrial thickness is less than 5mm, the pathology would show either inactive or no endometrial tissue. (Nasri MN 1991) Post menopausal patients with endometrial echo of more than 4mm had sensitivity of 96% specificity of 68% for selecting endometrial pathology. (gell B, Karlsson B et al 2000)

6. SALINE INFUSION SONOHYSTEROGRAPHY

Sonographic evaluation of endometrium can be enhanced by instillation of sterile saline into the endometrial cavity as observed during transvaginal sonography. It is of particular use in assessment of patients with thickened endometrium on sonography, in patients with scanty tissue on D&C and also to identify location & extent of intra uterine synechiae or septa or polyps - Dodson et al.

“Fluid is sonologist’s friend”. This is known from the enhanced sonographic visualization we observe with polyhydramnios, fluid in the dominant follicle, 2nd trimester ultrasound. This concept led to the discovery of SIS.
The introduction of saline into the uterine cavity provides a contrast that helps localization of abnormalities as intracavitary, endometrial or submucousal. Fluid represents an excellent medium for transmission of sound waves and provides a good contrast to examine the endometrial cavity.

The saline also distends the endometrial cavity separating endometrial walls so as to visualize polyp that could be seen as the part of overall endometrial thickness, when both walls are measured together in the standard scan.

In 108 patients with Abnormal uterine bleeding it had an overall sensitivity comparable to the gold standard of hysteroscopy & better than either MRI or TVS

Dr Goldstein is the inventor of the Goldstein sonohysterography catheter and the principal investigator and teacher of the technique. In a recent study of 400 women with abnormal bleeding, 19% had no anatomic abnormality and needed no further diagnostic procedure other than SIS.(Goldstein SR 1996)

ADVANTAGES OF SIS

❖ ACCURACY

It definitely enhances the diagnostic potential of TVS in assessment of endometrium and intracavitary pathologies.(Bart Kowial R,Kaminski 2003)
Sonohysterography allows a precise diagnosis of benign uterine pathology which generally basal transvaginal ultrasonography can only suspect. The conclusion drawn is that this new method offers an important aid for gynaecological diagnosis of benign pathology.(Dodero D, Corticelli A 2001)

Without SIS the diagnosis of focal lesions such as polyps, submucous myomas & focal hyperplasia would have been missed .(Jones K, Bournet 2001)

- Easy to use
  most authors encountered no failures (Cullinan JA, Heischer AC 1995)
- Cost effectiveness
  Apart from catheter, syringes, saline, the technique does not have additional requirements other than those needed for standard TVS (Epstein E, Laife-Narin SL 1999)
- Minimally invasive
- Needs no anesthesia
- Needs no prior cervical dilatation
- Provides excellent visualization of endometrial cavity
- Can differentiate polyps & sub mucous myoma
- Intramural and adnexal pathology can be simultaneously studied
- Unlike TVS, SIS can detect focal hyperplasia. Endometrial thickness of each wall is measured separately identifying focal thickening (Bron Z, L Sulter T, Russia 1997)
- No risk of ionizing radiation
- No risk of perforation
1. Abnormal uterine bleeding in peri and post menopausal women.
   Evaluation of abnormal uterine bleeding necessitates excluding local causes especially in peri and post menopausal patients. (Weeks AD, Duffy SRG 1996)
2. Evaluation of endometrium that is thickened irregular or poorly visualized in conventional TVS
3. Follow up of women receiving HRT
4. Follow up of women receiving tamoxifien
5. Follow up in cases of conservative management of endometrial hyperplasia
6. Presurgical evaluation of intracavitary fibroids
7. Infertility & recurrent pregnancy loss
   Saline hysterography in these patients is a reliable alternative that can avoid hysteroscopy in those patients with out a septum & guides resection in those with septate uterus (Clifford K, Regan L 1994)
8. Secondary amenorrhea – due to Asherman’s syndrome, SIS can avoid the use of hysteroscopy in those without such adhesions and guide resection in those with adhesions. (Asherman 1948, pinion 1944)
9. Assisted reproductive technology- patients undergoing ART are often investigated for abnormalities of uterine cavity such as fibroid ployps & uterine septae which need resection to avoid failure of implantation. (Ayida G, Chamberlain B 1997)
NORMAL FINDINGS OF SIS

The procedure is best done in proliferative phase when the endometrium is thin to facilitate detection of polyps.(Lindheim SR, Morales AJ 2002)

1. Normal endometrial cavity should distend symmetrically, is well demarcated and surrounded by anechoic saline.
2. Homogenous single layer thickness of endometrial lining in relation to phase of menstrual cycle.

ABNORMAL FINDINGS IN SIS

1. Endometrial polyps appear as protrusions into the cavity and move characteristically upon injecting saline.(Lasek W, Migda M 2004) This movement differentiates the polyps from blood clots which can be displaced anywhere in the cavity.

2. Intracavitary & sub mucous fibroids – appear as filling defects with mixed echogenicity that is different to the endometrium with which they are usually covered.(Baldwin MT, Dudiak KM 1999) Extension of fibroids upto serosal surface of uterus has to be
noted as resection of fibroids should not be attempted in these cases.

3. Focal endometrial thickening

Endometrial thickness of each wall is measured separately identifying focal thickening.(Bron Z LSubtert 1997) This will later guide biopsy at hysteroscopy.

Irregularity in the surface of endometrium, heterogeneity of the endometrium, irregularity of the junction between the endometrium and the myometrium and uniform increased echogenecity of the endometrium all raise the suspicion of malignancy.

4. Abnormalities of uterine cavity

Intrauterine adhesions and malformations of uterine cavity appear as immobile connections between the uterine wall.(Parsons AK, Lanv 2 1993) If adhesions are thick and wide spread, distension of the cavity will be difficult.

Incomplete separation of the anterior and posterior uterine walls, in longitudinal sections of the uterus denotes intrauterine synechiae and can give the uterus a bow tie appearance on transverse sections.
Malformations of the uterine cavity could cause much thicker connections between the anterior and posterior walls.

5. endometrial atrophy

LIMITATIONS

1. Pregnancy has to be ruled out before the procedure.
2. PID–As with all forms of uterine instrumentation, this test should only be performed after pelvic infection has been excluded. Patients with history of chronic pelvic infection are given a course of the Doxycycline. (Linheim SR, Morales A5 2002)
3. In submucous fibroids obliterating cavity larger than 4 cm the cavity cannot be adequately distended
4. Cervical stenosis can be managed by dilating the cervix under local anesthesia. (Wilrich J, Bradley Ld 1996)
5. Extensive intrauterine synechiae may limit feasibility of the procedure
6. Patients may develop occasionally uterine cramps that can be avoided by oral antispasmodics before the procedure. (Bonnamy L, Marret H, 2002)

COLOUR DOPPLER IMAGING

Colour Doppler and blood flow analysis in combination with SIS is generally promising in identifying patients with endometrial carcinoma and differentiating between benign & malignant uterine tumors. Malignant tumours have neovascularisation and angiogenesis.
COMPUTERISED TOMOGRAPHY

Computerised Tomography with contrast enhancement enables the pelvic organs to be delineated clearly.

It is used for staging endometrial carcinoma with accuracy of 84% to 88%.

CT is a useful non-invasive test to differentiate disease confined to uterus from extrauterine pelvic and abdominal spread.

Lymph node involvement is well demonstrated. But its role as a screening procedure is not appealing.

MAGNETIC RESONANCE IMAGING

This is the latest addition to the diagnostic modalities but it is still not available in most parts of the developing world.

Is the study of choice for accurate staging of endometrial carcinoma. Abnormalities can be detected in about 84% of patients with endometrial carcinoma. MR is advantageous over CT because of no radiation exposure, imaging is multiplanar, no contrast is required, soft tissue resolution is superior to CT. But it is expensive.
35 patients underwent hysterectomy for various reasons like adenomyosis, fibroid uterus, endometrial hyperplasia, endometrial polyps. Correlation between SIS findings and cavities of uterine specimens studied.
RESULTS
AGE DISTRIBUTION

TABLE 1

<table>
<thead>
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<th>S.No</th>
<th>Age in years</th>
<th>No. of patients</th>
<th>Percentage</th>
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<tr>
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<td>24</td>
<td>48</td>
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<tr>
<td>3</td>
<td>51-55</td>
<td>6</td>
<td>12</td>
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88% of patients taken up for study belonged to 40-50 yrs. Only 12% were in the age group of 51-55 yrs.
Age distribution

<table>
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<td>1 40-45</td>
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<tr>
<td>2 46-50</td>
<td></td>
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<tr>
<td>3 51-55</td>
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## PARITY DISTRIBUTION

### TABLE 2

<table>
<thead>
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<th>S.No</th>
<th>Parity</th>
<th>No. of patients</th>
<th>Percentage</th>
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<td>P0</td>
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<tr>
<td>8</td>
<td>P7</td>
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60% patients belonged to para2 & para3. Only 2% was nullipara. 32% patients were para4 and above.
SOCIO ECONOMIC STATUS

TABLE 3

<table>
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<tr>
<th>Class</th>
<th>No. of patients</th>
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</tr>
<tr>
<td>IV</td>
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<td>10</td>
</tr>
<tr>
<td>V</td>
<td>40</td>
<td>80</td>
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80% patients were belonging to low socio economic status.
DISTRIBUTION OF PERI AND POST MENOPAUSAL ABNORMAL UTERINE BLEEDING

TABLE 4

<table>
<thead>
<tr>
<th>S.No</th>
<th>Type of AUB</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perimenopausal</td>
<td>41</td>
<td>82</td>
</tr>
<tr>
<td>2</td>
<td>Postmenopausal</td>
<td>9</td>
<td>18</td>
</tr>
</tbody>
</table>

82% of patients included in the study had perimenopausal abnormal uterine bleeding. 18% were postmenopausal patients.
TYPE OF ABNORMAL UTERINE BLEEDING

1 Perimenopausal
2 Postmenopausal
TABLE 5

Almost 75% patients had either polymenorrhagia or menorrhagia. Nearly 10% had polymenorrhea & 14.6% had menometrorrhagia.
Menorrhagia

Polymenorrhea

Polymenorrhagia

Menometrorrhagia

No. of patients

CLINICAL PRESENTATION - PERIMENOPAUSAL AUB

No. of patients
Nearly 75% percent patients reported to the hospital within 1 year of onset of symptoms. Only 4.8% reported late after 2 years and about 20% reported within 1-2 yrs.
DURATION OF SYMPTOMS-PERIMENOPAUSAL PATIENTS

No. of patients

< 5 months
6-12 months
13-24 months
> 2 years

No. of patients
DURATION OF SYMPTOMS IN POSTMENOPAUSAL PATIENTS

TABLE -7

<table>
<thead>
<tr>
<th>S.No</th>
<th>Duration</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;10 days</td>
<td>5</td>
<td>55.55</td>
</tr>
<tr>
<td>2</td>
<td>11-30 days</td>
<td>2</td>
<td>22.22</td>
</tr>
<tr>
<td>3</td>
<td>2-4 months</td>
<td>1</td>
<td>11.11</td>
</tr>
<tr>
<td>6</td>
<td>4-6 months</td>
<td>1</td>
<td>11.11</td>
</tr>
</tbody>
</table>

Nearly 77% patients reported within 1 month of symptom onset. Only about 22% reported late within 6 months. Only one patient has adenocarcinoma endometrium. She had bleeding per vaginum for 6 months.
DURATION OF SYMPTOMS IN POST MENOPAUSAL PATIENTS

<table>
<thead>
<tr>
<th>Duration</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10 days</td>
<td>1</td>
</tr>
<tr>
<td>11-30 days</td>
<td>2</td>
</tr>
<tr>
<td>2-4 months</td>
<td>3</td>
</tr>
<tr>
<td>4-6 months</td>
<td>6</td>
</tr>
</tbody>
</table>
ASSOCIATED MEDICAL CONDITIONS

TABLE -8

<table>
<thead>
<tr>
<th>S.No</th>
<th>Medical disorders</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diabetes mellitus</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Hypertension</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>Obesity/overwt BMI&gt;25</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>Anemia</td>
<td>12</td>
<td>24</td>
</tr>
</tbody>
</table>

14% patients were diabetic, 22% had hypertension. 26% had BMI >25. 6% were both hypertensive & diabetic. 24% of patients were severely anemic requiring blood transfusions.
ASSOCIATED MEDICAL CONDITIONS

- Diabetes mellitus: 1 patient
- Hypertension: 2 patients
- Obesity/overweight BMI>25: 3 patients
- Anemia: 4 patients
On clinical examination, 3 (6%) patients had cervical polyp. Out of which 2 (4%) were mucous polypi and 1 (2%) was a myomatous polyp. All three underwent polypectomy. Out of 3 (6%) adnexal masses, 1 (2%) turned out to be hydrosalpinx, 2 (4%) were functional cysts of ovary. 39 (78%) patients were clinically diagnosed as dysfunctional uterine bleeding.
1 Cervical polyp
2 Adnexal mass
3 Fibroid
4 DUB
ASSOCIATED FINDINGS BOTH IN TVS & SIS

TABLE 10

<table>
<thead>
<tr>
<th>S.No</th>
<th>Findings</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fibroid</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Adenomyosis</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Hydrosalpinx</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Ovarian Cyst</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

TVS and SIS showed that associated fibroids were present in 10(20%) patients. 7(14%) patients had Adenomyosis. Hydrosalpinx was present in 1(2%) patient and ovarian cyst in 2(4%) patients, both were functional cysts.
ASSOCIATED FINDINGS BOTH IN TVS & SIS

- Fibroid: 1
- Adenomyosis: 2
- Hydrosalpinx: 3
- Ovarian Cyst: 4

No. of patients
**ENDOMETRIAL THICKNESS IN SIS**

**TABLE 11**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Thickness</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-5</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>6-10</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>11-15</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>16-20</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>&gt;20</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Endometrial thickness is the sum of thickness of anterior & posterior endometrium at the thickest portion after distension of cavity. It was uniformly equal in 46(92%) patients except in 4(8%) who had focal thickening of endometrium in one wall. Thickness >5 mm is considered hyperplasia in the post menstrual phase. 35(70%) patients had hyperplasia according to SIS.
ENDOMETRIAL THICKNESS IN SIS

<table>
<thead>
<tr>
<th>No. of patients</th>
<th>0-5</th>
<th>10-Jun</th>
<th>15-Nov</th>
<th>16-20</th>
<th>&gt;20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
FINDINGS DIAGNOSED ONLY BY SIS

TABLE 12

<table>
<thead>
<tr>
<th>S.No</th>
<th>Age in years</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Endometrial polyp</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Submucous fibroid</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Generalised thickened endometrium</td>
<td>31</td>
<td>62</td>
</tr>
<tr>
<td>4</td>
<td>Focal thickening of endometrium</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Intramural fibroids distorting cavity</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Suspected malignancy- polyp</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Suspected malignancy-focalH</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Fibroids were present in 11 (22%) patients with submucous fibroids had associated intramural fibroid. Out of 4(8%) polyps identified, 2(4%) turned out to be adenomatous polypi, 1(2%) was a myomatous polyp with a pedicle. 1(2%) patient with irregular polypoidal projections into the cavity had adenocarcinoma endometrium.
FINDINGS DIAGNOSED ONLY BY SIS

1. Endometrial polyp
2. Submucous fibroid
3. Generalized thickened endometrium
4. Focal thickening of endometrium
5. Intramural fibroids distorting cavity
6. Suspected malignancy polyp
7. Suspected malignancy- focal H
HPE OF ENDOMETRIUM BY FRACTIONAL CURETTAGE

TABLE 13

<table>
<thead>
<tr>
<th>S.No</th>
<th>Type of endometrium</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Atrophic</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Proliferative</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>Secretory</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>Cystoglandular Hyperplasia</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Simple Adenomatous hyperplasia</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Atypical adenomatous hyperplasia</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Adenocarcinoma</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

5(10%) patients had atrophic endometrium, 18 (36%) patients had proliferative endometrium, 13 (26%) had secretory endometrium. Endometrial hyperplasia was seen in 12 (24%) patients, out of which 10 (20%) had cystoglandular hyperplasia, 1 (2%) simple adenomatous hyperplasia, 1 (2%) atypical adenomatous hyperplasia. Adenocarcinoma was seen in 1 (2%) patient.
HPE OF ENDOMETRIUM BY FRACTIONAL CURETTAGE

- Atrophic: 1
- Secretory: 3
- Simple Adenomatous hyperplasia: 5
- Adenocarcinoma: 7

No. of patients

<table>
<thead>
<tr>
<th>Condition</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrophic</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Secretory</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Simple Adenomatous hyperplasia</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
CORRELATION BETWEEN SIS & HPE

TABLE 14

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Thickness mm</th>
<th>Atrophic</th>
<th>Proliferative</th>
<th>Secretory</th>
<th>CGH</th>
<th>SAH</th>
<th>AAH</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A (0-5)</td>
<td>6(40%)</td>
<td>7(46.66%)</td>
<td>2(13.33%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>B (6-10)</td>
<td>-</td>
<td>5(25%)</td>
<td>11(55%)</td>
<td>4(20%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>C (11-15)</td>
<td>-</td>
<td>2(33.33%)</td>
<td>-</td>
<td>3(50%)</td>
<td>1(16.66%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>D (16-20)</td>
<td>-</td>
<td>3(42.85%)</td>
<td>-</td>
<td>3(42.85%)</td>
<td>-</td>
<td>-</td>
<td>1(14.28%)</td>
</tr>
<tr>
<td>5</td>
<td>E &gt;20</td>
<td>-</td>
<td>1(50%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1(50%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Out of 31(62%) cases with globally thickened endometrium, 32.25% had proliferation, 35.48% had secretory endometrium, 29.03% had cystoglandular hyperplasia and 3.22% had simple adenomatous hyperplasia. Out of 4(8%) focal hyperplasia, atypical adenomatous hyperplasia, disorderly proliferative endometrium, cystoglandular hyperplasia, adenomocarcinoma were equally distributed 1(25%) patient each.
CORRELATION BETWEEN SIS & HPE OF ENDOMETRIUM

HYSTERECTOMY SPECIMENS- CAVEITY
TABLE 15
<table>
<thead>
<tr>
<th>S.No</th>
<th>Cavity</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal</td>
<td>21</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>Polyps</td>
<td>3</td>
<td>8.57</td>
</tr>
<tr>
<td>3</td>
<td>Submucous fibroid</td>
<td>3</td>
<td>8.57</td>
</tr>
<tr>
<td>4</td>
<td>Intramural fibroid</td>
<td>6</td>
<td>17.14</td>
</tr>
<tr>
<td>5</td>
<td>Carcinoma</td>
<td>1</td>
<td>2.85</td>
</tr>
<tr>
<td>6</td>
<td>Others - lippes loop</td>
<td>1</td>
<td>2.85</td>
</tr>
</tbody>
</table>

Out of 50 cases, 35(70%) underwent hysterectomy for fibroid, adenomyosis, endometrial hyperplasia, endometrial polyps and carcinoma endometrium.

21 (60%) patients had normal cavity on cut section. 3(8.57%) polyps were identified, 3(8.57%) submucous fibroids, 6 (17%) specimens showed distortion of cavity by intramural fibroids, 1 (2.85%) had lippes loop, 1(2.85%) showed features of carcinoma endometrium friable proliferative growth with necrosis filling the cavity.
HYSTERECTOMY SPECIMENS - CAVITY

1 Normal
2 Polyps
3 Submucous fibroid
4 Intramural fibroid
5 Carcinoma
6 Others - lippes loop
Cavity was normal in 21(60%) cases both in SIS and hysterectomy specimens.

Diagnosis of polyps were 4(11.4%) in SIS, 3(8.5%) benign and 1(2.8%) suspected malignant. But in the specimen only 3 (8.5%)benign polyps were identified, the suspected malignant polyp was actually, a foreign body- lippes loop. Diagnosis of sub mucous fibroids were 4(11.4%) by SIS but only 3(8.5%) were actually submucosal in specimens. The other case of suspected malignancy with focal irregular polypoid projections showed features of carcinoma endometrium in actual specimen also.
COMPLICATIONS

TABLE -17

<table>
<thead>
<tr>
<th>S.No</th>
<th>Complications</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Post procedure pain</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>2.</td>
<td>Others</td>
<td>Nil</td>
<td>-</td>
</tr>
</tbody>
</table>

Only 4% patients complained of abdominal pain after the procedure. There was no other complications.

COMPARISON OF HPE AND SIS

TABLE 18

<table>
<thead>
<tr>
<th>True positives</th>
<th>True negatives</th>
<th>sensitivity</th>
<th>PPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>15</td>
<td>15</td>
<td>37</td>
</tr>
<tr>
<td>False positives</td>
<td>False negatives</td>
<td>specificity</td>
<td>NPV</td>
</tr>
<tr>
<td>22</td>
<td>-</td>
<td>42</td>
<td>100</td>
</tr>
</tbody>
</table>

When findings of histopathologic examination of endometrium was taken as the confirmatory ,SIS findings had 22(44%) false positives and no false negatives. There were 13(26%) true positives and 15(30%) true
négrives. Sensitivity and Negative predictive value 100% but Specificity 
and Positive predictive value were 42% and 37% respectively.

**COMPARISON OF SIS FINDINGS & HYSTERECTOMY SPECIMENS**

**TABLE 19**

<table>
<thead>
<tr>
<th>S.N o</th>
<th>Lesion</th>
<th>True +ve</th>
<th>False +ve</th>
<th>True -ve</th>
<th>False -ve</th>
<th>Sen</th>
<th>Spe</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Polyps</td>
<td>3</td>
<td>1</td>
<td>31</td>
<td>-</td>
<td>100</td>
<td>96.85</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Sub mucous fibroid</td>
<td>3</td>
<td>1</td>
<td>31</td>
<td>-</td>
<td>100</td>
<td>96.85</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>I M fibroid distorting cavity</td>
<td>5</td>
<td>-</td>
<td>29</td>
<td>1</td>
<td>83.33</td>
<td>100</td>
<td>100</td>
<td>96.66</td>
</tr>
<tr>
<td>4.</td>
<td>Malignancy</td>
<td>2</td>
<td>1</td>
<td>33</td>
<td>-</td>
<td>100</td>
<td>97</td>
<td>66.6</td>
<td>100</td>
</tr>
</tbody>
</table>
Taking the findings of hysterectomy specimens on cut sections as the gold standard SIS findings were compared. There was one false positive (2.85%) in diagnosis each of polyp submucosal fibroid and malignancy. There was one (2.85%) negative in the diagnosis of intra mural fibroid distorting cavity. Sensitivity and negative predictive value were each 100% for polyps, submucous fibroid and malignancy. But for intra mural fibroid distorting cavity sensitivity was 83.33% and negative predictive value was 96.66% while specificity and positive predictive value were 100%. For polyps, submucous fibroid, malignancy, specificity and positive predictive value were 96.85%, 96.85%, 97% and 75%, 75%, 66.6% respectively.
CORRELATION OF SIS & HYSTERECTOMY SPECIMENS

1. Polyps 3 1
2. Sub mucous 3 1
3. I M fibroid distorting cavity 5 1
4. Malignancy 2 1
5. Foreign body 1 -
DISCUSSION
Abnormal uterine bleeding is common in the peri and post menopausal women. The etiology varies from simple dysfunctional uterine bleeding to benign lesions like polyps and malignancies. Apart from the clinical examination, various diagnostic modalities are available to confirm our diagnosis.

In our study the efficacy of Saline infusion sonohysterography in diagnosing abnormal uterine bleeding and its correlation with histopathology of endometrium by fractional curettage and hysterectomy specimens was studied.

In our study 88% patients belonged to 40-50 yrs. Only 12% were in 51-55 yrs age group. In study by valenzano, Lijoi D, 2003, out of 73 pts, 64% were of median age 38.9 years, 35.6% were in median age 60.5 years 32. A few post menopausal women >50 yrs had to be excluded because of cervical stenosis which prevented effective intrauterine catheterisation.

In our study only 2% were nulli para. 60% were para2 and para3. Nulliparous women have 2 to 3 times relative risk of developing endometrial carcinoma. (Novak et al) In women of low parity with abnormal uterine bleeding most common etiology is fibroid uterus.

In our study majority of patients belonged to low socio economic status. High prevalence of pelvic inflammatory and lower genital tract lesions in this class of patients led to the exclusion of many patients from the study. This group of patients also have decreased awareness towards appropriate health care facilities and novel investigations like hysteroscopy.
In our study 82% patients had perimenopausal abnormal uterine bleeding and 18% had post menopausal bleeding. The study sample is similar to that of Pasrija, Trivedi and Narula 2004 whose sample had 89% perimenopausal and 11% post menopausal patients. Ratio of incidence of perimenopausal to post menopausal abnormal uterine bleeding in GRH OP statistics is about 1:4.

In our study, 14% were diabetic, 22% had hypertension, 26% had BMI > 25. Association of diabetes, hypertension and obesity places the patient at high risk in the evaluation of abnormal uterine bleeding to rule out malignancy of the endometrium. Patients with diabetes have a relative risk of 8 and obesity have relative risk of 10 for developing endometrial carcinoma.[Novak et al]

In our study, taking more than 5 mm as the cut off value for the sum of anterior and posterior wall thickness, 70% patients had endometrial thickening. Out of which 62% had generalised thickening and 8% had focal thickening. In study by goldstein SR, Zelster, Horan, with single layer cut off thickness < 3 mm, 23% had generalised hyperplasia, 1% had focal hyperplasia.

In our study, out of 31 cases of globally thickened endometrium 38.7% had proliferative endometrium, 32.2% had secretory endometrium and 29% had cystoglandular hyperplasia, 3.2% had adenomatous hyperplasia. In goldstein’s study, 50% had proliferative endometrium 50% had hyperplasia.
According to Descargues, Lemercier & colleagues 2001 while comparing the results of sonohysterography and histopathological examination, positive predictive value & negative predictive value were 83% and 100%.

In our study positive predictive value was low 37% but negative predictive value was 100%. This may be due to interpretation errors associated with simple mucous hypertrophy as hyperplasia. Also patients with irregular cycles, the timing of the procedure could not be exactly made at the early proliferative phase and quite a number of patients around 26% had secretory endometrium on the HPE.

This contributes to 57% of patients with suspected hyperplasia. In few cases, when cavity was forcibly distended with, there was a decrease in the thickness of endometrium by 1-2 mm with SIS compared to TVS.

In our study clinical diagnosis of fibroids was made in 10%. This increased to 20% with TVS. With saline instillation, diagnosis of fibroids increased to 22% since a 2.5*2.5 cm submucosal fibroid came into view only after saline instillation.

Among findings exclusively diagnosed by SIS, endometrial polyps were found in 8.5%, sub mucous fibroids in 8.5%, intramural fibroid distorting cavity in 12%, malignancy in 2.8%. In study by Pasrija, Trivedi S.S, Narula ML 2004, 3.4% had sub mucous fibroids, 6.8% had polyps and 3.4% had suspected carcinoma thus almost correlating with our study.
In our study, the sensitivity of SIS in comparison with hysterectomy specimens is 100% for polyp, sub mucous fibroids, intramural fibroids distorting cavity and malignancy. Conventional TVS missed,\ polyps, and suspected only 4% sub mucous fibroids.

The sensitivity of SIS in the study by Valenzano, Lijoi and colleagues is also 100% in perimenopausal women. In post menopausal women, the sensitivity of SIS was 100% for hyperplasia, 93.8% for polyps but it decreased to 75% for submucosal fibroids.

Diagnosis of polyps were 8% in our study by SIS. In the actual specimens only 6% polyps were identified. One suspected malignant polyp was a foreign body, forgotten lippes loop partially embedded in the myometrium. Diagnosis of submucous fibroids were 8% by SIS, but only 6% were submucosal in actual specimen. An intramural fibroid distorting the cavity was mistaken for submucosal fibroid in SIS.

In our study, the specificity of SIS for diagnosing polyps, sub mucous fibroids, intramural fibroids distorting cavity and malignancy are 96.85%, 96.6%, 97% respectively. According to Pasrija and others, specificity was 88.5% on the whole. (less than our study).

Negative predictive value overall is 100% in our study. Positive predictive value for polyps, sub mucous fibroids, intramural fibroids distorting cavity and malignancy are 75%, 75%, 83.3, 66.6% respectively.
In Deuholm, Forman & colleagues 2001 study, positive predictive values were 98% and negative predictive values were 85% thus correlating with our study.

According to Nanda. S, Chadha N & colleagues, in whose study hysterectomy findings were kept as the gold standard, the sensitivity & specificity were 100% for polyps, 97.8% comparable to our study. For submucous fibroids, sensitivity was 89.5%, specificity 100% where as our study had 100% sensitivity.

Detection of focal hyperplasia is significant as 75% with focal hyperplasia had abnormal histopathology of endometrium requiring surgical interventions.

In our study only 2% patients complained of abdominal pain after the procedure. There was no severe complications as endometritis. This is in par with Bonnamy L, Marret H and others, in whose study out of 81% patients, the incidence of pelvic pain was 1.2% and endometritis 1.2%.
SUMMARY
SUMMARY

1. Fifty consecutive patients in peri & post menopausal age group with abnormal uterine bleeding attending GRH gynaecology OP, were taken up for study.

2. Majority belonged to the age group of 40-50 yrs (80%), 12% were in 51-55 yrs group.

3. Parity of 2 and 3 were maximum at 60%, followed by parity of 4 in 32%. Only one patient out of 50 was a nullipara.

4. Majority (80%) belonged to low socio economic status.

5. Perimenopausal women constituted 82% and post menopausal women 18%.

6. Clinical presentation of abnormal uterine bleeding were: menorrhagia and polymenorrhagia in 75%, polymenorrhea in 9.75% and menometrorrhagia in 14.6%.

7. Post menopausal women with bleeding per vaginum reported early within a month of onset of symptoms whereas perimenopausal patients reported late within a year of onset of symptoms.
8. High risk factors for endometrial cancer existed in the form of diabetes in 14%, hypertension in 22%, obesity in 24%. Overt anemia was present in 26% of women.

9. Associated clinical gynaecological conditions were present in 22% patients, out of which the commonest was fibroid in 46%.

10. Associated findings in TVS & SIS were: fibroids in 20% adenomyosis in 14%, hydrosalphinx in 2%, ovarian cyst in 4%.

11. Generalised endometrial thickening was diagnosed in 62% and focal endometrial thickeing in 8 % in SIS

12. Out of those with generalised thickening 32.25% had proliferative endometrium, 35.48% had secretory endometrium, 29% had cystic glandular hyperplasia 3.2% had simple adenomatous hyperplasia.

13. Out of those with focal hyperplasia, 25% had atypical adenomatous hyperplasia, 25% had disorderly proliferative endometrium, 25% cysto glandular hyperplasia, 25 % adenocarcinoma.

14. Sensitivity and negative predictive value of SIS with HPE is 100% but specificity & positive predictive value are low 42% &37% respectively.
15. In SIS, endometrial polyps were diagnosed in 8%, submucous fibroids in 8%, focal thickening of endometrium in 8%, intramural fibroids distorting cavity in 10% suspected malignancy 4%.

16. (one) 2% intramural fibroid was mistaken for a sub mucous fibroid in SIS, (one) 2% polyp (malignant) by SIS actually turned out to be forgotten lippes loop (in hysterectomy specimen).

17. Sensitivity, negative predictive value of SIS for diagnosis of polyps, submucous fibroids and malignancy was 100%. The sensitivity and negative predictive value for diagnosing intramural fibroids distorting cavity was 83.33% and 96.66%.

18. Specificity for polyps, sub mucous fibroids both 96.5% each, for intramural fibroids distorting cavity 100% and malignancy 97%. Positive predictive value for diagnosing malignancy was low 66.6%, for fibroids distorting cavity 100%, for both sub mucous fibroids & polyps each 75%.
CONCLUSION
CONCLUSION

Saline infusion sonohysterography is an ideal, cost effective, minimally invasive investigation to be done as the first step in the evaluation of abnormal uterine bleeding in perimenopausal and post menopausal patients.

This will alone be sufficient in most patients except very few who will require subsequent confirmation with sophisticated investigation like hysteroscopy.

SIS has an overall sensitivity and negative predictive value of 100% but positive predictive value and specificity are less. But it is still high for detecting focal endometrial abnormalities.

Combined with histopathology, specificity and positive predictive value can be increased further, false positives can be reduced.

The findings in SIS correlated almost in 76% of cases with histopathology of endometrium in fractional curettage and 95% with hysterectomy specimens.

Accordingly, the best suited management can be chosen for the individual patient among the varied options of medical, minimally invasive or surgical procedures.


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NAME:
AGE:
UNIT: Date of admission: Date of SIS: Address:
Socio economic status:
IP NUMBER:
MARITAL STATUS:
PARITY:
MENARCHE:
DURATION OF CYCLES: (before the presenting complaint)
DURATION OF FLOW: Perimenopausal Postmenopausal
COMPLAINTS:
Duration of cycles: Menopause
Duration of flow: Duration of bleeding;
H/O amenorrhea before bleeding:yes/no;if yes,duration- h/o passing clots:
Regularity of cycles:
Number of diapers used/day
H/O passing clots:
H/O dysmenorrhea : yes/no; if yes,spasmodic/congestive
Discharge PV:
Last menstrual period:
Abdominal pain:
Intermenstrual bleeding:
Postcoital bleeding:

TYPE OF ABNORMAL UTERINE BLEEDING:
Other bleeding tendencies:
H/O abnormal discharge pv
H/O thyroid dysfunction:  weight gain:
H/O IUCD insertion/OCP intake:
H/O abortion/recent child birth:
H/O intake of sex hormones:
H/O sterilization:

GENERAL EXAMINATION:
Height:  Weight:  Body mass index:
Anaemia:yes/no
Edemalegs:yes/no
Others:
Breast:
Thyroid:

VITAL SIGNS:  pulse:  blood pressure:

EXAMINATION OF ABDOMEN:

SPECULUM EXAMINATION:

BIMANUAL EXAMINATION:

EVALUATION:  haemoglobin%:  blood grouping:  CT:  BT:  CRT:

TRANS VAGINAL SONOGRAPHY:
SALINE INFUSION SONOHYSTEROGRAPHY:

Endometrial thickness:
Endometrial hyperplasia: localized/generalized
Polyps
Fibroids
Intra uterine adhesions:
Other significant findings:

histopathology if available:
MASTER CHART
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**Notes:**
- P: Pink
- V: Version
- M: Menstrual
- Ane: Amenorrhea
- DM: Dysmenorrhea
- HT: Hysterectomy
- DM: Dysfunctional
- PVC: Polycystic Ovary Syndrome
- I.M: Intrauterine Myoma
- Ovarian Cyst: Functional
- L: Large
- Multiple: Multiple
- 1.5+1.5: 1.5\+1.5 cm
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