

# Role of Transvaginal Sonography and Diagnostic Hysteroscopy in Abnormal Uterine Bleeding

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## ABSTRACT

**Introduction :** A prospective study was carried out in Department of Obstetrics and Gynaecology in KIMS Hospital Bangalore, India, for a period of 18 mnth from 2005-2008. Sixty cases were selected for this study from patients who were above the age of 40 y and who were presented with a history of abnormal uterine bleeding (after excluding pregnancy and its complications, Patients with local causes of bleeding, patients with carcinoma cervix and PID). All women underwent transvaginal sonography and hysteroscopy. Dilatation and curettage was done in cases with abnormal endometrial findings and sample sent for histopathology examination. Performance of TVS pick up rate in relation to hysteroscopy were analysed by various statistical methods.

**Results:** In the present study, transvaginal ultrasound showed an accuracy of 83.3% in detecting the proliferative phase and 66.67% in detecting the secretory phase. TVS has a sensitivity of 0% for a local lesion (intra-cavitary) of endometrial cavity. TVS was also preferable in case of post-menopausal patients with endometrial thickness less than 4mm.

**Conclusion:** Both TVS and hysteroscopy can detect endometrial intracavitary abnormalities with varying accuracies. These can supplement and enhance the accuracy of tissue diagnosis. Thus, the first procedure to which patients with AUB are to be subjected should be TVS followed by hysteroscopy and hysteroscopically directed biopsy, wherever required.

**Keywords:** Endometrial thickness, Local lesion, Proliferative phase

## INTRODUCTION

AUB is a very frequent gynaecological complaint and occurs across the entire age spectrum; approximately 75,000 hysterectomies are carried out each year, with 30% of these for menstrual problems alone.

The causes of AUB include a wide variety of gynaecological and non-gynaecological causes. It comprises of 10-15% of gynaec OPDs [1]. History and detailed examination in these patients are necessary to decide further investigations and management.

Transvaginal sonography (TVS) allows detailed assessment of anatomical abnormalities of the uterus and endometrium. In addition, pathologies of the myometrium, cervix, tubes, and ovaries may be assessed. This investigative modality may assist in the diagnosis of endometrial polyps, adenomyosis, leiomyomas, uterine anomalies, and generalized endometrial thickening associated with hyperplasia and malignancy [2].

Endometrial thickness shown by TVS can be interpreted as Secretory, Proliferative Endometrium or Abnormal Endometrium depending on the thickness measurement and co-relating it clinically with the phase of Menstruation.

A thick endometrium by TVS can be Late Secretory Endometrium, Hyper estrogenism, Pregnancy related conditions, Endometrial polyp, Endometrial hyperplasia and can be Ca endometrium which all can present with AUB.

Hysteroscopic evaluation in these patients gives a chance of direct visualisation of the cavity and guided biopsy of any local lesion, if present.

Proliferative Endometrium appears smooth pale pink and gland openings can be seen sometimes. Secretory Endometrium can be puffy and vascular, may be with regular protrusion or sometimes can be cloudy with fine debris floating in the media which is used. Post Menopausal Endometrium appears atrophic thin and avascular. Any variations in the findings can be interpreted as abnormal.

Hysteroscopy may be performed in an office setting with or without minor anaesthesia or in the operating room with regional or general anaesthesia. Directed biopsies can be taken if needed, which is

beneficial compared to "blind" dilatation and uterine curettage.

The risks of hysteroscopy include perforation of the uterus, infection, cervical lacerations, creation of false passages, and fluid overload. Although the major role of out-patient hysteroscopy in the management of AUB is diagnostic, there is scope for simple operative procedures such as polypectomy, and targeted endometrial biopsy [3].

Advancements in technology have made TVS and diagnostic hysteroscopy to become useful adjuncts to blind endometrial curettage. Hence, with stepwise evaluation of all possible organic causes of AUB, therapy can be tailored more appropriately and efficiently.

This can prevent occurrence of serious consequences in some and improve the quality of life in several others.

## AIM

To evaluate the efficacy of transvaginal sonography and diagnostic hysteroscopy in AUB.

## MATERIALS AND METHODS

This is a prospective comparative study conducted in Kempegowda Institute of Medical sciences Bangalore, Karnataka, India for a period of 18 mnth (the cases were studied between the year 2005 – 2008).

Patients who attended KIMS OPD with the complaints of AUB were enrolled in this study. Relevant clinical examinations detailed past and family histories were noted. Blood investigations were done after excluding pregnancy and its complications, Patients with local causes of bleeding (Vaginal and Vulval pathology) patient with carcinoma cervix, those on HRT and PID.

Sixty patients met the required criteria and were posted for TVS and hysteroscopy. Patients were explained about the need for undergoing TVS and hysteroscopic examinations and risk associated with them. After their consent, they were admitted on the day of the procedure.

Patients were asked to come nil orally on the day of procedure. Then injection tetanus toxoid and xylocaine test dose and injection Ampicillin 500mg IV (ATD) were given to all patients prior to the procedure on admission.

TVS was done in all patients using 7.5 MHz transvaginal probe. Uterus, endometrium and the adnexae were evaluated by the various maneuvers available. Ultrasound endometrial assessment was measured as the maximum anterior-posterior thickness of the hyperechoic lines on a long-axis transvaginal view of the uterus. The normal endometrium in a premenopausal woman varies in thickness according to the menstrual cycle from 4mm to 12mm and in postmenopausal women; it should be less than 5mm.

At KIMS hospital, hysteroscopy was performed in a dedicated clinic within the endoscopy unit. Patients were shifted to operation theatre and under general anaesthesia / IV sedation, with all aseptic precautions, hysteroscopy procedure was carried out. Diagnostic hysteroscopy procedure was performed using 4mm Rigid Storz Hysteroscope and 5mm sheath. CO<sub>2</sub> was used as distention media aided by hysteroflator. Wherever necessary, cervical dilatation was done. A Systematic survey – observation of cervix, endocervix, uterine fundus, endometrial cavity, right and left cornu and both tubal orifices were visualised and interpreted accordingly. Wherever necessary Dilatation and Curettage was also done in the same sitting and endometrial curettage was sent for HPE. Then patients were observed in the recovery room for 2 h and most of the patients were discharged on the same day.

## RESULTS

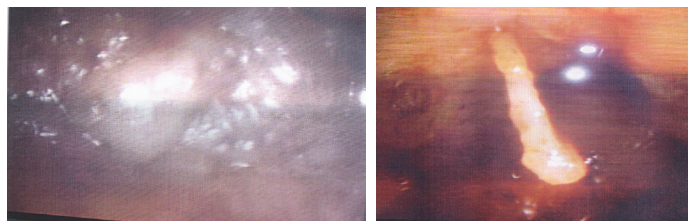
Most of menorrhagia patients had endometrial thickness between 7-9 mm. 60% of our postmenopausal patients had endometrial thickness of less than 4mm [Table/Fig-1]. 45% of the patients with the complaints of cyclical bleeding (menorrhagia and polymenorrhagia) had normal appearing endometrial cavity either with secretory or proliferative endometrium. 10% of post-menopausal patients had

| Endo-metrial Thickness (mm) | Menstrual Symptoms |               |                  |                      |                  | Total |
|-----------------------------|--------------------|---------------|------------------|----------------------|------------------|-------|
|                             | Menor-rgha         | Metror-rhagia | Polymen-orrhagia | Conti-nuous Bleeding | Post Meno-pausal |       |
| ≤3                          | 1                  | 2             |                  |                      | 5                | 8     |
| 4-6                         | 8                  | 2             | 4                | 1                    | 1                | 16    |
| 7-9                         | 14                 | 5             | 3                |                      | 3                | 25    |
| 10-12                       | 2                  |               | 1                | 1                    | 1                | 5     |
| 13-15                       | 3                  | 1             | 1                | 1                    |                  | 6     |
| Total                       | 28                 | 10            | 9                | 3                    | 10               | 60    |

[Table/Fig-1]: Relationship of type of bleeding and TVS findings

| Hyster-oscopy | Menstrual Symptoms |               |                  |                      |                  | Total |
|---------------|--------------------|---------------|------------------|----------------------|------------------|-------|
|               | Menor-rgha         | Metror-rhagia | Polymen-orrhagia | Conti-nuous Bleeding | Post Meno-pausal |       |
| Proliferative | 9                  | 3             | 2                |                      |                  | 14    |
| Secretory     | 10                 | 1             | 2                |                      |                  | 13    |
| Atrophic      | 1                  | 2             |                  | 1                    | 6                | 10    |
| Polyp         | 5                  | 2             | 1                |                      | 1                | 9     |
| Hyperplastic  | 1                  |               | 3                | 2                    | 2                | 8     |
| Fibroid       | 2                  | 1             | 1                |                      |                  | 4     |
| Others        |                    | 1             |                  |                      | 1                | 2     |
| Total         | 28                 | 10            | 9                | 3                    | 10               | 60    |

[Table/Fig-2]: Relationship of type of bleeding and TVS findings



[Table/Fig-3]: Submucous Fibroid [Table/Fig-4]: Submucosal Polyp

| Endo-metrial Thickness (mm) | Hysteroscopy findings |            |          |       |               |          |         | Total |
|-----------------------------|-----------------------|------------|----------|-------|---------------|----------|---------|-------|
|                             | Prolif-erative        | Secr-etary | Atrophic | Polyp | Hype-rplastic | Fib-roid | Oth-ers |       |
| ≤3                          | 1                     |            | 6        |       |               |          | 1       | 8     |
| 4-6                         | 8                     | 1          | 3        | 1     |               | 3        |         | 16    |
| 7-9                         | 5                     | 9          | 1        | 6     | 2             | 1        | 1       | 25    |
| 10-12                       |                       | 2          |          |       | 3             |          |         | 5     |
| 13-15                       |                       | 1          |          | 2     | 3             |          |         | 6     |
| Total                       | 14                    | 13         | 10       | 9     | 8             | 4        | 2       | 60    |

[Table/Fig-5]: Association of Hysteroscopic findings and TVS findings (ET)

| S. No. | Findings      | Hysteroscopy | Pick number of TVS | Pick-up rate of TVS (%) |
|--------|---------------|--------------|--------------------|-------------------------|
| 1      | Proliferate   | 14           | 8                  | 57.1                    |
| 2      | Secretory     | 13           | 11                 | 84.6                    |
| 3      | Atrophic      | 10           | 6                  | 60                      |
| 4      | Polyp         | 9            | 2                  | 22.2                    |
| 5      | Hyper plastic | 8            | 3                  | 37.5                    |
| 6      | Fibroid       | 4            | 3                  | 75                      |
| 7      | Others        | 2            | -                  | -                       |

[Table/Fig-6]: Performance of TVS (Pick-up rate) in relation to hysteroscopy

atrophic endometrium. All patients with continuous bleeding had an abnormal endometrial cavity [Table/Fig-2].

## DISCUSSION

AUB is one of the common gynaecological conditions encountered in the OPD which require a proper evaluation and management. In this study, comparison of TVS with hysteroscopy being done in evaluating 60 patients with the AUB and accuracy of TVS was analysed.

In the present analysis, majority of the patients were in perimenopausal age group and recorded painless bleeding in 68.3% of the patients. The studies conducted by Mark H.Emmanuel [4], Sheth SS [5] Nancy A.Towbin [6] and Acharya Veena [7] have also found the similar clinical presentations in their studies. This suggests that majority of the patients of AUB were in Perimenopausal age.

Since the majority of the menstrual cycles in perimenopausal age are anovulatory or luteal due to weaning of ovarian function, hence dysmenorrhea is less common and similar presentation is noticed in this study contributing for about 68.3% of the patients with painless bleeding.

In the study group, Menorrhagia is the commonest mode of presentation [Table/Fig-1], which correlates with studied by Emmanuel [4] and Acharya Veena [7].

In our study, anaemia was present in 41.5% of the patients, unlike the study conducted by Gunjan Sabherwal [1] (65%), Emmanuel [4] (59.3%) and Sheth SS [5] (73%), varying between 60 - 75%. This disparity could be due to the fact that most of our patients presented were within first 6 mnth of their complaint.

| S. No. | Diagnosis    | Diagnostic value of TVS keeping Hysteroscopy as Gold Standard |             |       |       |          |       |         |
|--------|--------------|---|-------------|-------|-------|----------|-------|---------|
|        |              | Sensitivity   | Specificity | PPV   | NPV   | Accuracy | Kappa | P Value |
| 1      | Proliferate  | 57.14   | 91.3        | 66.67 | 87.5  | 83.3     | 0.51  | < 0.001 |
| 2      | Secretory    | 84.62   | 61.7        | 37.93 | 93.55 | 66.67    | 0.32  | 0.002   |
| 3      | Atrophic     | 60  | 96          | 75    | 92.31 | 90       | 0.61  | <0.001  |
| 4      | Polyp        | 22.22   | 100         | 100   | 87.93 | 88.33    | 0.33  | 0.005   |
| 5      | Hyperplastic | 37.5  | 96.15       | 60    | 90.91 | 88.33    | 0.4   | 0.009   |
| 6      | Fibroid      | 75  | 98.21       | 75    | 98.21 | 96.67    | 0.73  | <0.001  |

**[Table/Fig-7]:** Diagnostic value of TVS with respect to hysteroscopy

Hysteroscopy in the present series has revealed normal endometrium in 45% (majority of these patients had endometrial thickness less than 9mm) of the cases and various abnormalities in 55% of the cases, as observed in [Table/Fig-2]. Whereas studies conducted by Gunjan Sabherwal [1], Acharya Veena [7] and Loizzi [8] showed normal hysteroscopic pattern varying from 20-70%. Among the local lesions, hysteroscopy in the present series shows submucous fibroid [Table/Fig-3] 6.7% and polyps [Table/Fig-4] in 15% cases, Neumann T, Astudillo [9] and Sciarra JJ [10] also had similar pick up rates of the intra-cavitary lesions.

TVS showed good correlation with the Hysteroscopic findings for normal variants of endometrium, but poor correlation for intracavitary pathology's, as the majority of the endometrial thickness in cases of abnormal hysteroscopic findings were also in the normal endometrial thickness range (4-12 mm) [Table/Fig-5].

Six of the post menopausal patients had endometrial thickness less than 4mm consistent with the hysteroscopic findings. One case of post-menopausal bleeding with endometrial thickness of 12mm had hyperplastic endometrium. One more post menopausal patient had endometrial polyp, which was picked up only by hysteroscopy. Hence, this result may suggest that hysteroscopy is superior in providing accurate results in post menopausal patients with endometrial thickness more than 4mm [Table/Fig-6]. Maia H Jr [11] also suggests similar opinion.

In the present study, transvaginal ultrasound showed an accuracy of 83.3% in detecting the proliferative phase and 66.67% in detecting the secretory phase. Many similar studies have not correlated the sensitivity of TVS with respect to the phase of menstruation, where as this study clearly picks up the accuracy of TVS with respect to each phase of menstruation [Table/Fig-7].

But in the present series, a case of intrauterine synechiae has been missed by TVS in a patient who had come with a complaint of metrorrhagia of 6 month duration.

The accuracy can be improved by the instillation of saline solution in to the uterine cavity to outline the contour of lesions (Hysterosonosalphingography), which is an invasive procedure. Hysteroscopy being the gold standard in diagnosing intracavitary lesions, it can be performed instead of Hysterosonosalphingography, as hysteroscopy leads to direct visualisations of the cavitary lesions. Cynthia Farquhar [12] and Dijkhuizen [13] also give the similar opinion in their study.

## CONCLUSION

Both TVS and hysteroscopy can detect endometrial intracavitary abnormalities with varying accuracies. These can supplement and enhance the accuracy of tissue diagnosis. Thus patients with AUB should to be subjected to TVS as first procedure, followed by hysteroscopy; and hysteroscopically directed biopsy, wherever necessary and required.

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