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# Evaluation of Dysfunctional Uterine Bleeding by TVS, Hysteroscopy and Histopathology

Acharya *Veena*, Mehta *Seema*, Randar *Anita*
*Zanana Hospital and Department of Gynecology and Obstetrics, S.M.S. Medical College, Jaipur*

**OBJECTIVE** –To evaluate the accuracy and predictive values of non-invasive tranvaginal sonography (TVS) and invasive procedures (hysteroscopy and D and C) in DUB patients. **METHODS -** One hundred patients with DUB were evaluated by TVS, hysteroscopy and histopathology. The sensitivity, specificity, positive predictive and negative predictive values of the procedures were calculated and compared. **RESULTS -** In detecting the histologic nature (proliferative / secretory) of endometrium, TVS and hysteroscopy are almost equally specific and sensitive. But for detecting submucous myomas and endometrial polyps, hysteroscopy has 100% sensitivity and specificity and very high positive and negative predictive values. **CONCLUSIONS -** In the diagnosis and management of DUB cases, the non-invasive TVS should be of first choice. If intracavity lesion is suspected or when the endometrial thickness is more then 14 mm, hysteroscopy followed by curettage and histopathology will improve the accuracy of clinical diagnosis.

**Key words** DUB, TVS

## Introduction

DUB is one of the most frequently encountered condition in Gynecologic OPD. Abnormal uterine bleeding was traditionally investigated by means of dilatation and curettage and histopatholical examination of the endometrium and this was considered the "Gold Standard". However, 100% accuracy of the procedure is doubtful and it is expensive, inconvenient and poses some surgical and anaesthetic risks.

Brooks and Serden[1] have revealed that approximately half of pedunculated abnormalities such as endometrial polyps were missed by curettage. For focal lesions, D and C is less accurate and less reliable.

Hysteroscopy and USG are now being increasingly used not only for detecting funtional disorders of endometrium but also for excluding various unsuspected organic diseases of the endometrium like cancer and tuberculosis.

USG can demonstrate anatomic findings frequently not discernible on pelvic examination such as small cyst, leiomyoma and even endometrial carcinoma. It can also predict the ovulatory and hormonal status of the patient.

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Correspondence :
Dr. Seema Mehta
Zanana Hospital and Department of Gynecology and Obstetrics, 16, Ganesh Colony, J.L.N. Marg, Jaipur - 302 004
Tel. 0141-620710 Fax : 0141-620330

Emanuel et al[2] compared TVS to hysteroscopy in abnormal uterine bleeding and concluded that TVS could be implemented as a routine first step technique in the evaluation of patients with abnormal uterine bleeding and that a further diagnostic procedure, preferably hysteroscopy with histopathologic examination is indicated in cases of an abnormal or inconclusive sonogram. By this approach the number of invasive diagnostic procedures could be reduced to approximately 50%.

Hysteroscopy can detect pathological lesions like submucous myoma, endometrial polyp, endometrial hyperplasia and carcinoma.

According to Valle[3], hysteroscopy is not a substitute for tissue diagnosis. According to Loffer[4] a tissue diagnosis is essential.

Hysteroscopy combined with histologic examination is the new "Gold Standard" for evaluating a case with abnormal uterine bleeding.

## Material and Methods

One hundred patients admitted for DUB were studied. The diagnosis of DUB was made by exclusion of any systemic or local disease. Cases of post-menopausal bleeding, were excluded.

Detailed menstrual, contraceptive, obstetric and medical history of each patient were taken and general physical, systemic and gynecological examination done

Every patient was subjected to following investigtions complete blood count, thyroid function test, blood sugar (fasting), liver function test and x-ray chest and was subjected to detailed TVS, hysteroscopy and D and C.

**Results**

Patients were in the age group of 26 to 45 years; 56% were from urban areas and 95% were Hindus, 4% Muslims and 1% Christians.

Mean marital life of patients was 18 years and 42% presented with menorrhagia, 24% with polymenorrhagia, 14% with polymenorrhoea, 12% with menometrorrhagia and 8% with continuous bleeding P/V.

Ninety percent were multiparous and 6% were nulliparous while 64% had tubal sterilization, 4% were using oral contraceptives, 10% IUCD and 2% barrier methods.

Table I shows TVS findings of the endometrium. The thickest endometrium of 22-24mm was seen in 3 cases. One case was diagnosed as having endometrial polyp by USG.

Hysteroscopic examination was done premenstrually except in those cases where cycles were grossly irregular. The hysteroscopic findings are shown in Table II.

All the patients were subjected to dilatation and curettage and histopathological examination of the endometrial tissue was done. The histopathological findings are shown in Table III.

Table IV shows the co-relatation between endometrial thickness on TVS and hysteroscopy. It was observed that on hysteroscopy proliferative and secretory phase endometrium were observed when endometrial thickness range on TVS was 2-18mm and 6-12mm respectively. When endometrial thickness was 16-24mm range, polypoidal growth was seen on hysteroscopiic examination. Tubercular endometritis was detected in thin endometrium of range 2-4 mm.

In Table V histopathological findings of endometrial biopsy are co-related with endometrial thickness seen on TVS. Proliferative phase endometrium without dilatation of glands, with mild dilatation of glands and with moderate dilatation of glands was seen in patients who had endometrial thickness ranging between 2-10, 10-14 mm and 14-20mm respectively. Secretory phase of endometrium was found in patients whose endometrial thickness was between 6-12mm. Mean endometrial thickness was 7.1mm in proliferative phase and 9.7 mm in secretory phase.

In Table VI hysteroscopic findings are co-related with histopathological findings of the endometrium. Seventy cases showed proliferative phase on hysteroscopic examination. Histopathological examination of these 70 cases showed simple proliferative phase in 31 cases, proliferatrive phase with mild dilatation in 30 cases and proliferative phase with moderate dilatation in 9 cases. Nine cases had secretory endometrium both on hysteroscopy and histopathology.

**Table No. I : Endometrial Thickness by TVS**

| Endometrial Thickness | No. of Patients | Three line sign. | Single line sign. | Percent |
|---|---|---|---|---|
| 2 - 4 mm | 3 | 3 | 0 | 3 |
| 4 - 6 mm | 2 | 2 | 0 | 2 |
| 6 - 8 mm | 16 | 14 | 2 | 16 |
| 8 - 10 mm | 17 | 14 | 4 | 17 |
| 10-12mm | 22 | 19 | 3 | 22 |
| 12 - 14mm | 11 | 11 | 0 | 11 |
| 14 - 16mm | 15[a] | 15 | 0 | 15 |
| 16 - 18 mm | 7 | 0 | 0 | 7 |
| 18 - 20mm | 1 | 0 | 0 | 1 |
| 20 -22mm | 3 | 0 | 0 | 3 |
| 22-24mm | 3 | 0 | 0 | 3 |
| Total | 100 | | | 100 |

[a] One endometrial polyp was also seen on TVS at 14-16 mm endometrial thickness.

Table No. II : Hysteroscopic Findings

| Endometrial diagnosis by hysteroscopy | No of Patient | Percentage |
|---|---|---|
| Proliferative endometrium | 70 | 70 |
| Secretary endometrium | 09 | 09 |
| Single endometrial Polyp | 12 | 12 |
| Polypoidal growth | 07 | 07 |
| Submucous fibroid | 1 | 1 |
| Tubercular endometritis | 1 | 1 |
| TOTAL | 100 | 100 |

Table No. III : Histopathology Findings

| Histopathology of endometrium | No. of patients | Percentage |
|---|---|---|
| Proliferative phase | 85 | 85 |
| Proliferative phase without dilatation glands | 32 | 32 |
| Proliferative phase with dilatation of glands | 53 | 53 |
| • mild dilatation | 30 | 30 |
| • moderate dilatation | 23 | 23 |
| Secretoary phase | 9 | 9 |
| Simple Hyperplasia (Cystic dilatation of glands without atypia) | 6 | 6 |
| TOTAL | 100 | 100 |

Single endometrial polyp was detected in 12 cases on hysteroscopic examination. Histopathological examination of these 12 cases showed proliferative endometrium with moderate dilatation of glands. Out of the seven patients who had polypoidal growth on hysteroscopic examination, six had simple hyperplasia and one showed proliferative phase with moderate dilatation of glands on histopathology. One case showed submucous fibroid on hysteroscopy. On histopathology, the endometrium was in proliferative phase with moderate dilatation of glands. The case with tubercular endometritis on hysteroscopy had proliferative endometrium on histology. Proliferative phase with moderate dilatation of glands may be associated with mucous polyp, polypoidal growth or submucous fibroid.

Tabel VII shows the correlation between TVS and hysteroscopic findings at different endometrial thickness on TVS. When the endometrial thickness was between 2-14mm the type of endometrium was either proliferative or secretory. Hysteroscopy showed similar findings. When the endometrial thickness was more than 14mm, the type of endometrium was proliferative or hyperplastic. On hysteroscopically evaluating these patients, the types of endometrium found were proliferative, endometrial polyp, submucous fibroid or polypoidal growth.

Table VIII shows the correlation between TVS and histopathological findings at different ranges of endometrial thickness. Here again, it was found that when the endometrial thickness is less the 14 mm, the TVS and histopathological findings were almost same. But when the thickness was more than 14 mm, TVS showed proliferative or hyperplastic endometrium while histopathology showed proliferate endometrium with moderate ditatation of glands or endometrial hyperplasia.

## Discussion

Table IX, X, XI show that TVS is less sensitive then hysteroscopy in detecting endometrial polyp and submucous fibroid. TVS had 8.33% sensitivity, 100% specificity and 100% positive predictive value and

**Table IV : Correlation Between Hysteroscopic and Sonographic Findings**

| Hysteroscopic Findings | Endometrial Thickness in mm by TVS | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2-4 | 4-6 | 6-8 | 8-10 | 10-12 | 12-14 | 14-16 | 16-18 | 18-20 | 20-22 | 22-24 | |
| Proliferative | 2 | 2 | 14 | 13 | 19 | 11 | 8 | 1 | - | - | - | 70 |
| Secretory | - | - | 2 | 4 | 3 | - | - | - | - | - | - | 9 |
| Sinfgle Endometrial Polyp. | - | - | - | - | - | - | 6 | 5 | 1 | - | - | 12 |
| Sub mucous fibroid | - | - | - | - | - | - | 1 | - | - | - | - | 1 |
| Polypoidal growth | - | - | - | - | - | - | - | 1 | - | 3 | 3 | 7 |
| T.B. Endometritis | 1 | - | - | - | - | - | - | - | - | - | - | 1 |
| TOTAL | 3 | 2 | 16 | 17 | 22 | 11 | 15 | 7 | 1 | 3 | 3 | 100 |

**Table V : Correlation Between Histopathological and Sonographic Findings**

| Histopathologic Findings | Endometrial Thickness in mm by TVS | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2-4 | 4-6 | 6-8 | 8-10 | 10-12 | 12-14 | 14-16 | 16-18 | 18-20 | 20-22 | 22-24 | |
| Proliferative phase without dilation of glands | 3 | 2 | 14 | 13 | - | - | - | - | - | - | - | 32 |
| With mild dilatation | - | - | - | - | 19 | 11 | - | - | - | - | - | 30 |
| With moderate dilatation | - | - | - | - | - | - | 15 | 7 | 1 | - | - | 23 |
| Secretory phase | - | - | 2 | 4 | 3 | - | - | - | - | - | - | 9 |
| TOTAL | 3 | 2 | 16 | 17 | 22 | 11 | 15 | 7 | 1 | 3 | 3 | 100 |

Table VI : Co-relation Between Histopathological and Hysteroscopic Findings

| Hysteroscopic Findings | Histopathological Findings | | | | | |
|---|---|---|---|---|---|---|
| | Proliferative Phase | | | Secretary phase | Simple Hyperplasia | Total |
| | Without dilatation of glands | Mild dilatation of glands | Moderate dilatation of glands | | | |
| Proliferative | 31 | 30 | 9 | - | - | 70 |
| Secretory | - | - | - | 9 | - | 9 |
| Single Endometrial Polyp | - | - | 12 | - | - | 12 |
| Polypoidal growth | - | - | 1 | - | 6 | 7 |
| Sub mucous fibroid | - | - | 1 | - | - | 1 |
| TB Endometritis | 1 | - | - | - | - | 1 |
| TOTAL | 32 | 30 | 23 | 9 | 6 | 100 |

Table VII : Co-relation between TVS and Hysteroscopic Findings at Different Endometrial Thickness

| No. of Patients | Endometrial thickness in mm | TV-U.S.G. Findings | | | Hysteroscopic findings |
|---|---|---|---|---|---|
| | | Proliferative endometrium | Hyperplastic endometrium | Secretory endometrium | |
| 5 | 2-6 mm | 5 | - | - | 4 Proliferative endometrium<br>1 Tubercucular endometrium |
| 33 | 6-10 mm | 27 | - | 6 | 27 Proliferative endometrium<br>6 Secretory endometrium |
| 33 | 10-14 mm | 30 | - | - | 30 Proliferative endometrium<br>3 Secretory endometrium |
| 22 | 14-18mm | 14 | 7 | - | 9 Proliferative endometrium<br>11 Single endometrial polyp<br>1 Sub mucous fibroid<br>1 Polypoidal growth |
| 7 | 18-24mm | - | 7 | - | 1 Single endometrial polyp<br>6 Polypoidal Growth |

**Table VIII : Table Shows co-relation between TVS and Histopathological Findings at different endometrial thickness range**

| Endometrial thickness in (mm) | No. of Pts. | TVS Findings | Histopathological Findings |
|---|---|---|---|
| 2-6mm | 5 | 5 Proliferative endometrium<br>0 Sectretory endometrium | 5 Proliferat ive endometrium<br>0 Sectretory endometrium |
| 6-10mm | 33 | 27 Proliferative endometrium<br>06 Sectretory endometrium | 27 Proliferative endometrium<br>06 Sectretory endometrium |
| 10-14mm | 33 | 30 Proliferative endometrium<br>03 Sectretory endometrium | 30 Proliferative endometrium with mild dilatation of gland<br>03 Secretory endometrium |
| 14-18mm | 22 | 14 Proliferative endometrium<br>01 Polyp.<br>07 Hyperplastic endometrium | Proliferative endometrium with moderate dilatation of gland |
| 18-24mm | 7 | 07 Hyperplastic endometrium moderate dilatation of gland<br>Simple endometrial hyperplasia | Proliferative endometrium with |

**Table IX : Sensitivity, Specificity, Positive Predictive and Negative Predictive Values of TVS Findings in Comparison to Histopathology**

| Findings | No. of Cases | | TVS | | | | Sensi-tivity A / A+C x 100 | Specificity D / D + B x 100 | Positive Predictive Value A/A+B x 100 | Negative Predictive Value D/D+C x 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| | TVS | Histopa-thology | True | | False | | | | | |
| | | | +ve A | - ve D | +ve B | - ve C | | | | |
| Proliferative Endometrium | 76 | 85 | 76 | 15 | 0 | 9 | 89.41% | 100% | 100% | 62.50% |
| Secretory Endometrium | 09 | 09 | 09 | 91 | 0 | 0 | 100% | 100% | 100% | 100% |
| Hyperplastic Endometrium | 14 | 06 | 06 | 86 | 8 | 0 | 100% | 91.49% | 42.86% | 100% |
| Endometrial Polyp. | 1 | 0 | 1 | 99 | 0 | 0 | 100% | 100% | 100% | 100% |

**Table X : Sensitivity, Specificity, Positive Predictive and Negative Predictive Values of Hysteroscopic Findings in Comparison to Histopathology**

| Findings | No. of Cases | | HYSTEROSCOPY | | | | Sensitivity A / A+C x 100 | Specificity D / D + B x 100 | Positive Predictive Value A/A+B x 100 | Negative Predictive Value D/D+C x 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hysteroscopic | Histopathology | True | | False | | | | | |
| | | | +ve A | -ve D | +ve B | -ve C | | | | |
| Proliferative Endometrium | 70 | 85 | 70 | 15 | 0 | 15 | 82.35% | 100% | 100% | 50% |
| Secretory Endometrium | 9 | 9 | 9 | 91 | 0 | 0 | 100% | 100% | 100% | 100% |
| Single Endometrial Polyp. | 12 | 0 | 12 | 88 | 0 | 0 | 100% | 100% | 100% | 100% |
| Submucous Fibroid | 1 | 0 | 1 | 99 | 0 | 0 | 100% | 100% | 100% | 100% |
| Simple Hyperplasia | 7 | 6 | 6 | 93 | 1 | 0 | 100% | 98.93% | 85.71% | 100% |
| TB Endometrium | 1 | 0 | 1 | 99 | 0 | 0 | 100% | 100% | 100% | 100% |

**Table XI : Sensitivity, Specificity, Positive Predictive and Negative Predictive Values of TVS Findings in Comparison to Histopathology Examination**

| Findings | No. of Cases | | TVS | | | | Sensitivity A / A+C x 100 | Specificity D / D + B x 100 | Positive Predictive Value A/A+B x 100 | Negative Predictive Value D/D+C x 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| | TVS | Histopathology | True | | False | | | | | |
| | | | +ve A | -ve D | +ve B | -ve C | | | | |
| Proliferative Endometrium | 76 | 70 | 70 | 24 | 6 | 0 | 100% | 80% | 91.58% | 100% |
| Secretory Endometrium | 9 | 9 | 9 | 91 | 0 | 0 | 100% | 100% | 100% | 100% |
| Hyperplastic Endometrium | 1 | 12 | 1 | 82 | 0 | 11 | 8.33% | 10% | 100% | 88.27% |
| Endometrial Polyp. | 0 | 1 | 0 | 99 | 0 | 1 | 0 | 100% | 100 | 100% |
| Submucous Fibroid | 14 | 7 | 7 | 86 | 7 | 0 | 100% | 92.48% | 50% | 100% |
| Endometritis | 0 | 1 | 0 | 99 | 0 | 1 | 0 | 100% | 0% | 99% |

88.27% negative predictive value in detecting polyp. TVS has 0% sensitivity, 100% specificity, 100% positive predictive value and 99% negative predictive value in submucous myoma. Hysteroscopy has 100% sensitivity, specificity, positive and negative predictive value in detecting polyp and submucous myoma.

In prediction of endometrial hyperplasia, TVS is 100% sensitive, 91.49% spoecific, has 42.85% positive predictive value and 100% negative predictive value while hysteroscopy has 100% sensitivity, 98.93% specificity, 85.71% positive predictivie value and 100% negative predictive value.

TVS is useful as a first step investigation of choice for screening of DUB patients and for decision on the need for further invasive endometrial examination.

When endometrial thickness on TVS was less than 14 mm, no significant endometrial pathologies were detected on hysteroscopy or histopathology. But when the endometrial thickness was more than 14 mm, significant endometrial pathologies were detected by hysterocopy and histopathology.

Thus, when intracavity lesion if suspected on ... endometrial thickness is more than 14mm hysteroscopy provides a precise and accurate adjunct to traditional methods of diagnosing pathology, particularly focal one which may be missed at curettage. In such cases hysteroscopy with curettage improves the accuracy of clinical diagnosis, the procedure being complementary to primary TVS.

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