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Original Research Article

The efficacy of transvaginal ultrasonography and office hysteroscopy in evaluation of abnormal uterine bleeding

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ABSTRACT

Background: Abnormal uterine bleeding (AUB) is a prevalent issue in women of child bearing age group. AUB can be uncomfortable and have a considerable impact on health-related quality of life. AUB is reported to occur in 9 to 14% women between menarche and menopause and reported prevalence in India is around 17.9%.

Methods: It is a prospective observational study done in 75 patients with abnormal uterine bleeding attending the gynaecology outpatient department (OPD) at Shri B. M. Patil Medical College, Vijayapura, Karnataka. Patient was thoroughly examined and then transvaginal sonography (TVS) was done after obtaining consent. This was followed by office hysteroscopy(OH) and endometrial biopsy was taken for histopathological examination. Data were gathered and examined and cost analysis of each procedure was done.

Results: The most frequent presenting symptom was heavy menstrual bleeding (49.3%). For proliferative and secretory endometrium, the sensitivity of TVS was 81.48% and for the detection of polyps, endometrial hyperplasia, and submucous fibroid it was 45.45%, 42.86%, 100% respectively. The sensitivity of OH for detection of polyps, endometrial hyperplasia, and submucous fibroid which was 46.15%, 100%, 100% respectively. The p value was <0.05 which shows the statistical significance of both tests. TVS demonstrated low correlation for intracavitary diseases. OH was costlier when compared to TVS.

Conclusions: TVS has more sensitivity and accuracy in detecting intramural pathologies. OH had showed greater diagnostic accuracy in identifying intra cavitory pathologies of uterus and doing intervention in the same setting.

Keywords: Abnormal uterine bleeding, Heavy menstrual bleeding, Hysteroscopy, Office hysteroscopy, Transvaginal ultrasonography

INTRODUCTION

The abnormal uterine bleeding (AUB) is one of the leading causes for seeking gynaecological advice. AUB may be defined as any variation from the normal menstrual cycle and includes change in regularity or frequency of menses, in the duration of flow, or in the amount of blood loss. Accordingly, AUB is divided into heavy menstrual bleeding (HMB), frequent/infrequent, intermenstrual, postcoital, pre/postmenstrual bleeding, prolonged/ shortened periods, acute and chronic AUB.¹ The PALMCOEIN (polyp; adenomyosis; leiomyoma;

malignancy and hyperplasia; coagulopathy; ovulatory dysfunction; endometrial; iatrogenic and not yet classified) classification system for AUB has been approved by International Federation of Gynaecology and Obstetrics (FIGO).² In recent times, several methods including TVS, saline infusion sonography and hysteroscopy, have been developed to assess the uterine cavity, with their own advantages and disadvantages.

TVS is a rapid, non-invasive and cost-effective method which assesses the structural uterine pathologies. TVS detects fibroids, adenomyosis, endometrial thickness and morphology as well as regularity of endo-myometrial

border.³ Office hysteroscopy (OH) on the other hand, allows direct visualisation of the uterine cavity and guides sampling of any suspected lesion and has an established diagnostic value for many uterine conditions. Hysteroscopy is highly sensitive and specific for endometrial polyps and submucous myomas. However, hysteroscopy is not as cost-effective and convenient as ultrasonography, as the latter is associated with relatively less patient discomfort and does not necessitate anaesthesia.⁴ In the present context of increasing cost awareness and an ever-increasing litigious environment, a balance has to be achieved between the practice of “blanket medicine” aiming at performance of all investigations and a condition-based approach.⁵ This study was undertaken, to compare the diagnostic values of TVS and those of OH and to determine the sensitivity, specificity, positive predictive value and negative predictive value of TVS versus hysteroscopy in detecting uterine abnormalities and correlate with those of histopathological findings.

METHODS

In this study, 75 patients presenting with AUB who met the inclusion criteria with AUB from November 2020 to April 2022 were undertaken. They were studied by TVS and OH followed by endometrial biopsy. These cases were further evaluated. The information was organised in an excel spreadsheet and statistically analysed. They were studied by TVS and OH followed by endometrial biopsy. These cases were further evaluated. The information was organised in an excel spreadsheet and statistically analysed.

Study period

The study period was from January 2021 to April 2022.

Sample size

The sample size was 75 cases.

Design

It was a prospective observational study.

All women who fulfilled the inclusion criteria were included in the study and explained about the procedure and results were subjected to statistical analysis.

Inclusion criteria

All patients with age >18 years with complaint of AUB willing to participate in the study were included.

Exclusion criteria

Patients with suspected pregnancy, suspected pelvic inflammatory disease, and ongoing vaginal infections were excluded.

Study procedure

After receiving written consent from the patient and receiving counselling, a thorough clinical history was collected, followed by general, systemic, and bimanual examinations. are among the investigations that are performed. After taking detailed history and physical examination patient was investigated to rule out organic causes of AUB with complete blood count (CBC), renal function tests (RFT), liver function tests (LFT), blood grouping and typing, bleeding time (BT), clotting time (CT), prothrombin time (PT), thyroid function tests and urine pregnancy test (UPT) to rule out pregnancy. After getting informed written consent for the procedure, TVS and OH followed by endometrial biopsy was performed. TVS was done on admission. Bladder was emptied. The patient was put in supine with thighs abducted, knees flexed and buttocks elevated on a pillow. A transvaginal probe is covered with a condom. The probe is gently inserted into the vagina and the bladder, ovaries, uterus, cervix and fallopian tubes are evaluated. Endometrial thickness more than 15 mm was taken as endometrial hyperplasia in our study. The average thickness of endometrium in various phase of menstrual cycle on TVS are taken as – proliferative endometrium 4-8 mm, periovulatory - 6-10 mm, secretory - 10-14 mm, and postmenopausal <4 mm. For OH The perineum and vagina were gently painted with povidone-iodine solution. Sims speculum introduced into the posterior wall of the vagina and retracted downwards. The 2.9 mm hysteroscopic telescope was selected and checked for clarity of the eyepiece and objective lens. The light generator was switched on, and the fibre-optic cable is attached to the telescope. The telescope is inserted into the diagnostic sheath, and 0.9% NS was flushed through the sheath to expel any air within the sheath. Then hysteroscope was introduced in the cervical canal and advanced under vision till it enters the uterine cavity. The uterine cavity, anterior and posterior uterine walls, fundus and the cervical canal were all thoroughly examined, and a biopsy was collected from suspected abnormal endometrium. Cervical canal was reevaluated while retracting back the office hysteroscope. Followed by, dilatation and curettage done with sharp curette and sample collected for histopathological examination. Patients were labelled as “negative hysteroscopic view” when the following 3 criteria were met: good visualization of entire uterine cavity, no structural abnormalities in the cavity, and uniformly thin, homogenous appearing endometrium without variation in thickness.

RESULTS

In this study, 75 patients presenting with AUB who met the inclusion criteria with AUB from November 2020 to April 2022 were undertaken. They were studied by TVS and OH followed by endometrial biopsy. These cases were further evaluated. The information was organised in an excel spreadsheet and statistically analysed. Table 1 shows the demographic parameters of these patients. Most

common age group was 30 to 39 years, mean age being 36.1 years, 77.3% of women were multiparous, i.e., para 2 and 3. Heavy menstrual bleeding was the most common bleeding pattern seen in 49.3% of cases and 41.5% of patients had irregular menstrual cycles. Majority of them didn't had any underlying medical pathologies i.e. 93.3%. Of them 4% (n=3) had hyperthyroidism. OH was normal in 58.62% (n=40) (both proliferative and secretory endometrium and uterine septum being the additional finding of cases. Among the abnormal ones most common finding was endometrial hyperplasia in 19.96% (n=15) cases followed by endometrial polyp in 16% (n=12) cases. Submucous fibroid was seen in 5.3% (n=4) of the cases and uterine synechia was seen in 1.3% (n=1) of the cases. Uterine septum was additionally detected in 3 cases. TVS was normal in 54 patients (72.1%) (both proliferative and secretory endometrium) of patients. The most prevalent among the abnormal findings was endometrial hyperplasia in 7 cases (9.3%) and endometrial polyp 6 cases (8%).

Table 2 shows OH findings in correlation with HPE where atrophic endometrium showed 100% sensitivity and accuracy while hyperplasia, polyp, secretory and proliferative endometrium findings were diagnosed with 100%, 46.15%, 84.62% and 70.73% sensitivity respectively. The accuracy of diagnosing polyp, hyperplastic endometrium, secretory and proliferative endometrium were 98.67%, 89.33%, 97.33% and 84% respectively with a p value of <0.001.

Table 3 shows TVS findings in correlation with HPE where atrophic endometrium showed 100% sensitivity and accuracy, while hyperplasia, polyp, secretory and proliferative findings were diagnosed with 42.86%, 45.45%, 61.54% and 82.93% sensitivity respectively. The accuracy of diagnosing polyp, hyperplastic endometrium, secretory and proliferative endometrium were 90.67%, 89.33%, 92% and 76% respectively with a p value of <0.001. The cost of baseline investigations were Rs.500/-, that of TVS was Rs.578/- and that of OH was Rs.3750/-. OH findings of endometrial polyp and endometrial hyperplasia is shown in Figures 1 and 2 respectively.

Table 1: Demographic distribution of women.

Parameter	Most common finding	Percentage (%)
Age group (years)	30-39 (n=26, mean SD-36.1)	34.7
Parity	Multiparous (n=58)	77.3
Bleeding pattern	Heavy menstrual bleeding (n=37)	49.3
Dysmenor-rhoea	Majority presented without dysmenorrhoea (n=67)	89.3
Medical disorders	Majority-normal without any medical disorders (n=70)	93.3

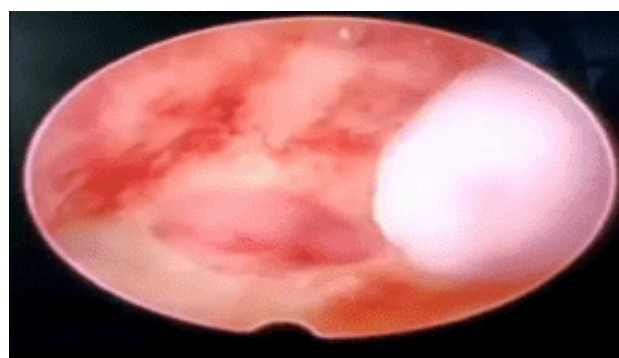


Figure 1: Endometrial polyp on OH.



Figure 2: Endometrial hyperplasia on OH.

Table 2: Correlation of findings between office hysteroscopy and HPE.

Finding	TP	FP	FN	TN	Sensitivity	Specificity	PPV	NPV	Accuracy	P value
Atrophic	3	0	0	72	100	100	100	-	-	<0.001
Proliferative	29	0	12	34	70.73	100	100	73.91	84	<0.001
Secretory	11	0	2	62	84.62	100	100	96.88	97.33	<0.001
Hyperplasia	7	8	0	60	100	88.24	46.67	100	89.33	<0.001
Polyp	11	1	0	63	46.15	100	98.44	100	98.67	<0.001

Table 3: Correlation of findings between TVS and HPE.

Finding	TP	FP	FN	TN	Sensitivity	Specificity	PPV	NPV	Accuracy	P value
Atrophic	3	0	0	72	100	100	100	-	-	<0.001
Proliferative	34	11	7	23	82.93	67.65	75.56	76.67	76	<0.001
Secretory	8	1	5	61	61.54	98.39	88.89	92.42	92	<0.001
Hyperplasia	3	4	4	64	42.86	94.12	42.86	94.12	89.33	<0.001
Polyp	5	1	6	63	45.45	98.44	83.33	91.3	90.67	<0.001

DISCUSSION

Most common pathologies causing AUB in perimenopausal patients are endometrial hyperplasia, endometrial polyps, submucous fibroids and adenomyosis. If the etiologic reason is correctly identified, it may be possible to treat the pathology specifically and prevent the need for large surgical operations. The most frequently used diagnostic tests for evaluation of AUB are TVS, OH and sono-hystero-graphy either alone or together. It has been proven that professionals who order and execute the diagnostic procedure frequently have a poor understanding of how the various diagnostic tests available operate. The techniques used to assess the uterine cavity have advanced significantly during the past few years. TVS is considered a simple examination with good acceptability. The uterus and its intramural pathological lesions can be visualised clearly but it lacks accuracy in diagnosing intra-cavitary pathologies. OH on the other hand has the advantage of providing a direct visualisation of the uterine cavity and endometrium and allows biopsy to be taken from suspected abnormalities. The age group in the study population was above 18 years and the most of the patients were between 30-39 years of age i.e. 26 of them (34.7%) followed by 40-49 years i.e. 23 of the patients (30.7%) with the youngest being 20 years and the eldest was of 59 years & with mean age being 36.1 years. This correlates with studies of Sinha et al where mean age was 36.4 ± 7.6 years and Kathuri et al where mean age group was 30-45 years.^{6,7} Krishnamoorthy et al conducted a study on 100 women with AUB and the mean age of the patients was 42.9 years (4050) years.⁸ The most common presentation was heavy menstrual bleeding found in 37 cases i.e. 49.3% followed by irregular cycles in 31 cases i.e. 41.4% cases, which correlates with the studies done by El-khaya et al (40%), Kumari et al (40%).^{9,10} Here, most of the patients were multi parous i.e. n=58 (77.3%), 6 were primipara i.e. 8%, 11 were nulliparous i.e. 14.7% which correlates with study of Rustagi et al where nulliparous women comprised of 10% and multiparous women of 77.1% and also correlates with studies done by Bhosle et al, Wanderley et al.¹¹⁻¹³ In this study 93.3% (n=70) of the patients are normal without any medical disorders, 4% (n=3) of the patients presented with hyperthyroidism. In this study TVS showed normal endometrium in 54 cases (72.1%) and abnormal in 46 cases (27.9%) which correlates with Towbin et al where TVS showed 59% normal uterus. In a research by Fedele et al TVS was reported to be 100% sensitive and 94% specific for identifying submucous myomas.^{14,15} Among the abnormal lesions polyp constituted 6 cases (18%) and submucous fibroid in 4 cases (9%) which Neumann et al had similar observations.¹⁶ Sensitivity and specificity to detect polyps were 45.45% and 98.44% respectively. On TVS endometrial hyperplasia in the present study has sensitivity of 42.86% and specificity of 94.12%. This was correlating with the studies done by Krishnamoorthy et al and Wanderley et al.^{8,13} Hence based on these findings it

was observed that TVS showed good accuracy in diagnosing normal variants and intramural pathologies but Less accurate in diagnosing intra cavitory pathologies. OH in the present study showed normal uterus in 40 cases (58.62%) and abnormal in 35 cases (41.38%). Among the abnormal lesions polyp constituted 12 cases (16%) and submucous fibroids were seen in 4 cases (5.3%) which Neumann et al had similar observations and it was 100% sensitive and specific and were correlating with the sensitivity and specificity of the present study.¹⁶ Atrophic endometrium was seen in 3 cases (4%) and were correlating with the study done by Rustagi et al in which 4.3% of atrophic endometrium cases were present.¹¹ In addition, OH had the advantage of accurately diagnosing the intra uterine pathologies like intra uterine synechiae and septum. In this study we had observed one case of uterine synechiae and 3 cases of intra uterine septum which was not visualized with TVS. Sensitivity and specificity of the intra uterine pathologies by OH were correlating with other studies. OH's sensitivity for polyp diagnosis using HPE as the gold standard was 46.15%, and its specificity was 100%. This study, which was comparable to earlier studies, indicated that OH had the highest sensitivity and specificity for detecting endometrial polyps. Endometrial hyperplasia was seen in 15 cases (19.96%) which were correlating with Rustagi et al.¹¹ There are limited studies available comparing the cost effectiveness of OH with TVS. Though OH is costlier than TVS, it has the own advantage of decreasing the need for the costlier alternative in the operation room (OR). When clinically appropriate, OH has the ability to decrease the need for OR hysteroscopies under anaesthesia and to increase OR availability for other procedures and services.

Our study's findings support their reasoning. OH, as compared to TVS, provides a direct sight of the endometrial cavity and identifies any localised lesions. TVS can identify fibroids with good sensitivity. The TVS has a 100% negative predictive value for fibroids. However, TVS has a limited sensitivity (42.86%) for diagnosing endometrial hyperplasia, despite having a negative predictive value (94.12%). OH exhibited a good negative predictive value of 100% and was 100% sensitive in detecting endometrial hyperplasia.

Therefore, one of the best ways to find polyps in this area is through OH. As a result of the high degree of agreement between pathology and OH, the former's diagnostic efficacy outperformed that of transvaginal sonography in detecting intra uterine pathologies. In light of this, it is advised that patients with AUB to be carried out with both transvaginal sonography and OH as the next step. An extensively used, reasonably priced, and practical approach to diagnose uterine pathologies is trans-vaginal ultrasonography. The patient has minimal discomfort because it is non-invasive. As a result, it is frequently employed as the first modality in patients with AUB. It is an excellent diagnosing tool and initial method of evaluation.

CONCLUSION

Both TVS and office hysteroscopy have different accuracies in diagnosing intra uterine pathologies and both are complementary to each other in precisely finding out the conditions causing AUB. Though office hysteroscopy wasn't cost effective it had its own advantage of accurately diagnosing intra uterine pathologies and hence further decreasing the need and costs of major surgical procedures.

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