ORIGINAL RESEARCH

A prospective comparative study of transvaginal ultrasonography and hysteroscopy as diagnostic modalities in evaluation of abnormal uterine bleeding

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ABSTRACT

Background: Abnormal uterine bleeding (AUB) is defined as any type of bleeding in which the duration, frequency, or amount is excessive for an individual patient. **Aims:** To evaluate the diagnostic accuracy of TVS and hysteroscopy in order to examine if the number of hysteroscopic procedures can be reduced. **Materials and Methods:** The study selected 80 women with abnormal uterine bleeding randomly among the patients attending the Gynaecology OPD who met the inclusion criteria. Detailed history and general and gynaecological examination was followed by TVS, hysteroscopy and curettage and removal of abnormal lesions like polyps and submucous fibroid and the material was sent for histopathological analysis. **Results:** Hysteroscopy reported 75% findings as abnormal while in 25% cases no abnormality was detected. The commonest lesion detected by hysteroscopy was endometrial polyp – 41.25%. The overall sensitivity, specificity, PPV, NPV for hysteroscopy was 98.24%, 82.61%, 93.33% and 95% respectively. TVS reported 85% as abnormal findings and in the remaining 15% no abnormality was detected. Most common abnormal lesion detected by TVS was Endometrial Hyperplasia (58.75%). The overall sensitivity, specificity, PPV, NPV for TVS was 96.49%, 43.48%, 80.88% and83.33% respectively. Overall accuracy of hysteroscopy in this study was 93.75% and that of TVS was 81.25%. **Conclusions:** Both TVS and hysteroscopy can detect endometrial abnormalities with varying accuracies. These can supplement and enhance the accuracy of tissue diagnosis. Transvaginal ultrasonography should be the first procedure for evaluation of AUB and if necessary, a hysteroscopy with directed biopsy should be performed.

Keywords: Abnormal uterine bleeding, Transvaginal sonography, Positive Predictive value, Negative predictive value

INTRODUCTION

Abnormal uterine bleeding (AUB) is defined as any type of bleeding in which the duration, frequency, or amount is excessive for an individual patient. It is a common reason for women of all ages to consult their gynecologist and is the direct cause of a significant health care burden for women, their families and society as a whole. It affects 10-30% of reproductive age women and upto 50 % of perimenopausal women. It is responsible for more than one-third of gynecologic consultations and nearly two-thirds of hysterectomies.[1]

Though abnormal uterine bleeding is a common gynecological presentation, it is often complex and difficult to diagnose. Thorough history and physical examination are fundamental for the workup of AUB.[2,3] Given that benign uterine diseases and endometrial hyperplasia are responsible for at least

70% of AUB cases, investigating the uterine cavity enables the gynecologist to offer the most appropriate therapy. Fibroids or polyps are the most common cause of anatomic AUB. Twenty to forty percent of women have fibroids. These women might present with abnormal bleeding, anemia, pain, and occasionally infertility.[4,5] Diagnostic procedures for anatomic changes and for endometrial carcinoma include ultrasonography, hysteroscopy and dilatation & curettage (D&C)[2]. Endometrial abnormalities are common diagnostic challenges for the radiologist and referring gynecologist. For the evaluation of AUB, transvaginal sonography plays an important role as the initial modality.[6] Transvaginal ultrasonography is useful in determining endometrial thickness and morphology as well as the regularity of the endo/myometrial border.[7] Transvaginal sonography (TVS) is considered a simple examination with good accuracy for most uterine cavity abnormalities. The uterus and its pathologic lesions can be visualized clearly but there are conflicting reports about its diagnostic accuracy. A major limitation of TVS is the higher false negative rate in diagnosing focal intrauterine pathology. This is due to the physical inability of TVS to clearly assess the endometrium when there is concurrent uterine pathology such as leiomyomas or polyps. Advanced ultrasound equipment and multi frequency transducers are necessary to increase the sensitivity of the examination. One sixth of endometrial lesions are missed or are not diagnosed when TVS is used alone in the perimenopausal patients.

Hysteroscopy is a surgical procedure in which a gynecologist uses a small lighted telescopic instrument called a hysteroscope to diagnose and treat many uterine disorders, including abnormal bleeding. In the presence of organic lesions, hysteroscopy allows for the direct visualization of the probable uterine source of bleeding, improving the chance that the tissue obtained by directed biopsy will yield an accurate histological diagnosis. Hysteroscopy not only offers a quick, safe and accurate diagnosis, but is also curative in cases of fibroid polyps, intrauterine adhesions, menorrhagia and lost IUCD (Intrauterine contraceptive device).Hysteroscopy with directed biopsy has become the ‘‘gold standard’’ for diagnosing endometrial diseases in patients with AUB.[8-10] Hysteroscopy has emerged as a useful diagnostic procedure that is safe, with a low incidence of clinically significant complications. Hysteroscopy has become the standard of choice for evaluating the uterine cavity, but it is an invasive procedure, performed under local or general anesthesia, and associated with discomfort. It is not as cost-effective and convenient as ultrasonographic imaging modalities, which are associated with relatively less patient discomfort and do not necessitate anesthesia. Thus, currently available modalities are far from being perfect.The purpose of this study is to evaluate the diagnostic accuracy of TVS and hysteroscopy in order to examine if the number of hysteroscopic procedures can be reduced

METHODS

This prospective comparative observational study of transvaginal ultrasonography and hysteroscopy as diagnostic modalities in evaluation of abnormal uterine bleeding was conducted in the Department of Obstetrics and Gynaecology, Durgabai Deshmukh, Hospital and Research Centre, Vidyanagar, Hyderabad during the time period of July 2018 to June 2019. Patients with clinical diagnosis of AUB satisfying the inclusion criteria were selected at random from the Gynecology Out Patient Department of the hospital. Sample size was calculated by Open Source Epidemiologic Statistics for Public Health, dated 23rd June 2014. Standard population size was taken as 1 million. Anticipated % frequency of occurrence was taken as 5%. Confidence limit was taken as 5%.Design effect taken as 1.With this recommended sample size came to be 73 with 95% confidence level. By taking non responsiveness into account, total sample size was taken as 80.

Patients satisfying the inclusion criteria were enrolled after getting informed consent using random sampling method. It was a prospective study to evaluate the intrauterine pathology in 80 women with abnormal uterine bleeding. Ultrasound scan machine, Rigid hysteroscope, light source, uterine distension medium and video camera system.

For all patients, name, address, other personal and clinical details were recorded. Complete history including detailed menstrual history was taken as regards onset, course, duration, amount of bleeding; medical history (diabetes, hypertension, thyroid disorders) and surgical history were recorded. Detailed general, systemic and local examination to record the size of the uterus, its mobility and the presence of any cervical or adnexal masses was done. Along with this, patient was investigated to rule out organic causes of AUB with CBC, RFT, LFT, blood grouping and typing, coagulation profile, thyroid function tests and UPT to rule out pregnancy. All the data was duly recorded in the standard prepared proforma. After getting informed written consent for the procedure, transvaginal ultrasonography and hysteroscopy were performed followed by curettage and removal of abnormal lesions like polyps and submucous fibroid and the material was sent for histopathalogical analysis.

RESULTS

A total of 80 patients of reproductive age group, premenopausal and postmenopausal women up to 60 years age presenting with AUB were selected for the study. The duration of prospective study was between July 2018 and June 2019. All the patients with AUB were subjected to TVS and biopsy and histopathological confirmation obtained for all. Hysteroscopy was done under intravenous sedation. It

was successful in 100% of cases and concluded satisfactorily in almost all cases. There was no failure in any of the patients taken for study. During and after the procedure there was no complication.

Age: Age group of the patients ranged from 25-60 years.Mean age was 47.06±9.00. The most common age group was 41-50 years. This group comprised of 41.25% of the patients. Next common age group was of patients aged greater than 50 years which comprised 35% of the patients.

Parity: 81.25% of patients were multiparous, 16.25% were primiparous and the rest 2.5% were nulliparous. (Table 1)

Table 1: Parity wise distribution

Parity	No. of cases	Percentage
Nullipara	2	2.5
Primipara	13	16.25
Multipara	65	81.25
Total	80	100

Chief complaints: Menorrhagia was the commonest presenting symptom in this study. 43.75% patients presented with this symptom. The next common presentation was postmenopausal bleeding (37.5%) and metrorrhagia (12.5%). 2.5% patients came with polymenorrhagia and 3.75% with menometrorrhagia. (Table 2)

Table 2: Different types of abnormal uterine bleeding

Menstrual cycle pattern	No.of cases	Percentage
Menorrhagia	35	43.75
Postmenopausal bleeding	30	37.5
Metrorrhagia	10	12.5
Menometrorrhagia	3	3.75
Polymenorrhagia	2	2.5
Total	80	100

Duration of complaints: Most of the patients (62.5%) presented within three months of the onset of symptoms.15% patients presented within 4-6 months. (Table 3)

Table 3: Duration of complaints

Duration (months)	No. of cases	Percentage
1-3	50	62.5
4-6	12	15
7-12	8	10
>12	10	12.5
Total	80	100

TVS findings: The commonest lesion diagnosed by TVS is endometrial hyperplasia which was found in 58.75% cases followed by endometrial polyp in 20% cases and normal endometrium in 15% cases. Other findings were submucous fibroid in 5% cases and cervical polyp in 1.25% cases. (Table 4).

Hysteroscopy Findings: On hysteroscopy, 25% of the patients had either proliferative or secretory picture which was grouped as normal. The rest 75% of patients had some abnormality. Endometrial polyp was the most common finding which was seen in 41.25% patients. The other findings included endometrial hyperplasia 20%, submucous myoma or myomatous polyp 7.5%, atrophic endometrium 1.25%, cervical polyp 5%. (Table 4).

Table 4: Findings of TVS, hysteroscopy and histopathology

Finding	TVS	Hysteroscopy	HPE
Normal endometrium	12 (15%)	20(25%)	23 (28.75%)
Endometrial Polyp	16 (20%)	33(41.25%)	31 (38.75%)
Endometrial Hyperplasia	47 (58.75%)	16 (20%)	14(17.5%)
Submucosal Fibroid	4 (5%)	6 (7.5%)	6(7.5%)
Atrophic endometrium	0	1 (1.25%)	0
Carcinoma endometrium	0	0	1 (1.25%)
Cervical canal polyp	1 (1.25%)	4 (5%)	5(6.25%)
Total	80 (100%)	80 (100%)	80 (100%)

Histopathology Findings: Histopathology reports of the tissue sent for biopsy came out to be normal (proliferative or secretory) in 28.75% patients. Endometrial polyp was reported in 38.75%.The rest consisted of hyperplasia in 17.5%, myoma in 7.5%, endometrial carcinoma in 1.25% and cervical polyp in 6.25% samples. (Table 4)

DISCUSSION

Menstrual dysfunction is the cause of discomfort, inconvenience and disruption of healthy lifestyle, which affects millions of women in both the developed and the developing world. Abnormal uterine bleeding is one of the most frequently encountered conditions in gynaecology. As quoted by Prentice A[11], AUB affects 10 to 30% of reproductive aged women and up to 50% of perimenopausal women.

Until recent times, the usual method of evaluating abnormal uterine bleeding was dilatation and curettage. Although the diagnosis may be obtained by this manner in most patients, yet in about 10% patients evaluated by blind curettage; may miss the focal pathology. TVS is useful in detecting endometrial thickness and morphology as well as the regularity of endo myometrial border and is well tolerated by patients but sessile or pedunculated lesions of endometrium and malignant disease cannot be excluded. Hysteroscopy offers a valuable extension of the gynecologist armamentarium. It can improve the diagnostic accuracy and can permit better treatment of the uterine diseases. After hysteroscopy, the elective surgery of the patient can be planned. The use of hysteroscopy in abnormal uterine bleeding is replacing the blind curettage, as it "sees" and "decides" the cause. This is because the uterine cavity can be observed and the area in question can be curetted. In fact, it is the eye in the uterus[12,13]. This study evaluated the diagnostic performance of TVS and hysteroscopy in assessing endometrial pathology. The sensitivity, specificity, positive predictive value and negative predictive value of both methods were measured. The results from each of the methods were compared with results obtained from biopsy, the current gold standard for the investigation of endometrial lesions.

Most common uterine pathology detected by USG was thickened endometrium consisting of 58.75 % cases. This finding is similar to the studies by Maiti et al[14]and Patil et al[15] who also reported endometrial hyperplasia to be the most common pathological finding of TVS. In this study, most common hysteroscopic finding was endometrial polyp seen in 41.25 % cases. This correlates with the study done by Lasmar et al[1] in which endometrial polyp was seen in 33.9% cases. Allameh et al[16] also reported endometrial polyps as the most common finding (38.09% cases). In the present study, most common histopathological finding was of endometrial polyp which was observed in 38.75% cases. The majority of other studies also state the highest incidence of endometrial polyp. Allameh et al[16] reported the finding of endometrial polyp in 41.9% tissue samples. Maiti et al[14] also reported endometrial polyp as the most common pathology detected in tissue samples.In the diagnosis of any endometrial pathology, hysteroscopy had a sensitivity of 98.24%,specificity of 82.61%,PPV of 93.33%, NPV of 95% and accuracy of 93.75%, whereas transvaginal ultrasonography had a sensitivity of 96.49%, specificity of 43.48%,PPV of 80.88%, NPV of 83.33% and accuracy of 81.25%.Statistically significant difference is observed between hysteroscopy and TVS findings (p=0.04). Hysteroscopy was found to be a more specific and accurate diagnostic technique compared with TVS. These results are similar to those of other published studies. Grimbizis et al[17] found that TVS and hysteroscopy had sensitivities of 89.04 and 97.26%, respectively, and specificities of 56%, and 92% respectively, for the detection of any endometrial pathology. Razzaq et al[18] observed an overall sensitivity 97.9%, specificity 90.6%, PPV 94%, NPV 96.7% and accuracy of 95% for hysteroscopy. Waleed El-Khayat et al[19] observed an overall sensitivity of 92.3%, specificity 72.72%, PPV 92.3%, NPV 72.72% and accuracy 88% for transvaginal ultrasonography.

TVS is quick, non invasive, easy to perform, at low cost. Detection of abnormalities in the parametrium and ovaries is possible with TVS. It has significantly lower sensitivity but comparable specificity with hysteroscopy in diagnosing endometrial polyp and submucous fibroid. It has higher sensitivity but low specificity and low PPV in diagnosing endometrial hyperplasia. For the diagnosis of any endometrial pathology, TVS has comparable sensitivity and positive predictive value with hysteroscopy, hence can be used as screening test. Expertise of the sonologist will reduce the false positives and false negatives and increase the accuracy. To perform hysteroscopy the women should be counselled, informed consent has to be taken, short general anaesthesia is required. The woman needs to explain the anaesthesia and procedure related complications. Pathology in the adnexa will not be visualised. Apart from these the patient needs short hospital stay. It is costlier and special training is required for the clinician. But the benefits of hysteroscopy outweigh the risks. Hysteroscopy is a valuable, simple, low-risk technique which allows an adequate exploration of the uterine cavity under visual control. It ensures speed and safety with the diagnosis and treatment. The results are immediately available. In patients with abnormal uterine bleeding, hysteroscopy provides the possibility of immediate diagnosis and prompt and effective treatment. It allows finding out the source of bleeding and perform a directed biopsy of the suspected area. Surgical skill of the treating clinician will reduce the complications. In this study, hysteroscopy had got higher overall specificity, sensitivity and accuracy. Hence it can be used as diagnostic procedure. Moreover in our study we had found that hysteroscopy has a very high predictive value, both negative as well as positive. It is highly sensitive and specific for diagnosis of endometrial polyp and submucous myoma but less sensitive and highly specific for endometrial hyperplasia. On the other hand, for hyperplasia and carcinoma endometrium, histopathology is 100% diagnostic.

Therefore, in all cases, an endometrial biopsy sample should be obtained during hysteroscopy to confirm the diagnosis.So it can be concluded that both TVS and hysteroscopy can detect endometrial abnormalities with varying accuracies. These can supplement and enhance the accuracy of tissue diagnosis. Thus, ideally, transvaginal ultrasonography should be the first procedure for evaluation of AUB and if necessary, a hysteroscopy with directed biopsy should be performed. The adoption of this measure is expected to improve the diagnostic accuracy.

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