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Radiodiagnosis

TRANSABDOMINAL AND TRANSVAGINAL ULTRASONOGRAPHIC EVALUATION IN THE MEASUREMENT OF ENDOMETRIAL THICKNESS IN PATIENTS WITH ABNORMAL UTERINE BLEEDING

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ABSTRACT

Background: Abnormal uterine bleeding is a common complaint in women of all ages for which they consult their gynecologist and is the direct cause of a significant health-care burden for women. It affects 10%–30% of reproductive age women and 50% of perimenopausal women. The most probable etiology of abnormal uterine bleeding relates to the patients' reproductive age, as does the likelihood of serious endometrial pathology. Imaging plays a pivotal role in resolving these common complaints in practice.

Study Design: This study is of 50 women presenting/referred with abnormal uterine bleeding in the department of radiodiagnosis of our hospital. They underwent both transabdominal and transvaginal ultrasonography for the evaluation of endometrial thickness and also to look for the presence of other pelvic pathologies.

Results and Conclusion: In our study of 50 patients, transabdominal and transvaginal ultrasonography did not yield a significant difference in the measurement of endometrial thickness. However, both had a complimentary role in better diagnosing pelvic pathologies and eliminating the use of invasive procedures for diagnosing cases of abnormal uterine bleeding.

KEYWORDS :

INTRODUCTION

Abnormal uterine bleeding is a common complaint in women of all ages for which they consult their gynecologist and is the direct cause of a significant health-care burden for women. Abnormal uterine bleeding affects 10%–30% of reproductive age women and 50% of perimenopausal women. The most probable etiology of abnormal uterine bleeding relates to the patients' reproductive age, as does the likelihood of serious endometrial pathology.[1]

The specific diagnostic approach depends on whether the patient is premenopausal, perimenopausal, or postmenopausal as the endometrium demonstrates a wide spectrum of normal and pathological appearances throughout menarche as well as during the premenopausal and postmenopausal years.[2]

Abnormal uterine bleeding is related to:

- Changes in frequency of menses (regularity)
- Duration of flow (timing)
- Amount of blood loss (amount)
- Targeted approach is related to age and stage.

PALM-COEIN classification of AUB[3]

STRUCTURAL NON-STRUCTURAL

- Polyps Coagulopathy
- Adenomyosis Ovulatory dysfunction
- Leiomyomas Endometrial
- Malignancy Iatrogenic
- Hyperplasia Not yet specified

The endometrial appearance is influenced by several factors such as age, menstrual status, pregnancy, and hormonal therapy. Abnormal uterine bleeding is diagnosed by excluding pregnancy, iatrogenic causes, systemic conditions, and genital tract pathologies.[1]

The advent and use of diagnostic ultrasound changed the spectrum of diagnostic approach to abnormal uterine bleeding. It forms the primary mode of examination in its evaluation and provides information to plan out the right therapeutic approach required in the given situation [Table 1] and [Table 2].

	Mean ± SD
TAS	6.60±0.60
TVS	6.88±0.68
t	0.30
P	0.75 (nonsignificant)

TAS: Transabdominal sonography, TVS: Transvaginal sonography, SD: Standard deviation

Table 2: Other findings transabdominal sonography

Other findings	TAS	TVS
Endometrial hyperplasia	7	9
Endometrial polyp	4	5
Cervical polyp	3	2
Ovulatory dysfunction	1	1
Pelvic congestion	1	3
Adenomyosis	-	2

χ^2=4.32 (P<0.05). TAS: Transabdominal sonography, TVS: Transvaginal sonography

MATERIALS AND METHODS

The proposed study was planned as a prospective study of fifty female patients with clinically suspected pelvic pathologies in cases of abnormal uterine bleeding for evaluation by transabdominal ultrasonography and transvaginal ultrasonography [Figure 1] [Figure 2] and [Figure 3]. The patients included in this study were those attending the outdoor patients/admitted at shardaben general hospital Hospital.

Figure 1: Image showing comparison between transabdominal sonography and transvaginal sonography

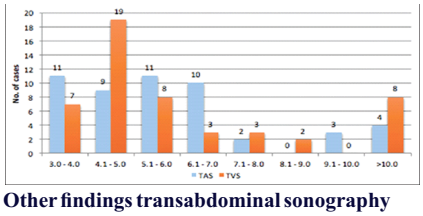


Figure 2: Other findings transabdominal sonography

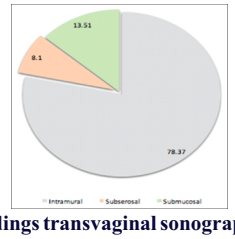
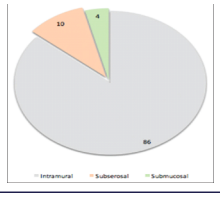


Figure 3: Other findings transvaginal sonography



All the patients were assessed as follows.

Criteria for selecting patients of abnormal uterine bleeding
Females of any age group with clinically suspected pelvic pathologies presenting with abnormal uterine bleeding, who were able to undergo transvaginal ultrasonography, and had no contraindications to it were included in this study. Prior informed consent was taken from all the patients.

Exclusion criteria
- Pregnancy
- Trauma
- Patients in whom transvaginal ultrasonography was contraindicated
- Patients who did not willingly consent to the examination were not included in the study.

Sample size
Fifty individuals were included in the study.

Clinical assessment
All patients included in this study were subjected to detailed clinical history and examination.

Laboratory investigations
Routine hematological investigations such as hemoglobin, total leukocyte count, differential leukocyte count, and erythrocyte sedimentation rate were done prior and reports were reviewed in all patients.

Radiological investigations
Transabdominal ultrasonography

It was done in all the patients as a primary investigation. It was done with convex 3.5–5 MHz probe on GE Voluson machine/GE Voluson P6 machine. Before the sonography, patients were asked to drink plenty of water as urinary bladder acts as an acoustic window for ultrasonography. Patients were positioned lying face-up on an examination table. A small amount of ultrasound gel is put on the skin of the lower abdomen, with the ultrasound probe then scanning through this gel. The transducer was placed on the body and moved back and forth over the area of interest until the desired images are captured.

Transvaginal ultrasonography
Before it, patients were asked to empty the bladder completely. Transvaginal probes insonate at higher frequencies of 6–10 MHz. During it, tubular probe covered with lubricated condom was inserted into the vaginal canal. The probe was rotated slightly to obtain close images of the uterus and ovaries.

Transvaginal ultrasonography was performed using a standard transducer (6.25 MHz transvaginal curvilinear array transducer probe) on GE Voluson/GE Voluson P6 machine.

Before the test
There needed no special preparation before the transvaginal ultrasonography. The patient may continue taking all the medications as prescribed by health-care provider.

On the day of the test
- Empty the bladder before the test
- Patients were asked to change into the hospital gown.

During the test
Patients lied on the bed in the lithotomy position on a table set to Trendelenburg position. The probe was gently inserted into the vagina. Longitudinal and transverse images of the uterus, ovaries, and adnexa were obtained. There was minimal discomfort during the test.

After the test
Patients were able to resume usual routine activities. A written report of transvaginal ultrasonography results was forwarded to the patient.

RESULTS
Of fifty patients, majority of the patients in this study were in the age group of 25–30 and 36–40 years, of which a maximum number of patients were found in the age group of 36–40 years (28%) with the mean age of 40.1 + 10.18 years.

The presenting patients were multiparous accounting for 82% of the total study, followed by primiparous (10%) and nulliparous (8%) women.

The most frequently encountered presenting complaint was menorrhagia (36%), followed by irregular menses (26%), pain (24%), postmenopausal bleeding (10%), and spotting (4%). This indicates that menorrhagia was the dominant clinical presentation.

On per vaginal examination, 50% of the patients had normal examination, 40% patients had bulky uterus, and 4% were postmenopausal in size. Nearly 6% of patients refused per vaginal examination.

Of all the cases of abnormal uterine bleeding, 22% of patients had endometrial thickness between 3–4 mm and 5.1–6 mm, followed by 20% of patients with thickness of 6.1–7 mm on transabdominal sonography (TAS). However, on transvaginal sonography (TVS), 38% of patients had endometrial thickness of 4.1–5 mm. Hence, using "*t*-" test on the acquired observations, *P* value was found to be insignificant for endometrial thickness.

The most common uterine pathology in the present study was leiomyoma. There was no case of uterine mass below 25 years in the present study. Most cases had multiple myomas; however, in few cases, we missed the presence of multiple leiomyomas on TAS which were correctly diagnosed on TVS.

In the final diagnosis, numbers of leiomyomas were 50. TAS diagnosed 78% intramural, 13.5% submucosal, and 8.1% subserosal leiomyomas; however, TVS diagnosed 86% intramural, 10% subserosal, and 4% submucosal leiomyomas.

Four cases by TAS and five cases on TVS of endometrial polyp were noted. One case was incorrectly diagnosed as leiomyoma on TAS which was found out to be adenomyosis on TVS.

Endometrial thickness is considered to be indicator of benign and malignant endometrium. Seven cases of endometrial hyperplasia were noted on TAS and eight cases on TVS; however, with histopathological correlation in four cases, three cases of endometrial carcinoma and one case of benign endometrial hyperplasia were found.

The results of the present study show that TVS is slightly superior to TAS in diagnosing endometrial polyp, endometrial carcinoma, and number and location of leiomyomas.

DISCUSSION
Ultrasonography is initial imaging study of choice in the evaluation of women with abnormal uterine bleeding.

An ideal diagnostic test should be minimally invasive or noninvasive, easy to perform, well accepted and tolerated by the patient, inexpensive, and with high sensitivity and specificity. Unfortunately, no method meets all these criteria, some of them being unacceptable for focal injuries and others being too invasive and not easily accepted by the patients. There is no consensus regarding these methods for the diagnostic evaluation of patients with AUB.

The present study was conducted to evaluate the role of transabdominal and transvaginal ultrasonography in the diagnosis of endometrial thickness and associated pathologies in cases of abnormal uterine bleeding. The two techniques in adjuvant provide diagnostic information of equal usefulness and extent.

Majority of the patients in this study were in the age group of 25–30 and 36–40 years, of which a maximum number of patients were found in the age group of 36-40 years (28%) with the mean age of 40.1 + 10.18 years.

The presenting patients were multiparous accounting for 82% of the total study, followed by primiparous (10%) and nulliparous (8%) women.

The most frequently encountered presenting complaint was menorrhagia (36%), followed by irregular menses (26%), pain (24%), postmenopausal bleeding (10%), and spotting (4%). This indicates that menorrhagia was the dominant clinical presentation. As against

the study by Singh *et al*.[4] wherein polymenorrhagia was the major clinical entity.

On per vaginal examination, 50% of the patients had normal examination, 40% patients had bulky uterus, and 4% were postmenopausal in size. Nearly 6% of patients refused per vaginal examination.

Of all the cases of abnormal uterine bleeding, 22% of patients had endometrial thickness between 3–4 mm and 5.1–6 mm, followed by 20% of patients with thickness of 6.1–7 mm on TAS. However, on TVS, 38% of patients had endometrial thickness of 4.1–5 mm. Hence, using "*t*-" test on the acquired observations, *P* value was found to be insignificant for endometrial thickness.

Meldrum *et al*.[5] have reported similar findings in their study of transvaginal ultrasound scanning of ovarian follicles, where when data obtained transvaginally were analyzed by anatomic subgroup, it was found that the transvaginal approach contributed more information for ovaries than for myometrium or endometrium.

Mendelson *et al*.[6] conducted a study of sonographic findings in 200 patients who underwent concurrent transabdominal and transvaginal pelvic ultrasound and were reviewed. The sonographic techniques were compared for image quality, completeness of anatomic detail depicted, and unique diagnostic information. Transvaginal image quality was better in 79%–87% of scans; transabdominal image quality was better in 3%–5% of scans; images of both techniques were equally good in 10%–18% of scans. However, in its ability to provide diagnostic information, transvaginal findings were found less striking. The techniques provided equivalent diagnostic information in 60%–84% of cases.

Tehranian *et al*.[7] conducted a study of diagnostic accuracy of sonohysterography compared to endometrial biopsy in premenopausal women with abnormal uterine bleeding and concluded that in reproductive age, women with abnormal uterine bleeding and thickened endometrium can be attributable to neoplasia, polyps, leiomyomas, and retained products of conception. TVS is not a reliable predictor of pathology in this population.

Dueholm *et al*.[8] reported that polyps are the most frequently missed endometrial pathology. Sensitivity using TVS has been reported to be 80% for endometrial polyps (n = 344) and 94% for submucosal leiomyoma.

Individual organs and fine structures were better seen transvaginally, but the regional survey offered by the transabdominal full-bladder approach remains necessary to provide anatomic orientation, particularly when the patient has not been studied previously.

Transvaginal image quality was significantly better in visualization than TAS for pelvic pathologies, but did not yield much significance for endometrial thickness in this study.

The most common uterine pathology in the present study was leiomyoma. There was no case of uterine mass below 25 years in the present study. Common sonographic picture was enlargement of the uterus with nodular architecture. Most cases had multiple myomas; however, in few cases, we missed the presence of multiple leiomyomas on TAS which were correctly diagnosed on TVS.

In the final diagnosis, numbers of leiomyomas were 50. TAS diagnosed 78% intramural, 13.5% submucosal, and 8.1% subserosal leiomyomas; however, TVS diagnosed 86% intramural, 10% subserosal, and 4% submucosal leiomyomas.

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The results of the present study show that TVS is slightly superior to TAS in diagnosing endometrial polyp, endometrial carcinoma, and number and location of leiomyomas.

CONCLUSION

Ultrasonography is the primary imaging modality in evaluation of patients with abnormal uterine bleeding. It is widely available, noninvasive, and cost-effective.

TAS should be the first modality of choice in all such cases, especially when the patient has not been studied previously.

TAS and TVS can have complimentary roles. TAS by providing panoramic view helps evaluation of whole lesion and its relationship with other organ. TVS having better resolution provides better morphological characteristic of lesion. The advantage of TAS is that it visualizes the entire pelvis and gives a global view. The limitations of TAS are examination of obese patients, patients who cannot fill bladder or woman with retroverted uterus in whom fundus may be located beyond the focal zone of the transducer. The major limitation of TVS is limited field of vision.

Transvaginal ultrasonography is the gold standard noninvasive tool to know the structural causes of PALM and to know ovulatory dysfunction, endometrial hyperplasia, intrauterine contraceptive devices in cases of nonstructural causes of COEIN. Other pelvic pathologies can also be delineated.

In the present study, it was found that both TAS and TVS have equivalent significance for measurement of endometrial thickness and had have high sensitivity and accuracy in the diagnosis of pelvic pathologies and determination of the type of pelvic mass was improved significantly when a transvaginal study was performed after TAS in cases of abnormal uterine bleeding.

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Conflicts of interest

There are no conflicts of interest.

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