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Research Article

Evaluation of endometrial pathologies with high resolution transvaginal ultrasound

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ABSTRACT

Background: The purpose of this study is to evaluate endometrial lesions on the basis of their appearances by high resolution trans-vaginal ultrasound. High resolution trans-vaginal sonography is useful for diagnosis of various endometrial lesions. Broad spectrum of endometrial lesions can be accurately imaged by various available modalities of which ultrasound is easily available, reliable, non-invasive and cost effective modality.
Methods: In these study cases with complaints of abnormal uterine bleeding, suspected retained products, white discharge, dysmenorrhea and habitual abortions were evaluated with trans-vaginal ultrasound. Lesions were carefully studied and evaluated. Philips HD-11 and Accuson Siemens ultrasound machines with trans-vaginal probes were used.
Results: In all 121 cases, trans-abdominal and trans-vaginal high resolution ultrasound was performed for different lesions in endometrium. Age group of females was between 18 to 65 years. Different uterine lesions were studied. Out of which most commonly encountered lesions were endometrial hyperplasia followed by polyps and least common lesion was AV malformation.
Conclusions: High resolution trans-vaginal ultrasound helped in staging and management in cases of ca. endometrium. Hence trans-vaginal ultrasound should be 1st choice of investigation for diagnosis of endometrial lesions.

Keywords: Endometrial lesions, High resolution trans-vaginal sonography

INTRODUCTION

High resolution trans-vaginal sonography is useful for diagnosis of various endometrial lesions. Broad spectrum of endometrial lesions can be accurately imaged by various available modalities of which ultrasound is easily available, reliable, non-invasive and cost effective modality. Trans-vaginal ultrasound helps to accurately assess various endometrial lesions with high accuracy at early stages.[1] The purpose of this study is to evaluate endometrial lesions on the basis of their appearances by high resolution trans-vaginal ultrasound. High resolution trans-vaginal sonography is useful for diagnosis of various endometrial lesions. Broad spectrum of endometrial lesions can be accurately imaged by various available modalities of which ultrasound is easily available, reliable, non-invasive and cost effective modality.

METHODS

Study of 121 cases of endometrial abnormalities with high resolution trans-vaginal ultrasound was done. Initially, all cases were seen trans-abdominally and then trans-vaginally in sagittal and axial plane.

- Philips HD-11 and Acuson Siemens ultrasound machines with trans-vaginal probes were used.
- Endometrial thickness was measured at higher point and Colour Doppler was also used to access vascularity.
- Hysterosonosalpingography was performed in 8 patients which was required.

Follow-up and further evaluation was done in patients with endometrial Biopsy, D and C and histopathology. 11 cases underwent hysteroscopy for further evaluation and diagnosis as well as resection of Polyps and Fibroids. 5 cases underwent hysterectomy who were diagnosed as Ca-Endometrium and Chorio-carcinoma.[2,3]

- All different endometrial lesions were analyzed on ultrasound for their size, shape, location and appearance.

RESULTS

In all 121 cases, trans-abdominal and trans-vaginal high resolution ultrasound was performed for different lesions in endometrium. Age group of females was between 18 to 65 years. Different uterine lesions were studied. Out of which most commonly encountered lesions were endometrial hyperplasia followed by polyps and least common lesion was AV malformation.

Table 1: Transvaginal ultrasound findings in 121 patients.

Endometrial cavity lesions	Number	Incidence in percentage
Endometrial hyperplasia	25	20.6
Polyps	21	17.3
Submucosal fibroids	18	14.8
Endometrial atrophy	11	9
Endometrial carcinoma	8	6.6
Choriocarcinoma (invasive mole)	3	2.4
Retained products and clots	11	9
Blood/pus in uterine cavity	8	6.6
IUCD (forgotten)	7	5.7
Calcification and adhesions		
Tamoxifen (endometrial changes)	3	2.4
Submucosal lipoma	1	0.8
AV malformation	1	0.8
Uterine anomalies	5	4.1

DISCUSSION

Endometrial thickness is the most important parameter to be assessed in various endometrial diseases.[2] A thickened endometrium at TVS is a reliable predictor of endometrial disease.[3] Trans-vaginal sonography in postmenopausal women should demonstrate a thin endometrium less than 5 mm in thickness.[4] Sonohysterography is a technique in which sterile saline is instilled into the uterine cavity via a trans-cervical catheter whilst performing a trans-vaginal scan for better visualization of the endometrium Sonohysterography demonstrates polyps, submucosal leiomyomas, and adhesions more clearly than trans-vaginal sonography and should be used an adjunct to trans-vaginal sonography in selected patients.[2,5]

Various lesions seen in endometrial cavity were as Follows:

Endometrial hyperplasia (25 cases)

Endometrial hyperplasia is increased endometrial thickness and it was most commonly seen in our study. It is a common cause of vaginal bleeding in premenopausal and postmenopausal women. It is due to un-opposed oestrogen stimulation, also seen in oestrogen or HR therapy as well as in tamoxifen therapy patients. Cystic and adenomatous hyperplasias were the most common forms of endometrial hyperplasia seen in our study. Cystic hyperplasia was the most common form of endometrial hyperplasia. It is characterized by dilated glands of varying sizes lined by a tall columnar or cuboidal epithelium. The stratification and columnar shape of the cells distinguish it from cystic senile atrophy, in which the endometrium is lined by a single layer of flattened or low cuboidal epithelium.[6] The term adenomatous hyperplasia has been used to include all categories of endometrial hyperplasia except cystic hyperplasia.[6] Tiny cysts of varying sizes were seen in endometrium in our study in 11 cases. It was difficult in our study to differentiate from polyps/ ca endometrium in 8 cases; hence we subjected these patients for D and C and Biopsy. There was no vascularity seen on color doppler in endometrium.

Figure 1: Endometrial hyperplasia seen as thickened endometrium.

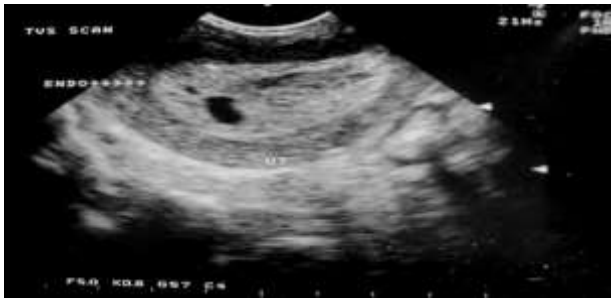

Figure 2: Cystic changes in endometrium.

Endometrial polyp (21 cases)

Endometrial polyps are common lesions. We have found maximum number of cases of Polyps, after endometrial hyperplasia. They can be of various types pedunculated, broad based, or attached to the endometrium by a slender stalk.[6] In our observation, polyps were seen as focal round echogenic area in endometrial cavity and 8 of them showed feeding artery on color Doppler. Single Polyps were seen in 17 and multiple Polyps were seen in 4 patients.

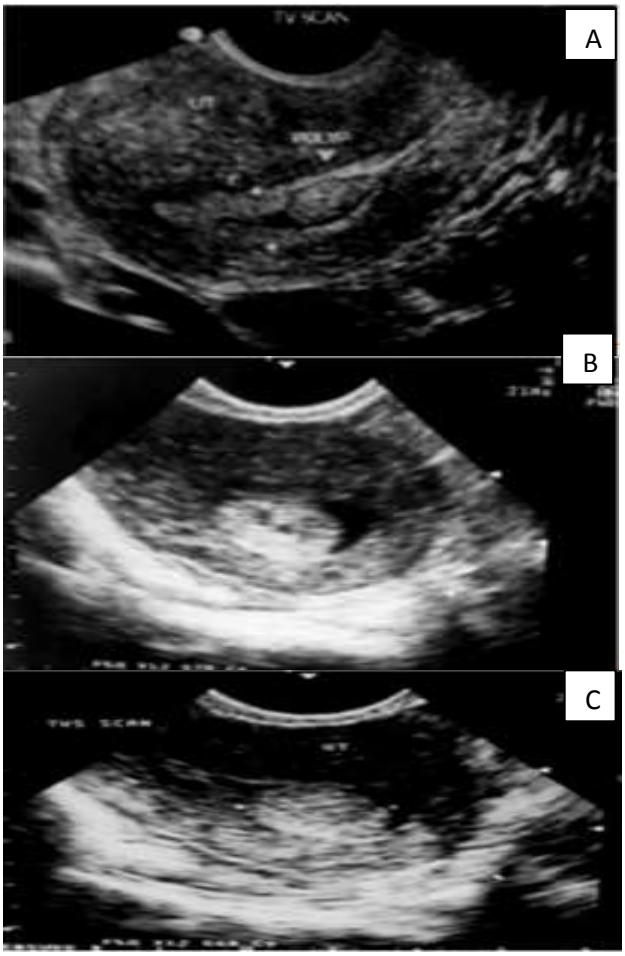

Figure 3: (A, B, C) Endometrial polyp seen as focal increased echogenic area in endometrial cavity.

Sub-mucosal fibroids (18 cases)

Sub mucosal fibroids are most symptomatic since they project into the endometrial cavity.[3] In our observation sub-mucosal fibroids were seen as isoechoic or echogenic nodules in endometrial cavity and they displace or distort endometrial echo. If muscular component is more it looks echogenic and if fibrous component is more, they show isoechoic or echogenic echotexture. In our study, fibroids did not show significant vascularity on color Doppler.

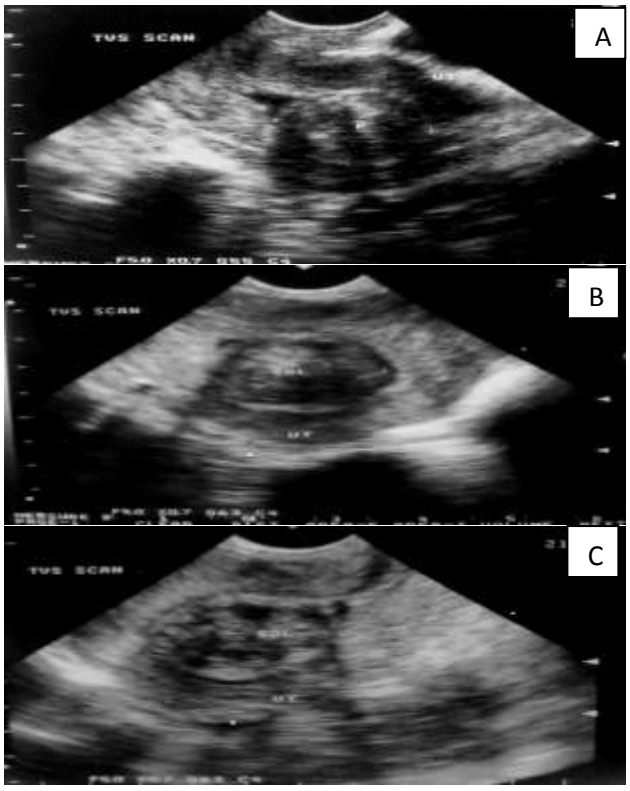

Figure 4: (A, B, C) Sub-mucosal fibroids seen as iso-echoic or Echogenic nodule in endometrial cavity.

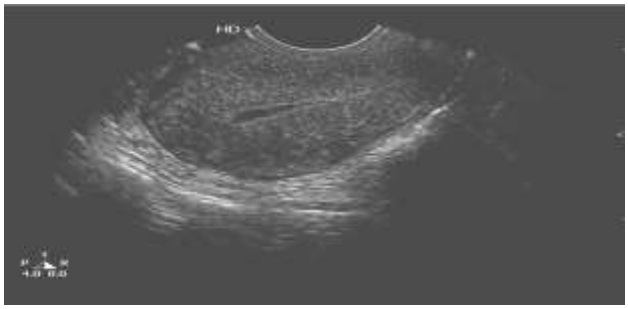

Figure 5: Endometrial atrophy.

Endometrial atrophy (11 cases)

We have come across 9 patients with post-menopausal bleeding in whom we have found endometrial atrophy. The endometrial thickness was less than 5 mm in 8 cases and 3 cases showed small cystic changes in endometrium. We have seen fluid in endometrial cavity in 5 patients, in

those cases single layer of endometrial thickness was less than 2 mm.[6] Sometimes post-menopausal bleeding or spotting occurs in endometrial atrophy - which is considered to be normal if endometrial thickness is less than 5 mm.

Carcinoma-endometrium (8 cases)

Common malignancy seen in post-menopausal females.[7] Clinically presents as post-menopausal bleeding. Endometrial thickening in endometrial carcinoma usually measures more than 5 mm. Most endometrial carcinomas are either diffusely or partially echogenic. Irregular or poorly defined endometrial thickening was seen in endometrial malignancy.[6] Telltale sign: endometrial thickening is irregular and there may be invasion of myometrium. We have found 2 cases with positive telltale sign and confirmed on biopsy.

Usg staging for endometrial carcinoma was possible in 8 cases with TVS ultrasound.

- Stage I A: superficial growth confined to endometrium (2 cases)

Myometrial invasion

- Stage I B: less than half myometrium is invaded (3 cases)
- Stage I C: more than ½ myometrium is invaded (2 case)
- Stage II: endometrium + myometrium + Invasion of cervix (1 case)
- Stage III: growth beyond uterus but in pelvis
- Stage IV: adjacent organs and endometrial cavity

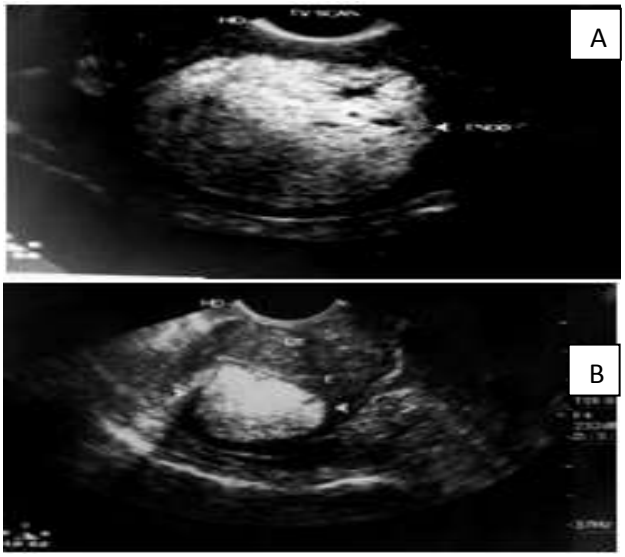

Figure 6: (A, B) Carcinoma of endometrium.

We have observed endometrial thickness cut-off 5 mm or less may be non-significant and hence need observation and follow-up only.

Chorio-carcinoma/invasive mole (3 cases)

Choriocarcinoma is a highly malignant tumor of trophoblastic origin. Most cases present within one year of the antecedent pregnancy (molar or non-molar). However, very rarely, choriocarcinoma can develop from germ cells or from dedifferentiation of endometrial carcinoma into choriocarcinoma.[7] Usually have H/O missed or Incomplete abortion or vesicular mole, Uterine bleeding post dilation and curettage and follow-up shows growth in uterine cavity as mixed-echoic mass with few small cystic spaces.

In our study, 2 cases had h/o missed abortion in past and 1 case had uterine bleeding post D and C. Ultrasound of these cases showed growth in uterine cavity as mixed-echoeic mass with few small cystic spaces. In all 3 cases increased vascularity was seen on colour Doppler. In 1 case myometrial invasion was observed. In all 3 cases, B-HCG levels were increased.

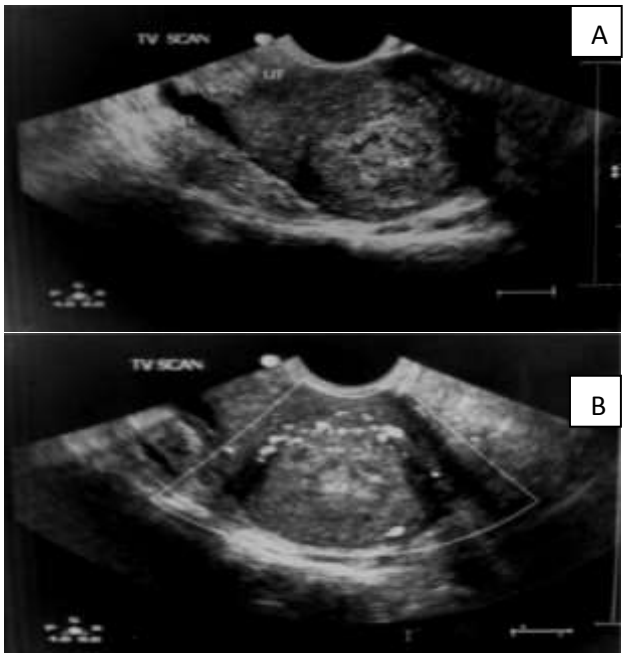

Figure 7: (A, B) Chorio-carcinoma/invasive mole.

Retained products and placenta (11 cases)

In our study retained products was seen as collapsed gestational sac or echogenic nodule in uterine cavity. Retained chorionic tissues or placental bits were seen in uterine cavity in our study.

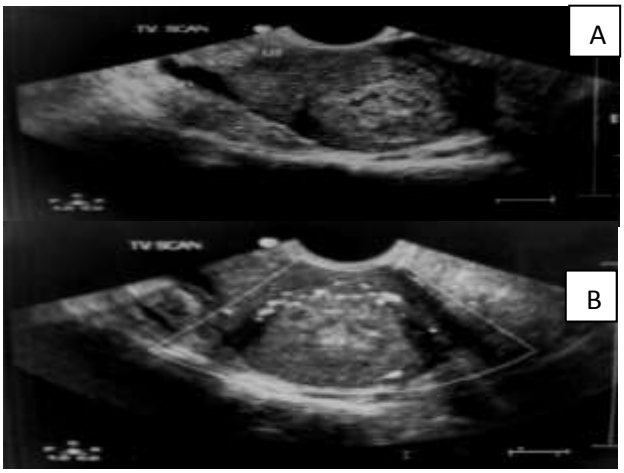

Figure 8: (A, B) retained products and placenta seen as collapsed/crumpled gestational sac in uterine cavity.

Blood/ pus/fluid (5 cases)

In our study, blood, pus and fluid were seen as hypoechoic/ anechoic collection in uterine cavity.

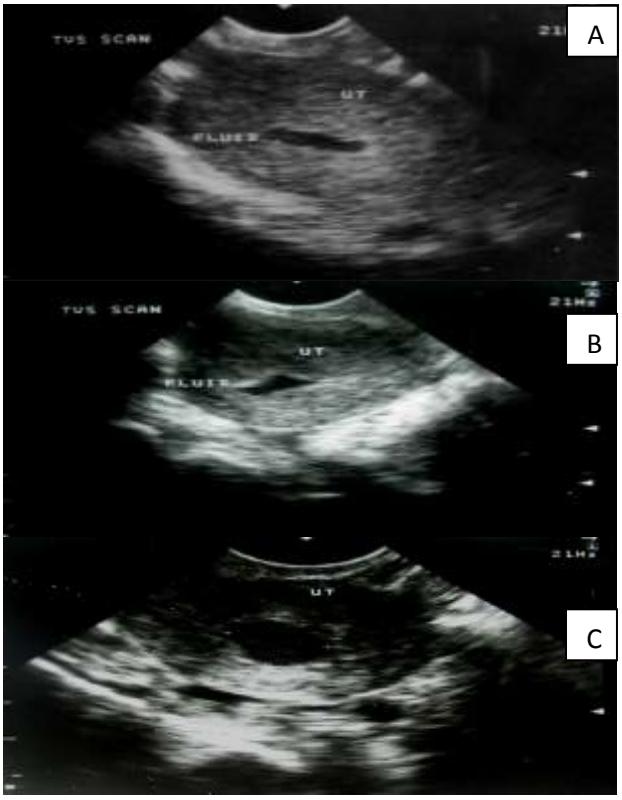

Figure 9: (A, B, C) Blood, pus and fluid seen as collection in endometrial cavity.

AVM (1 case)

Uterine and sub mucosal AVM are rare. Uterine AVMs are generally congenital (4). Congenital AVMs have multiple vascular connections and tend to invade the surrounding structures (eg, muscle, skin, viscera). They are believed to result from arrested vascular embryologic development. In contrast, arteriovenous fistulas are usually acquired and typically represent a single artery joining a single vein. They have been reported as a consequence of previous uterine trauma (eg, prior pelvic surgery, curettage), use of intrauterine contraceptive devices, pathologic pregnancy-related events, and previous treatment for gestational trophoblastic disease. Bleeding is the major presenting symptom in AVMs.[8]

We have observed 1 case of large AVM in our study. We have seen AVM as inhomogeneous mixed-echogenic mass in sub mucosal location extending to the myometrium. It showed cystic spaces and increased vascularity .Venous flow showed high flow velocities and systolic velocity peaks also like arterial pattern which was suggestive of arterio-venous shunting.

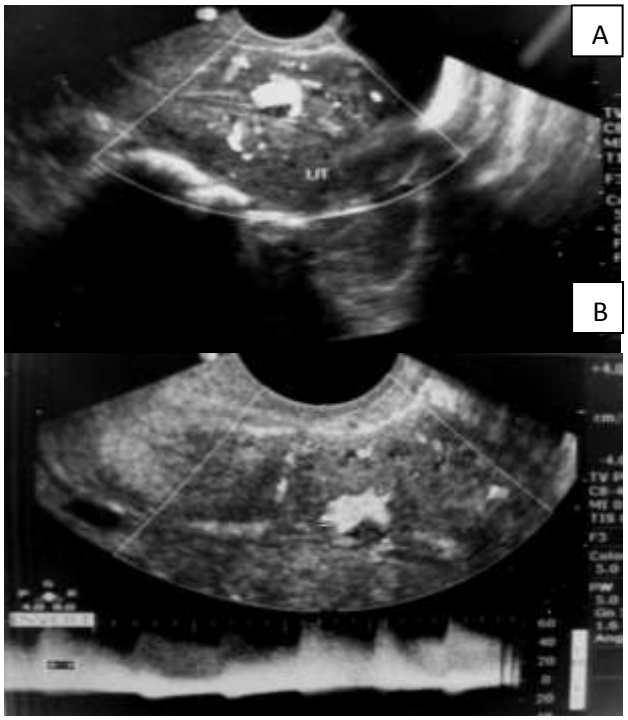

Figure 10: (A, B) Uterine AV malformation seen as vascular mass with increased vascular flow. Confirmed by colour Doppler imaging.

Submucosal lipoma and lipoleiomyomas (1 case)

Lipoleiomyomas are rare. The reported incidence varies from 0.03% to 0.2%. The sonographic appearance of leiomyomas is that of a hyperechoic mass partially encased by a hypoechoic rind. The rind is thought to represent a layer of myometrium surrounding the fatty component.[9] We have come across 1 case of lipoleiomyoma. On ultrasound it was seen as bright oval echogenic nodule in sub mucosal location adjacent to endometrium.

Figure 11: (A, B) Sub-mucosal lipoma and leiomyomas seen as round or oval echogenic nodule in myometrium or sub-mucosal location like fibroids.

Calcification /adhesions (7 cases)

Figure 12: Calcification is seen as echogenic area with posterior acoustic shadowing.

Figure 13: Adhesions are seen uterine cavity.

We have seen 3 cases of endometrial calcifications and 4 cases of adhesions. Calcification is seen as bright echogenic areas with acoustic shadowing and adhesions were seen as echogenic adherent strands. Uterine cavity walls were adherent to each other in 3 cases which was confirmed with hysteroscopy.

CONCLUSION

In view of assessing premenopausal and post-menopausal bleeding trans-vaginal high resolution ultrasound is good method to assess endometrial thickness and endometrial lesions. Endometrial thickness less than 5 mm should be considered non-significant and unnecessary Biopsy and D and C should be avoided. However in these cases follow up trans-vaginal ultrasound is necessary. Ultrasound helps for staging of carcinoma Endometrium. Hence trans-vaginal Ultrasound should be 1st choice of investigation for diagnosis of endometrium.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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