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Abnormal endometrium-myometrium junction on ultrasound imaging

Suyasha Vyas*, Mathur Neha Satyaprakash

Department of Obstetrics and Gynecology, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India.

Correspondence Address: * Suyasha Vyas, 240, Section 7 Extension, New Power House Road, Jodhpur, Rajastan-342003, India.

Abstract

Introduction: The inner myometrial layers underlying the endometrium have been termed the uterine junctional zone and appear to be a distinct anatomical structure. Visualisation of an abnormal junctional zone on imaging by USG may indicate disease – notably adenomyosis and endometrial cancer.

Cases: This is a series of three cases; two with postmenopausal bleeding and the third with abnormal uterine bleeding. All of them had an interesting clinical history; multiple comorbid conditions - which made their management a challenge; and were distinguished by an abnormal endometrium–myometrium junction visualised on ultrasonography.

Conclusion: The endometrial-myometrial zone is an important USG marker for disease; however widespread use is hampered by subjective nature of evaluation, low sensitivity and lack of standard criteria. Development of standard criteria may help increase the utility and ease of junctional zone evaluation. More research is required as to the next best step in evaluation of symptomatic patients in whom imaging shows abnormality of the endometrial-myometrial junction.

Keywords: Endometrium-myometrium junction, ultrasonography, abnormal uterine bleeding, endometrial cancer

Introduction

Both TVS and MRI demonstrate an intermediate layer between the endometrium and the myometrium. The inner myometrial layers underlying the endometrium have been variously termed - the uterine junctional zone, the endometrial–subendometrial unit, the subendometrial myometrium[1,2,3]; and appear to be a distinct anatomical structure. This zone has structural and functional differences with the myometrium, and similarities with the endometrium.[4,5]

The normal appearance of the junctional zone is described as a subendometrial halo – a regular hypoechoeiclayer of myometrium[6], measuring 5 mm or less in thickness. The endometrial- myometrial junction may appear thick and hazy in adenomyosis.[7,8] It may be disrupted or irregular in cases of myometrial invasion as in carcinoma endometrium.[9]

We present a series of cases with myriad clinical presentation, all demonstrating an abnormal junctional zone on ultrasonography.

CASE - 1

A 61 year old woman presented with a complaint of spotting per vagina on and off for the last 5 years. She had attained menopause 15 years ago. The patient had undergone dilation and curettage 4 years ago, and the endometrium at the time had revealed scanty endometrial glands in proliferative phase and no malignant cells. She had 2 children by Caesarean section. She had been hypertensive for the last 10 years, had been diagnosed with schizophrenia 7 yrs ago, with hypothyroidism 5 years ago, and wore a hearing aid for age related conductive hearing loss. The patient was on medication for all the above conditions.

Physical findings were unremarkable.

Transvaginal sonography showed a bulky uterus with thickened endometrium 17-18 mm, wide and irregular junctional zone. *[Image 1]*Pap smear was unsatisfactory with reduced cellularity. Her repeat endometrial biopsy at this time, showed moderately differentiated endometroid adenocarcinoma with papillary patterns at places.*[Image 2]*CT scan showed bulky uterus with thick endometrium and suggestive of endometrial malignancy. Infiltration appeared to be about one third of myometrium.

A total abdominal hysterectomy with bilateralsalpingoophorectomy was performed; bilateral pelvic lymph nodes were sampled. Histopathology revealed well differentiated endometrioid adenocarcinoma of endometrium with less than half of the myometrium involved by the tumour. Bilateral ovaries and bilateral fallopian tubes, vaginal cuff, cervix and bilateral parametria and pelvic lymph nodes were free of tumour. FIGO stage IA1 was thus, confirmed.

Patient is due for her first follow up visit.

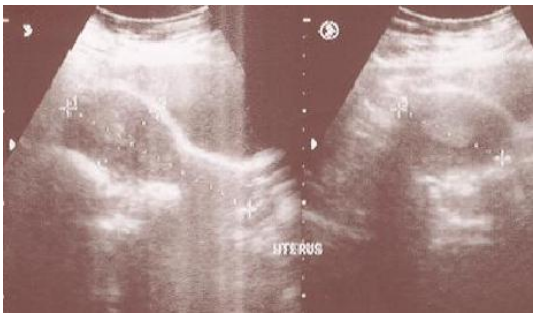

Image 1. Thick endometrium, hazy subendometrium.

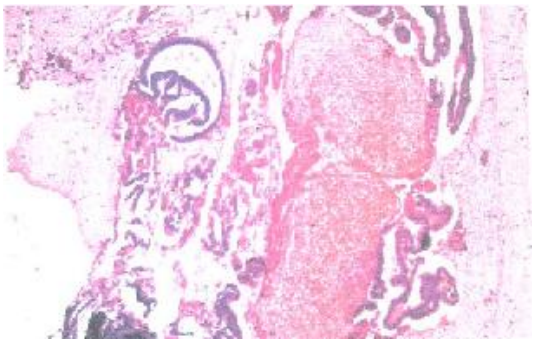

Image 2. Well differentiated adenocarcinoma endometrium.

CASE - 2

A 54 year old lady presented with complaint of vaginal bleeding for last 10 days, weakness and malaise for last 7 months. She had two children by vaginal birth and had menopause 11 years ago. She had a lump in left breast 5 years ago, FNAC of which diagnosed benign breast disease. She was hypertensive and on medication.

On physical examination, no remarkable findings were present.

Her USG showed mild ascites, normal sized uterus with hazy endometrial – myometrial junction, endometrial thickness could not be defined.MRI abdomen revealed diffuse abnormal thickening of uterine endometrium with poorly marginated polypoid lesion filling the uterine cavity (thickness 2 cm), endocervical canal, upper part of vagina; with myometrial invasion. Few small bilateral iliac lymph nodes, suspicion of omental deposits and subdiaphrgammatic deposits. Mild ascites seen, no upper

abdominal lymph nodes seen. CA 125 was 137mIU/ml. Ascitic fluid was dark yellow in color and positive for malignant cells (morphologically metastatic adenocarcinoma). Her Pap smear findings were – adenocarcinoma; probably metastatic- a single cell cluster seen similar to papillary cell clusters in peritoneal fluid.
Endometrial curettage was obtained – revealed scanty bits of endometrial gland and stroma, no malignant cells and inadequate for opinion. Repeat curettage was to no avail, similar findings were noted.
This patient was then planned for Paclitaxel and Carboplatin combination chemotherapy on basis of imaging, Pap and ascitic fluid cytology; likely adenocarcinoma endometrium FIGO IIIC3; and has received first cycle of the same.

CASE - 3

A 50 years old woman reported in gynecology OPD with heavy bleeding per vagina for 30 days after 10 months amenorrhea.. She had 2 issues both by Caesarean section. She was a known case of diabetes, on insulin; on medication for hypothyroidism. On physical examination, uterus was bulky, on examination per vagina.
On investigation, her CA 125 was 121mIU/l, TSH was 3.5mIU/ml.;blood sugar-fasting and postprandial; serum creatinine, hemogram, were within normal range.USG report noted bulky uterus with altered echotexture in the junctional zone, endometrial lining could not be visualised separately, heterogenous echotexture in region of endometrial canal, right ovarian cyst 3.2x3.9 cm.*[Image 3]*
Pap smear was negative for intraepithelial lesion or malignancy. Endometrial curettage revealed asynchronous endometrium - strips of endometrial glands and stroma. The endometrial glands tubular and lined by single to multilayered columnar cells. The stroma showing decidualisation and breakdown.
The patient underwent abdominal hysterectomy for abnormal uterine bleeding not relieved by medication, and histopathology of specimen revealed adenomyosis uterus and simple cyst right ovary.

Image 3. Bulky uterus, heterogenous myometrium.

Discussion

During the past decade ultrasound has played an increasing role in the evaluation of the endometrium in patients with abnormal uterine bleeding. Previously, and still today, in many centres, endometrial biopsy, curettage and hysteroscopy were and are the main methods of evaluation of these patients. While these techniques obviously have their place in the diagnostic armamentarium, they have been replaced by diagnostic ultrasound as the initial step in the investigation of the patient with abnormal uterine bleeding.[10,11]
Histological analysis of the subendometrial halo suggests that it is a distinct compartment of the myometrium. Visualisation of an abnormal junctional zone on imaging by USG may indicate disease – notably adenomyosis and endometrial cancer.
Several patterns of abnormality described on imaging have been linked to adenomyosis, but the correlation is weak and the diagnostic accuracy is low outside of a research context. Nevertheless, thickening or abnormality of the subendometrial myometrium has been repeatedly

documented on imaging, and believed to be adenomyosis. However, several studies have found poor correlation between above findings and pathological diagnosis of adenomyosis. It has even been proposed that endometrial-subendometrial myometrium unit disruption disease be considered as a new entity, the diagnosis of which is simple and straightforward on imaging and expressed mainly by pathological thickening or abnormality of the subendometrial myometrium.[12,13]

Endometrial carcinoma, on sonography, usualIy appear as thickening of the endometrium, or a polypoid mass. These sonographic features are non specific and endometrial thickening can also be due to benign proliferation, endometrial hyperplasia or polyps. Those patients in whom the sonolucent halo surrounding the basal layer is interrupted, penetration of endometrial carcinoma can be suggested. However, it has also been suggested that discrepancy between histologic confirmation of invasion and assessment of the same on imaging was found more commonly in cases with irregular junctional zone.[14]

Conclusion

Besides endometrial thickness, the endometrial-myometrial zone is an important USG marker for disease; however widespread use is hampered by subjective nature of evaluation, low sensitivity and lack of standard criteria.

Development of standard criteria may help increase the utility and ease of junctional zone evaluation. It may help select a pool of patients, hitherto undiagnosed, for further evaluation. More research is required as to the next best step in evaluation of symptomatic patients in whom imaging shows abnormality of the endometrial-myometrial junction. Endometrial aspiration, saline infusion sonography, hysteroscopy guided biopsy, MRI – are some of the possible available options.

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