

ULTRASOUND SIGNS OF ADENOMYOSIS: PICTORIAL ESSAY

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ABSTRACT

Adenomyosis is defined as the presence of ectopic endometrial glands and stroma within the myometrium. It is a disease of the inner myometrium and results from infiltration of the basal endometrium into the underlying myometrium. Transvaginal ultrasound and magnetic resonance imaging are the main imaging modalities for the diagnosis of this disease. The asymmetry of the thickness of the uterine walls, intramyometrial cysts, hyperechogenic intramyometrial islands, myometrium with a shading fan shape, signs of interruption of the junctional zone are the most frequent ultrasound findings to establish the presence of adenomyosis. Adenomyosis can appear as a diffuse or focal form. In this article, ultrasound findings of adenomyosis were illustrated in order to disseminate the importance of these signs for the diagnosis of this disease.

KEYWORDS: DIFFUSE ADENOMYOSIS, FOCAL ADENOMYOSIS, ADENOMYOSIS, TRANSVAGINAL ULTRASOUND

INTRODUCTION

Adenomyosis is a common benign gynecological disorder, defined as the presence of ectopic endometrial glands and stroma within the myometrium. Transvaginal ultrasound (TVUS) is a method present in most diagnostic imaging services and has become a first-line diagnostic imaging method for the detection of adenomyosis. Thus, the recognition of characteristic TVUS findings in adenomyosis is essential to clarify the current clinical approach to patients with suspected adenomyosis ¹⁻⁴.

In the present essay, the main findings of adenomyosis in TVUS are presented.

METHODS

The findings described in this study were obtained from confirmed cases (surgically and/or histologically) of adenomyosis, following the rules of conduct and ethical principles, according to the Declaration of Helsinki (1975) – 6th revision, and developed in a diagnostic imaging service in the city of Sobral and Fortaleza – Ceará, Brazil.

TVUS PROTOCOL

The technique used was based on the protocol defined by the consensus opinion of the Morphological Uterus Sonographic Assessment (MUSA)^{2,6}. The examinations were performed by a radiologist specializing in women's imaging and with a specialist title from the Brazilian College of Radiology. The ultrasound equipment used were HS40 (Samsung®), HS70A Prime (Samsung®) and NX3 (Simiens®), using an endocavitary transducer with a frequency of 9 MHz.

ADENOMYOSIS FINDINGS ON TVUS

In the present study, the sonographic characteristics of the myometrium and myometrial lesions related to adenomyosis are described according to the terms and definitions published in the MUSA consensus ^{2,6,7}. The typical findings of adenomyosis identified on TVUS are:

Thickening or irregularity of the junctional zone

The junctional zone (JZ) is visible as a hypoechogenic subendometrial halo ^{2,5,6}. This layer is composed of smooth muscle fibers compacted longitudinally and circularly ^{2,5,6}. To recognize, on ultrasound, the pathological aspects of the JZ, it is necessary to recognize the normal echographic appearance of it. Figure 1 shows the uterus in cross-section with a well-defined JZ surrounding the echogenic endometrium.

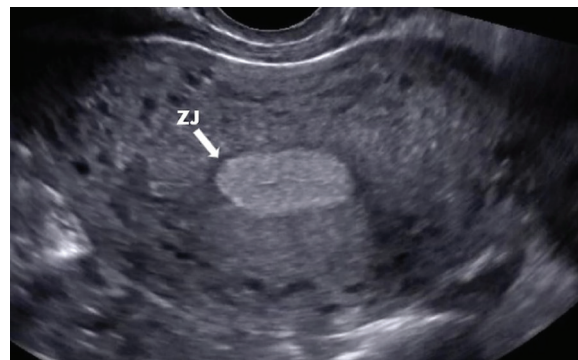


Figure 1. Cross-sectional view of the uterine body obtained by ultrasound in B-mode. The junctional zone (JZ) can be visualized as a dark line just below the endometrium (white arrow)

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Figure 2 demonstrates an echographic appearance with changes in the JZ with irregularity and discontinuation in the anterior wall of the endometrium.

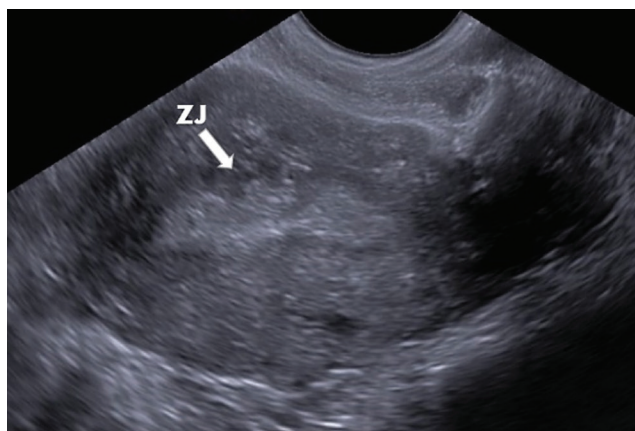


Figure 2. Longitudinal view of the uterus obtained by ultrasound in B-mode. The irregular and discontinuous junctional zone (JZ) in the anterior wall of the endometrium (white arrow).

Asymmetric thickening of the myometrial walls

The extent of myometrial lesion can be estimated subjectively as a percentage according to the volume of myometrium involved. If less than 50% of the myometrium is involved, the lesion is reported as focal, if more than 50% of the myometrium is involved, it is reported as diffuse^{2,4,5,7}. The myometrial lesions of adenomyosis determined asymmetry of the uterine walls, as shown in figure 3.

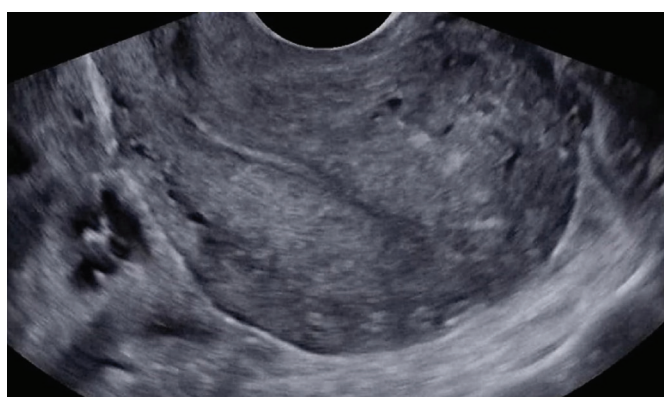


Figure 3. Longitudinal view of the uterus obtained by ultrasound in B-mode. Asymmetry of myometrial walls due to involvement of more than 50% of the posterior wall in the retroverted uterus.

Acoustic bands present in the myometrium (myometrial stratification in "sunbeams")

Acoustic shadows may arise from the margins of lesions. Reported in many works as myometrial stratification in "sunbeams" (figure 4) they are defined by the presence of hy-

poechoic linear acoustic bands, sometimes alternating with linear hyperechoic stripes²⁻⁶. This type of acoustic bands can be caused by superimposed microcystic structures.



Figure 4. Longitudinal view of the uterus obtained by ultrasound in B-mode. Acoustic bands present in the myometrium (myometrial stratification in "sunbeams") in the anterior wall of the myometrium (white arrow).

Subendometrial echogenic lines and echogenic islets in the myometrium

Echogenic islands are hyperechoic areas within the myometrium and may be regular or irregular. Islands can be distinguished from small echogenic lines seen in the subendometrial halo^{2,5-7}. Figure 5 illustrates the echographic appearance of the myometrial echogenic islands, represented by an irregular hyperechoic area in the anterior wall of the myometrium.

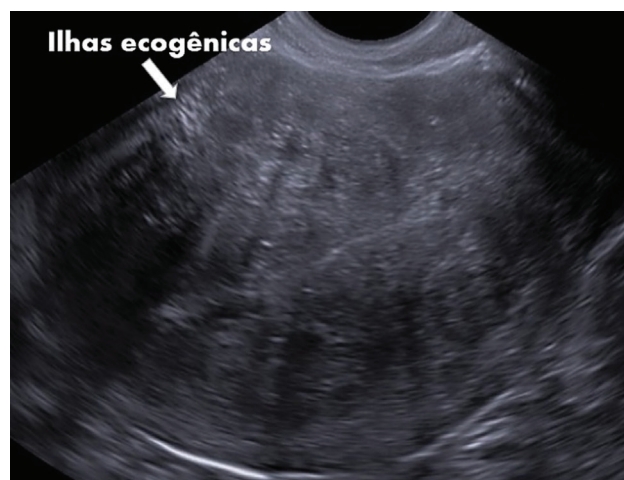


Figure 5. Longitudinal view of the uterus obtained by ultrasound in B-mode. Echogenic islands in the anterior wall of the myometrium (white arrow).

Small cystic formations in the myometrium

Myometrial cysts are rounded lesions within the myometrium and the content of these cysts can be anechoic or of mixed echogenicity^{2-4,7}. A cyst may be surrounded by a

hyperechoic rim and some cysts may form aggregates of tiny hypoechoic microcysts in the myometrium^{2,4,6}.

Figure 6 illustrates the characteristic appearance of clustered cysts in the anterior wall of the myometrium.



Figure 6. Longitudinal view of the uterus obtained by ultrasound in B-mode. Cysts clustered in the anterior wall of the myometrium (white arrow).

Increased vascularity on Doppler with penetrating vessels in the affected area

In areas affected by adenomyosis, translesional myometrial vascularization, defined as vessels perpendicular to the endometrium crossing the lesion, is increased on color Doppler or Power Doppler (figure 7)^{2,3,5-7}.

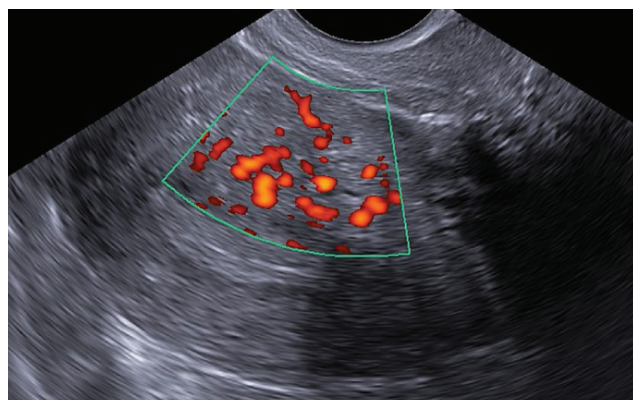


Figure 7. Longitudinal view of the uterus obtained by ultrasound in Power Doppler mode. Translesional vascularization, defined as vessels perpendicular to the endometrium crossing the lesion.

Report

Structured ultrasound assessment report for adenomyosis is strongly recommended⁸, and a description of standard reporting recommendations for endometriosis has recently been published⁹. For this study of TVUS in adenomyosis, we suggest a reporting template to be used in addition to the standard TVUS report (Table 1). This systematic report

is currently used in our diagnostic imaging center and incorporates all relevant structures respecting the terms and definitions described in the literature^{2,4,6,7}.

Uterus	
Biometrics: <input type="text"/> x <input type="text"/> cm (volume: <input type="text"/> cm ³)	
Position: () anteversoflexion () retroversion () retroflexion	
External contours: () regular	
endometriosis in the anterior uterine serosa endometriosis in the posterior uterine serosa	
Myometrial echotexture: () regular	
() adenomyosis () focal () diffuse	
() anterior wall () involvement more than 50% () less than 50%	
() posterior wall () involvement more than 50% () less than 50%	
Signs of adenomyosis:	
() thickening or irregularity of the junctional zone	
() Asymmetry of the myometrial walls	
() Acoustic bands in the myometrium (myometrial stratification in "sunbeams")	
() Subendometrial and myometrial echogenic lines	
() myometrial cysts	
() increased vascularity on Doppler with penetrating vessels in the affected area	
() myometrial infiltrating endometriosis () anterior wall () posterior wall	

Table 1 - Structured TVUS report in patients with suspected adenomyosis (in addition to the standard report)

CONCLUSION

The echographic findings described demonstrate the usefulness of ultrasonography for the diagnosis of adenomyosis. In clinically suspected cases of adenomyosis, TVUS may be the initial tool for diagnostic imaging. These ultrasound signals should be relevant to physicians performing TVUS examinations in everyday practice and for clinical research.

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