International Journal of Reproduction, Contraception, Obstetrics and Gynecology
El-Habashy A et al. Int J Reprod Contracept Obstet Gynecol. 2025 Jan;14(1):58-62
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20243792

Original Research Article

Comparison of uterine transcornual diameter using 3D-transvaginal ultrasound between adenomyotic and normal uteri

Ahmed El-Habashy*, Mohamed Farag, Rehab El-Said

Department of Obstetrics and Gynecology, Faculty of Medicine, Alexandria University, Egypt

Received: 27 November 2024
Revised: 11 December 2024
Accepted: 12 December 2024

***Correspondence:**
Dr. Ahmed El-Habashy,
E-mail: ahmadelhabashy@yahoo.com

ABSTRACT

Background: Various sonographic markers for diagnosis of adenomyosis had been published by the morphological uterus sonographic assessment (MUSA) group. Most of their data based on two dimensional transvaginal ultrasound (2D-TVUS) findings. Our study aimed to find if there is a relation between the presence of adenomyosis uteri and the transcornual diameter.
Methods: We had studied 768 cases (33-44 years old) who were referred to Habashy 4D scan center (Alexandria; Egypt) between August 2019 and August 2023. We had divided cases into two groups; each with 384 cases. First group has diffused adenomyosis and the second group has normal uterus. We had diagnosed adenomyosis based in the presence of ≥4 of the MUSA criteria. In the control group; we had selected cases with normal sized uterus. We had compared the transcornual diameter of the uterine cavity in the coronal plane between both groups using 3D-TVUS during the luteal phase of the cycle.
Results: The mean transcornual diameter in cases who had adenomyosis was 39 mm (±6 mm). The mean transcornual diameter in the control group was 24 mm (±8 mm).
Conclusions: The mean transcornual diameter of the uterine cavity in the coronal plane using luteal 3D-TVUS in adenomyotic uteri was statistically significantly higher than in the controls. To the best of our knowledge, our study is the first study in literature that compare the transcornual diameter adenomyotic and normal uteri. We can extrapolate from our data to assume that transcornual diameter <35 mm can be used as an exclusion for diagnosis of cases as having adenomyosis uteri.

Keywords: Adenomyosis, 3D-TVUS, Uterine cavity, Transcornual diameter

INTRODUCTION

Adenomyosis is a common benign uterine pathology that is defined as migration of endometrial glands and stroma into the myometrium.[1,2] About third of cases who attend gynecology clinic had had adenomyosis. The common symptoms associated with adenomyosis are: chronic pelvic pain (CPP) and abnormal uterine bleeding (AUB).[3,4]

Currently 2D-TVU is the best diagnostic method for adenomyosis with specificity and sensitivity up to 78%. The 3D-TVUS had increased the diagnostic potentials for adenomyosis as it improves the visualization of endo-myometrial junctional zone (EMJZ) better than 2D-TVUS.[5]

The MUSA group had released consensus definitions for diagnosis of adenomyosis. They had described the direct sonographic signs of adenomyosis; which are: subendometrial myometrial cysts, hyperechogenic islands and echogenic subenometrial lines and buds. They had also described the indirect sonographic signs of adenomyosis; which are: globular uterus, asymmetrical myometrial thickening, fan-shaped shadowing,

translesional vascularity and irregular or interrupted junctional zone.[6-8]

Most of MUSA group data based on 2D-TVUS findings with no definite extrapolation of uterine cavity biometry by 3D-TVUS. We compare in this study the transcornual diameter of the uterine cavity in cases diagnosed as adenomyosis with normal controls aiming that this biometric measurement could be used as a diagnostic marker for cases of adenomyosis uteri.

METHODS

Our study is a cross-sectional study. We had studied 768 cases (between 33-44 years old) who were referred to Habashy 4D scan center (a tertiary center for obstetrics and gynecology sonography in Alexandria; Egypt) between August 2019 and August 2023. We had divided cases into two groups; each with 384 cases. First group has diffused adenomyosis and the second group has normal uterus (control group).

We had diagnosed adenomyosis based in the presence of at least 4 of following 6 MUSA criteria: uterine length ≥9 cm, myometrial wall thickness discordance ≥1 cm, subendometrial myometrial cyst, subsenometrial echogenic buds, myometrial mottling (sunray appearance) and indistinct EMJZ.

In the second group (normal uterus); we had selected cases that not had uterine enlargement due to any cause. We had excluded any confounding factor in both groups, namely; endometrial polyp, myoma, adenomyoma, Mullerian anomaly, isthmocele, endometrial hyperplasia, intrauterine adhesions (IUA) and intrauterine devices (IUD).

To get the coronal plane of the uterus; we used Voluson S10 expert BT22 ultrasound system (GE healthcare, Zipf, Austria), with volumetric transvaginal probe (GE RIC 5-9 MHz). We scanned our cases during the luteal phase of the cycle (i.e. between days 17 and 25). After obtaining the sagittal plane of the uterus in 2D-TVUS select 3D volume box that encompassed the uterus and ask the patient to hold her breath during 3D volume acquisition that was performed with maximum quality setting and maximum sweep angle of 180^0.

We had compared the transcornual diameter of the uterine cavity in the coronal plane between both groups using 3D-TVUS during the luteal phase of the menstrual cycle. For each case we measure the transcornual diameter of the uterus using four rendering modes and get the widest of them.

The 4 rendering mode that we had used are: surface rendering mode, tomographic ultrasound imaging mode (TUI), Omniview mode and volume contrast imaging mode (VCI). Transcornual diameter (or the intercornual line) is defined as the line that is connecting the highest point of the endometrial cavity on each side of uterus in coronal plane; which is depicted in Figure 1.[9,10]

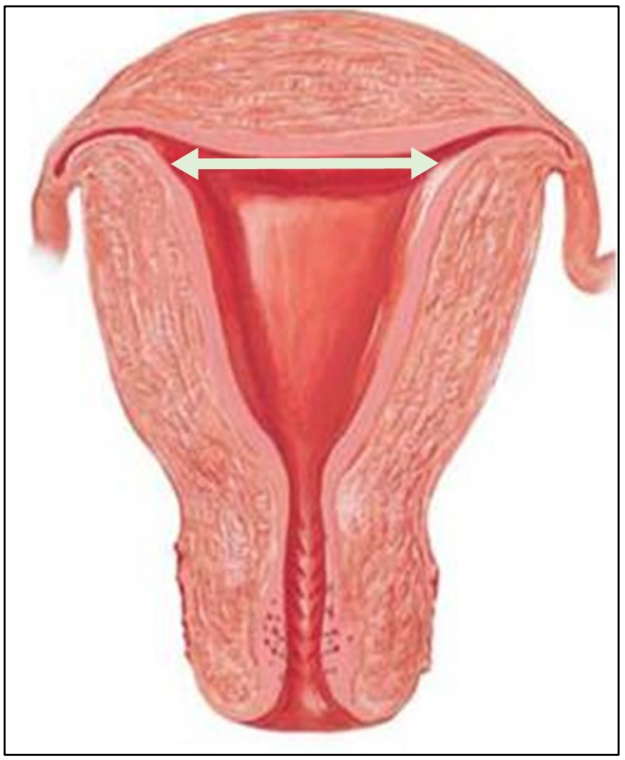

Figure 1: Diagram presenting the transcornual diameter of the uterine cavity in the coronal plane (↔).

RESULTS

Table 1 shows the demographic data of the studied groups. There was no statistically significant difference between the studied groups as regards the age. Parity was higher in group A than group B. Incidence of pain and AUB were higher in group A than group B. Incidence of infertility was higher in group B (the control group) than group A (adenomyosis cases).

Table 2 shows comparison between both groups as regard the external uterine geometry and the transcornual diameter. All external uterine geometric measurement, endometrial thickness and transcornual diameter were statistically significantly higher among group A in comparison to group B.

The mean transcornual diameter of the uterine cavity in the coronal plane using luteal 3D-TVUS in cases who had adenomyosis uteri was 39 mm (±6 mm). Figure 2 showed the transcornual diameter in an adenomyotic uterus using various 3D rendering modes.

The mean transcornual diameter in the control group was 24 mm (±8 mm). Figure 3 showed the transcornual diameter of a normal uterus using various 3D rendering modes.

Table 1: Demographic data of the studied groups.

Variables	Group A, (n=384)	Group B, (n=384)	P value*
Age (in years), mean±SD	38.62±5.21	38.46±5.4	0.861
Parity, mean±SD	3±2	1±1	0.001
Pain	279 cases (78%)	111 cases (29%)	<0.001
Bleeding	283 cases (74%)	119 cases (31%)	<0.001
Infertility	89 cases (28%)	257 cases (67%)	<0.001

*P value for comparing between group A and B.

Table 2: Comparison between both groups as regard the external uterine geometry and the transcornual diameter.

Variables	Group A, (n=384)	Group B, (n=384)	P value*
Uterine length (cm), mean±SD	13.6±3.1	8.4±1.9	<0.001
Uterine height (cm), mean±SD	6.3±2.7	3.4±1.6	<0.001
Uterine width (cm), mean±SD	8.8±2.6	4.8±1.1	<0.001
Endometrial thickness (mm), mean±SD	13.2±3.1	8.9±1.3	0.001
Transcornual diameter (mm) mean±SD	39±6	24±8	0.008

*P value for comparing between group A and B.

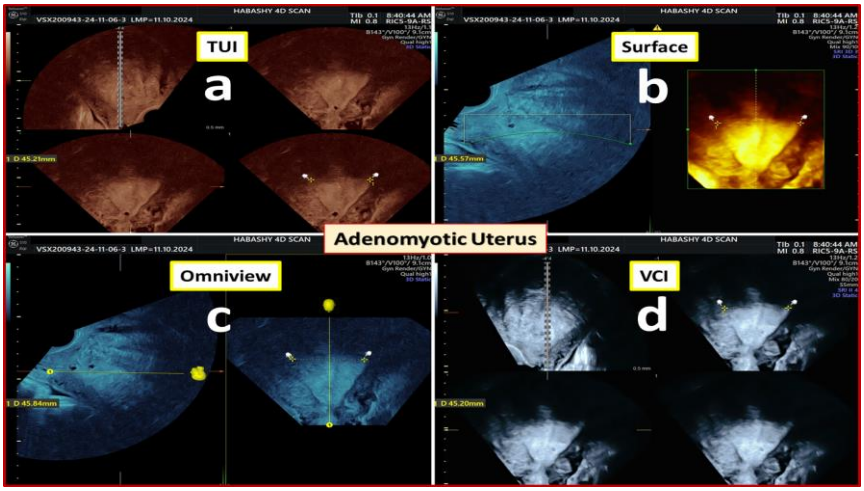

Figure 2 (a-d): Transcornual diameter in adnemoyotic uterus using various 3D-TVUS rendering modes, TUI mode, surface rendering mode, omniview mode and VCI mode. The transcornual diameter in this case is about 45 mm.

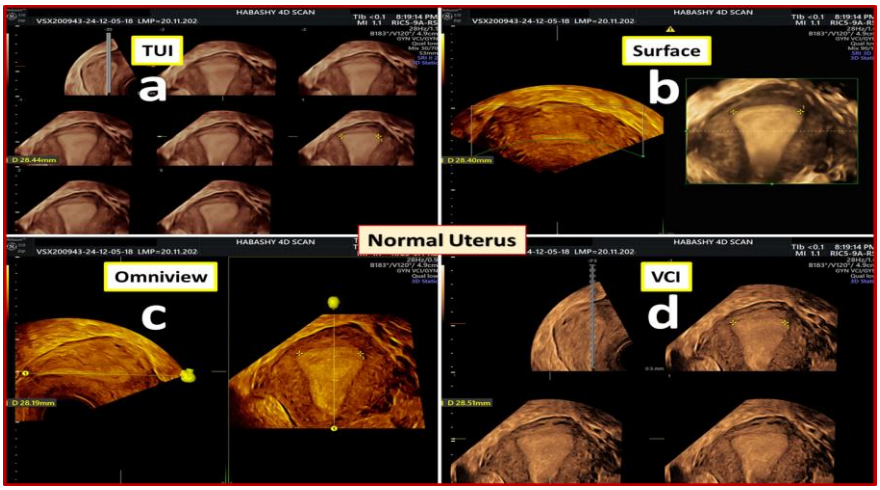

Figure 3 (a-d): Transcornual diameter in normal uterus using various 3D-TVUS rendering modes. TUI mode, surface rendering mode, omniview mode and VCI mode. The transcornual diameter in this case is about 28 mm.

The mean transcornual diameter of uterine cavity in the coronal plane using luteal 3D-TVUS in adenomyotic uteri was statistically significantly higher than that in normal uteri (39±6 mm vs 24±8 mm respectively); p<0.05. All cases with adenomyosis have transcornual diameter <35 mm. None of cases with normal uterus has transcornual diameter >32 mm.

DISCUSSION

Various sonographic markers for diagnosis of adenomyosis had been published by the MUSA group. Most of their data based on 2D-TVUS findings with no definite extrapolation of uterine cavity biometry by 3D-TVUS. We compare in this study the transcornual diameter of the uterine cavity in cases diagnosed as adenomyosis with normal controls. Our study is a cross sectional study that aimed to find if there is a relation between the presence of adenomyosis uteri and the diameter of the transcornual plane in the coronal plane of the uterus using luteal 3D-TVUS and shall this finding may help in diagnosis of adenomyosis.

We had studied 768 cases (between 33-44 years old) who were referred to Habashy 4D scan center (a tertiary center for obstetrics and gynecology sonography in Alexandria; Egypt) between August 2019 and August 2023. We had divided cases into two groups; each with 384 cases. First group has diffused adenomyosis and the second group has normal uterus (control group).

We had compared the transcornual diameter of the uterine cavity in the coronal plane between both groups using 3D-TVUS during the luteal phase of the menstrual cycle. The mean transcornual diameter of the uterine cavity in the coronal plane using luteal 3D-TVUS in cases who had adenomyosis uteri was 39 mm (±6 mm). The mean transcornual diameter in the control group was 24 mm (±8 mm). All cases with adenomyosis have transcornual diameter <35 mm. None of cases with normal uterus has transcornual diameter >32 mm.

Abdel-Naby et al had studied 299 nulliparous cases (20-40 years old) to assess the geometric measures of normally appearing uterine cavity.[10] They found that the maximum width of endometrial cavity at the fundus was: 28.2±5.9 mm. Their findings were near to our finding that showed the transcornual diameter in normal cases in our study was: 24±8 mm. What differ our study from their study are that our study includes normal uterine cavity irrespective to the parity and our age window was: 33-44 years.

Raimondo et al had studied 112 cases for sonographic assessment of uterine biometry for the diagnosis of diffuse adenomyosis.[11] Half of their cases were adenomyosis and the other half were normal control. They concluded that uterine length, width and height are statistically significantly higher than that of normal control. The difference between their study and our study is that they had used 2D-TVUS for external uterine geometry in the sagittal and axial planes and our study had used 3D-TVUS for internal uterine geometry (i.e. transcornual diameter of the uterine cavity in the coronal plane).

To the best of our knowledge, our study is the first study in literature that compare the transcornual diameter of the uterine cavity using 3D-TVUS between adenomyotic and normal uteri. Further studies are needed to assess geometric measures of the uterine cavity in cases of adenomyosis that could help in its diagnosis or exclusion in borderline cases.

We have three limitations in our study. Firstly; we had excluded cases that could increase uterine size in the control group like myomas. Adenomyosis can coexist with liomyomas in significant proportion of cases.[12-14] So exclusion of myoma from the studied cases could affect the significance of transcornual diameter in cases with coexisting adenomyosis and myomas. The second limitation was that we studied cases with only diffuse adenomyosis in group A and we did not include cases who had focal adenomyosis (adenomyoma) that may affect the transcornual diameter measurement. The last limitation was that we did not correlate the severity of symptoms in cases with adenomyosis with the transcornual diameter.[15]

CONCLUSION

The mean transcornual diameter of the uterine cavity in the coronal plane using luteal 3D-TVUS in adenomyotic uteri was statistically significantly higher than in the controls. To the best of our knowledge, our study is the first study in literature that compare the transcornual diameter of the uterine cavity using 3D-TVUS between adenomyotic and normal uteri. We can extrapolate from our data to assume that transcornual diameter <35mm can be used as an exclusion for diagnosis of cases as having adenomyosis uteri.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee Faculty of Medicine; Alexanrdia University; Egypt. Serial number: 0305985 on 19-01-2023

REFERENCES

1. Dason ES, Maxim M, Sanders A, Papillon-Smith J, Ng D, Chan C, et al. Guideline No. 437: Diagnosis and Management of Adenomyosis. J Obstet Gynaecol Can. 2023;45(6):417-29.e1.
2. Ferenczy A. Pathophysiology of adenomyosis. Hum Reprod Update. 1998;4(4):312-22.
3. Naftalin J, Hoo W, Pateman K, Mavrelos D, Holland T, Jurkovic D. How common is adenomyosis? A prospective study of prevalence using transvaginal ultrasound in a gynaecology clinic. Hum Reprod. 2012;27(12):3432-9.

4. Pinzauti S, Lazzeri L, Tosti C, Centini G, Orlandini C, Luisi S, et al. Transvaginal sonographic features of diffuse adenomyosis in 18-30-year-old nulligravid women without endometriosis: association with symptoms. Ultrasound Obstet Gynecol. 2015;46(6):730-6.
5. Tellum T, Nygaard S, Lieng M. Noninvasive Diagnosis of Adenomyosis: A Structured Review and Meta-analysis of Diagnostic Accuracy in Imaging. J Minim Invasive Gynecol. 2020;27(2):408-18e3.
6. Harmsen MJ, Van den Bosch T, de Leeuw RA, Dueholm M, Exacoustos C, Valentin L, et al. Consensus on revised definitions of Morphological Uterus Sonographic Assessment (MUSA) features of adenomyosis: results of modified Delphi procedure. Ultrasound Obstet Gynecol. 2022;60(1):118-31.
7. Harmsen MJ, Van den Bosch T, de Leeuw RA, Dueholm M, Exacoustos C, Valentin L, et al. Consensus on revised definitions of Morphological Uterus Sonographic Assessment (MUSA) features of adenomyosis: results of modified Delphi procedure. Ultrasound Obstet Gynecol. 2022;60(1):118-31.
8. Biasioli A, Degano M, Restaino S, Bagolin M, Moro F, Ciccarone F, et al. The Udine Hospital Endometriosis Group. Innovative Ultrasound Criteria for the Diagnosis of Adenomyosis and Correlation with Symptoms: A Retrospective Re-Evaluation. Biomedicines. 2024;12(2):463.
9. Ludwin A, Martins WP. Correct measurement of uterine fundal internal indentation depth and angle: an important but overlooked issue for precise diagnosis of uterine anomalies. Ultrasound Obstet Gynecol. 2021;58(3):497-9.
10. Abdel-Naby MA, and El-Said R. OP31.02: 3D ultrasound novel geometric measures for normally appearing uterine cavity in nulliparous females in reproductive age. Ultrasound Obstet Gynecol. 2014;44:161-2.
11. Raimondo D, Lazzeri L, Raffone A, Giorgi M, Orsini B, Verrelli L, et al. Sonographic Assessment of Uterine Biometry for the Diagnosis of Diffuse Adenomyosis in a Tertiary Outpatient Clinic. J Pers Med. 2022;12(10):1572.
12. Bergholt T, Eriksen L, Berendt N, Jacobsen M, Hertz JB. Prevalence and risk factors of adenomyosis at hysterectomy. Hum Reprod. 2001;16(11):2418-21.
13. Weiss G, Maseelall P, Schott LL, Brockwell SE, Schocken M, Johnston JM. Adenomyosis a variant, not a disease? Evidence from hysterectomized menopausal women in the Study of Women's Health Across the Nation (SWAN) Fertil Steril. 2009;91(1):201-6.
14. Taran FA, Weaver AL, Coddington CC, Stewart EA. Characteristics indicating adenomyosis coexisting with leiomyomas: a case-control study. Hum Reprod. 2010;25(5):1177-82.
15. Exacoustos C, Morosetti G, Conway F, Camilli S, Martire FG, Lazzeri L, et al. New Sonographic Classification of Adenomyosis: Do Type and Degree of Adenomyosis Correlate to Severity of Symptoms? J Minim Invasive Gynecol. 2020;27(6):1308-15.

Cite this article as: El-Habashy A, Farag M, El-Said R. Comparison of uterine transcornual diameter using 3D-transvaginal ultrasound between adenomyotic and normal uteri. Int J Reprod Contracept Obstet Gynecol 2025;14:58-62.