

Three-dimensional ultrasound of adenomyosis: morphological findings, their diagnostic value and their correlation with MRI and histopathology.

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Introduction: The uterine junctional zone (JZ) plays a central role in the pathogenesis and symptomatology of adenomyosis. Detection of alterations in the JZ is therefore a reasonable diagnostic approach, especially for an early diagnosis. MRI has been superior to ultrasound in the diagnosis of adenomyosis, mostly due to better imaging of the junctional zone. 3D-transvaginal ultrasound (TVUS) seems to diminish this difference: the possibility to use rendering-techniques and the display of the coronal plane provides a more detailed and clearer vision of the JZ. The downside of 3D-rendering is the vulnerability for artefacts. The comparison of the diagnostic accuracy of 3D-TVUS with the gold standard (histopathology) was prior shown in only two studies. Our aim in this study was therefore 1) to define a diagnostic benchmark of alterations in the junctional zone for adenomyosis and 2) to investigate if alterations in the junctional zone seen with 3D-TVUS correlate with MRI- and histopathological findings.

Patients and methods: 100 premenopausal women scheduled for hysterectomy due to benign conditions (adenomyosis and other) underwent 2D- and 3D-TVUS, MRI, hysterectomy and histopathological examination of the specimen. Structured clinical information was gathered from each woman. We assessed the appearance of the uterus and the JZ in both ultrasound and MRI according to the consensus presented by the Morphological Uterus Sonographic Assessment Group (MUSA). Morphological changes and size of the JZ as seen on 3D-TVUS were correlated with MRI- and histological findings. Other 2D-TVUS features of the uterus (wall-asymmetry, anechoic myometrial cysts, myometrial striations, hyperechogenic islands) were documented from both MRI and 2D-TVUS. The pathologist was not blinded for the imaging results, but asked to take out sections specifically at the locations where adenomyosis was suspected. Photo-documentation of the specimen was taken and the histological finding of each takeout-location was documented and then re-compared to the MRI and 3D-TVUS-volumes. Descriptive analysis was performed by using proportions, means and SDs. For statistical analysis we use Student's t-test, chi-square test or Fisher's exact test. A P-value < 0.05 was considered as statistically significant. The diagnostic accuracy of the different features was determined using Bayes' theorem. Sensitivity, specificity, accuracy, negative and positive predictive values and likelihood ratios (LR) were calculated.

Results: We have reached the end of inclusion and are currently finalizing the data analysis of this study. 96 (96%) out of 100 included women underwent hysterectomy, 60 (62%) of those have histologically confirmed adenomyosis. We expect to have the final results on hand by the end of February and hope to have the opportunity to present our final results at the SEUD congress in Singapore.

Conclusion: Our preliminary results indicate that various findings in 3D-TVUS have a good correlation with uterine histopathology. Nevertheless, it is sensitive to artefacts and difficult to evaluate when fibroids present. In our preliminary data, the test accuracy for one type of morphological change alone seems to be low. When extensive adenomyosis present, 2D-TVUS shows a better accuracy.

Keywords : Adenomyosis, 3D Ultrasound, Junctional Zone

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