

Comparison of 2D and 3D SPACE T2-weighted TSE MR Imaging at 3.0 T for Image Quality and Local Staging of Uterine Cervix Cancer

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PURPOSE: To compare the diagnostic performance and image quality for a 3D T2-weighted turbo spin-echo (TSE) MR imaging sequence (SPACE; Siemens Healthcare, Germany) with a conventional multiplanar 2D T2-weighted TSE sequence in the pretreatment evaluation of invasive cervical carcinoma.

MATERIALS AND METHODS: Seventy-five patients with biopsy-proven cervical carcinoma underwent MRI of the pelvis at 3T, using both 5-mm-thick multiplanar 2D (total acquisition time = 12 minutes 25 seconds) and 1-mm-thick coronal 3D TSE T2-weighted sequences (total acquisition time = 7 minutes 20 seconds). Interactive multiplanar reconstruction of the 3D data was performed for analysis. Quantitative analyses of the estimated signal-to-noise ratio (SNR) and of the relative tumor contrast between the tumors and skeletal muscles and qualitative analyses of tumor conspicuity, sharpness of tumor margin, and overall image quality were performed. In forty-five patients who underwent radical hysterectomy, two radiologists independently assessed the local-regional staging of cervical carcinoma.

RESULTS: The estimated SNR of cervical carcinoma and the relative tumor contrast were significantly higher with the 3D TSE than with the 2D TSE sequence ($p < 0.0001$). Tumor conspicuity was better with 3D T2-weighted imaging, but the sharpness of the tumor margin was better with 2D T2-weighted imaging. No significant difference in overall image quality was noted between the 2D and 3D data ($p = 0.38$). There were no significant differences between the 2D and 3D data in terms of the accuracy, sensitivity and specificity of parametrial invasion, vaginal invasion, and lymph node metastases in both reviewers ($p > .05$ for all comparison pairs).

CONCLUSION: Multiplanar reconstruction 3D T2-weighted MR imaging protocols had better tumor conspicuity with shorter scan time and showed no significant differences in accuracy of local-regional staging and overall image quality, in comparison with conventional multiplanar 2D TSE T2-weighted MRI. However, the reformatted 3D T2-weighted images had limitations with regard to the sharpness of the tumor margin.