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TITLE

MRI-BASED 3D PATIENT-SPECIFIC RECONSTRUCTION OF UTERINE FIBROMATOSIS: IMPACT ON SURGERY

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ABSTRACT

Objective: Myomas offer relevant challenges even to skilled surgeons, and often limit the possibility to achieve hysterectomy in a mini-invasive fashion. Myomectomy can be even more challenging, since extensive ablation of myomas needs to be obtained, while preserving the function of the uterus.

We applied a MRI-based 3D reconstruction of the uterus anatomy testing its diagnostic accuracy and impact on planning and performance of surgical procedures for uterine fibromatosis.

Patients, intervention: Patient-specific 3D models of the uteri of 18 women with symptomatic fibromatosis selected for surgery were obtained from MRI images with semi-automated segmentation routines and were shown to the surgeon at the time of pre-surgical planning and during surgery. Diagnostic accuracy of the 3D reconstruction vs. transvaginal ultrasound in identifying and locating the myomas was tested. The impact of the 3D modeling on the choice and the performance of surgery was compared with 30 comparable procedures where MRI was not available.

Results: Sensitivity and specificity of the 3D imaging system was higher than transvaginal ultrasound, respectively 97% vs. 62% and 98% vs. 76%. Pre-operative visualization of the 3D images induced to shift from a pre-surgical plan of open surgery to a mini-invasive technique in 22% of patients and from total hysterectomy to myomectomy in 31%.

Conclusions: 3D imaging of uterine with a MRI-based system identifies and locates myomas with high sensitivity and specificity and appears to be useful for both planning and execution of surgery. In patients selected for multiple complex myomectomies, the perform of MRI and 3D reconstruction did not determine any statistically significant difference in perioperative outcome but the intraoperative identifications of detailed anatomical landmarks could have allowed a conservative or mini-invasive approach.

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