

Case Report: 3D SPACE MR Acquisition in Genitourinary Tract Imaging

Dr. Wallabh Upasani; Dr. Priti Apte-Upasani

Sun Scan Center, Thane, India

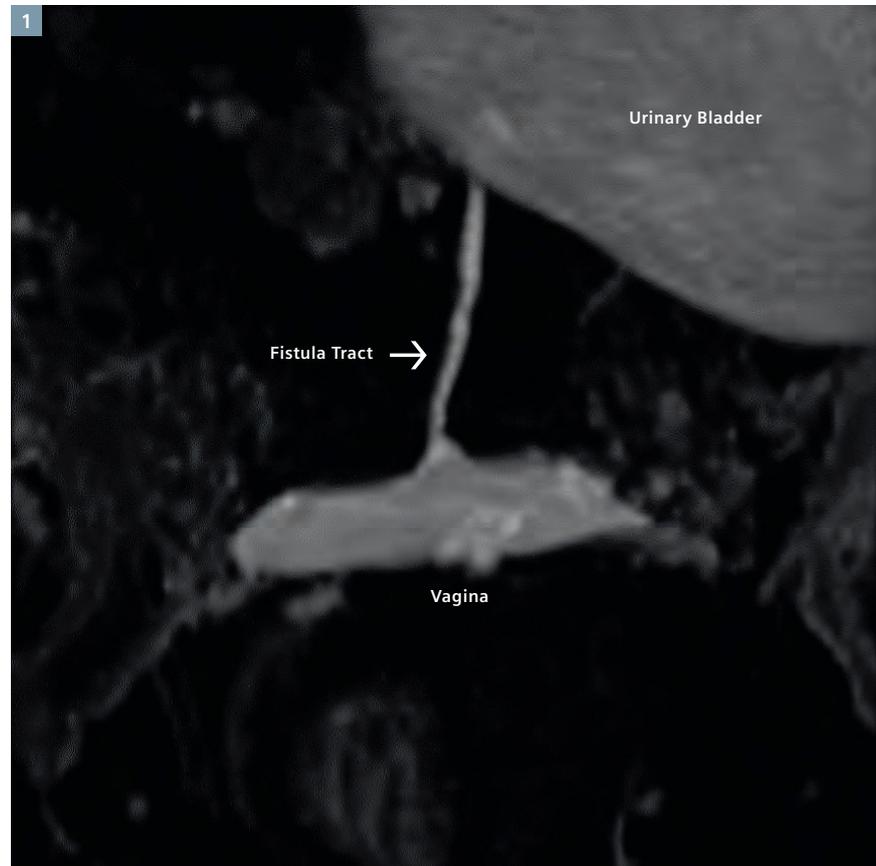
Introduction

Advantages like the absence of ionizing radiation, the excellent soft-tissue contrast, the capability of multi-planar and 3D acquisitions as well as the ability to gain multi-parametric functional information have driven the increasing utilization of MRI in genitourinary (GU) tract imaging in clinical routine. For MRI systems, advances in hardware and software have enabled a reduction of motion artifacts, and helped acquire high-resolution 3D images in times acceptable to patients and clinicians.

The use of a versatile 3D sequence like T2-weighted 3D SPACE with fat suppression (fatsat) in this clinical example of vesico-vaginal fistula highlights the ability of MRI to provide excellent imaging information for complex clinical problems. MR imaging has helped the surgeon to accurately trace the fistulous tract during surgery, enabling complete excision of the tract. Furthermore, the acquisition of a 3D MRI dataset helped to avoid additional invasive pre-operative investigations like cystoscopy, which clearly works to the advantage of both, the patient and hospital resources.

Case report

A 49-year-old female patient presented in our outpatient department with complaints of intermittent foul urinary smelling discharge per vaginum. She also presented a history of urinary urgency and of abdominal hysterectomy for myomas and resultant dysfunctional uterine bleeding (DUB) performed 9 months ago. She complained of urinary incontinence in the early post-opera-



1 Vesico-vaginal fistula with T2w fatsat 3D SPACE.

tive period which was resolved by the third week post-operatively, but complains of subsequent intermittent vaginal discharge. There is no antecedent history of any other major medical illness.

The patient underwent routine blood investigations and pelvic ultrasound, with normal findings. On contrast-enhanced CT examination there was

no significant pelvic fluid and normal appearance of kidneys, ureter, and the urinary bladder. There was minimal vaginal contrast on the delayed images, suggestive of vesico-vaginal fistula. However, the exact location of fistula could not be demonstrated.

MR examination with a T2w fatsat 3D SPACE sequence with acquisition of very thin axial images was performed on our MAGNETOM Avanto 1.5T

system. Sagittal and coronal reconstructions of the 3D dataset demonstrated an approximately 2.75 cm long fistulous tract communicating between the urinary bladder and anterior wall of the vaginal vault (Fig. 1). Since SPACE is a 3D sequence, maximum intensity projection (MIP), and multiplanar reconstruction (MPR) images in different planes were generated from the original images. This enabled exquisite delineation of the pathologic anatomy of the fistulous tract.

Discussion

Analysis of the detailed patient history and a multimodality imaging approach helped us to identify the root cause of the patient's symptoms.

The MAGNETOM Avanto consistently provides excellent image quality. One key enabler is the excellent stability of the magnet and its large, homogenous field-of-view. With advances in shim

procedures and local shim options, the volume-of-interest is better prepared for sequences with fat suppression in presence of pathology (e.g. cysts/fluid) resulting in improved and consistent image quality. Improved signal-to-noise ratio (SNR) in short times is possible due to hardware like Tim (Total imaging matrix) technology, which allows to combine a 6-channel Body Matrix coil with the respective segments of the integrated spine coil to create a high-channel pelvic coil.

As a radiologist I decided to perform an MRI scan with T2w fatsat 3D SPACE after imaging. Post-processing and reformatting of the SPACE images in 3D as well as detailed reporting and correlation of the multi-modality image information helped to demonstrate the pathological anatomy to the surgeon.

Based on this information the surgeon was able to carefully plan the best approach for surgery, which ultimately helped to achieve the optimal outcome for the patient.

Contact

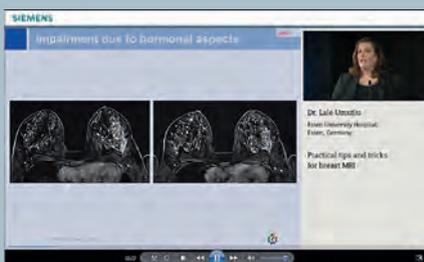
Dr. Priti Apte-Upasani
 Sun Scan Center
 Ground Floor, Shanti Niwas, Dr Moose Road
 Talaopali, Thane, Maharashtra 400602
 India
 pritiwallabh@yahoo.co.in



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