Comparison of Dynamic TrueFisp versus HASTE Imaging for the Evaluation of Pelvic Floor Dysfunction

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Introduction: Both dynamic True Fisp (Fast Imaging with Steady State Precession) and sequential HASTE (Half-Fourier Acquisition Single Shot Turbo Spin Echo) images are used in the MR evaluation of pelvic organ prolapse and pelvic floor relaxation [1,2]. The purpose of this study is to compare these two sequences to determine if one demonstrates a greater degree of pelvic floor dysfunction.

Materials and Methods: Thirty-five women referred to our department for suspected pelvic floor dysfunction were identified from an MRI database search from 1/20/2004 -11/8/20005 (mean 56 y: range 26-83 y). All patients underwent a routine pelvic floor MRI exam using a 1.5 T magnet (Vision, Symphony, Avanto) and torso phased array coil including midline sagittal dynamic True Fisp alternating between rest and strain with the following parameters: TR= 3.9 ms TE=1.9 ms; FA= 70º; FOV=300-350mm, Matrix= 256, ST=8 mm/ 90 consecutive measures and sagittal HASTE with the following parameters: TR= ∞ ms TE=64 ms; FA= 140º; FOV=300 mm, Matrix= 256, ST= 5 mm/ 7 slices (midline and parasagittal) at rest and strain. Images from each data set were reviewed retrospectively on a PACS system by two experienced radiologists in random order and in consensus. The optimal midline sagittal image that revealed the greater degree of organ prolapse was selected for each sequence. The presence and degree of pelvic organ prolapse at maximal strain was graded using the pubococcygeal line (PCL) as the reference standard. Grading of the cystocele, urethrocele, rectal descent, rectocele, uterine, cervical and vaginal prolapse was as follows: negative (< 1 cm), mild (< 2 cm), moderate (between 2 to 4 cm) and severe (> 4 cm). Hypermobility of the urethra was graded as follows: < 45º mild, 45-90º moderate, > 90º severe. Additional findings such as peritoneocele or enterocele were noted. Measurements were compared on a per patient basis using a Wilcoxon analysis, p< 0.5 was considered significant. The number of patients with a change of at least one degree of prolapse based on either sequence was tabulated.

Results: A total of 201 diagnoses of compartmental prolapse were made in all 35 patients. A statistically significant increase in the degree of urethrocele ($p<0.029$), vaginal prolapse ($p<0.021$) and rectal descent ($p<0.044$) with a similar trend for cystocele ($p<0.099$) was demonstrated with the TrueFisp sequence. An increase of at least one degree of prolapse was seen in 48/201 cases (23.9%) on the True Fisp images, 16 of which (33.3%) were only seen on True Fisp (Fig 1). An increase of at least one degree of prolapse was seen in 20/201 cases (10%) on the HASTE images, 8 of which (40%) were only seen on HASTE (Table 1).

Conclusion: Greater degrees of organ prolapse in all three pelvic compartments were diagnosed using the dynamic True Fisp when compared to the HASTE sequence. The ability to image in real time with the True Fisp sequence may allow for more physiologic evaluation of the pelvic floor.

Table 1	**Greater degree of prolapse demonstrated (# of patients)**	
Prolapse	**True FISP**	**HASTE**
Cystocele	9 (5)	1(1)
Urethrocele	10 (2)	3
Hypermobility	9 (1)	3
Rectocele	4 (1)	3 (1)
Rectal descent	6	2
Vaginal prolapse	4	2
Cervical prolapse	6 (5)	4 (3)
Uterine prolapse	1 (1)	2 (2)
(n)= Indicates # of pts with prolapse seen only on that sequence		

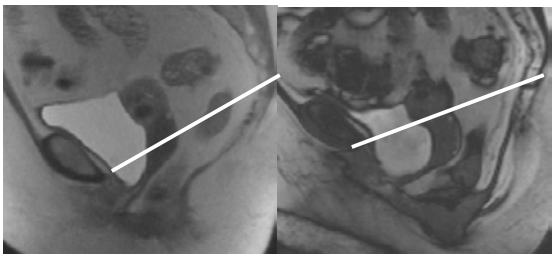

Fig 1: Sag HASTE (left), TrueFISP (right) showing a greater degree of 3 compartment prolapse on the dynamic True Fisp.

References:

1. Babaric ZL et al. Topics in MRI 2001:12:83-92.
2. Fielding JR. Radiographic 2002; 22: 295-304.