

## COMPARISON OF SUPINE MRI DEFECOGRAPHY WITH STANDING CYSTOGRAM IN THE GRADING OF CYSTOCELE AND URETHRAL MOBILITY.

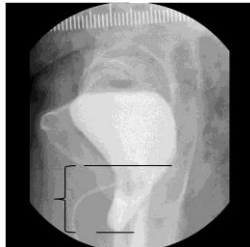
### Hypothesis / aims of study

MRI defecography (MRI def) is a modern variant of defecography which adds to the study of defecation by providing information on the mobility of other pelvic organs in supine position. Standing cystography (VCUG) has been used to measure the degree of urethral mobility and extent of cystocele on lateral views with gravity. This study compares findings of these two modalities, with the a priori hypothesis that a gravity study should be superior to any testing done supine.

### Study design, materials and methods

Following IRB approval, patients with symptomatic anterior compartment prolapse requiring repair procedures were studied pre-operatively with VCUG and MRI defecography. VCUG was done according to a prior published protocol (1). MRI was performed with the patients supine on a single 1.5 T scanner (Avanto; Siemens Healthcare, Erlangen, Germany). Standard MR imaging of the pelvis was performed using axial, sagittal, and coronal T2 weighted images (field of view 26 cm, slice thickness 5 mm, matrix 320 x 256, TE 90, TR 5000) as well as axial T1 weighted images (field of view 26 cm, slice thickness 5 mm, matrix 256 x 192, TE 10, TR 625). MR defecography was performed after instilling 120-180 cc ultrasound gel into the rectum, using the TrueFISP pulse sequence. A single sagittal slice was acquired repeatedly through the midline pelvis (field of view 34 cm, slice thickness 8 mm, matrix 256 x 256, TE 1.8, TR 734) at the rate of 1 acquisition per second during evacuation. The images series was displayed as a real-time cine loop on the Picture Archiving and Communication System (PACS) station. VCUG and MRI images were reviewed jointly by 2 body MRI-trained radiologists. Changes in angle were compared between straining on standing VCUG and the most dependent bladder base image during the defecation phase of MRI def. Cystocele height (2) was defined in cm on lateral images on the VCUG in reference to the inferior edge of the pubic bone (A). For MRI def measurements, the reference was the pubococcygeal line (PCL)(B) (3). Urethral axis with straining (UAS), measured in degrees, was used as a comparator since urethral axis often follows a similar downward direction as bladder descent. UAS was measured on the same VCUG/MRI def images selected for cystocele height measurement. Bladder volume was not standardized across studies because it did not influence the measured points. Paired t-test was applied to compare data sets.

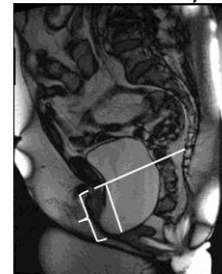
Standing Lateral VCUG - cystocele



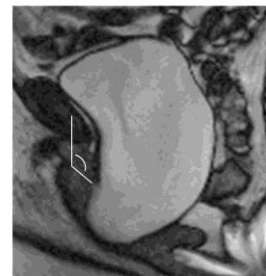
Standing Lateral VCUG- UAS



Supine Lateral MRI- cystocele



Supine Lateral MRI- UAS



### Results

Between June and November 2011, 18 consecutive women with symptomatic Pelvic Organ Prolapse (POP) and lower urinary tract symptoms underwent both tests pre-operatively. Eight patients were evaluated for recurrent cystocele, while ten had vault and posterior compartment prolapse symptoms and physical findings. The paired difference between the mean of the cystocele height was 1.26 cm lower for the MRI over the VCUG measurements (95%CI:(0.70, 1.81), p=0.0002), and for the mean of UAS with straining 28 degrees more downward with MRI than by VCUG (95% CI:( -38,-17), p<0.0001).

### Interpretation of results

MRI with straining efforts in supine position has been recommended to evaluate the severity of POP. MR defecography, because of the defecatory efforts, has the potential to amplify the POP process. Indeed, we observed a significantly increased degree of urethral mobility and bladder base descent measured by MRI def over VCUG. To our knowledge, this is the first demonstration that an imaging test done supine which incorporates a dynamic effort (true defecography) can mimic or intensify the effect noted from a comparator study done with gravity.

### Concluding message

Contrary to the original hypothesis, the degree of urethral and bladder base mobility was superior by supine MRI def compared to standing VCUG.

### References

1. Arbique GM et al. Urology 67:269-274, 2006
2. Showalter PR et al. Urology 58:33-37, 2001
3. Broekhuis et al. Int.Urogynecol.20:721-729, 2009

### Disclosures

**Funding:** None **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Institutional Review Board of UT Southwestern Medical Center **Helsinki:** Yes **Informed Consent:** Yes