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MRI DEFECOGRAPHY: INFLUENCE OF RECTAL GEL VOLUME ON STUDY PERFORMANCE IN WOMEN WITH SYMPTOMATIC PELVIC ORGAN PROLAPSE.

Hypothesis / aims of study

Magnetic resonance defecography (MRD) is an exciting technology that, compared to dynamic MRI with valsalva alone, may permit better assessment of the degree of pelvic organ prolapse (POP) in supine position because of higher pressure necessary to provoke defecation. Although use of gel in the rectum has been shown to enhance detection of POP on MRD (1), the volume of rectal gel used varies in the literature (1-3). In our practice, we have anecdotally noted that over distention of the rectum may mask some compartment prolapses. Therefore, we studied the effect of two different intrarectal gel volumes on defecation performance during MRD.

Study design, materials and methods

Following IRB approval, a review of MRD in patients with symptomatic POP was performed. Group A received 180cc intrarectal gel volume whereas Group B received 120cc. All MRD examinations were performed on a single 1.5T Siemens Avanto magnet. 180 or 120 cc of ultrasound gel was instilled in the rectum according to a standardized institutional protocol with a catheter tip syringe. Cine trueFISP images were obtained through a midline slice in the sagittal plane during rest and then while performing Kegel, Valsalva, defecation, and post-defecation Valsalva maneuvers.

All studies were reviewed by a single radiologist (AB) trained in MRD who was blinded to the instilled gel volume and not involved in the clinical patient evaluation. Quantitative analysis was performed using a free hand ROI tool to obtain the area of gel-distended rectum on midline sagittal images during rest and at the end defecation to assess degree of defecation (Figure 1). For qualitative analysis, the ability of the patient to defecate any volume of gel during the defecation phase acquisition was recorded (yes or no). This was assessed by identifying any passage of gel through the anus or into the region of the perineum.

The tested hypothesis was that the larger filled rectum with 180 cc would result in better defecation performance over the lower volume of 120ml. The Student's t-test was used to find significant differences in mean areas between two groups, while Fisher's Exact test was used to determine if there was a significant association between fill group and ability to defecate.

Results

From 11/2011-2/2013, 31 consecutive patients in each group were reviewed. The patients were referred for MRI def for evaluation of pelvic mesh (28), POP (31), pelvic pain (2), and constipation (1). The mean patient age was 59.5 (39-79). The majority of patients were Caucasian (n=56). The mean BMI was 28.6 (17 to 60.2), mean gravida 3.2 (1-8), mean parity 2.6 (2-6), with an average of 2.3 vaginal births. Table 1 below presents the mean area found during MRD for the two fill groups at pre and post defecation. Pre defecation (rest) area was significantly higher in Group A than in Group B (35.2 vs. 28.3, $p < 0.0001$). Post defecation area and the change in area from pre to post were not found to be significantly different between the two groups. Qualitatively, 30/31 (96.8%) of those in Group B had some amount of defecation compared to 29/31 (93.5%) of those in Group A.

Table 1: Mean Area (cm^2) Pre and Post Defecation by Fill Amount Group

	Mean Area ± Std. Error		**p-value**
	120 cc Fill Group B	**180 cc Fill Group A**	
Pre Defecation	28.3 ± 1.1	35.2 ± 1.2	<0.0001
Post Defecation	9.0 ± 1.5	12.2 ± 2.2	0.2366
Pre – Post Difference	19.3 ± 1.8	23.0 ± 2.3	0.2076

Interpretation of results

There is considerable variability in the literature regarding the appropriate volume of instilled rectal gel during MRD (1-3) with high volume (like 180 cc) presumably more successful at provoking defecation. In the initial experience at our institution with MRD, we found cases of rectal distention with 180cc masking middle or posterior compartment defects such as enteroceles. In an effort to minimize underestimation of POP, we decreased rectal gel volume to 120cc, however wanted to study the effects of this lower volume on patient defecation. This pilot study rejects our hypothesis by demonstrating no significant quantitative or qualitative difference in successful defecation between the two resting rectal gel volumes.

Concluding message

Instillation of 120cc of gel in the rectum for MRD does not decrease the rate of successful defecation compared to a higher volume of 180cc and thus can be reliably used for this technique in order to minimize potential underestimation of POP related to rectal over distention.

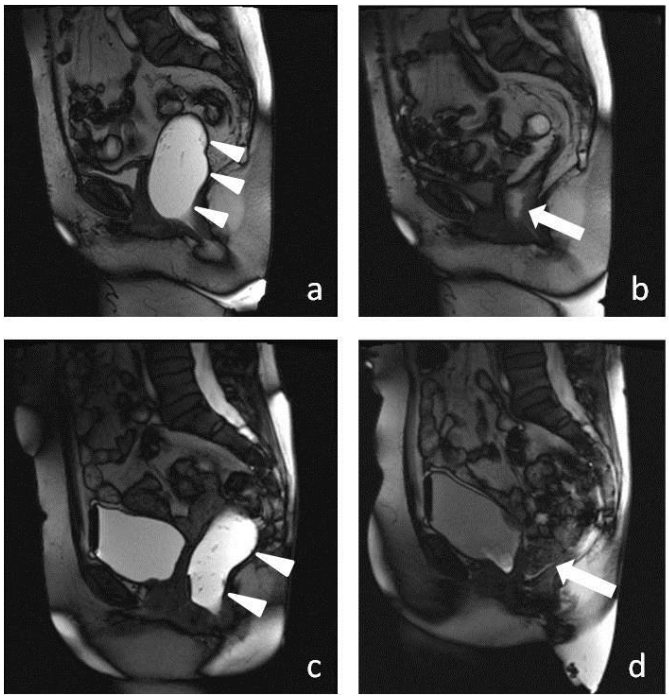

Figure 1. Sagittal midline truFISP MRD images from a patient in Group A (a and b) and a patient in Group B (c and d) at maximal intrarectal filling (arrowheads) and after defecation (arrows). The area of rectal gel volume was (a) 36 cm^2, (b) 2 cm^2, (c) 32 cm^2, and (d) 1 cm^2.

References
1. J Comput Assist Tomogr 33: 125-130, 2009
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