Glucagon Administration for Performing 3 Tesla Multiparametric MRI of Prostate: Is There Any Impact on Image Quality?

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Introduction: Surrounding structures of prostate may cause motion-related artifact and decrease signal-to-noise ratio in prostate multiparametric MRI (mpMRI). There is no definite role for administration of anti-spasmodic agents in prostate mpMRI.

Objective and Specific Aims: To assess the value of glucagon administration for reduction of image blurring and geometrical distortion in 3T mpMRI of prostate.

Rationale and background: Most guidelines suggest using anti-spasmodic agents to decrease the motion artifact and increase image quality in prostate mpMRI; however, there are no consensus between investigators regarding the benefits of this approach.

Methods and materials: This was a retrospective, single-center and HIPAA-compliant study, which included a cohort of sixty-nine consecutive patients who underwent 3T mpMRI between January and March 2019. Individuals with history of prior pelvic surgery or radiation were not included. Study cohort was subdivided into those who received 1 mg intra-muscular glucagon (glucagon subcohort: 25/69) and those who did not (non-glucagon subcohort: 44/69). Each 3T mpMRI was evaluated for qualitative scoring by two radiologists separately, blinded to the clinical data. A five-point Likert scale was used to assess the degree of rectal gas/ rectal distention and rectal peristalsis on dynamic contrast-enhanced (DCE) images, prostate capsule blurring on axial turbo spin echo T2 weighted image (TSE-T2WI), and geometrical distortion on single shot echo-planar diffusion weighted imaging (DWI). SPSSv.16 was used to perform wieghted Kappa Inter-rater reliability and Chi square test.

Results: The inter-rater reliabilities for scoring capsule blurring, rectal distention, rectal gas and geometrical distortion were 0.84, 0.83, 0.97 and 0.78, respectively. There was not any significant difference in T2WI quality between glucagon and non-glucagon subcohorts with mean capsule blurring score of 1.52 in glucagon vs. 1.31 in non-glucagon subcohorts ($p= 0.11$). The mean Likert scores for rectal distention, rectal peristalsis, and geometrical distortion in glucagon vs. non-glucagon subcohorts were 2.34 vs. 2.33 ($p=0.21$), 2.56 vs. 2.61 ($p= 0.80$), 1.66 vs. 1.74 ($p = 0.90$), respectively.

Discussion and Conclusion: Glucagon administration had a small but non-significant effect in improving image quality parameters on 3T mpMRI. The current data did not find mandatory benefits for glucagon administration; however, further study on a larger group of patients is recommended.