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Diffusion-Weighted Imaging of the Pituitary Gland

In this issue of the *American Journal of Neuroradiology*, you will find the article "Evaluation of Diffusivity in the Anterior Lobe of the Pituitary Gland: 3D Turbo Field Echo with Diffusion-Sensitized Driven-Equilibrium Preparation" by Hiwatashi et al.[1] I enjoyed reading this article and found it to be a nice "proof of principle" regarding the use of "diffusion-sensitized driven-equilibrium turbo field echo" to image the anterior pituitary gland.[1] In my clinical practice, I have found diffusion-weighted imaging to have particular utility in neuroimaging…well beyond the classic assessment for acute brain ischemia or infarction or pyogenic abscess formation. I like the idea of "squeezing out" as much information as possible from each of our MR images to help identify and characterize neuropathology. It is also helpful, I think, to approach each neuroimaging examination and sequence in terms of its physiologic basis and known or presumed "added value." For example, in terms of DWI, I like to think about its physiologic basis as the diffusion of water. As we consider new technical variants and/or adding sequences to our brain MR imaging, I propose that we need to critically appraise "the literature" and developments communicated at meetings of "organized radiology." In this context, I would like to comment on this article.

There have been quite a few recent publications regarding pituitary gland/sellar/parasellar imaging and a few of these are listed here: "Imaging of the Pituitary: Recent Advances" by Chaudhary and Bano,[2] "Rathke's Cleft Cysts: Differentiation from Other Cystic Lesions in the Pituitary Fossa by Use of Single-Shot Fast Spin-Echo Diffusion-Weighted Imaging" by Kunii et al,[3] "A Pituitary Abscess Showing High Signal Intensity on Diffusion-Weighted Imaging" by Takayasu et al,[4] "Role of PROPELLER Diffusion Weighted Imaging and Apparent Diffusion Coefficient in the Evaluation of Pituitary Adenomas" by Mahmoud et al,[5] and "Role of PROPELLER Diffusion Weighted Imaging and Apparent Diffusion Coefficient in the Diagnosis of Sellar and Parasellar Lesions" by Mahmoud et al.[6] I thought that the authors of the "Evaluation of Diffusivity in the Anterior Lobe of the Pituitary Gland: 3D Turbo Field Echo with Diffusion-Sensitized Driven-Equilibrium Preparation" did a good job at not only sharing their results but also conveying the relative advantages and disadvantages of this technique for this use, at least currently.[1] According to these authors, they were able to image the anterior lobe of the pituitary gland with diffusivity and without distortion, make measurements, and compare these values with internal controls.[1] The "scientist in me" appreciates the approach of assessing what "normal range" is before we proceed to measuring pathologic values. This is also in keeping, I think, with the "modern" notions of quantitative imaging and personalized medicine. To the best of my reading, it would appear that the authors were able to acquire volumetric data and with high spatial resolution (please see the article for details)[1]; this was especially enticing to me and it is pleasant to think of a future sella/pituitary protocol MR readout with capabilities like these! Some challenges shared by the authors include that the sequence has "limited coverage," "longer acquisition time," a single direction, "difficulty" assessing the posterior lobe of the pituitary gland and "absence of a 'criterion standard' for pituitary ADC."[1] I think that the specific values for ADC presented in this article are of limited utility, but as a "proof of concept," I found it quite appealing. I hope that you will, too.

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