

Internal Derangement of the Shoulder: Initial Evaluation of the Three Point Dixon Technique

Sanjaya Viswamitra¹, William B. MORRISON², Mark E. SCHWEITZER³

¹University of Arkansas for Medical Sciences, 4301, W Markham Rd, Slot 556, Little Rock, AR USA; ²Thomas Jefferson University Hospital, 111 S. 11th St. Suite 3390, Philadelphia, PA USA; ³Thomas Jefferson University, Department of Radiology, Philadelphia, PA United States;

Introduction

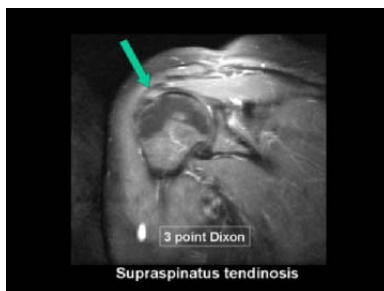
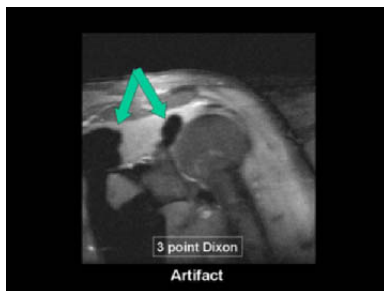
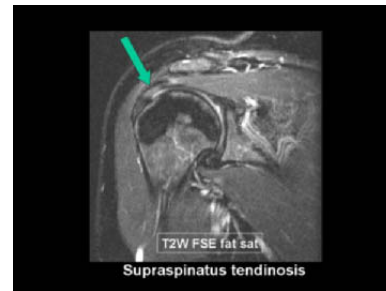
The three point Dixon technique potentially offers an alternate method for fat suppression which can be applied for imaging of internal derangement of joints. The method is of particular benefit in low field strength magnets. We therefore sought to compare a three point Dixon MR imaging sequence versus T1w SE and fat suppressed T2w FSE sequences for evaluating of the rotator cuff and glenoid labrum in terms of image quality, fat suppression, diagnostic confidence of pathology, and preference.

Methods

1.5T MR imaging of 27 shoulders was performed using oblique coronal T1w SE and fat suppressed T2w FSE sequences. An additional oblique coronal sequence with three point Dixon technique (acquisition of fat image, water image, and water minus fat image) was also performed. Two blinded musculoskeletal radiologists (A and B) separately evaluated the Dixon and T1w SE / T2w FSE images. Separate review sessions were used to evaluate the two sets of images for rotator cuff tear and labral tear using a five point confidence scale. A third independent reading directly compared the two techniques evaluating for quality (artifact, contrast, efficacy of fat suppression, and overall image quality) using a five point quality scale as well as visualization of the rotator cuff / labrum and overall reader preference.

Results

Average quality ratings (1=poor, 5=excellent) for readers A/B were higher for T1w SE / T2w FSE (standard) versus Dixon images (artifact, 4.67/4.74 vs. 4.04/3.93; contrast, 4.96/4.81 vs. 4.07/3.96; overall quality, 4.74/4.67 vs. 3.89/4.04). Fat suppression was judged as same or better on standard images (4.93/4.52 vs. 4.59/4.48). Both readers judged visualization of the rotator cuff and labrum to be the same or better on standard images (cuff: reader A, 26 of 27, reader B, 22 of 27; labrum: reader A, 26 of 27, reader B, 25 of 27). Although confidence for diagnosis of rotator cuff tear and labral tear was similar, overall preference in direct comparison was for standard images over the Dixon Images (reader A, 23/27; reader B, 23/27).



Discussion

Initial experience with the three point Dixon technique for evaluation of shoulder internal derangement suggests that image quality and reader preference favors standard T1w SE / fat suppressed T2w FSE images.

References

- 1) Maas M, Dijkstra PF, Akkerman EM. Uniform fat suppression in hands and feet through the use of two-point Dixon chemical shift MR imaging. *Radiology*. 1999;210:189-93.
- 2) Szumowski J, Coshov W, Li F, Coombs B, Quinn SF. Double-echo three-point-Dixon method for fat suppression MRI. *Magn Reson Med*. 1995;34:120-4.
- 3) Daniel BL, Butts K, Glover GH, Cooper C, Herfkens RJ. Breast cancer: gadolinium-enhanced MR imaging with a 0.5-T open imager and three-point Dixon technique. *Radiology*. 1998;207:183-90.