

## Assessment of fat content in supraspinatus muscle with proton MR spectroscopy in asymptomatic volunteers and patients with supraspinatus tendon lesions

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### PURPOSE

To evaluate proton magnetic resonance (MR) spectroscopy in the assessment of lipid content of the supraspinatus muscle in asymptomatic volunteers and patients with supraspinatus tendon lesions.

### MATERIALS AND METHODS

Single-voxel proton MR spectroscopy was used to assess lipid content of the supraspinatus muscle in asymptomatic volunteers ( $n = 30$ ) and patients with partial-thickness supraspinatus tendon tears ( $n = 30$ ), newly diagnosed full-thickness supraspinatus tendon tears ( $n = 30$ ), and chronic full-thickness supraspinatus tendon tears ( $n = 30$ ). The apparent lipid content of the supraspinatus muscle measured with proton MR spectroscopy was related to its appearance on sagittal-oblique T1-weighted spin-echo MR images (grades 0-4). One-way analysis of variance was performed to test for significant differences, and the Tukey honestly significant difference procedure was performed for post hoc comparisons.

### RESULTS

Mean apparent lipid content was 13.7% (95% confidence interval [CI]: 11.5%, 15.8%) for asymptomatic volunteers, 29.5% (95% CI: 25.1%, 34.0%) for patients with partial-thickness tears, 48.6% (95% CI: 41.3%, 55.9%) for patients with full-thickness tears, and 66.1% (95% CI: 57.7%, 74.5%) for patients with chronic tears. Values were significantly different (analysis of variance,  $P < .001$ ;  $P < .001$ -.002 for all post hoc pairwise comparisons). Mean apparent lipid content for the supraspinatus muscle was as follows: grade 0, 19.6% (95% CI: 16.7%, 22.6%); grade 1, 36.8% (95% CI: 33.2%, 40.4%); grade 2, 53.6% (95% CI: 43.1%, 64.2%); grade 3, 67.5% (95% CI: 52.6%, 82.3%); and grade 4, 79.2% (95% CI: 73.2%, 85.3%). With analysis of variance ( $P < .001$ ), all post hoc pairwise comparisons were significant ( $P \leq .001$ ) except between grades 2 and 3 ( $P = .112$ ) and between grades 3 and 4 ( $P = .261$ ). In 14 (25%) subjects who had grade 0 appearance on T1-weighted images, lipid content values were greater than the upper range of



values in the volunteers.

#### CONCLUSION

Proton MR spectroscopy is suitable in the assessment of apparent lipid content of rotator cuff muscles.

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