Sonographic Evaluation of the Fatty Infiltrations within the Infraspinatus Muscles in Patients with Rotator Cuff Tears

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Abstract

Purpose: The purpose of this study was to measure the echo intensity of the infraspinatus muscle, and compare magnetic resonance imaging (MRI) and ultrasound (US) findings.

Methods: Thirty-two patients with rotator cuff tears (RCTs) were enrolled in this study (women: 12; men: 20; mean age: 68.2±11.4 years). Tear size and fatty infiltration were determined by MRI. The subjects were classified into three grades according to Goutallier's classification: mild 1 was stages 0 and 1, moderate was stage 2, and severe was stages 3 and 4. Gray-scale histogram analysis was used for US assessment, which was performed in both subcutaneous fat and muscle in three different regions; the echogenicity ratio (ER) was the ratio between subcutaneous fat and muscle echogenicity. Sonograms of the 32 patient's shoulders revealed 3 shoulders with a partial tear, and 6 with a small tear, 6 with a medium tear, 7 with a large tear and 6 with a massive tear; 4 shoulders had no tear.

Results: When compared by tear size, significant differences were observed according to age [$F(5, 26)= 2.75$, $p=0.040$]. Subsequently, age was significantly higher in the massive tear cases than in the no tear cases. Meanwhile, significant differences were observed in the echo intensities within subcutaneous fat [$F(2, 29)=3.71$, $p= 0.037$], and infraspinatus muscle [$F(2, 29)=6.63$, $p= 0.004$], as well as in ER [$F(2, 29)= 13.30$, $p< 0.001$], when compared by MRI fatty infiltration staging. Subsequently, in subcutaneous fat was significantly higher in the mild grade than in the severe grade subjects. Conversely, ER and muscle echo intensities were significantly lower in the mild grade than in the severe grade.

Conclusion: The study suggests that US can quantitatively and objectively assess fatty infiltration in the infraspinatus muscle.

Vol.41 No. 1 (2016) 17-23

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Received on April 15, 2015; Revision accepted on October 9, 2015