Ultrasonography of the Shoulder: Pitfalls and debates

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Biceps tendon anisotrophy

Fig. 1—Sonography in 54-year-old woman with normal long head of biceps tendon (arrow) showing anisotropy. GT = greater tuberosity, LT = lesser tuberosity, Del = deltoid muscle, Sub = subscapularis muscle.

A, In sonogram obtained with tendon fibers at right angles to beam, tendon appears echoic.
B, In sonogram obtained with tendon fibers at angle to beam, tendon appears hypoechoic.

Musculoskeletal Sonography: Important Imaging Pitfalls
Biceps tendon anisotrophy

Fig. 8—54-year-old woman with normal long head of biceps tendon showing anisotropy.
A, When long head biceps tendon (arrows) is at right angle to ultrasound beam, normal echogenic fibrillar pattern is seen.
B, When long head biceps tendon (arrows) is oriented at angle to ultrasound beam, echogenic fibrillar pattern is not as well seen or is lost, simulating tear or tendonosis.

Musculoskeletal Sonography: Important Imaging Pitfalls
Supraspinatus tendon anisotrophy

Fig. 7—54-year-old woman with normal supraspinatus tendon. SST = supraspinatus tendon, Delt = deltoid, Gt Tub = greater tuberosity.

A, Inserting supraspinatus tendon fibers curve away from ultrasound beam and appear hypoechoic (arrows), which should not be interpreted as tear.

B, By angling transducer to bring orientation of these fibers at right angles to ultrasound beam, hypoechoic area fills in with normal-appearing tendon (asterisk).
Normal subscapularis tendon

Fig. 9—42-year-old man with normal subscapularis tendon imaged in short axis. Multipennate tendon shows echogenic tendon slips (T) with intervening hypoechogenic slips of muscle that may simulate cleft or tear. Delt = deltoid muscle, Les Tub = lesser tuberosity of humerus.

Musculoskeletal Sonography: Important Imaging Pitfalls
Junction of the supraspinatus and infraspinatus tendons
Rotator cuff interval
Artifact from a deltoid septation

**FIG. 24:** US scans show almost isoechoic subacromial-subdeltoid bursitis (vertical arrows). Note the artifact (thick horizontal arrow) from a deltoid septation, not to be confused with a supraspinatus tendon tear.
Artifact from a deltoid septation

The rotator cuff interval is the gap between the anterior margin of supraspinatus and the superolateral margin of subscapularis, through which the long head of biceps passes as it exits the glenohumeral joint (Fig. 4). This interval can be mistaken for a tear of either the supraspinatus or subscapularis tendon. A good knowledge of regional anatomy, locating the biceps tendon and careful comparison with the opposite side are all important in excluding a tear. In addition, using the modified view, which allows better assessment of the medial aspect of the supraspinatus and the interval, is helpful.

Septations are commonly seen in the overlying deltoid muscle (Fig. 5). These also cause hypoechoic areas, simulating tears in the supraspinatus tendon. The false tear does not remain constant when the probe or arm is moved, whereas a true tear is unchanged in appearance and position.

The echogenic tendons of the subscapularis tendon superimposed on the muscle fascicles on the short axis should not be confused with a tendon tear (Fig. 6).

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Normal SSP & SASD bursa
Subdeltoid Bursa의 distension
Subdeltoid Bursa distension
Overestimation of the thickness of the SST tendon

Fig. 2—63-year-old woman with shoulder pain and bursal thickening. Sonogram in long axis of supraspinatus tendon (SST) shows subacromial–subdeltoid bursal thickening (all arrowheads) extending beyond insertion of supraspinatus tendon on greater tuberosity (GT) of humerus. Bursa is easily differentiated from supraspinatus tendon. Note outer layer of supraspinatus tendon (black arrowheads) is echogenic but less so than peribursal fat layer (white arrowheads). Bursa lies between these two echogenic interfaces. D = deltoid muscle.

Musculoskeletal Sonography: Important Imaging Pitfalls
Overestimation of the thickness of the SST tendon

Fig. 3—43-year-old man with right shoulder pain and bursal thickening. Sonogram in long axis of supraspinatus tendon (SST) shows bursal thickening (all arrowheads) extending beyond insertion of supraspinatus tendon on greater tuberosity (GT) of humerus. Bursa in this patient is not as easily differentiated from supraspinatus tendon. Note visualized outer layer of supraspinatus tendon (black arrowheads) is echogenic but less so than peribursal fat layer (white arrowhead). D = deltoid muscle.

Musculoskeletal Sonography: Important Imaging Pitfalls
Overestimation of the thickness of the SST tendon

Fig. 4—39-year-old woman with right shoulder injury, pain, and bursal thickening. Sonogram in long axis of supraspinatus tendon (SST) shows bursal thickening (arrowheads) extending beyond insertion of supraspinatus tendon on greater tuberosity (GT) of humerus. Bursa and peribursal fat in this patient are difficult to differentiate from supraspinatus tendon because echogenic interface between supraspinatus tendon and bursa is not appreciated. D = deltoid muscle.
Incomplete evaluation of the rotator cuff

One must remember that the greater tuberosity is several centimeters in width (anterior to posterior), and this entire distance must be evaluated both in long and short axis relative to the supraspinatus tendon.
Frozen shoulder

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Thank you for attention!