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Disclosures:

Financial disclosure statements have been obtained, and no conflicts of interest have been reported by the authors or by any individuals in control of the content of this article.

0894-9115/15/9402-e13
American Journal of Physical Medicine & Rehabilitation

DOI: 10.1097/PHM.0000000000000169

CASE REPORT

Simultaneous Bilateral Biceps Tendon Rupture

A Case Report with Practical Sonographic Diagnosis

ABSTRACT

Babaei-Ghazani A, Eftekhar-Sadat B, Ghabili K: Simultaneous bilateral biceps tendon rupture: a case report with practical sonographic diagnosis. Am J Phys Med Rehabil 2015;94:e13–e18.

Simultaneous bilateral complete tear of the biceps tendons is a rare clinical entity with challenging treatment approaches. Current diagnostic imaging of rupture of the biceps tendon has reverted to magnetic resonance imaging; however, in the recent years, sonography has been widely used in musculoskeletal practice. The authors present a case of simultaneous bilateral biceps tendon rupture diagnosed on the basis of fundamental sonographic findings of the torn biceps tendons.

Key Words: Biceps, Tendon Rupture, Sonography, Musculoskeletal Rehabilitation

Simultaneous complete rupture of both long head of biceps brachii tendons is a rare clinical entity mainly occurring in older individuals. This injury can have a detrimental effect on the level of function, and it is difficult to treat and may have poor outcome. The long head biceps tendon (LHBT) is a key stabilizer of the humeral head within the glenohumeral joint. The LHBT may be affected by several pathologic conditions such as acute or chronic tendonitis, subluxation or dislocation, and partial or complete tear.[1] Biceps tendon ruptures are commonly detected through exploring distal migration of the biceps brachii muscle mass. They may occur suddenly by a seemingly trivial event. Often, individuals will note an acute "popping" sensation.[2] Herein, the authors report a patient with simultaneous bilateral biceps tendon rupture diagnosed with sonography and treated with rehabilitation therapy.

CASE PRESENTATION

A 71-yr-old right-handed white man referred to the authors' physical medicine and rehabilitation department with bilateral arm pain, swelling, and ecchymosis. The day before, while he was lifting an object from the ground to his chest level, he felt a sudden sharp pain in the anterior aspect of his right arm and shoulder. He immediately shifted the weight to his left arm, incurring another eccentric contraction at his shoulder, and he felt a similar pain on his left side. Both arms were in resisted flexion position, and both forearms were in supination. The pain and subsequent weakness in both shoulder and elbows persisted, precipitating his visit. Ecchymosis was more dominant on the left side (Fig. 1).

His medical history was significant only for hypertension and mildly elevated lipid profile for the past 3 yrs. He was treated with angiotensin-converting enzyme inhibitor and low-dose statin. He also had mild chronic low back pain without any preexisting tenderness or pain in the shoulder region. He had no allergies, had never smoked cigarettes, and had never consumed alcoholic beverages. He had been doing sedentary office work for 30 yrs and did not have any regular sport or creational activity recently.

Physical examination of his right arm demonstrated an obvious deformity in the contour of the biceps muscle and tendon. There was no significant ecchymosis on the anterior arm. There was an obvious supination and flexion weakness with 4 of 5 power in manual muscle testing, and no tendon was palpable in the bicipital groove. His right elbow active range of motion (ROM) was 130 degrees in flexion, 90 degrees in pronation, and 80 degrees in supination. Passive ROM was normal.

His left biceps muscle belly was less enlarged, but more ecchymosis was obvious on the left than on his right. He had supination and flexion power of 4 of 5. The region was quite tender to palpation, and no obvious tendon was palpable. His left elbow active ROM was 135 degrees in flexion, 90 degrees in pronation, and 85 degrees in supination. Functions of the median, anterior interosseous, posterior interosseous, radial, ulnar, axillary, and musculocutaneous nerves were intact on both sides, and the vascular status was normal.

The Ludington test was performed,[3] a recommended position to observe differences in the contour and shape of the biceps. This test is performed by having the patient clasp both hands over or behind the head, allowing the interlocking fingers to support the arms. This action permits maximum relaxation of the biceps tendon in its resting position. The patient then alternately contracts and relaxes the biceps while the clinician palpates the tendon and muscle. In a complete tear, contraction is not felt on the affected side. The result of this test was bilaterally positive in this patient.

The results of the Yergason[4] and Speed[5] tests, used in the assessment of bicipital tendinitis, were also positive in both sides. In the Yergason test, the examiner provides resistance against supination of the forearm with the elbow flexed at 90 degrees. The test result is considered positive when pain is produced or intensified in the intertubercular groove. In the Speed test, the examiner provides resistance to forward flexion of the shoulder with the elbow in extension and supination of the forearm. Pain is elicited in the intertubercular groove in a positive test result. Results of shoulder instability tests were normal bilaterally.

Instead of magnetic resonance imaging, sonographic evaluation was performed because of low cost, availability, and dynamic picture with a high resolution. Evaluation was performed with a commercially available sonographic scanner (Sonix OP; Ultrasonix Medical Corporation, Richmond, Canada), 5.0- to 14-MHz linear transducer. While the patient was seated, his hand was placed on the knee with the palm upward to rotate the bicipital groove anteriorly. The probe was placed both transversely and longitudinally (short axis and long axis) on the anterior aspect of the humeral head over the bicipital groove (Fig. 2). In both views, complete fiber disruption and retraction of the tendon stump with empty bicipital groove were evident bilaterally (Fig. 3). Moreover, more distal imaging in the transverse plane demonstrated a thickened and retracted distal stump surrounded by hypoechoic fluid (Fig. 4). In dynamic imaging during the elbow flexion and also during the Ludington test, free movement of the distal stump with muscle contraction was seen bilaterally.

FIGURE 1 *Simultaneous, bilateral, and complete tear of proximal biceps tendons in a 71-yr-old man.*

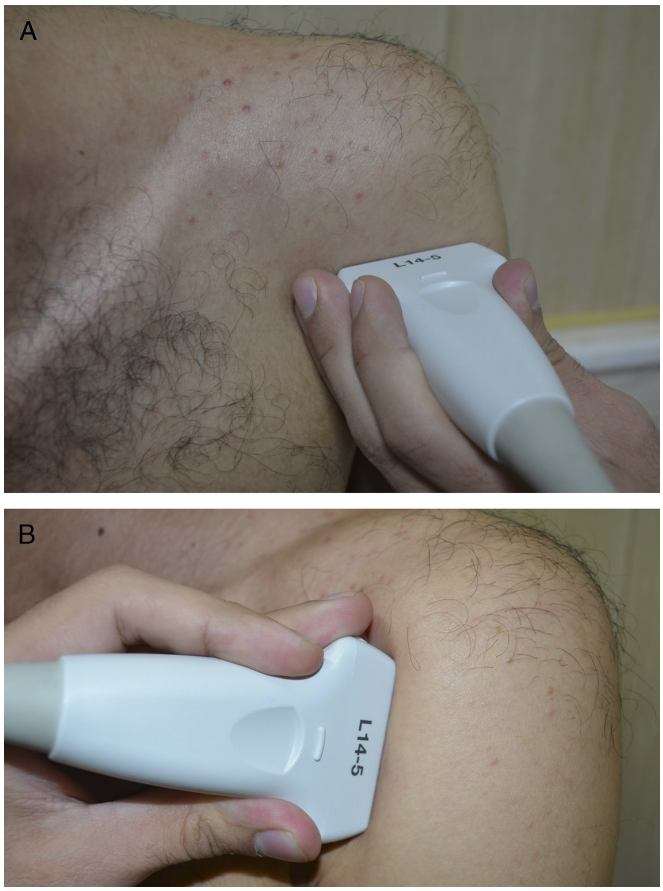

FIGURE 2 *Demonstration of transducer position for transverse (A) and longitudinal (B) view of the biceps tendon in the bicipital groove.*

After explaining the diagnosis of bilateral biceps tendon rupture to the patient and because of his age and lack of athletic performance, the authors decided to follow a conservative treatment plan. Initial treatment was begun immediately with analgesics, nonsteroidal anti-inflammatory drugs, and advice of applying ice pack and resting. After swelling and pain control within the first week, rehabilitation therapy including ROM exercises of the elbow and the shoulder for contracture prevention, iontophoresis, and therapeutic ultrasound was started. After 8 wks of rehabilitation, the patient had no pain and he could perform his daily activities normally. His elbow and shoulder flexion as well as forearm supination power improved to +4 of 5 in manual muscle testing. After treatment, the passive and active ROM on his left and right sides were 150 degrees in elbow flexion, with 90 degrees in pronation and supination. The patient was instructed to avoid strenuous exercise or lifting with the upper limbs. In follow-up examinations 3, 6, and 9 mos after the incident, the shoulder flexion and forearm supination power remained +4 of 5 in manual muscle testing, and motions of the elbow and the shoulders were in full ROM. One year after the incident, the patient complained of no pain with normal ROM and muscle strength.

DISCUSSION

Biceps tendon rupture, either complete or partial disruption of the tendon of the biceps brachii muscle, can occur proximally or distally. Simultaneous biceps tendon rupture is a rare diagnosis, and the most appropriate management of this injury depends on numerous factors.[6]

The incidence of biceps tendon rupture is 1.2 per 100,000 patients, with a majority on the dominant side of smoker men frequently associated with concomitant rotator cuff disease.[2] The diagnosis of complete LHBT rupture is often made on a clinical basis alone. Visual inspection of the biceps brachii including comparison with the unaffected limb is usually the first and most critical element in the physical examination of this condition. Edema and ecchymosis may be seen with tendon rupture. They are typically less painful but can be preceded by chronic shoulder discomfort.[1]

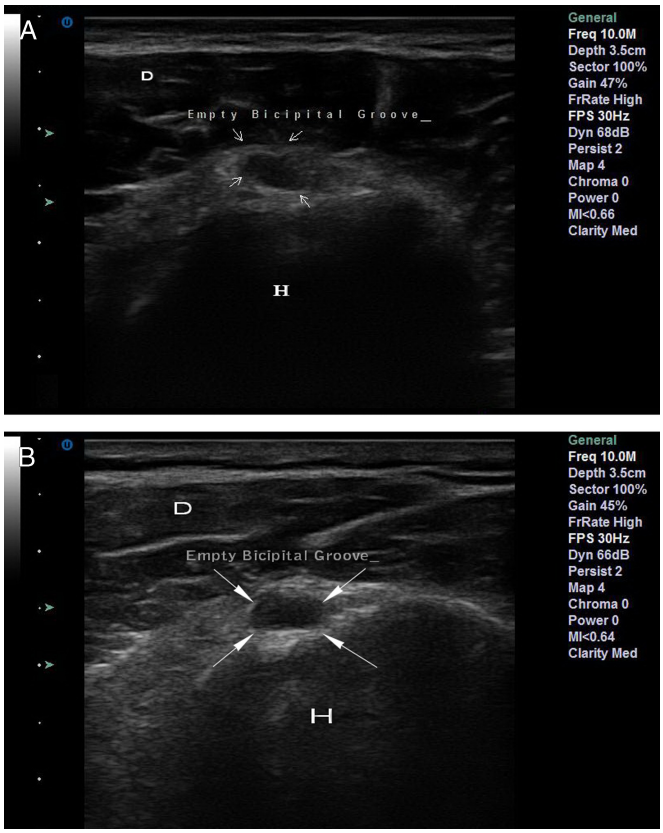

FIGURE 3 *Empty bicipital groove in transverse (short axis) view indicating complete tear of the proximal biceps tendon in the left (A) and the right (B) arm. The left side of the images is medial. D indicates deltoid muscle; H, humerus.*

Complete ruptures are relatively easy to diagnose; patients often come in aware of the biceps muscle retraction, whereas partial ruptures exist along a spectrum and can be more difficult to diagnose. Posterior dislocation of the LHBT has been reported[7] and may share some common physical examination findings but not the muscle retraction.

Magnetic resonance imaging is helpful in confirming the diagnosis and assessing the extent of the injury; however, it should be performed in the flexed elbow, abducted shoulder, forearm supinated position to obtain a true longitudinal view.

Recently, sonography has gained popularity for musculoskeletal problems on the basis of its dynamic real-time property and low-cost availability in comparison with magnetic resonance imaging.[8] Sonographic criteria for the diagnosis of biceps tendon rupture could be divided into two categories: complete tear and partial tear. The criteria for complete tear include (1) complete disruption of normal

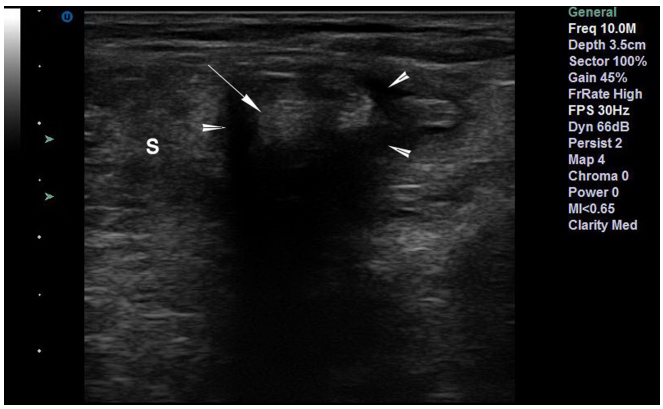

FIGURE 4 *Axial (short axis) view of retracted distal stump of the biceps tendon (arrow) surrounded by hypoechoic fluid (arrowheads). S indicates short head of the biceps brachii.*

tendon fibrillar pattern, (2) empty bicipital groove, (3) hypoechoic or anechoic fluid replacement in the bicipital groove with or without hemorrhagic debris, (4) retracted and thickened distal stump (often, the proximal stump is not seen because the tear could have occurred proximally at the biceps anchor at the glenoid labrum), and (5) real-time dynamic evaluation of tendon retraction during the muscle contraction.[8,9] Diagnosis of partial biceps tendon tears is much more difficult and is based on these criteria: (1) incomplete disruption of fibrillar pattern, (2) hypoechoic fluid around the tendon and synovitis of the tendon sheet, (3) loss of tendon thickness in longitudinal view, and (4) hypervascularity in power Doppler images.[8,9]

Special consideration should be taken for sonographic artifacts particularly anisotropy, which could be misdiagnosed with the tendon rupture. When a tendon is imaged perpendicular to the ultrasound beam, normal appearance of the tendon in long axis should be hyperechoic fibrillar pattern. However, when the angle of beam is changed even as little as 5 degrees, this pattern of appearance could be lost; the tendon becomes more hypoechoic with increased angle. Therefore, ultrasound beam should be kept perpendicular to tendon or ligament structures to avoid anisotropy.[10]

Ultrasound imaging has some limitations including limited access to bony structures, operator dependency, and sonographic artifacts. The former is applicable to the knee joint, where access to intra-articular elements of the cruciate ligament or the meniscus is minimal. In addition, a majority of the sonographic artifacts are caused by the physics of the image-forming process, whereas others arise from limitations in scanner or operator performance. Artifacts such as anisotropy, shadowing, posterior acoustic enhancement, posterior reverberation, and comet-tail artifact should be considered to avoid any misdiagnosis. Some artifacts, for example, shadowing or anisotropy, are valuable in identification of some structures. In case of empty bicipital groove without other criteria, biceps tendon dislocation should be considered in differential diagnosis as well.

For most patients, conservative treatment of the proximal biceps tears is recommended.[2,11] Surgery is rarely indicated because there is little loss of function and the cosmetic deformity is generally acceptable without any surgical repair.[6] On the other hand, young athletes and heavy laborers typically need to regain the lost muscle strength occurring with loss of the continuity of the biceps tendon.[1] Moreover, distal biceps tendon tears are more commonly referred to surgery. Analgesics, nonsteroidal anti-inflammatory drugs, and applying ice may assist to relieve discomfort and swelling in both proximal and distal ruptures.[2]

Partial proximal or distal ruptures are generally observed nonoperatively until a complete rupture occurs. The partial rupture can be healed by scar tissue, and hence, continuity is maintained.[11] The goal of surgical treatment is to restore the strength of supination and flexion. Generally, corticosteroid or anesthetic injection is not recommended as a therapeutic approach to the biceps tendon rupture.[12]

In any case of biceps tendon rupture, particular attention should be given to potential complications such as contracture formation, heterotopic ossification, median nerve compression, and compartment syndrome.[2]

CONCLUSIONS

Overall, signs and symptoms of the simultaneous bilateral biceps tendon rupture significantly improved in this patient after rehabilitation therapy. He regained his muscle strength and was able to participate fully in daily activities. Clearly, in such rare cases of bilateral biceps tendon rupture, conservative treatment with rehabilitation, albeit in a more cautious manner, is of choice. Musculoskeletal ultrasound is efficient in diagnosis of LHBT disorders. When used for proper indications, this imaging modality has a definite role among other imaging methods in the diagnosis of musculoskeletal disorders.

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