Malignant Soft Tissue Tumors of the Biceps Muscle Mistaken for Proximal Biceps Tendon Rupture

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Abstract

Tears of the proximal long head of the biceps tendon are among the most common tendon tears in the body. In most cases, the diagnosis is easily determined based on the history and physical examination. However, malignant soft tissue tumors can simulate proximal biceps tendon tears. Although tumors simulating tears of the distal biceps tendon at the elbow have been reported, to the authors’ knowledge, no previous cases of tumors simulating or being mistaken for proximal biceps tendon tears have been reported.

This article describes 2 cases of malignant sarcomas initially mistaken for tears of the long head of the biceps tendon. In the first case, a 62-year-old woman developed swelling in her arm after feeling a twinge in her shoulder. A magnetic resonance imaging scan was misread as a biceps tendon tear and not treated by the examining physician. In the second case, a mass appeared with little trauma in the brachium of a 70-year-old man. On physical examination, the mass was hard to palpation. In each case, biopsy revealed a soft tissue sarcoma. Both patients underwent wide excision with radiation and are currently disease free. These 2 cases emphasize the importance of obtaining a good history and of performing a thorough shoulder and arm examination in patients with deformities consistent with tears of the long head of the biceps tendon.

Figure: Axial postcontrast fat-suppressed T1-weighted magnetic resonance image (gradient echo sequence; repetition/echo time, 266/2.8) showing enhancement throughout most of the mass, indicating a solid tumor suspicious for sarcoma.
Soft tissue tumors located in the upper extremity between the shoulder and elbow are uncommon compared with locations in the lower extremity. The most common cause of a mass in the arm is a torn biceps tendon at the proximal or distal attachments. Similarly, soft tissue malignancies in the brachium are rare, especially in the biceps muscle, and soft tissue sarcomas of the biceps have been mistaken for distal biceps tendon ruptures. Both of these entities typically present as a mass in the distal third of the biceps muscle and may be associated with pain. The proper diagnosis of a malignancy vs a tendon rupture, despite common clinical presentations, affects the treatment options and patient morbidity and mortality.

However, to the authors’ knowledge, no previous cases have been reported of soft tissue sarcomas of the arm that initially presented as possible tears of the proximal biceps tendon. This article describes 2 cases of soft tissue sarcomas that were initially believed to be possible proximal biceps tendon ruptures.

**Case Reports**

According to the authors’ institutional review board’s policy, case reports do not require review. However, both patients gave written consent for their information to be reported.

**Patient 1**

A 62-year-old right-hand-dominant woman presented to her primary care physician with pain and swelling in her proximal right arm after she felt a twinge when reaching for an object. She reported being unsure whether that incident was when she began having pain and swelling in her mid-arm area. The primary care physician obtained a magnetic resonance imaging (MRI) study of the arm, which was interpreted by the radiologist as a rupture of the proximal biceps tendon. She continued to report pain and was referred to an orthopedic surgeon. The surgeon diagnosed a tear of the proximal biceps tendon; therefore, he recommended icing the area, taking oral nonsteroidal anti-inflammatory drugs, and beginning physical therapy.

Because her anterior arm pain and swelling continued, she presented to the current authors’ institution 8 months after the onset of her symptoms. She reported an intermittent, diffuse ache with occasional burning over the middle to the distal two-thirds of the anterior compartment of her right arm. Her pain was exacerbated by activities that required lifting, but the pain did not prevent her from performing activities of daily living or sleeping.

Physical examination revealed an obvious, large mass in the proximal third of her arm in the area of the biceps muscle. The mass was hard to palpation but was mobile and fixed. No redness, warmth, or drainage was present. Shoulder range of motion was normal, but elbow flexion was limited by the mass. She was neurologically intact to sensory, motor, vascular, and reflex testing. She had no palpable lymph nodes in her neck or axilla.

Conventional radiographs of the humerus showed anteromedial soft tissue swelling at the mid to distal humerus. The noncontrast MRI obtained 5 months previously showed a heterogeneous soft tissue mass with variable signal intensity (A). Postcontrast axial T1-weighted magnetic resonance image (spin echo; repetition/echo time, 5116/120 ms) showing a heterogeneous mass with variable signal intensity (A). Postcontrast axial T1-weighted magnetic resonance image (spin echo; repetition/echo time, 5116/120 ms) showing a heterogeneous soft tissue mass containing cystic portions in the biceps muscle (Figure 1). No evidence existed of osseous involvement.

The patient was referred to the orthopedic and medical oncology departments for additional evaluation and treatment. Fine aspirate of the lesion was consistent
with a pleomorphic malignant fibrous histiocytoma. Staging studies suggested no metastatic disease. After preoperative neoadjuvant chemotherapy and radiation, she underwent radial resection of her right arm malignancy with soft tissue reconstruction and postoperative adjuvant chemotherapy. At last follow-up 30 months postoperatively, she remained disease free and had full shoulder and elbow range of motion.

**Patient 2**

A 70-year-old right-hand-dominant man presented with a 2-week history of a mass in his left anterior arm. One month previously, he had begun a weight-training program at his gym. He reported no specific injury to the left arm but was concerned he might have a torn proximal biceps tendon. He reported no pain or discomfort in his arm or around the mass and had no night pain or difficulty using the arm with activities of daily living.

Physical examination revealed a mass over the middle third of the humerus of the left arm, which was localized over the biceps muscle. The mass was mobile and not fixed, but it was firm and not consistent with a torn proximal biceps tendon. He was neurologically intact to sensory, motor, vascular, and reflex testing. He had no palpable lymph nodes in his neck or axilla.

Magnetic resonance imaging of the left upper extremity showed a 3×3-cm heterogeneous mass with features suspicious for a soft tissue sarcoma (Figure 2). He was subsequently referred to a musculoskeletal oncologist. Percutaneous fine needle aspirations and core biopsies yielded the histologic diagnosis of a high-grade, undifferentiated sarcoma. He subsequently underwent repeat radial resection of the brachium with soft tissue reconstruction.

Postoperatively, he regained full shoulder and elbow range of motion. Seventy-three months after his second surgery, no evidence existed of local recurrence or metastasis.

**DISCUSSION**

The proximal biceps tendon is one of the most commonly torn tendons in the body. These 2 cases show that, although rare, soft tissue sarcomas can be clinically mistaken for tears of the proximal biceps tendon. Although soft tissue tumors of the arm resemble tears of the distal biceps tendon, to the current authors’ knowledge, the 2 current patients are the first reported cases in which the tumors were initially believed to be tears of the proximal biceps tendon.

These 2 cases remind practitioners that the possible presence of a malignancy, especially if the mass occurs with minimal or no trauma. Other lesions reported to appear in the biceps muscle include ganglion cysts, lung or renal carcinoma metastasis to the biceps, hydatid cysts, extramedullary plasmacytoma, benign metastasizing leiomyomas, pseudotumor of a chronic distal biceps tendon rupture, focal myositis, muscular sarcoidosis, cysticercosis, and tears of the biceps muscle.

Historical features of the mass can be beneficial when trying to distinguish the mass of a torn biceps muscle from that originating from other causes. Sim et al suggested asking patients 7 questions about the mass:

1. How long has the mass been present? Tumors present for long periods of time are less likely to be malignant.
2. How rapidly is the tumor growing? Rapidly growing tumors may indicate a malignancy.
3. Does the mass cause pain? Abscesses and local reaction to a tumor can present with pain local to the swelling.
4. Do you have a history of penetrating trauma? With penetrating trauma, the mass may be a reactive lesion to a foreign body.
5. Do you have a history of cancer? Some tumors, such as melanoma or lymphoma, can metastasize to soft tissue.
6. Do you have any systemic signs such as fever, chills, or malaise? Such symptoms can be seen with lymphoma, Ewing’s sarcoma, and some angiosarcomas.
7. Do you have a family history of masses? Some conditions, such as...
neurofibromatosis, can have familial inheritance.

The physical examination of the patient with a torn proximal biceps tendon should include palpation of the mass and, when indicated, examination of the axillary and cervical lymph nodes. Tumors larger than 5 cm or fixed to bone or the surrounding soft tissue should be considered suspicious for soft tissue sarcomas. Local tenderness can be present secondary to local inflammation in the reactive zone of the tumor. Tears of the proximal biceps tendon may be tender initially, but the tenderness usually resolves in several weeks. Similarly, tears of the proximal biceps tendon present with a typical Popeye deformity that should not get larger over time. In addition, the mass of a proximal biceps tendon rupture should not be fixed and should be mobile when palpated. If necessary, a repeat examination several months later can determine whether the tumor is enlarging.

Radiographs of a proximal biceps tendon rupture are often not necessary if the history and physical examination are characteristic for this injury. If suspicion exists of a tumor, conventional radiographs of the arm should be obtained first but they are frequently negative. Magnetic resonance imaging of the mass should also be obtained, and care should be taken that the study includes the area of the abnormality. In the current authors’ experience, it is not uncommon to request a scan of the arm for a torn proximal biceps tendon, only to receive a scan of the shoulder that misses the mass.

It is important to understand the MRI features that distinguish a torn muscle from a malignant tumor. Soft tissue sarcomas have a highly variable appearance on noncontrast MRI. However, all sarcomas enhance after contrast administration, although the enhancement pattern may vary. Enhancement of the tumor can be affected by the tumor’s pharmacokinetic properties, presence of cystic or necrotic portions, and presence of hemorrhage. Because a large portion of the tumor may potentially be masked by hemorrhage, it underscores the need to follow-up any extremity hematoma that does not resolve completely. If persistent clinical suspicion exists regarding soft tissue swelling along the biceps, follow-up MRIs should be obtained with a dedicated tumor protocol that includes, at a minimum, conventional noncontrast and contrast-enhanced sequences. Advanced MRI techniques have also been used for the characterization and distinction of hematomas from tumors and include functional and metabolic MRI sequences.

In patients with suspected soft tissue sarcomas, consultation with a musculoskeletal or surgical oncologist should be considered. Some studies have indicated that inappropriate biopsy or excision can compromise the surgical result and patient survival. A thorough evaluation for metastatic disease should include a chest radiograph and computed tomography. A multidisciplinary approach with an oncologist, radiation oncologist, and orthopedic oncologist is recommended for the evaluation and treatment of soft tissue sarcomas.

More than 200 types of benign and 70 types of malignant soft tissue tumors have been described. However, some sarcomas cannot be linked to a specific type of soft tissue or cell type (ie, unclassified soft tissue tumors). These tumors can only be graded as low- or high-grade or un- or well-differentiated. The 2 current patients had high-grade sarcomas, which have a worse prognosis if metastatic disease exists, if the tumors are larger than 5 cm, and if local recurrence occurs postoperatively. The 5-year survival for patients with high-grade lesions with local disease only is approximately 70% to 80%. The most common soft tissue sarcoma in adults is malignant fibrous histiocytoma, a pleomorphic high-grade tumor composed of fibroblasts, myofibroblasts, and histiocytes. It represents 24% of all classified malignant tumors encountered in late adult life with a peak incidence in the seventh decade, and it occurs more often in men than in women.

**Conclusion**

Soft tissue sarcomas can present as tears of the proximal biceps tendon. A high index of suspicion for a mass in this area that occurs without trauma and that is hard, fixed, or growing rapidly will help clinicians make the proper diagnosis. Imaging studies can be obtained for select patients when suspicion exists of a mass that does not appear like a classic tear of the short head of the biceps tendon.

**References**


