CASE REPORT

Anterior Glenoid Perforation with Suture Anchor Causing Subscapularis Irritation and Pain

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Received: 12 October 2012/Accepted: 10 April 2013 /Published online: 21 June 2013
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Abstract *Background:* Suture anchors for labral repair have been associated with complications including suprascapular notch encroachment and osteolysis. *Case Description:* We present a case of suture anchor penetration of the anterior glenoid neck leading to pain secondary to subscapularis muscle irritation in a 14-year-old boy. The patient had labral repair and subsequent anterior shoulder pain which resolved after anchor removal. *Literature Review:* Chondrolysis of the glenohumeral joint has been described following labral repair with knotless anchors. There have also been cases of injury to the suprascapular nerve following labral repair. However, we are not aware of any reports describing suture anchor penetration of the anterior glenoid neck leading to pain secondary to subscapularis muscle irritation. *Purposes and Clinical Relevance:* Labral repair has become a common and routine procedure, but complications can occur. We report a new complication related to osseous penetration of the anterior glenoid neck of the scapula by a suture anchor. We identified the complication using magnetic resonance imaging, an important part in reproducible, noninvasive, and objective assessment of the

postoperative shoulder. We also present the technique for anchor removal used to resolve the patient's anterior shoulder pain.

Keywords shoulder surgery · arthroscopy · sports medicine · labral repair · anchor tip removal · labral repair complications · subscapularis pain

Introduction

Suture anchors for labral repair have been associated with complications including suprascapular notch encroachment and osteolysis. There have been reports of loose, fragmented, or prominent knotless anchors causing chondrolysis and pain in the glenohumeral joint following labral repair [1]. There is also a case report that describes injury to the suprascapular nerve following labral repair [5]. However, we are not aware of any reports describing suture anchor penetration of the anterior glenoid neck leading to pain secondary to subscapularis muscle irritation.

We present such a case in a 14-year-old boy who had labral repair and subsequent anterior shoulder pain. This case highlights the importance of appropriate imaging studies for patients with anterior shoulder pain after labral repair. It also presents a technique for arthroscopic anchor tip removal.

Case Report

A 14-year-old boy presented with a 1-year history of shoulder pain with throwing activities following excessive throwing as a baseball pitcher in the summer. There was no specific injury. The patient was diagnosed with little league shoulder and went to physical therapy for 1 year. The patient failed non-operative treatment during rehabilitation. He was unable to begin a throwing program due to persistent pain and was also limited with respect to repetitive shoulder activity and heavy lifting. On physical examination, the adduction compression test was painful in pronation and much less in supination. The load

Electronic supplementary material The online version of this article (doi:10.1007/s11420-013-9339-7) contains supplementary material, which is available to authorized users.

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Fig. 1. Axial fast spin echo image demonstrates tear of the anterior labrum.

shift test clearly reproduced a click with anterior translation. The click was painful and reproduced symptoms anteriorly. MRI demonstrated an anterosuperior labral tear (Fig. 1). The superior labrum had some increased signal without clear detachment. In view of the patient's limitations, the duration and severity of his symptoms, and his desire to continue playing baseball, he elected to undergo surgery. He underwent superior and anterior labral repair with three bioabsorbable suture anchors. The anterior labrum, from one o'clock to three o'clock, was avulsed and frayed from the anterior glenoid. The superior labrum was also detached and using an elevator could be completely elevated off of the glenoid. We started with a superior Mitek Lupine anchor (made of polylactic acid (PLA)), inserting this at the twelve o'clock position. The anterior labrum was approached as a separate procedure. We reattached the labrum anatomically with two Mitek Lupine anchors (made of PLA), one at one o'clock and one at two-thirty. The anchors were inserted through a high lateral rotator interval portal. There were no complications during drilling or anchor insertion, and excellent labral fixation was obtained (Figs. 2, 3, and 4).

Fig. 2. Anterior superior labral tear is identified, with the shaver inserted between the labrum and glenoid.

Fig. 3. Suture fixation of the superior labrum.

In the postoperative course, the patient complained of anterior shoulder pain that was not responsive to physical therapy, anti-inflammatory medications, or subacromial cortisone injection. Nine days postoperatively, the patient complained of tenderness over the lateral glenoid just lateral to the joint line. Deep palpation accurately reproduced his pain. On the physical exam, the Hawkins test in abduction and adduction was a little uncomfortable. Resisted lift-off test reproduced the pain in the front of the shoulder. At 4.5 months, the patient had active elevation to 180° but was having discomfort after therapy sessions. At 6 months, external rotation power and supraspinatus strength were normal, but uncomfortable. Hawkins test in abduction and adduction was still uncomfortable. A subacromial cortisone injection was performed at this time but it did not provide relief.

Eleven months after surgery, the patient's persistent anterior shoulder pain did not respond to the cortisone injection or anti-inflammatory medications and continued to limit his activities. The resisted lift-off test reproduced pain in the front of the shoulder. Subsequent magnetic resonance (MR) imaging demonstrated that the inferiorly placed two-thirty anchor had violated and protruded through cortical bone at the anterior glenoid neck, with its tip in contact with the undersurface of the subscapularis muscle (Fig. 5a–c).

Fig. 4. Suture fixation of the anterosuperior labrum. The inferior suture was the one attached to the anchor that penetrated the anterior glenoid.

Fig. 5. **a** Sagittal fast spin echo MR image demonstrates protrusion of the anterior anchor (*arrow*) out of the cortex of the anterior glenoid, abutting the deep surface of the subscapularis muscle. **b** Oblique coronal fast spin echo MR image demonstrates osseous protrusion of the anterior suture anchor out of the cortex of the anterior glenoid, impinging onto the undersurface of the subscapularis muscle. **c** Axial fast spin echo MR image demonstrates osseous protrusion of the anterior suture anchor out of the anterior glenoid margin, with its tip abutting the undersurface of the subscapularis muscle.

Fig. 6. Complete healing of the labrum seen at re-operation.

Fig. 7. Anterior glenoid neck was approached through the rotator interval via the glenohumeral joint and cautery used to expose the anchor tip.

Arthroscopic evaluation of the shoulder with a view to surgically remove the offending anchor tip demonstrated a healed labral repair (Fig. 6). We approached the anterior glenoid neck through the rotator interval and around the front of the glenoid, so as not to disrupt the labral repair. In the area of the protruding anchor, we found a tip sticking out. We used cautery to expose the anchor tip, which was loose (Fig. 7). We retrieved it with a grasper (Fig. 8). The subscapularis muscle was normal. The remainder of the anchor (approximately half) was left in the glenoid.

The patient reported significant pain relief and had restoration of full and symmetrical range of motion within 2 weeks postoperatively. At 1 month, the patient reported nearly complete relief of the anterior shoulder pain, and his external rotation power and supraspinatus strength were normal. At 3 months postoperatively, he had recovered strength and had started a throwing program, but after two operations and many months from the onset, full recovery to competitive throwing was prolonged.

The last clinical follow-up was at 20 months. The patient reported that his right shoulder had progressively improved since the surgery. Nine months after surgery, he returned to competitive sport, playing at second base. He had some soreness at that time, but it had since gone away. At 20 months, he was still throwing and playing, with no soreness or pain in the right shoulder.

Fig. 8. Anchor tip was removed with a grasper.

Discussion

Labral repair has become a common and routine procedure. Nevertheless, complications can occur. Studies have reported complications with PLA bioabsorbable suture anchors in the shoulder including glenohumeral loose bodies, cystic resorption, osteolysis, and arthropathy [1, 2]. Although we used PLA bioabsorbable anchors, the complication we report was not directly related to the anchor material. The anchor did not migrate or loosen. We report a new complication relating to osseous penetration of the anterior glenoid neck of the scapula by a suture anchor. This was most likely the result of an excessive drilling angle in a patient of small size. In order to avoid this complication, the drilling angle should be very carefully monitored in smaller patients.

There are various potential sources of anterior shoulder pain after labral repair, including biceps-labral anchor instability, suprascapular nerve entrapment, anchor prominence within the joint, and in this case, osseous penetration of the glenoid neck by a suture anchor. Suprascapular nerve entrapment can result from cyst formation at the suprascapular notch after a labral tear [4]. Depending on the site of injury, the infraspinatus may be the only affected muscle, resulting in weak external arm rotation. If the supraspinatus is also involved, weak arm elevation, especially between 90° and 190°, is often present [4]. Anchor prominence within the joint can also cause anterior shoulder pain after labral repair and can be diagnosed via radiographs and other imaging [3]. With the absence of ionizing radiation and its multiplanar capabilities as well as excellent soft tissue and osseous contrast, MR imaging plays an important part in reproducible, noninvasive, and objective assessment of the postoperative shoulder. Evaluation by MR imaging is recommended for all patients with persistent anterior pain following labral repair.

Disclosures

Conflict of Interest: Robert G. Marx, MD receives royalty payment from Demos Health and Springer, outside the work. Lana Verkuil, BA, Sean Wilson, BA and Li Foong Foo, MD have declared that they have no conflict of interest.

Human/Animal Rights: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5).

Informed Consent: Informed consent was waived from all patients included in the study.

Required Author Forms Disclosure forms provided by the authors are available with the online version of this article.

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