Proximal radial fracture after revision of distal biceps tendon repair: A case report

Article in Journal of shoulder and elbow surgery / American Shoulder and Elbow Surgeons ... [et al.] · March 2007

CITATIONS
8

READS
124

3 authors:

Alejandro Badia
Badia Hand to Shoulder Center, Miami, FL...
47 PUBLICATIONS 608 CITATIONS

Senthil Nathan Sambandam
31 PUBLICATIONS 187 CITATIONS

Prakash Khanchandani
Sri Sathya Sai Institute of Higher Medical Sc...
14 PUBLICATIONS 114 CITATIONS

Available from: Prakash Khanchandani
Retrieved on: 20 May 2016
Proximal radial fracture after revision of distal biceps tendon repair: A case report

Alejandro Badia, MD, FACS, S. N. Sambandam, MS, MRCS, and Prakash Khanchandani, MS, Miami, FL

Distal biceps tendon ruptures are considered relatively uncommon injuries, with only around 300 reported cases in the literature as of 1997.20 They comprise only 3%9 to 10%10,22 of all biceps tendon injuries, whereas the majority affect the proximal tendon. The incidence,5 pathomechanics,1,2,18,19 and pathophysiology of this condition,4,17,21 as well as various treatment options,2,14,18,19 have been reported. Reinsertion can be achieved by use of either a Henry anterior approach coupled with suture anchors, the Boyd-Anderson double-incision technique, or a single posterior incision.6,13 Various complications have been reported after repair. These include radial and median nerve injury5,15 and transient paresthesia of the lateral antebrachial cutaneous nerve6,8,11,16 after an anterior incision, posterior interosseous nerve injury after the Boyd-Anderson technique3 and Morrey’s muscle-splitting modification of the posterior approach,17 and radioulnar synostosis after the Boyd-Anderson technique.7 However, there are no reports in the literature on proximal radial fracture through the repair site. This is the first report of a proximal radial fracture after the patient underwent repair and subsequent revision repair of a distal biceps tendon rupture via a 2-incision approach.

CASE REPORT

A 46-year-old, right hand–dominant, male realtor presented with increasing pain and swelling around his right elbow after a fall on his right forearm 3 days before evaluation. He was referred by a sports medicine specialist who had performed revision repair of a distal biceps tendon rupture via a 2-incision technique 2 months earlier. This was necessary because of poor postoperative compliance after the initial repair, which was done 3 weeks earlier. According to the sports medicine specialist who did the repair and his operative notes, the initial repair was done by reattaching the biceps tendon to the radius using nonabsorbable sutures anchored to the proximal radius through 2.7-mm unicortical drill holes. The revision was done by use of nonabsorbable sutures through a separate 2.7-mm unicortical drill hole. The surgeon decided to use a separate drill hole for the revision procedure because of excessive scarring around the previous hole and the difficulty and associated bleeding encountered in clearing the previous drill hole site. The patient had done well after revision until a minor fall occurred, where his forearm directly struck a cardboard box while he was packing for a move. On physical examination, there was moderate tenderness over the proximal radius without gross deformity. There was slight swelling with supination, restricted to 50° as a result of pain, with preserved pronation. Previous radiographs did not reveal any abnormality except for some cortical irregularity suggestive of the previous drill hole site. Radiographs obtained after the fall showed a proximal radial fracture through the radial tuberosity (Figure 1) with medial displacement of the distal fragment. There was some cortical irregularity in the area, indicating that the trough created for the biceps reattachment was still healing. We concluded that this fracture occurred through a stress riser of the biceps reattachment site and would require open reduction–internal fixation to minimize nonunion risk and regain pronation-supination.

Open reduction–internal fixation was performed with the patient under regional anesthesia with sedation and tourniquet control. An incision was made in line with the previous posterior incision, which had been used to tie the sutures for the biceps tendon repair. There was some difficulty in dissection because of excessive scarring from the previous surgery. The posterior interosseous nerve was identified and isolated, and care was taken to preserve the distal healed reattachment of the biceps brachii tendon. The insertion site of the distal biceps tendon to the proximal fracture fragment was identified, revealing excessive scarring and a fracture line running through the distal drill hole, where the heavy suture from the previous repair was noted (Figure 1). The suture was removed, and careful tendolysis was done, preserving the biceps tendon attachment while debriding any scar tissue and curetting the fracture site. The pull of the intact biceps tendon resulted in a very unstable fracture with significant displacement. Finally, provisional reduction was obtained with a Verbrugge clamp.

Because of the very proximal nature of the fracture and to avoid any impingement on the bone for pronation-supination, we selected a mini-blade plate (2.4 mm) for osteosynthesis (Figure 2). The blade was inserted in the radial neck, taking care not to violate the proximal radioulnar joint. The radial shaft was reduced to the plate to achieve reduction of the fracture site, and the distal screws were placed. Good stability and full supination were obtained with no impingement from the plate on the ulna because it was placed on the safe spot of the proximal radius. Intraoperative fluoros-
copy was used to confirm the reduction achieved and to check the length of the blade and most proximal screws. The posterior interosseous nerve was inspected again, and the extensor interval was closed. A bulky dressing was applied with a sugar-tong plaster splint in forearm supination to minimize elbow extension/flexion and to prevent rotation.

Initial follow-up at 4 months revealed very good fracture healing with acceptable alignment on radiographic studies (Figure 3). The patient had 65° of supination, 85° of pronation, and normal flexion/extension with return to full activities. He had done well despite poor compliance with physiotherapy and the initial period of immobilization in a Muenster cast (Figure 4). The patient is still undergoing routine follow-up and his clinical and radiologic results have remained satisfactory at 1 year after the treatment of his fracture.

DISCUSSION
Avulsion of the distal biceps brachii tendon comprises just 3% to 10% of all biceps tendon ruptures. This classically affects middle-aged men, associated with an extreme eccentric contraction of the biceps brachii muscle. Surgical treatment has provided superior elbow flexion and forearm supination strength compared with nonsurgical management.

There are few studies in the literature regarding the complications after surgical repair. El-Hawary and MacDermid6 carried out a prospective study of 19 distal biceps tendon repairs over a period of 4 years, 9 via a single anterior incision and 10 via a modified Boyd-Anderson technique. Complications were seen in 44% of patients in the 1-incision group, including transient paresthesia of the lateral antebrachial cutaneous nerve, 1 flexion contracture, and 1 case of heterotopic ossification. The only complication seen in the modified 2-incision group was a transient superficial radial nerve paresthesia. Kelly et al12 conducted a retrospective study of 74 consecutive distal biceps tendon repairs performed through a muscle-splitting 2-incision technique. This resulted in a 31% complication rate (23 patients). The complications consisted of 5 sensory nerve paresthesias (lateral antebrachial cutaneous nerve in 3 and superficial radial nerve in 2), 1 transient palsy of the posterior in-

Figure 1 Radiograph showing proximal radial fracture, which appeared to go through the tuberosity.

Figure 2 A mini-blade plate (2.4 mm) was chosen for internal fixation.

Figure 3 At 4 months, fracture healing was demonstrated by radiography.

Figure 4 The patient obtained an almost complete range of pronation-supination.
terosseous nerve, and 6 complaints of constant anterior elbow pain. Other complications included heterotopic ossification not limiting forearm rotation in 4 patients, a superficial wound infection in 3, a tendon rupture in 1, a lack of forearm rotation in 3, and development of reflex sympathetic dystrophy in 1. There were no cases of proximal radioulnar synostosis nor were there any radial fractures. Failla et al have reported 4 cases of proximal radioulnar synostosis after repair through a Boyd-Anderson 2-incision technique. All of these complications have been reported after primary surgical repair.

Rerupture after distal biceps tendon injury is exceedingly rare, and fracture of the proximal radius has not been reported as a postoperative complication. This single report outlines several interesting aspects of this traumatic pathology. It is the first description of a proximal radial fracture through the repair site, and it takes place in the setting of a biceps brachii tendon rupture and subsequent revision repair. The fracture started in one of the drill holes and was unstable as a result of the constant pull of the intact biceps brachii tendon. The proximal fracture fragment was small and grossly displaced, compounding the difficulty of achieving and maintaining reduction. Because of the very proximal site of the fracture, we elected to use the 2.4-mm mini-blade plate to achieve stable fixation of the proximal radius while preventing any impingement against the ulna throughout the arc of forearm rotation. Another challenging aspect of this treatment was the immobilization necessary to protect the reduction until healing was obtained. We used a Muenster cast, limiting rotation while allowing flexion and extension in an uncooperative patient. Enough compliance was obtained to allow healing, but minimal therapy was performed; the patient still went on to regain a nearly normal range of motion. Such a complication may have been avoided by making a minimal trough to reattach the biceps and drill holes large enough only to pass the suture, by using the same drill holes for the revision procedure, by packing of unused drill holes with bone substitutes, and by using some form of support such as a Muenster cast postoperatively. Nevertheless, a successful outcome could be obtained following strict principles of internal fixation.

REFERENCES