

Primary one stage reconstruction of a simultaneous bilateral distal biceps tendon rupture with bone anchors and a mini open incision

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ABSTRACT

Aim: We present a rare case of bilateral distal biceps tendon rupture treated with primary bilateral one stage reconstruction by bone anchors.

Materials and Methods: A 40 years old male was presented at the outpatient clinic after sustaining a bilateral distal biceps tendon rupture, during a heavy object lift-off. Primary one stage reconstruction was performed bilaterally, with the use of mini open technique and two bone anchors.

Results: At two years postoperatively the patient has regained complete pronation-supination range of movement (ROM), while the muscle belly has adequate shape and mass bilaterally.

Conclusions: Performing a primary one stage reconstruction at bilateral distal biceps tendon ruptures minimizes complications and favors early return to former activities.

KEY WORDS: Distal biceps tendon, bone anchors, one stage reconstruction

Introduction

The biceps muscle is considered the primary supinator of the forearm, while participating in the elbow flexion. Injuries are common, but complete ruptures are rare traumatic incidents of the upper extremity. Simultaneous bilateral complete rupture of the distal biceps tendon is extremely rare. Since no consensus on surgical treatment has been achieved, we present an immediate one stage bilateral surgical reconstruction with the use of two bone anchors.

Materials and methods

A 40 year old Caucasian male presented to our De-

partment for further evaluation and treatment after sustained a bilateral elbow injury, while lifting a refrigerator, two days before administration. The patient reported acute pain on both elbow joints and inability to perform elbow flexion. Macroscopically hematoma at the elbow crease and reverse "Pop-eye" sign was documented bilaterally. Hook test was positive bilaterally, while flexion and pronation could not be performed due to pain. His past medical history was unremarkable.

Magnetic Resonance Imaging (MRI) confirmed the presence of a complete tear of the distal biceps tendon on both arms, with 5,2 cm retraction from

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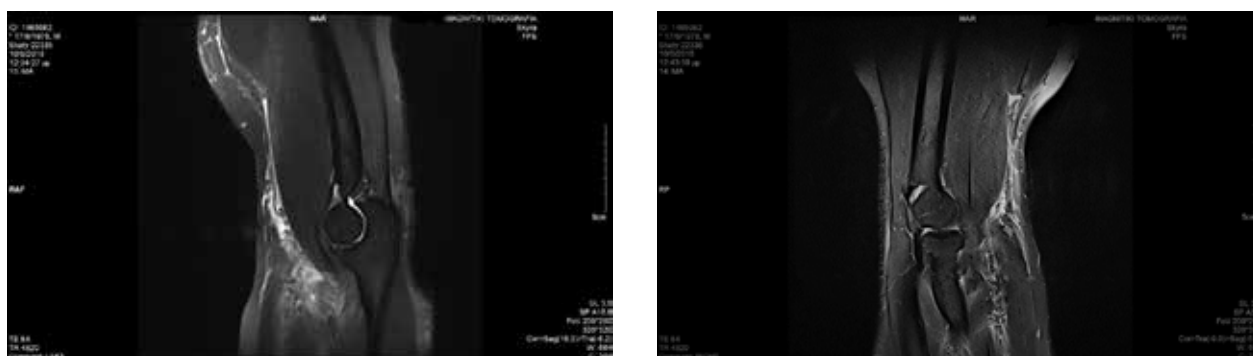


Figure 1. *a* T2 weighted MRI showing retraction of the right biceps distal tendon stump at 9cm from the radial tuberosity. *b*. T2 weighted MRI showing retraction of the left tendon stump at 5,2cm.



Figure 2. *a*. The retracted left distal tendon stump. *b*. The tendon is reattached to the radial tuberosity.



Figure 3. Two weeks postoperatively, before removal of the sutures. The surgical scar is minimal, while no edema or hematoma is documented at the forearm. The rest position of the forearm is at 40 degrees of supination, after temporarily removal of the casts.



Figure 4. *a* Right biceps muscle flexed at 90 degrees. *b*. Left biceps muscle flexed at 90 degrees. At 24 months postoperatively the biceps muscle is symmetrical, with adequate mass size bilaterally.

the radial tuberosity on the right (Fig. 1a) and 9 cm on the left extremity (Fig. 1b).

Immediate one stage surgical reconstruction of both tendons was the recommended treatment of

choice. Under general anesthesia, with the patient in a supine position and the use of tourniquet, a 4cm straight incision was performed firstly at the right anterior cubital fossa. The forearm was kept

on full supination during the operation. The tendon stump was located at the lower arm, and through its sheath was retracted (fig 2.a). The radial tuberosity is exposed through retraction of the brachioradialis laterally and the pronator teres medially. Two bone suture anchors (PANALOK® QUICK-ANCHOR™PLUS, DePuy Mitek, Inc., Johnson & Johnson) were inserted in the tuberosity. The stump was debrided and with a criss-cross suture technique, the tendon was reattached to the tuberosity. The repair was secured with the second suture anchor (fig 2.b). The tourniquet was deflated, followed by extensive wash with saline solution and hemostasis. A Jackson - Pratt drain was attached near the tuberosity and the wound was closed with staples. A cast at 90° of flexion and complete supination was applied. The procedure was repeated on the contralateral side. Total operating time was less than 60 minutes.

Results

The drains were removed the next day and the patient was discharged from hospital. Sutures were removed at two weeks postoperatively (fig. 3), while the casts removed at four weeks respectively. Immediate physiotherapy started after the removal of the cast. The patient returned to his previous profession and activities 4 months postoperatively. At 2 year follow up the range of pronation and supination movement is symmetrical, bilateral muscles regained preinjury shape and mass (fig. 4a,b), while the patient remains highly satisfied and pain free.

Discussion

Complete rupture of the distal biceps brachii tendon is a rare injury, covering about 3% of all biceps lacerations [1]. It usually affects the dominant arm of manual workers at their fifth decade of life. An excessive eccentric force against flexed elbow, causing hyperextension of the arm is the usual traumatic incident leading to detachment of the tendon from the radial tuberosity. A simultaneous rupture of the distal biceps tendon is considered even rarer. As a result those traumatic injuries are referred mostly as case reports in bibliography. In the reported case series, where a bilateral biceps tendon rupture is reported, the second injury is not synchronous. Green

et al. [2] presented a large series of 23 bilateral ruptures, none of which had a simultaneous episode. Having an average interval of 4,1 years between the two incidents, they reported that 55% of all deferred cases were partial ruptures.

Aetiology of bilateral tendon rupture can be multifactorial. Chronic use of steroids, smoking, bodybuilding, weightlifting, a physically demanding job [3], obesity [3], anatomical variances of the radial tuberosity, previous injuries are mostly referred to English bibliography.


Usually the patient describes an unexpected, intense pain at the inner crease of the elbow, followed in most cases by ecchymosis and oedema at the anterior and medial area of the cubital fossa [1]. Clinical diagnosis is based nowadays on the positivity of the "Hook test" [4], due its proved high sensitivity and specificity, as well as the inability of the patient to perform a painless flexion and supination move at full strength. In doubtful occasions MRI is a remarkable diagnostic tool [5], which can identify complete or partial ruptures and provide accuracy preoperatively, counting the retraction distance of the tendon's stump.

To our knowledge none of the previously reported cases [6], which was operated simultaneously and at one stage, had been repaired with the use of two bone anchors. A staged procedure is commonly preferred with multiple intervals. Blond [7] reported a case of late distal biceps reconstruction with the use of semitendinous and quadriceps tendons as autografts, choosing an interval of four weeks. Dacampira et al. (2013) [8] reported an interval of 6 weeks, while Rokito [9] set a seven weeks gap.

If the conservative treatment is chosen, the patient must be informed that a loss of 8% to 36% of flexion strength and 21% to 55% of supination strength will have affection on every daily activity. Due to this fact we encourage operative reconstruction when treating acute and subacute injuries in youngsters, hard workers, professional athletes or active middle aged patients.

The main advantages when choosing a two stage reconstruction is the use of the non-operative arm for daily activities [7], such as personal hygiene, protecting the injured arm and being safer during mobilization. The surgeon should take into con-

sideration socioeconomic details of the patient, mental health and dominant arm before proceeding to one or two stage reconstruction. In our case the patient assured us about the help that could be provided to him daily by his social surrounding, while pointing the need for early return to his job. One stage reconstruction allows early mobilization and return to work. Saving time when operating a rupture of the distal biceps tendon, avoids possible use of autograft tendons, more complex procedures, minimizing total operating time and complications, such as large postoper-

ative scars, after harvesting the retracted tendon stump away from the radial tuberosity. In our case we preferred the mini open surgical incision with the use of two bone anchors, due to previous experience with the procedure. The procedure is safe and fast, with excellent postoperative results in contrast to other surgical techniques [10]. No complications were documented in our patient at two years follow up. 

Conflict of interest

The authors declare no conflict of interest.

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