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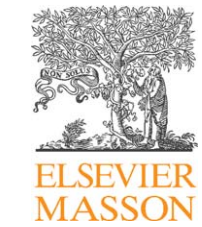

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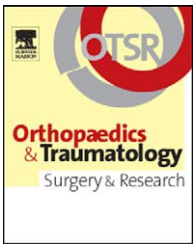

ORIGINAL ARTICLE

Suture anchor reinsertion of distal biceps rupture: Clinical results and radiological assessment of tendon healing

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KEYWORDS
Distal biceps rupture;
Suture anchor;
Ossifications;
Tendon healing;
MRI

Summary
Introduction: The present study consisted in a clinical follow-up of patients with distal rupture of the biceps brachii tendon managed by suture anchor reinsertion to the radial tuberosity. Tendon apposition on the cortical bone is the least resistant reinsertion technique according to biomechanical studies. A parallel radiological (X-ray and MRI) study was therefore performed to assess the exact quality of tendon healing and its correlation to clinical results.
Patients and methods: Twenty-eight patients were followed up retrospectively at a mean 22 months (minimum FU: six months) with clinical examination (mobility, force, satisfaction, residual pain, and return to work) and radiological assessment (standard X-ray exploration for heterotopic ossification, and MRI for quality of healing of the tendon apposed to the cortical bone).
Results: Forty percent of cases showed complications (mainly neurological) which resolved without sequelae under medical treatment. Mobility was normal in all but eight patients who showed −5° to −20° supination loss. Force in flexion-supination was 91% of that on the contralateral side. On X-ray, only 46% of patients were free of ossification. On MRI, reinsertion was judged anatomic in 19 patients (70%), moderate in six and poor in two, with one iterative rupture. Statistical analysis revealed that the greater the number of suture tacks through the tendon, the greater the force in patients with less than two weeks' interval to surgery and satisfactory reinsertion on MRI.

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Discussion: Many reinsertion techniques have been reported, giving clinical results similar to one another and to the present findings. The complications rate, in contrast, varies according to technique and surgical approach. Radiologically, 70% of reinsertions were satisfactory: healing with the tendon apposed on the cortical bone is thus a reliable technique. Heterotopic ossification is considered benign in the literature. The present radiological study refined this notion by identifying three types of ossification: pure asymptomatic intratendon ossification; pure asymptomatic tuberosity ossification without impact on healing on the radial tuberosity; and tuberosity ossification with associated boney metaplasia of the terminal part of the reinserted tendon, impairing healing and leading to less satisfactory clinical results. To ensure anatomic healing of the distal biceps tendon, we recommend less than two weeks' interval to surgery and at least two suture tacks to obtain good apposition on the radial tuberosity.
Level of evidence Level IV: Retrospective therapeutic study.

Introduction

Distal biceps brachii tendon rupture is rare, at 1.2 per 100,000 patients per year in 40 to 50 year-old males [1]. The mechanism is usually trauma, with excentric biceps contraction leading to disinsertion from the radial tuberosity [2]. The underlying trauma may be minor, as histologic changes in the tendon are observed as of 35 years of age, weakening the insertion [3], with a hypovascularized region in the terminal part of the tendon [4].

Without surgical reinsertion, the clinical result is unsatisfactory, with loss of force in flexion and supination of the forearm and sometimes disabling residual pain [5—7].

Surgical reinsertion to the radial tuberosity usually gives complete satisfaction, but is not without complications [8]. The quality of biceps tendon cicatrization on the cortical bone of the radial tuberosity, however, has never been studied, whatever the reinsertion technique: transosseous, suture anchor, EndoButton or endoscopy.

The present study analyzed clinical results with suture anchor reinsertion in distal biceps brachii tendon rupture. A parallel MRI study assessed the quality of tendon cicatrization on the radial tuberosity.

Patients and methods

Between 2003 and 2008, 31 patients presented with traumatic rupture of the distal biceps brachii tendon, reinserted to the radial tuberosity by suture anchor using a single surgical technique. Patients were installed in dorsal decubitus, with the upper limb lying on an arm table. The pneumatic tourniquet was positioned as high as possible on the arm so as to avoid the reinsertion region.

The singular anterior approach was via a cutaneous bayonet incision starting in the medial bicipital groove and then moving laterally into the elbow flexion fold. The distal branch of the incision descended along the medial edge of brachioradialis muscle. Superficial veins were retracted and the lateral antebrachial cutaneous nerve was located. The biceps brachii tendon was then located and released.

The trajectory to the radial tuberosity was disclosed by progressive dissection by blunt dissector, between the medial edge of brachioradialis muscle and the lateral edge of the pronator teres. The forearm was then positioned in forced supination, to give access to the radial tuberosity. The elbow was then positioned in 60° flexion and the radial tuberosity was exposed using Langenbeck retractors (Hohmann retractors on either side of the radial neck not being recommended) (Fig. 1) so as to:

- release the motor branch of the radial nerve;
- reduce reinsertion tension, and to increase the contact between tendon and radial tuberosity.

The suture anchors were positioned on the radial tuberosity without prior rasping. The biceps brachii tendon was then tacked to and fro with a single suture. This technique enhances the solidity of the assembly while allowing the suture to slide by means of the free strand (Fig. 2). Mechanically solid reinsertion was thus obtained, with optimal tendon/bone contact.

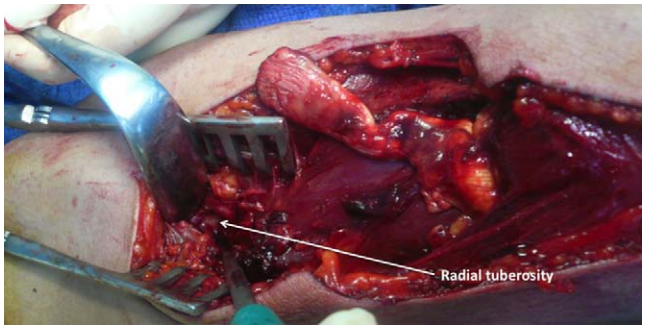

Figure 1 Radial tuberosity approach.

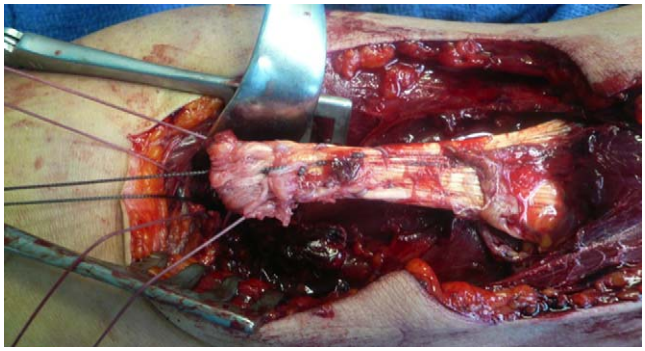

Figure 2 Suture anchor reinsertion and to-and-fro tacking of distal biceps brachii tendon.