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Case Report

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Acute Distal Biceps Tendon Rupture During Weightlifting Practice: Clinical Case

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Abstract

Distal biceps tendon ruptures (DBTR) usually occur in the region where the tendon inserts into the radial tuberosity and constitute 3% of all ruptures of this tendon. The aim of this study is to present a case of acute rupture of the distal biceps tendon during the weightlifting practice, and to review the literature on the most appropriate treatment for this type of injury. A 33-year-old male was recruited to the Emergence Service for an indirect right elbow injury with a 1-day evolution, referring to elbow pain after lifting a weight of about 7.5 kg during bicipital training in the gym. He performed an ultrasonography that confirmed a total rupture of the distal biceps tendon. He was submitted to surgical treatment with reinsertion of the distal biceps tendon with button and screw system (Arthrex Distal BicepsButton™, USA), without intercurrents in the immediate or late postoperative period. The patient presented, in the final evaluation at 6 months of follow-up, complete joint range of motion, without pain or weakness, and with unlimited return to daily life activities, obtaining an excellent functional result. The total rupture of the distal tendon of the brachial biceps in young and in individuals with high physical demand presents better results with the surgical treatment when compared with the conservative treatment. Thus, complete injury of this tendon at the osteotendinous junction is of preferential surgical treatment through reinsertion of the tendon, allowing for a morphological reestablishment and a complete functional recovery of the affected upper limb.

Keywords: Acute Tendon Rupture; Distal Biceps; Elbow; Elbow Injury; Tendon; Treatment

Introduction

The lesion of the distal brachial biceps insertion is uncommon, with an incidence of 1.2 per 100,000 patients per year. [1] Stark was the first to describe the rupture of the distal brachial biceps, in 1843, and in 1987, Johnson completed the first successful reintegration. [1,2] Distal Biceps Tendon Ruptures (DBTR) usually occur in the region where the tendon inserts into the radial tuberosity and constitute 3% of all ruptures of this tendon. [2,3] They usually occur in middle-aged men in the dominant upper limb when an eccentric extension load is applied to the elbow. Several studies refer some risk factors related to rupture including regular tobacco usage, anabolic steroid use and weightlifting. The incidence of distal biceps rupture has increased due to increased practice of sports activities. [2,4-6] In cases of complete rupture, the muscle

retracts proximally giving rise to the so-called “reverse Popeye” sign. [7] Diagnostic auxiliary exams, such as magnetic resonance imaging or ultrasonography, are relevant in differentiating the degree of tendon rupture lesion (partial vs. complete rupture). [8,9] Surgical treatment provides better clinical and functional results than conservative treatment, since this usually leads to muscle strength deficit, mobility disorders, and aesthetic deformities. [10-15] The aim of this study is to present a case of acute rupture of the distal biceps tendon during the weightlifting practice, and to review the literature on the most appropriate treatment for this type of injury.

Case Report

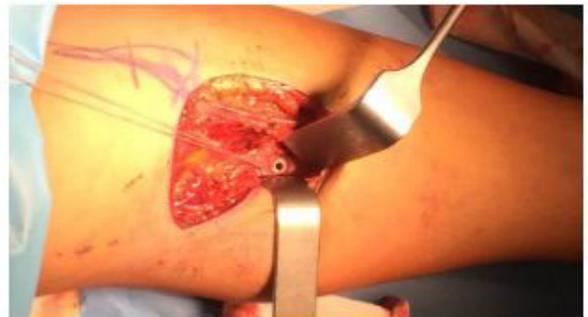
Male, 33 years old, lawyer, with no relevant medical history, namely smoking habits, and without consumption of medications, namely anabolic steroids. He recruited the Emergence Service because of an indirect right elbow injury, with 1 day of evolution,

referring to pain in the elbow, after lifting weight of about 7.5 kilograms, during bicipital training in the gym. The objective examination in the Emergency Service showed edema and pain on palpation of the antecubital region, with loss of the normal contour of the distal biceps and palpable gap. The range of motion of the elbow was complete and showed a decrease in the force on the supination of the forearm and flexion of the right elbow. He also presented positive squeeze test of the biceps and hook test positive for DBTR. He performed ultrasonography that confirmed a total rupture of the distal biceps tendon.

He was submitted to surgical treatment with reinsertion of the distal biceps tendon with a button and screw system (Arthrex Distal BicepsButton™, USA, (Figures 1-7), without interurrences in the immediate or late postoperative period (Figure 8). After surgery, the elbow was immobilized in 90° flexion with the forearm placed on supination for about 10 days. After this period, he began a progressive functional rehabilitation program. The patient presented, in the final evaluation at 6 months of follow-up, complete joint amplitude, without pain or weakness, and with unlimited return to the activities of daily living and physical activity, obtaining an excellent functional result, according to the Andrews-Carson and Mayo Elbow Performance Score (MEPS-100 points).



Figures 1-3: Intraoperative images of the identification and reference of the proximal portion of the distal biceps.



Figures 4-7: Intraoperative images of the surgical treatment with reinsertion of the distal biceps tendon with button and screw system of interference (Arthrex Distal BicepsButton™, USA).



Figure 8: Postoperative image at 8 weeks.

Discussion

There are several therapeutic options (conservative and surgical) for the treatment of acute distal biceps tendon rupture, and patients who have been treated conservatively tend to have obvious clinical deficits [10,11]. Good to excellent results were described for early surgical treatment, with complete functional recovery and high degree of patient satisfaction [12-15]. Total acute rupture of the distal biceps tendon in young and in individuals with high physical demands presents better results with the surgical treatment when compared to the conservative treatment. Thus, complete acute injury of this tendon at the osteotendinous junction is of preferential surgical treatment through reinsertion of the tendon, allowing a morphological reestablishment and a complete functional recovery of the affected upper limb [16]. It should be noted that anatomically there are 2 distinct bicipital muscle, short (flexor) and long (supinator) muscle inserts, which should be considered during surgical treatment.

Several surgical techniques have been described for the reinsertion of the distal biceps tendon, using double or single approaches and with different methods of fixation, among which we can mention the most used: the bone tunnel, the interference screw, the end button and the suture anchor. Clinical studies have demonstrated advantages in the use of single approach, with excellent results in repair with suture anchors [17-19]. Henry and colleagues compared the surgical technique through an incision or two surgical incisions and found no difference in supination and flexion between the two techniques [20]. Biomechanical studies have tested the strength of various techniques. The cortical button technique exhibits the maximum load until failure in vitro, and the anchors and interosseous screw techniques produce the least deviation. Surgical complications include sensory and motor neuropraxia, infection, and heterotopic ossification. Current trends in postoperative rehabilitation include an early return to motion and

activities of daily living [21]. Regarding tendon fixation, Lemos et al. compared the use of bone tunnels with anchor suture fixation in biomechanical studies in cadavers and reported that the elastic force of the suture anchor fixation is 263 N and 203 N in bone tunnel [18]. Conservative treatment of acute DBTR typically results in loss of flexion and supination force. Non-operative treatment is reserved for elderly patients with low functional demand and for those patients with significant medical comorbidities, resulting in an unacceptably high risk for surgery.

Conclusion

The surgical treatment of acute DBTR seems to be safe and effective in repairing rupture of the distal tendon of the brachial biceps. Our results show that anatomical repair offers good results.

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