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Rupture of distal insertion of the biceps tendon: A particular Case study

Kamenan Akindri Valery,ValdumirRavid Mendes, EkekangCandidoSergio
Service de Traumato-orthopédie, Hôpital militaire d'instruction Mohamed V,Faculté de Médecineet Pharmacie de Rabat,Maroc

Abstract
Introduction
Ruptures of the distal insertion of the radius are rare injuries in trauma.
Given the major role that plays this muscle in the functioning of the upper limb, the goal of our observation is to elucidate the benefits of an adequate surgical technique for the management of this lesion.
Patient and methods
We report a clinical case handled in our trauma centre. Indeed, this patient whose clinical and ultrasound evaluation diagnosed the rupture of the distal insertion of the bicipital tendon enabled us to make the therapeutic decision. He benefited from surgical repair by means of a cortical button.
Results
The recovery of the biceps contraction strength and the full mobility of the elbow were satisfactory after 2 months. Moreover, the patient could resume work effectively after 3 months.
Discussion
Anatomical tenodesis is the technique traditionally used by most authors and is obtained through various means depending on the surgeon's choice. They all expose to the same risk of complications such as; damage of the interosseous nerve of the forearm, lesion of the deep branch of the radial nerve as well as the appearance of heterotopic ossification.Hence the necessity of an adequate surgical technique.
Conclusion
Ruptures of the distal insertion of the radius are unusual. Surgical repair by tenodesis technique by cortical button has proven to us it's true effectiveness.
Key Word: *bicipital tendon,rupture, tenodesis, cortical button*

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I. Introduction

The biceps is one of the largest muscles of the arm, whose primary function is flexion of the elbow and supination of the forearm. The management of a distal biceps tendonrupture is subject to many debates, particularly on surgical and non-surgical interventions and also on the importance of emergency or deferred management of this lesion.

II. Patient and methods

This is a description of a clinical case that we managed in our trauma center. An Adult in his fifties, a baker by profession with no significant medical history, who presented himself at the emergency department complaining of anterior elbow pain associated with functional motion disability of the forearm following an injury he sustained while doing pull-up exercise. Physical examination after his admission at the emergency centerrevealed a reversed Popeye sign associated with a positive hook test as described by O'Driscoll {1}.

Flexion of the forearm was limited at 80° with loss of muscle strength rated 2 according to the muscle rating described by Lacote{2}. A standard x-ray of the elbow performed revealed no solution of continuity to eliminate a possible stress fracture. An ultrasound evaluation confirmed the diagnosis of rupture of the distal insertion of the biceps tendon. Based on the young and active nature of our subject, and after confirming rupture of the tendinous insertion, our patient was suggested for surgical intervention. Our patient was admitted into the operating room 24 hours following his injury, where he would undergo a reinsertion of the distal biceps tendon.

After general anesthesia , he was placed in a supine position with his upper limb on an arm's surgery table. The incision was an extension of Henry's approach.{3}The 2 cm incision started at one- third of the proximal portion of the forearm towards the antecubital fossa . Gentle digital dissection of the superficial and deep muscular planes made it possible to spot the bicipital slide.

The proximal segment of the ruptured tendon, which was slightly retracted in its gutter, was fully unveiled {image 1} .A retractor was used to bring out the noble elements of the cubitalfossa and to expose the radial bicipital tuberosity on which persisted few fibers from the distal portion of the shreddedtendon. First, the proximal end of the ruptured tendon was prepared, then attached by a wire and connected to the Toggleloc cortical button {image 2,3}. Initial tunnel was drilled, from front to back next to the bicipital tuberosity, first of all bicortical to the drill bit 3,2, and laterunicorticalanterior to the drill bit corresponding to the size of the tendon, thus allowing the cortical button to pass, in order to attach it to the posterior cortical while adjusting the muscle tension of the forearm in full extension and supination {image 3,4}

Image 1: proximal end of the ruptured tendon exposed

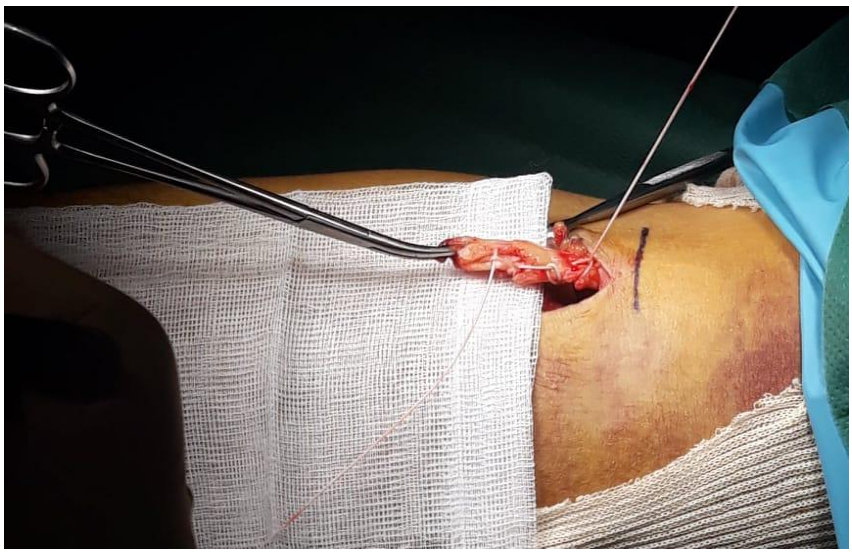

Image 2: proximal end of the tendon connected to cortical button by wire

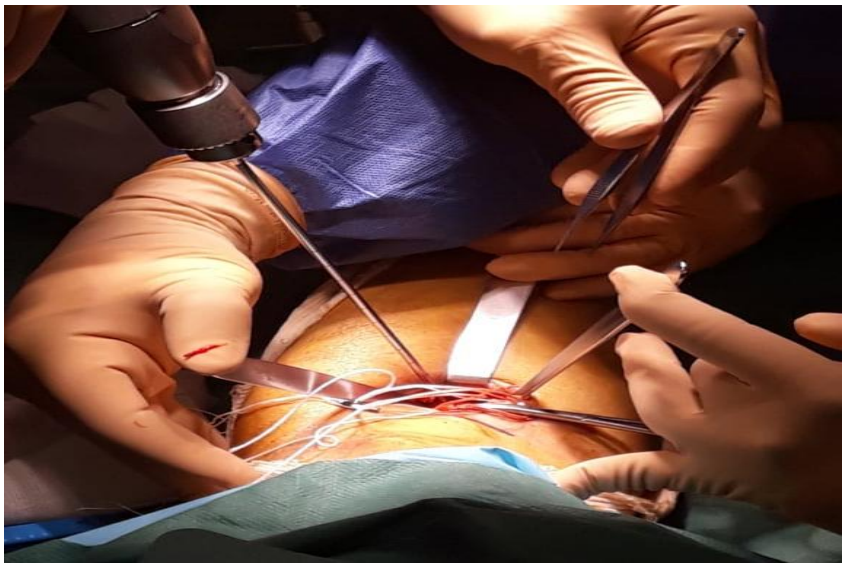

Image 3 : Tunnel drilling for corticalbutton implantation

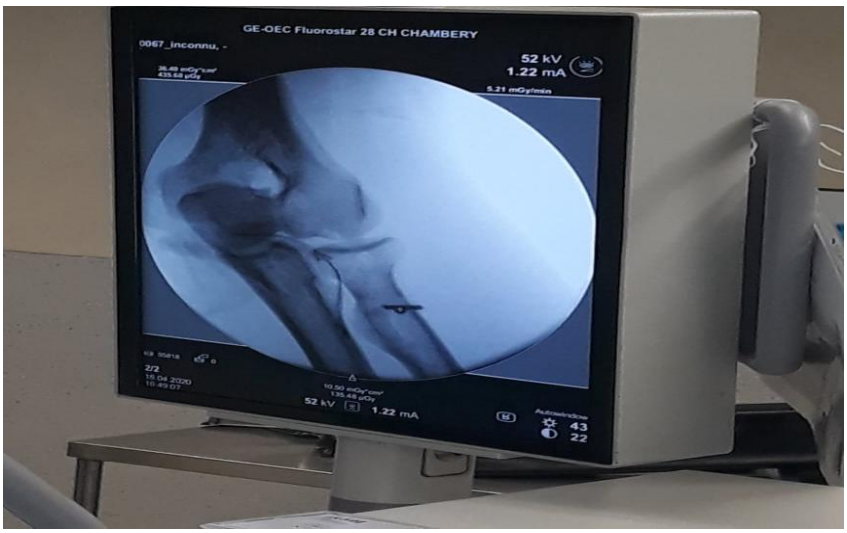

Image 4 : Peroperative X-ray confirms good position of the button

The immediate outcomes were favorable . An articulated brachio antebrachialorthosis at -90° of extension was placed immediately after surgery and was to last for the first 3 weeks . Passive flexion was initiated without limitation of amplitude. Followed by progressive rehabilitation whichstarted from the third week, with gradual recovery offull extension which made it possible to retrieve a full range of extension at 180°, and also an elbow flexion and pronosupination after 8 weeks.

III. Results

Mayo elbow score was 100 and the muscular strength was 4 at the clinical control 2 months after the surgery. Our patient resumed work effectively after 3 months. Radiological check-ups at2, 6 and 12 months revealed no secondary displacement of the cortical button, and no further complications were objectified. Complete recovery of muscle strength and endurance to mobilization in flexion and supination was identical to the contralateral side at 12-months control {image5}.

Image 5 : Standard X-ray showing the cortical buttonafter 2 monthcontrol.

IV. Discussion

Ruptures of the distal insertion are rare injuries {4,5}. They usually occur during sport activities during which the arm is brought abruptly into extension from flexion by an eccentric force or during a weightlifting exercise. {6}

Dojcinovic and collaborators propose a double anterior and posterior surgical approach as opposed to the basic single anterior approach described by other authors. Although the latter remains the most practiced {7,8}.

Different surgical techniques, ranging from a simple transosseous suture, to tendon reinsertion by an interference screw or by anchor or by means of an cortical button attached to the dorsal cortical of the radius, have shown their effectiveness through satisfactory functional results obtained after repair. Nikolauslang shows in his series that, the mean time to resume work is 3 months after surgery {9}.

However, as multiple as they may be, none of these techniques have been able to demonstrate its superiority compared to another as stated by some authors. Therefore the choice of a technique, most often, comes back to the appreciation of the surgeon.

However, many articles defend the superiority of surgical treatment over non-surgical treatment represented by an adequate functional education. {10,11}

These techniques of anatomical tenodesis with tendon re-integration at the bicipital tuberosity of the radius showed their superiority over those performed in extra anatomical position as reported by Chillemi and Watson. {12,13}

Furthermore, it is important to remember that these surgical techniques are not without drawbacks. In fact, at different levels, they all expose to the same risk of complications suchas; damage to the interosseous nerve or lesion of the deep branch of the radial nerve and the appearance of heterotopic ossification of the radius, thus limiting the area of motion of the forearm and radius especially around its axis during prono-supination movements.Chillemi and collaborator recommend shortening the time between diagnosis and intervention to improve functional outcomes and reduce some secondary complications such as heterotopic ossifications {12,14,15}.

Our study is therefore in line with this view which consist of reducing postoperative complications and allowing us to remind orthopaedic surgeons of the importance of adequate surgical repair to restore the essential functions of the biceps brachialis muscle that are supination and flexion of the forearm. Furthermore, a broader study would be required in order to assess the incidence of postoperative complications and complications related to conservative treatment.

V. Conclusion

Ruptures of the distal insertion of the bicipital tendon are quite rare in trauma. However, when they occur, their surgical management must be well developed for a better clinical and functional outcome of patients. Although no technique has been unanimously accepted, our surgical technique using the cortical button remains adapted and reduces the incidence of complications.

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