Non-Simultaneous Bilateral Closed Rupture of the Triceps Tendon in a Woman

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Introduction

Rupture of triceps tendons is uncommon. Bilateral triceps ruptures are even rarer [1, 2]. There are very few case reports in women [3]. The first triceps rupture was reported in 1868 [4]. Although many cases have been reported since then, reports of bilateral ruptures still remain rare [1, 2]. The etiology of triceps tendon rupture is still under debate. Multiple etiologies have been proposed for making the tendon insertion susceptible to weakness and tear. In case of a complete triceps tendon rupture, surgical repair is the preferred treatment [4, 5]. Timely rehabilitation is mandatory to regain the triceps strength and elbow range of motion after surgery [4].

Case Report

A 46-year-old left-hand dominant female sustained a closed rupture of her left distal triceps in 2008 after falling off her bicycle during a motor vehicle accident. In 2013, she ruptured her right distal triceps during an ice hockey game. In both instances, she had been diagnosed with an olecranon bursitis by other physicians for a few weeks prior to her presentation

with a ruptured distal triceps. Her past medical history was otherwise unremarkable and she denied using any anabolic steroids or local cortisone injection.

During both episodes there was minimal local bruising, but there was distinct local tenderness at the tip of the olecranon and a distinct step in the triceps just proximal to the olecranon was obvious through the intact skin in both injuries. Antigravity extension was not possible on the left and was accompanied by pain. On the right side, she could not extend the elbow overhead against resistance. Neurologic exam was normal in both events.

Imaging and Laboratory Findings

Radiographs were unremarkable on both sides. Magnetic resonance imaging (MRI) of both elbows was performed and revealed a complete rupture of the distal triceps from its attachment to the olecranon on the left with 1.5 in. of tendon retraction. On the right, the rupture appeared to be incomplete on the MRI (Fig. 1a, b).

Surgical Technique

The patient elected to undergo surgical repair on the right side because she had experienced a good outcome after previous surgery on the left triceps. In both events, surgical repair was done within the first 2 weeks. We used the same approach for both sides. The patient was placed in a lateral position with the injured side up and sterile tourniquet was taken around the upper arm. A posterior midline incision centered over the tip of olecranon was utilized (Fig. 2a, b).

Left Side On the left side, the central third of the triceps in the superficial portion was completely ruptured off the olecranon and retracted about 1.5 in.. The deep portion of the triceps was still intact as well as the medial and lateral expansions.

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Fig. 1 **a** T-2 weighted MRI of right and **b** left elbow showing triceps rupture in a middle-aged woman

Right Side On the right side, it was noted that the triceps tendon was ruptured completely in the superficial lamina from the olecranon with longitudinal rent in the triceps for about 1.5 in. only on the ulnar side, but not on the radial side. The rest of it was completely intact including the deep lamina.

Olecranon Bursitis, which drained pure serous fluid, was noted and debrided on both sides.

The triceps was repaired using #5 Ethibond (Ethicon Inc. New Jersey, USA) with a modified Krackow stitch. A trough was fashioned on the tip of the olecranon and cruciate holes were drilled from this trough. The sutures were passed through these holes. The tourniquet was now released and the triceps was brought down into the trough with the elbow in extension and the sutures were then tied with the elbow extended. Elbow flexion of between 60 and 90° was noted

Fig. 2 **a** Intra-operative photograph showing complete left triceps rupture. **b** Triceps tendon repaired directly to the olecranon through cruciate drill holes

after repair. The limb was splinted with the elbow in 10–15° of elbow flexion.

Postoperative Follow-up

Identical rehabilitation protocols were used on both sides. The elbow was maintained in 10–15° short of complete extension for 3 weeks in a cast. Thereafter, the cast was replaced with an anterior orthoplast splint, which was modified each week to allow increasing amounts of elbow flexion over a period of 8 weeks. During this 8-week period the patient was allowed gravity assisted elbow extension. Antigravity and resisted extension of the elbow was commenced 3 months after surgery.

In both instances the patient exhibited close to a full range of motion after 3 months. However, a full range of motion was noted only at the 6-month post-operative visit on both sides.

Discussion

Bilateral triceps rupture is a rare event [2]. To the best of our knowledge, there are less than 6 reports on bilateral rupture of triceps tendons [2–7]. Of all patients in these reports, only one was a woman [3]. Thus, it appears that triceps rupture in

women is extremely rare, which could possibly be attributed to lesser involvement than men in strenuous activities such as construction and weight lifting.

Since triceps eccentric contraction usually results in olecranon avulsion fracture, tendon rupture is an uncommon occurrence [2]. Multiple etiologies have been suggested for tendon rupture such as hypocalcemia-induced tetany [1], chronic renal failure and subsequent secondary hyperparathyroidism and chronic hemodialysis [6, 8], metabolic acidosis [9], olecranon bursitis [10], steroid injection [11], and finally idiopathic with no predisposing factor [2]. The association of tendon rupture with above factors may be due to pathological changes occurring at the site of tendon attachment resulting in fraying and weakness of the tendon and therefore, making it susceptible to further tear with a sudden triceps eccentric contraction. In addition, such a mechanism involving strong eccentric contraction has also been implicated in insertion ruptures of other strong muscle groups such as quadriceps and triceps surae [1, 8].

It has been suggested that olecranon bursitis may result in tendon insertion weakness [10]. Our patient did have a diagnosis of olecranon bursitis on both sides made by other physicians. While it may seem intuitive to correlate olecranon bursitis with the triceps rupture, a causal relationship has never been established to the best of our knowledge and any inference drawn about the relationship of the two conditions, is in our opinion purely speculative.

Weak or absent antigravity extension of the elbow with or without resistance is considered to be pathognomonic of distal triceps rupture. Plain radiographs may demonstrate a small bony avulsion off the olecranon, the so-called “fleck” sign, which is highly suspicious for a distal triceps rupture and is often associated with a missed diagnosis in the acute setting [3, 7]. MRI has a role in diagnosis, especially in patients whose clinical examination may be inconclusive and whose radiographs are unremarkable. In patients who are unable to tolerate an MRI or in patients in whom an MRI may be contraindicated, ultrasound can be useful to establish a diagnosis [4].

In the patient described in the current report, olecranon bursitis may have contributed to bilateral triceps ruptures. The operative results of triceps tendon repair were largely

satisfactory both in terms of patient satisfaction and regaining full and painless range of motion and strength.

Ethical Standards The manuscript does not contain clinical studies or patient data.

Conflict of Interest None.

Financial Support None.

References

1. Mont MA, Torres J, Tsao AK (1994) Hypocalcemic-induced tetany that causes triceps and bilateral quadriceps tendon ruptures. *Orthop Rev* 23:57–60
2. Desai B, Shish J, Allen B (2012) Bilateral and simultaneous rupture of the triceps tendon in a patient without predisposing factors. *Case Rep Emerg Med* 2012:920685. doi:10.1155/2012/920685
3. Moon YL, You JW, Noh KH, Song KS (2009) Bilateral and simultaneous triceps avulsions in a patient with chronic renal failure receiving long-term peritoneal dialysis. *Orthopedics* 32. doi:10.3928/01477447-20090624-20
4. Harris PC, Atkinson D, Moorehead JD (2004) Bilateral partial rupture of triceps tendon: case report and quantitative assessment of recovery. *Am J Sports Med* 32:787–792
5. Jørgensen F, Solgaard S (1982) Bilateral rupture of the triceps tendon in a patient receiving long-term hemodialysis. *Ugeskr Laeger* 144: 2723
6. Tsourvakas S, Gouvalas K, Gimsas C, Tsianias N, Founta P, Ameridis N (2004) Bilateral and simultaneous rupture of the triceps tendons in chronic renal failure and secondary hyperparathyroidism. *Arch Orthop Trauma Surg* 124:278–280
7. Golshani B, Bindra J, Hunter JC (2011) Bilateral triceps tendon tear. *Radiol Case Rep* 6:581. doi:10.2484/rcr.v6i4.581
8. De Franco P, Varghese J, Brown WW, Bastani B (1994) Secondary hyperparathyroidism, and not beta 2-microglobulin amyloid, as a cause of spontaneous tendon rupture in patients on chronic hemodialysis. *Am J Kidney Dis* 24:951–955
9. Murphy KJ, McPhee I (1965) Tears of major tendons in chronic acidosis with elastosis. *J Bone Joint Surg Am* 47:1253–1258
10. Clayton ML, Thirupathi RG (1984) Rupture of the triceps tendon with olecranon bursitis. A case report with a new method of repair. *Clin Orthop Relat Res* 184:183–185
11. Stannard JP, Bucknell AL (1993) Rupture of the triceps tendon associated with steroid injections. *Am J Sports Med* 21:482–485