

Traumatic rupture of the triceps tendon: a case report and literature review

Sharon Zammit, Ivan Esposito

Abstract

Rupture of the distal tendon of triceps brachii muscle, producing loss of active elbow extension, is rarely encountered. Careful examination is needed at the time of presentation. The diagnosis can be made clinically but an MRI or ultrasound is often done to confirm this easily missed injury. There are literature reports giving good results with surgical repair using trans-olecranon sutures. We used this technique in a 32 year old male patient who sustained this type of injury, with good functional outcome.

Case Report

A 32-year-old man presented to the Accident and Emergency Department at Mater Dei Hospital in April 2008 after a fall of his own height leading to a direct hit to just above the left elbow. He complained of pain, swelling and bruising on the posterior aspect of the elbow that developed within a few minutes from the fall. He was a resistance-trainer and admitted to the use of anabolic androgenic steroid injections, the last injection having been taken four months prior to the injury. He never had any local steroids injected directly into the tendon, nor did he have any previous injury or symptomatology related to the elbow. Anteroposterior and lateral radiographs of his left elbow did not reveal any bony abnormalities and he was discharged home. Three days later he attended an orthopaedic surgeon's clinic because of persistent pain, swelling and bruising. He was found to have a haematoma at the left elbow, with inability to extend the elbow against resistance, and to have a palpable gap above the olecranon. A diagnosis of a triceps tendon tear was

suspected, and the patient was referred for admission to the orthopaedic ward, where further investigations and treatment were carried out.

The patient was treated with elevation of the limb, ice-packs and anti-inflammatory drugs, and a magnetic resonance imaging scan (MRI) was carried out. The findings on MRI were consistent with a complete rupture of the triceps tendon (Figure 1).

Primary surgical repair was performed once the diagnosis was confirmed. At operation, a complete avulsion of the triceps tendon from the olecranon was found. The approach was via a 12cm midline incision on the posterior aspect of the elbow. The distal end of the tendon was identified and debrided, and the olecranon bursa was excised. Two millimetre holes were drilled into the olecranon, and the tendon was anchored using synthetic absorbable sutures. Further reinforcement of the repair was done using synthetic non-absorbable sutures. Absorbable sutures were used for the repair of the superficial tissues. The repair was protected with an above elbow plaster at 60° of flexion. The patient was discharged home the day after surgery on prophylactic antibiotics and analgesia.

He was followed up at the Orthopaedic Out Patients Department and the Physiotherapy Department. The plaster was retained for five weeks and physiotherapy was started at the sixth post-operative week. He carried out an exercise regime using progressively increasing weights, during which he regained full flexion followed by full extension. When he was reviewed at twelve weeks after injury his elbow range of movement was comparable to the other side, and no residual palpable gap was noted at the tendon site. Normal triceps muscle power was regained, with grade strength of 5/5 using the Medical Research Council (MRC) scale. The patient was satisfied with the outcome. He was advised not to resume his former resistance training until six months after surgery.

Discussion

Distal ruptures of the triceps tendon are very rare, with an incidence of <1% of all tendon problems related to the upper limb.^{1,2} Disruption occurs most commonly as an avulsion from the osseous tendon insertion. Less commonly, the injury occurs intramuscularly or at the myotendinous junction.^{1,3} The use of anabolic steroid use is a known factor associated with triceps tendon ruptures, as are other systemic conditions such as chronic renal failure with secondary hyperparathyroidism, hypocalcaemic tetany, rheumatoid arthritis, osteogenesis

Keywords

Triceps, tendon, rupture, elbow

Sharon Zammit* MD MRCS
Department of Orthopaedics
Mater Dei Hospital, Malta
Email:sharonzammit@gmail.com

Ivan Esposito FRCS, FFSEM
Department of Orthopaedics
Mater Dei Hospital, Malta

* corresponding author

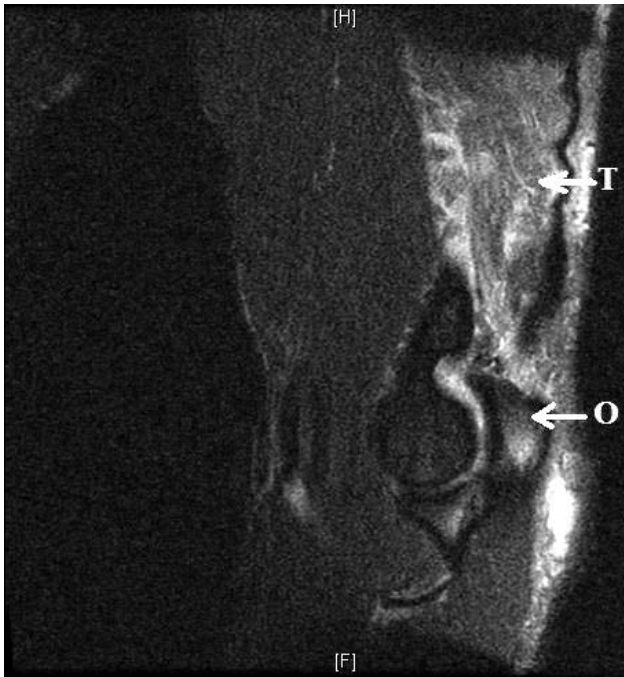


Figure 1: Sagittal MRI T2-weighted image showing complete avulsion of the triceps tendon (T) from the olecranon (O)

imperfecta, and possibly insulin-dependent diabetes. Local factors include local steroid injections, degenerative arthritis and olecranon bursitis.¹⁻³

The diagnosis is difficult and often missed in the acute phase because of swelling and pain, and because of the low degree of suspicion of triceps rupture. The pain in acute injury may prevent an appropriate examination such as elbow extension against gravity and resistance, and swelling may mask the palpation of the gap.^{5,6}

Lateral X-rays show avulsed osseous material from the olecranon in the majority of cases.⁵⁻⁷ This 'flake sign' is almost pathognomic of the lesion. When the injury is in doubt, the patient should be followed closely, and re-examined once the pain and swelling have diminished.^{1,5} In doubtful cases, an ultrasound or MRI is useful in aiding diagnosis.^{2,5} An MRI may be of further value in pre-operative planning because it shows whether the injury is complete or partial.^{3,5}

Surgical treatment is advisable for complete rupture to prevent late functional disability.^{1,3,7} Early primary repair should be done within the first three weeks after the injury.¹ Delayed treatment leads to more complex surgery because of the poor quality of the local soft tissues. Partial tears seen on MRI as involving less than 50% of the tendon can heal non-operatively with a splint, without subsequent functional deficits.^{3,5} If clinical examination reveals significant weakness, and an MRI shows a tear of more than 50%, then operative repair is recommended.⁵

The most commonly used method of surgical repair of the complete triceps tendon tear is direct suture repair through olecranon drill holes.^{1,2,5} Sutures used are either absorbable³ or non-absorbable.^{1,8} Another described technique is a

reconstruction of the ruptured triceps using autogenous semi-tendinosus and gracilis tendon. This is performed in cases where direct reattachment is impossible, such as in a case of rupture associated with chronic tendon degeneration induced by corticosteroid injections.⁹ A repair using an advancement flap of the triceps tendon was used in a case of rupture of a degenerate tendon associated with olecranon bursitis.¹⁰ The tendon was completely split in partial thickness proximal to the ruptured end, and the flap was turned down and anchored through olecranon drill holes. Other techniques have included the use of an olecranon periosteal flap, reinforcement with a reflected slip of fascia from the posterior forearm and attachment of avulsed bone using suture anchors.⁵ A polyester mesh was utilised in a case of a patient who presented four years after a triceps tendon rupture.¹¹

Post-operative care described in the literature involved immobilisation at 60° of flexion to prevent excessive tension, followed by isometric exercises from day 12 and progressive active flexion from 4 weeks.⁵ Other authors described passive mobilisation starting from six weeks after the repair.²

In summary, careful evaluation of distal triceps injury should be performed to ensure an accurate early diagnosis, and may need to be repeated when the initial findings are inconclusive. Surgical repair of tears involving more than 50% of the triceps tendon can be carried out acutely by direct reattachment of the tendon to the olecranon. The results are generally successful, with a good return of function.

References

- van Riet RP, Morrey BF, Ho E, O'Driscoll SW. Surgical treatment of Distal triceps ruptures. *J Bone Joint Surg Am.* 2003;85-A(10):1961-7.
- Langenhan R, Weihe R, Kohler G. Traumatic rupture of the triceps brachii tendon and ipsilateral Achilles tendon. *Unfallchirurg.* 2007;110(11):977-80. German.
- Mair SD, Isbell WM, Gill TJ, Schlegel TF, Hawkins RJ. Triceps tendon ruptures in professional football players. *Am J Sports Med.* 2004;32:431-4.
- Lambert MI, St Clair Gibson A, Noakes TD. Rupture of the triceps tendon associated with steroid injections. *Am J Sports Med.* 1995;23:778.
- Scharma SC, Singh R, Goel T, Singh H. Missed diagnosis of triceps tendon rupture: a case report and review of literature. *J Orthop Surg (Hong Kong).* 2005;13(3):307-9.
- Carpentier E, Tourne Y. Traumatic avulsion of the triceps brachialis tendon. A case report. *Ann Chir Main Memb Super.* 1992;11(2):163-5. French.
- Gerard F, Marion A, Garnuio P, Tropet Y. Distal traumatic avulsion of the triceps brachii. Apropos of a treated case. *Chir Main.* 1998;17(4):321-4. French.
- Esenyel CZ, Ozturk K, Ortak O, Kara AN. Rupture of the triceps brachii tendon: a case report. *Acta Orthop Traumatol Turc.* 2003;37(2):178-81. Turkish.
- Dos Remedios C, Brosset T, Chantelot C, Fontaine C. Repair of a triceps tendon rupture using autogenous semi-tendinosus and gracilis tendons. A case report and retrospective chart review. *Chir Main.* 2007;26(3):154-8. French.
- Clayton ML, Thirupathi RG. Rupture of the triceps tendon with olecranon bursitis. A case report with a new method of repair. *Clin Orthop Relat Res.* 1984;(184):183-5.
- Sai S, Fujii K, Chino H, Inoue J, Ishizaka J. Old rupture of the triceps tendon with unique pathology: a case report. *J Orthop Sci.* 2004;9(6):654-6.