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Missed Tibialis Anterior Tendon Laceration -Case Report

Key words: Missed, Unrecognized, Tibialis Anterior Tendon, Laceration, Rupture

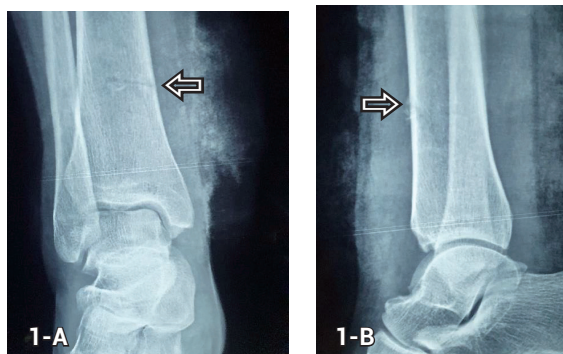


Figure 1-A and 1-B: AP (1-A) and lateral (1-B) X-ray views of the distal tibia. Arrow points to the bony cut injury.

Abstract:

Laceration of the tibialis anterior (TA) tendon is a rare injury that has been reported previously. A seemingly trivial wound may ‘mask’ a completely divided tendon. Therefore, unless the clinician is aware of the possibility of a TA tendon injury, the diagnosis can be missed.

A 47-year-old lady presented for a wound review following surgery 3 days previously, for a laceration on her distal shin from a grass cutter. On clinical examination she was found unable to dorsiflex her foot, diagnostic of a cut TA tendon. Secondary exploration of the laceration confirmed the diagnosis of a divided TA tendon which was repaired.

All lacerations involving the distal third of the shin, especially where there is evidence of a bony injury, should be considered to have involved the TA tendon, unless proven otherwise.

Patient history and clinical findings:

A 47-year-old lady, who was otherwise fit and well, presented three days previously at the emergency department

of another hospital. She gave a history of a laceration to the anterior aspect of her distal shin from a grass cutter, she sustained, when she had inadvertently walked onto its path. Clinical examination revealed two sutured cuts situated in the distal fourth of her shin; separated by a triangular shaped, bridge of skin that was about 5 to 7 cm in length and had roughly a 1 to 2 cm medial base, an inch or so medial to the crest of the tibia (anterior border of the tibia). Following initial X-rays and a clinical examination, she was taken to theatre for a wound debridement, washout and primary closure of her wound. She was instructed to present in the next three to four days following the initial wound debridement for a wound examination. She presented her self to our institute, wanting a ‘faster’ service.

Previous hospital data, documented a unicortical breach of the anterior tibia, the debridement, washout and primary closure of the wound, but made no reference to a TA tendon cut.

Review of the initial X-rays revealed a uni-cortical cut in the distal fourth of

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the tibia (figure 1). There were no signs of any overt infection or significant issues with regard to the viability of the skin tag at this stage. On further clinical examination a normal distal neuro-vascular status was confirmed. However, she was found unable to dorsi flex her foot, suggestive of a diagnosis of a cut tibialis anterior (TA) tendon. Clinically, Extensor Hallucis Longus (EHL) tendon was intact as well as those of the lesser toes-Extensor Digitorum Longus (EDL).

She consented to a 'second look' exploration following the explanation of her clinical condition and the possible long-term impact of a TA tendon cut.

Operative procedure:

Exploration of the wound was done under a spinal anaesthetic, prophylactic intra-venous antibiotics and the use of a tourniquet. The wound was extended proximally and distally along the lateral border of the original laceration. The divided ends of the tendon were retrieved. There was no significant contamination of the cut ends. Maceration of the cut ends were minimal, which were finely trimmed and sutured (Figure 2). The wound was washed and closed. Following the surgery, she was placed in a below knee back slab with the ankle in neutral and following discharge, requested to come back in 3 to 5 days for a wound review (Figure 3).

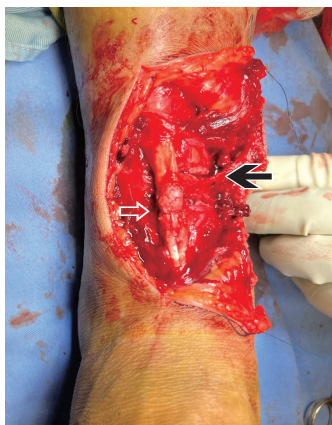


Figure 2: Upper arrow (↖) points to the bony cut in the tibia-at the level of the skin laceration. Lower arrow (⇨) points to the sutured tendon laceration. Note the location of the tendon cut is distal to the level of the skin laceration.



Figure 3: Wound review 4 days post-operatively. Skin flap laceration sutured, running horizontally from medial to lateral and the proximal and distal wound extensions clipped.

Discussion:

Traumatic rupture of the TA tendon is considered to be a rare injury¹ and apart from the association with cut injuries^{2,3} they have also been reported with closed fractures of the distal tibia^{4,5} as well as occurring spontaneously⁶.

Though earlier on the management of these injuries was considered to be controversial, more recently the recommendation has been for surgery^{1,3}. Scores after surgical repair have been noted to be superior to conservative management⁷. Early surgical repair offers the only chance of a direct tendon suturing whereas older, missed injuries that have a larger gap will require some reconstruction / tendon graft with a tendon transfer to be considered where there is evidence of fatty infiltration of the TA muscle.

All of the current evidence is strongly in support of a surgical repair of the TA tendon^{3,6,8,9}. A significant improvement in function following the repair of TA tendons is seen in both in acute cases as well as in chronic cases⁸. Logic would dictate that an early repair would be preferable to a late repair, However, given the paucity of the cases there has not been enough evidence to show a statistically significant difference between early vs. late repairs⁸.

The current recommendations are as follows:⁹

- Conservative treatment of TA tendon rupture is recommended only for low-demand inactive patients with contraindications for surgery.

- Direct repair should be attempted in all cases of acute TA tendon rupture with a gap <2.5 cm.
- Lengthening and rotationplasty procedures are recommended for acute traumatic TA tendon ruptures with a gap <5 cm in otherwise healthy tendons.
- EHL or EDL transfer is recommended for acute large defects after debridement and chronic degenerated TA tendon ruptures with muscle fatty infiltration.
- Free tendon graft is suggested for large defects following debridement and chronic degenerated TA tendon ruptures without muscle fatty infiltration.

The TA muscle originates from the proximal lateral two thirds of the tibia (and the adjoining interosseous membrane) giving rise to the TA tendon which crosses the entire length of the remaining anterior crest of the Tibia at a very shallow angle from lateral to medial. The muscle as well as the tendon can be seen and palpated on one self. Therefore, it is important to be cognizant of the fact that all lacerations that extend to the bone, in the distal third of the tibia, have the potential to divide the TA tendon at a minimum.

All of the extensor tendons that cross the ankle joint anteriorly contribute to the dorsi flexion of the ankle joint. The intact EDL and the EHL can mask the loss

of the TA (tendon) function. Therefore, it is imperative that the function of the TA is tested 'in isolation' to the rest of the dorsiflexors of the ankle. If there is a doubt, an US scan will be able to verify the diagnosis s¹⁰.

As the TA tendon has an estimated excursion of about 6.5 to 7.5 cm s¹ the position of the foot at the time of the injury will dictate the level at which the tendon is cut. Hence, with the retraction of the proximal cut end, if the foot was in a dorsiflexed position, the distal cut end can be a few cm from the level of the skin laceration (Figure 2). Therefore, an extension of the original laceration is required to locate the divided tendon ends-and repair the cut ends (Figure 3).

This case report illustrates, firstly, the importance of being aware of the anatomy and the relevant surgical implications, especially, when a laceration extends to the bone. And secondly, the importance of extending the wound in these instances in order to assess the degree of the injury.

Take home message

- 🏥 All lacerations involving the distal third of the shin, especially where there is evidence of a bony injury, should be considered to have involved the TA tendon (at a minimum), unless proven otherwise.
- 🏥 An adequate extension of the wound is needed in order to do an adequate wound exploration

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