



CASE REPORT



Posterior tibial artery injury in ankle trauma: a case report

Simone Cigni^o

Abstract: The purpose of this case report is to present a clinical case of vascular injury correlated an ankle injury, an event that is rare but potentially a harbinger of even serious complications in the following days. The case concerns a 23-year-old young man who suffered an apparently minor ankle injury. In the days following the trauma, given the dysesthetic symptomatology manifested by the patient, a posterior tibial artery lesion was diagnosed that required emergency surgery. This clinical case highlights the importance of clinical follow-up in preventing even slight complications.

Key words: ankle, trauma, vascular injury.

Key messages:

- Early diagnosis in ankle injuries is crucial in preventing complications such as tibial artery injury.
- Clinical follow-up strategies are crucial in improving patient adherence to clinical treatment and early detection of rare trauma sequelae.

Introduction

Vascular lesions, whether they affect a trunk wall or take the form of an aneurysm, are rare complications of ankle injuries (1). They often occur in the military, which offers the largest case series, or in sports (2). Very frequently, the immediate clinical evidence is blurred and does not correlate directly with the real severity of the case (3). This fatally leads to delays in diagnosis and treatment. Moreover, precisely in relation to the ways in which it is possible to deal with this type of injury, it

should be noted that to date there are no well-defined management algorithms (4), also given the scarcity of case histories reported in the scientific literature.

Every patient who is assessed urgently following traumatic events may present with a wide range of associated injuries. It is therefore necessary to be prepared not to exclude each of them a priori and plan a treatment that minimises the risk of disabling outcomes, since the frequent delay in diagnosis (weeks and sometimes even months), preceded by the appearance of blurred symptoms (4), can

also lead to major ischaemic complications, up to and including possible amputation (4, 5, 6).

Vascular involvement in lower limb injuries may accompany either simple sprains or fractures, and may involve arterial or venous structures in their entirety, in partial form or result in pseudoaneurysms (7). Approximately 1% of lower limb injuries have arterial lesions, which are more frequent in young people, almost always males, and rather rare in the over-55s (8). The vascular arcades (which are located in the lower limbs in close proximity to the

^o Surgeon. Specialist in Orthopaedics and Traumatology. Division of Orthopaedics and Traumatology, 'Santi Paolo e Carlo' Local Healthcare Unit, Milan, San Paolo VI Hospital.

Corresponding: Email: scisim26@gmail.com

osteomuscular structures) may be involved at different levels: in 44.9% of cases the popliteal artery (4) is involved, often in association with knee dislocation, and in 26.5% the anterior tibial artery (8), which can be the harbinger of major limb damage (9). Injuries of the perforating fibular, dorsal pedidian and external malleolar arteries are not uncommon, whereas more distal branches (6) and the posterior tibial (10) are affected. Treatment options vary depending on the individual patient and range from conservative to cruel treatment approaches, which may be oriented either towards open trunk revision or embolisation procedures.

Purpose

The purpose of this clinical case is to describe a young man's ankle injury, which initially appeared not to be serious, but after some time instead presented a major vascular involvement that required a delayed open surgical approach.

Clinical case presentation

Male patient, 23 years old, who sustained an accidental sprain of the right ankle while walking. His medical history showed several similar injuries, also suggestive of moderate joint laxity. Radiographs taken at the emergency room assessment (**Fig. 1, 2**) showed a fracture of the posterior tibial malleolus and referred the specialist to treatment with a cast boot and concomitant heparin prophylaxis.

Given the patient's poor clinical compliance, the X-ray check after 12 days showed that the fracture was essentially stable. At the same time, a dressing of the phlyctenae had been



Fig. 1 e 2 - Radiographs in coronal and sagittal projection taken on admission to the emergency room.

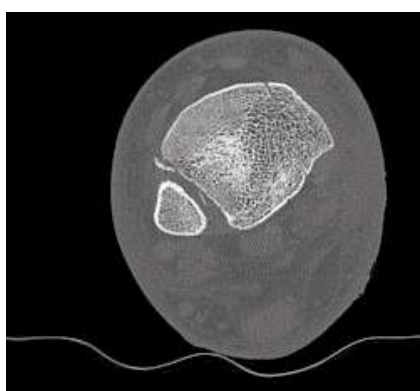


Fig. 3 e 4 - CT examination in axial and coronal cut.

performed, which had appeared in the days following the trauma and had been highlighted at the precautionary opening of the plaster cast, given the oedema of the foot. In the immediately following days, the patient reported local pain with worsening swelling, for which it was decided to perform, 16 days after the event, an instrumental check by CT examination (**Fig. 3, 4**) which showed the already known fracture of the tibial malleolus, associated with lamellar fragments of the talo-crural joint, more evident at medial level.

A further worsening of the symptoms in the following days recommended further instrumental investigations and a CT angiography with contrast medium, which showed an oval formation in the postero-lateral soft tissues of the ankle, measuring 45 X 33 mm, such that

impregnation with contrast medium suggested the presence of a haematoma with punctiform blushing (**Fig. 5**).

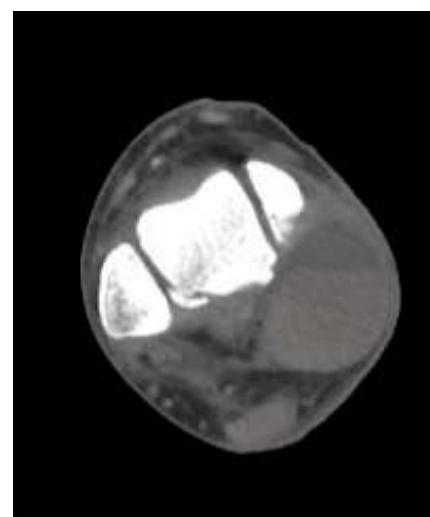


Fig. 5 - Angio-CT examination in axial cut. Note on the right the tumefaction coinciding with the vascular lesion.

After this, further investigation was performed by means of an MRI (*Fig. 6, 7*), the images of which showed extensive diffuse bone oedema in the presence of tibial bone microfragments and fracture foci affecting the intraspongious portion of the talus, the peroneal malleolus and the calcaneus.

The ligamentous part was also injured. In addition to the avulsion of the anterior tibioperoneal ligament and anterior peroneo-astragalic ligament, there was a high-grade lesion of the peroneo-calcaneal ligament, distraction of the deltoid ligament, posterior peroneo-astragalic ligament and posterior tibioperoneal ligament with post-traumatic haematoma. Treatment continued with plaster and a plan of follow-ups.

After a few days, the patient returned to the emergency room complaining of severe local pain with increasing tissue tension. The foot showed a purplish discolouration with partial loss of motility of the fourth and fifth toes and plantar sensitivity. On suspicion of compartment syndrome, the vascular specialist was consulted, who suggested urgent exploratory surgery.

The incision in the lower third of the



Fig. 8 e 9 - Final Rx in lateral and sagittal projection.

right leg, in the medial supra-malleolar site, allowed to drain a large haematoma and the identification of a discontinuity in the wall of the posterior tibial artery, the actual source of the active bleeding. After isolating the two arterial stumps and noting that their distance and the extent of the lesion would not allow direct reconstruction, the vascular surgeon, after verifying the presence of an effective pedid pulse and the patency of the interosseous artery, proceeded to ligate the arterial vessel.

Three months after the injury, at the post-surgical clinical check-up, the patient reported back pain in the ankle, joint stiffness, plantar hypoesthesia and

lack of thermotectomy perception. A psychomotor electromyography check-up was therefore requested, which was never performed, given the patient's poor compliance with medical indications, and a rehabilitation approach was started at the same time for joint recovery, gait re-education, balancing and strengthening of the muscular structures involved in walking. At subsequent check-ups, the bone lesion had healed (*Fig. 8, 9*) and the patient had regained full weight-bearing but, despite this, plantar dysesthesias remained.

The patient decided against further investigations, but returned for a check-up 17 months after the event with signs of inflammation in the affected leg. A diagnosis of erysipelas over-infection was made and antibiotic therapy was started with clavulanic acid and amoxicillin 1 g, 3 times/day, combined with low molecular weight subcutaneous heparin sodium and elastic restraint of the limb with antithrombosis stockings. After this, the patient did not present for clinical follow-up.

Discussion

Vascular lesions, in most cases present in the form of aneurysms and pseudo-



Fig. 6 e 7 - MRI examination in coronal and sagittal cut. Lateral and posterior vascular tumefaction is detected.



aneurysms, but sometimes also as simple wall discontinuities in association with lower limb trauma, are rarely encountered (11), even more so when the latter are caused by low kinetic energy events (12) as in the clinical case presented. The importance of their early identification lies in the fact that they can be a source of even serious complications, including ischaemic events, which can lead to disability or even death (13-14). Unfortunately, in many cases they are difficult to identify at an initial clinical assessment, becoming evident over time due to the presence of signs and symptoms, including persistent oedema, in situ albias or circulatory alterations.

In these cases, symptoms are often misleading for a differential diagnosis, which is why it is necessary that the clinical examination is (11), supported by appropriate instrumental diagnostic investigations of second level, see CT-angio and MRI. Early diagnosis is therefore a fundamental objective, in patients who have suffered closed trauma also involving soft tissue (2) or even more so in those with exposed injuries involving the tibial or peroneal diaphysis (15).

Wynes and Kirksey (4) in 2014 proposed a simple guideline algorithm for an early diagnosis which, starting from the pulsatility or otherwise of the posterior tibial artery and the pedicle, is able to

point towards the possible need for further investigations, e.g., CT, MRI, angiography. Above all in these cases, one needs to consider a therapeutic procedure that provides for periodic checks able to show as soon as possible pulsatility defects of the arterial branches and consequently direct towards an immediate vascular surgical consultation (13). Specifically, it is useful to remember how the treatment possibilities are still controversial in the literature, in which traumas of this entity are treated with open surgery (16), or with endovascular surgical techniques, which guarantee less invasiveness (6).

Therefore, it is desirable for all emergency room operators to be aware of the importance of this particular complication in ankle trauma, which, moreover, involves several healthcare professionals. As Croman (9) has already pointed out, a multidisciplinary approach is strictly necessary in order to guarantee the correct treatment procedure in relation to each individual anatomical structure. Moreover, a decisive element in the early diagnosis of a trauma complication emerges from this case report, namely the poor clinical compliance of patients.

Conclusions

Despite the fact that the patient was only partially cooperative in the medical

prescriptions and was then lost at follow-up, the evolution of his rare case is useful, as we have said, in drawing suggestions both in the diagnostic and therapeutic approach but above all in suggesting clinical follow-up strategies. Traumas of the ankle, even minor ones, as we have seen, can conceal multidistrict complications involving bones, vessels, nerves or soft tissues, which become apparent even months after the trauma. Constant vigilance and careful clinical assessment are therefore required to avoid delays in diagnosis and treatment (10). Scheduling serious check-ups is advisable and a parallel multi-specialist collaboration is necessary to get a clear picture of the damage.

Given the rarity of the lesion described, the scarcity of case studies, the clinical implications and the as yet undefined approach protocols, continuing with further studies remains important (6) in order to better define a more appropriate approach protocol.

Disclosures:

The Author declares that he has no relationships relevant to the contents of this paper to disclose.

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