Scholars Journal of Medical Case Reports **ISSN 2347-6559 (Online)**
Sch J Med Case Rep 2016; 4(6):368-371 **ISSN 2347-9507 (Print)**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjmcr.2016.v04i06.001

Vascular Injuries by Ankle Strangulation: A Case Report.

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Abstract: Vascular injuries are a major cause of morbidity and mortality. In this report, we describe the case of a young man with a serious ankle trauma by strangulation causing vascular lesions of the three axes of the leg. This is the first reported case of such a trauma. Given the risk and severity of the lesions, it was important to do a primary amputation of the leg.
Keywords: ankle, strangulation, arteries, amputation.

INTRODUCTION

Ninety percent of arterial trauma affects the arteries of the limbs, and their appearance has changed profoundly in the past ten years with etiologies diversification [1].Benign ankle trauma may be associated with arterial lesions and affect the functional limb prognosis. We report the case of an exceptional situation of severe trauma of the ankle by strangulation with three vascular axes injuries leading to a primary leg amputation.

CASE REPORT

A 24-year-old fisherman, without medical history, was admitted to the emergency department of Avicenne Hospital in Rabat (Morocco), 48 hours after a severe trauma to his right ankle. The mechanism was special: it was a severe ankle trauma by strangulation with a rope from a fishing boat in the Dakhla region. The patient was transported by helicopter to Agadir then to our department for care. The examination at the admission showed an advanced right foot ischemia, with strangulation along the circumference of the right ankle (Figure 1).

Fig 1: Pre-operative photos showing the strangulation injury along the circumference of the right ankle.

An angio-Computed tomography with reconstruction was performed in emergency and shown a stop of the blood flow in the three arteries in the lower part of the right leg without bone involvement (Figure 2).

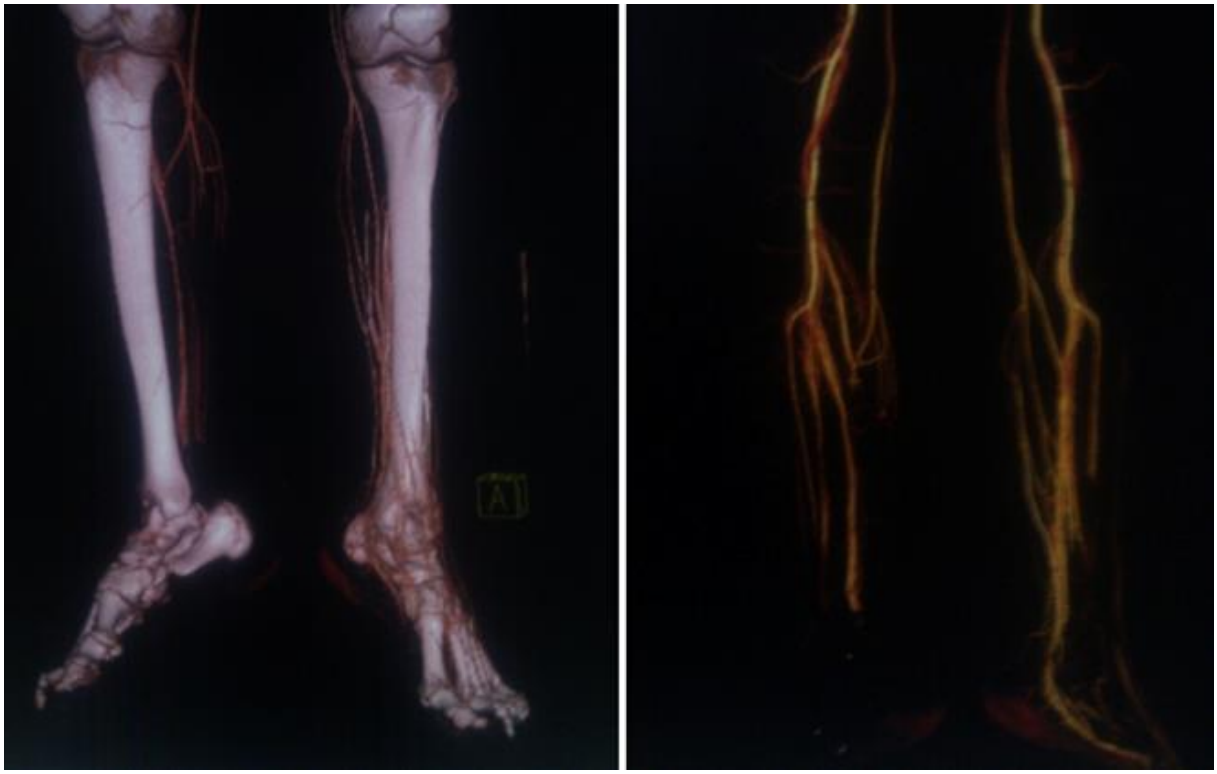

Fig 2: An angio-computed tomography with reconstruction of the legs showing the three Vascular axes injuries without bone involvement.

Given the severity of the trauma with injury of all adjacent structures (arteries, veins, nerves and tendons) and the condition of the foot, leg amputation was performed. The evolution was marked by a good healing of the stump with adapted equipment (figure 3).

Fig 3: Photos showing the leg amputation with good evolution.

DISCUSSION

Several injury mechanisms have been described for the vascular injuries of the lower extremities [1]. To the best of our knowledge, this case is the first ankle trauma report by strangulation generating an arterial thrombosis of three axes without bone lesion with advanced foot ischemia.

During strangulation, arterial thrombosis is the result of a trauma by direct compression on the bone relief. Physiopathologically, the artery intimal injury is the starting point of thrombosis, either in situ or through a dissection of the arterial wall. The traumas by strangulations are characterized by its prevalence in young adults and male sex, with a late treatment time (Table -1). For our patient, the injury of the three

arteries was pertinent because we did not find such cases in any literature.

Table-1: Case reports of the ankle trauma including vascular injury without fracture

	Terrain	mechanism	Delays in the diagnosis of arterial injury	arterial injury	treatment	evolution
Maguire *et al.*[10]	19 old year man, basketball	inversion of the foot	5 days	Peroneal artery aneurysm	Excision+ by-pass	favorable
Rainey *RK et al*.[11]	27 old year man	inversion of the foot	4 weeks	Peroneal artery false aneurysm	ligature	neuropathic pain in the territory of the sural nerve
Bandy *et al.*[12]	22 old year woman, volley-ball	inversion of the foot	25 days	Peroneal artery false aneurysm	embolisation	pain during jumps + limitation of dorsiflexion
Rians *et al*.[13]	16 old year man, athlete	inversion of the foot	8 weeks	Peroneal artery false aneurysm	embolisation	favorable
Marks *et al.*[14]	28 old year man, basketball	Anklesprain	8 weeks	posterior tibial artery false aneurysm	excision ligature	trophic disorders (ulcer) initial, secondary healing
Rooney JJ *et al*.[15]	45 old year woman	inversion of the foot	2 days	anterior tibial artery false aneurysm	by-pass	favorable
Dhawan A *et al.*[16]	35 old year man, basketball	inversion of the foot	2 days	Disruption of the anterior tibial artery	by-pass	Modest effects of a compartment syndrome of the foot
Chougle *et al.*[17]	33 old year man, football	eversion of the foot	immediate	posterior tibial artery Intimal tear	by-pass	favorable
Ward NJ *et al.*[3]		Anklesprain	One day	peroneal artery rupture	ligature	favorable
Brzakala *et al.*[2]	50 old year man	inversion of the foot	17 days	posterior tibial artery thrombosis	by-pass + secondary amputation	Favorable
Kemp MA *et al.*[4]	24 old year man, football	inversion of the foot	immediate	peroneal artery rupture	ligature	Favorable
Yu-Pin Chen *et al.* [5]	24 old year man	inversion of the foot	immediate	peroneal artery rupture	ligature	limitation of dorsiflexion
Our case	24 old year man, fisherman	strangulation by rope	2 days	the leg three arteries thrombosis	amputation	Favorable

The severity of leg arteries injuries is conditioned by the level of arterial disease and the number of affected arteries [1]. To have foot ischemia produced by the leg arterial lesions, the three axes must be affected by arterial trauma. However, the ischemia can be the result of a single permeable axis breach in an arteritic patient or during a constitutional arterial variation (5% of cases have mostly a single axis). In our case the ischemia was induced by three arterial axes thrombosis in a non-arteritic patient.

In civil practice, several series reflects the seriousness of these arterial lesions, with 60% of amputations in patients with lesions of the three vascular axes leg and 50% for lesions of the tibiofibular trunk [6].

Immediate amputation is always a difficult decision, that balances the chances of enduring conservation of a functional member, and the risk of morbidity and mortality associated to the conservative treatment. Also a well paired amputation of the lower limb has a much greater functionality than the one of an insensitive and impotent member [1].

A meta-analysis of 214 studies, objectified that among 1138 patients with severe lower limb trauma, 769 (67.5%) were amputated while 369 (32.5%) had only received reconstruction [7].

The questions to ask before a severe trauma of the lower limb are [8]:
1. Is limb salvage feasible (considering the damaged extremity systems)?
2. Is limb salvage advisable?
3. If embarking on salvage, what are the management priorities?
4. When should secondary amputation be considered?

The impact of the amputation is not only psychological but also social and economic. Our patient had already foot ischemia at admission (Figure 1), which leads to a leg amputation after preparing the patient and his family [9].

CONCLUSION

Arterials thrombosis following injury without fracture of the ankle is rare. Its occurrence in the three arteries of the leg is exceptional, causing ischemia with some serious consequences.

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