

Wagstaffe-Le Fort Fracture in a Patient With an Ankle Fracture-Dislocation. Quadrimalleolar Equivalent. Case Report

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ABSTRACT

In this article, we present the case of a patient who suffered a fracture-dislocation of the left ankle with trimalleolar involvement. However, the preoperative tomography revealed the additional involvement of the Wagstaffe-Le Fort tubercle, so it was decided to approach it as a quadrimalleolar equivalent different from those previously described, with involvement of the anterolateral fragment of the tibia (Tillaux-Chaput). This case allows for a 360° approach to ankle injuries that disrupt joint congruence, and an osteo-ligament analysis is proposed for its definitive treatment, prioritizing anatomical repairs to reduce the need for syndesmotic transfixation, without compromising surgical outcomes.

Keywords: Ankle fracture; Wagstaffe-Le Fort; anteroinferior tibiofibular ligament; trimalleolar fracture-dislocation; malleolus; quadrimalleolar.

Level of Evidence: IV

Fractura del fragmento de Wagstaffe-Le Fort en un paciente con luxofractura de tobillo. Equivalente cuadrimalleolar. Reporte de un caso

RESUMEN

Se presenta el caso de una paciente que sufre una luxofractura del tobillo izquierdo con compromiso trimaleolar, pero, en la tomografía computarizada prequirúrgica, se documenta el compromiso adicional del tubérculo de Wagstaffe-Le Fort, por lo que se decide considerarlo como un equivalente cuadrimalleolar diferente de los descritos previamente con el compromiso del fragmento anterolateral de la tibia (Tillaux-Chaput). Este caso permite un enfoque de 360° de las lesiones de tobillo que afectan la congruencia articular y se propone un análisis osteo-ligamentario para su tratamiento definitivo, favoreciendo las reparaciones anatómicas para disminuir la necesidad de fijaciones transindesmales sin afectar el desenlace quirúrgico.

Palabras clave: Fractura de tobillo; Wagstaffe-Le Fort; ligamento tibioperoneo anteroinferior; luxofractura trimaleolar; maléolo; cuadrimalleolar.

Nivel de Evidencia: IV

INTRODUCTION

The ankle joint is made up of a set of bone and ligament structures that work in perfect harmony and allow many of the activities of daily life, work and sports. The distal segments of the tibia (the plafond and medial malleolus) articulate with the fibula (lateral malleolus) and the talus, resulting in three joints: distal tibiofibular, tibiotalar syndesmosis, and talofibular, each with their own static ligament stabilizers..¹

Over the years, other structures that form part of this joint have been described separately and progressively. Destot² described the posterior lip of the tibia, referring to it as the third malleolus and known today as Volkmann's malleolus. In 1907, Chaput³ described the anterolateral region of the tibia or Tillaux-Chaput tubercle, structures of vital importance for the stabilization of the ankle, since they serve as the tibial insertion point for the ligaments

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that stabilize the syndesmosis: posterior-inferior tibiofibular ligament (PITFL) and anterior-inferior tibiofibular ligament (AITFL), respectively.

The ankle syndesmosis is defined as the distal joint between the tibia and fibula, typically stabilized by the AITFL, the posterior-inferior tibiofibular ligament and the interosseous and transverse ligaments.¹

In 1875, Wagstaffe described, for the first time, an avulsion fracture of the anterior region of the fibula. Later, in 1886, Le Fort described the same vertical fractures of the anteromedial portion of the fibula corresponding to the anatomical fibular insertion site of the AITFL, and introduced, for the first time, the description of the fractures known as Wagstaffe-Le Fort fractures.⁴

In 1932, Henderson coined the term trimalleolar fracture to refer to fractures involving fragments of the medial and lateral malleoli and the posterior tibial lip or Volkmann's fragment or posterior malleolus. Then, in 1996, Van Laarhoven used the term "fourth malleolus" for fractures involving, in addition, the Tillaux-Chaput fragment.⁵ According to the above, the biomechanical compromise provided by the tibial disinsertion of the AITFL can also be represented by avulsions of the Wagstaffe-Le Fort tubercle, allowing us to refer to fractures involving the three main malleoli and the anterior region of the fibula as quadrimalleolar equivalents, as well as fractures involving the anterolateral region of the distal tibia.

Few studies have been conducted to record the occurrence and characteristics of quadrimalleolar lesions, as well as the most recommended treatment. Due to the above, we present a case that was documented and treated as a quadrimalleolar equivalent, with special emphasis on the anatomical repair of the bone and ligament components to provide adequate stability to the tibiofibular syndesmosis without using transfixation in this anatomical segment.

CLINICAL CASE

A 54-year-old woman came to the Emergency Department after a fall from a chair of approximately 60 cm in height. She reported trauma to the left ankle only and severe pain, edema around both malleoli, marked deformity and inability to stand and walk. On physical examination, the patient's general condition was good, with no skin wounds, with ecchymosis around both malleoli, edema and deformity in the left ankle, pain on palpation of both malleoli, preserved sensitivity in the territories of the sensory nerves of the foot, no paresis in the toe flexors or extensors, and normal distal pulses and capillary refill time in all toes. She reported that she had epilepsy and that Neurology had adequately treated her ailment, but she denied having had any surgery.

The patient was admitted with plain anteroposterior and lateral radiographs of the left ankle showing a trimalleolar fracture with lateral translation of the talus (Figure 1). After analysis of the images, a trimalleolar fracture-dislocation of the left ankle was diagnosed. The patient underwent closed reduction with pharmacological sedation by the Emergency Medicine Department. She was immobilized with a posterior splint.

After the procedure, there were no changes in the neurological or vascular physical examination of the extremity and a simple CT scan of the right ankle was requested to characterize the lesions and for surgical planning. In the control images, the trimalleolar involvement already described was observed with an additional component in the anteromedial and distal region of the fibula corresponding to a Wagstaffe-Le Fort fracture (Figure 2); therefore, it was decided to consider the injury as a quadrimalleolar equivalent. Osteosynthesis and ligament reconstruction were performed and the patient was discharged with analgesics and recommendations to reduce edema.

The patient attended the surgical service two weeks after discharge. The soft tissue status was evaluated prior to admission in the operating room and a positive wrinkle sign was documented, with no vesicles or lesions contraindicating the procedure.

The surgery was performed under regional anesthesia. Antibiotic prophylaxis was administered with 2 g of cefazolin, 30 min before the skin incision. The patient was placed in the right lateral decubitus position and the surgical site was washed with alcohol and chlorhexidine soap according to the institutional infection prevention protocol.

The posterior malleolus was reduced and fixated under direct vision using a posterolateral approach to the ankle, followed by reduction and stabilization using an anatomical plate in the distal fibula. Then, through an anterolateral approach to the ankle, the fractured Wagstaffe-Le Fort fragment was identified with its ligamentous insertion intact, it was stabilized with an anchoring suture to the bone, and the recovery of AITFL tension was verified (Figure 3).

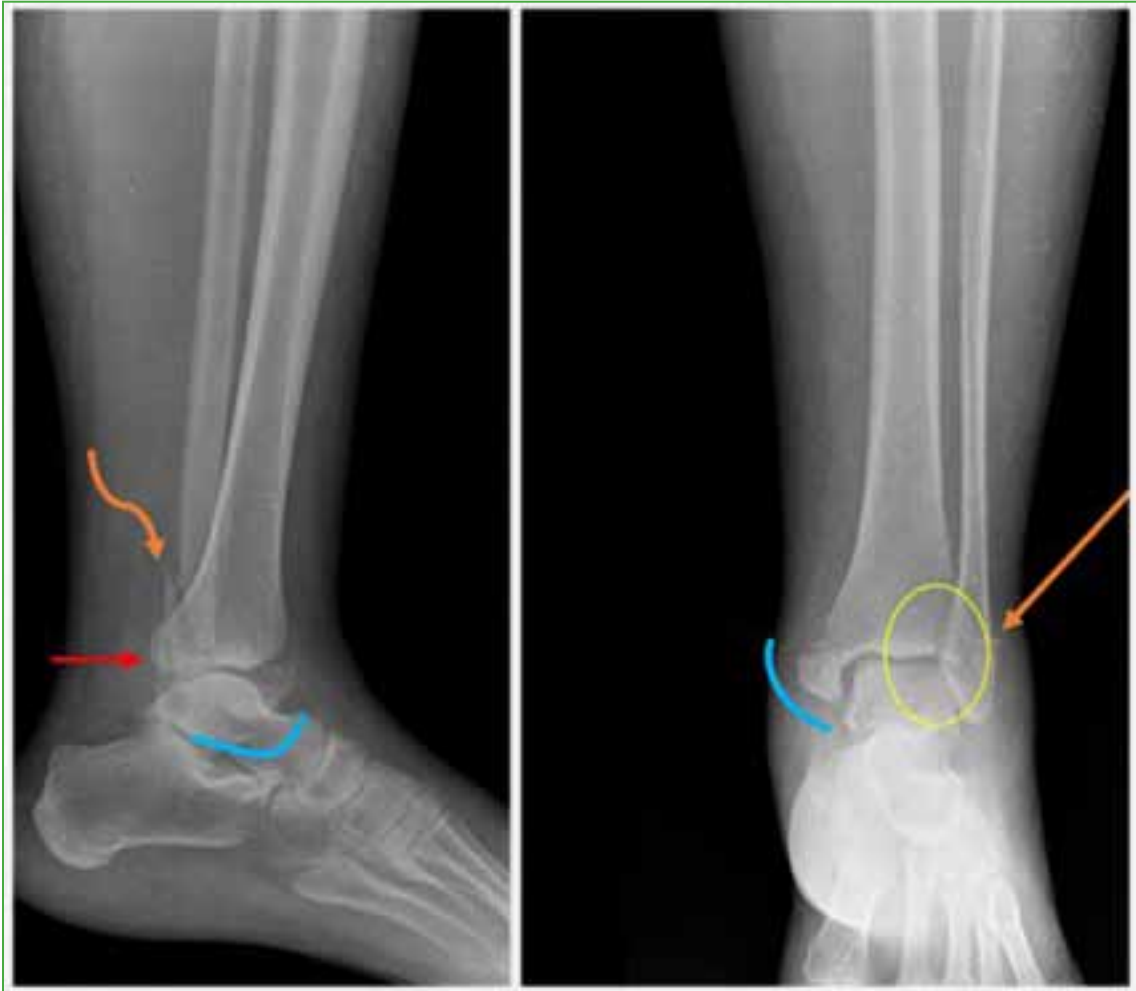


Figure 1. Initial lateral and anteroposterior radiographs of the left ankle. Fracture of fibula (orange arrow), fracture of the medial malleolus (blue curve), fracture of the posterior malleolus (red arrow) and lateralization of the talus (yellow oval).

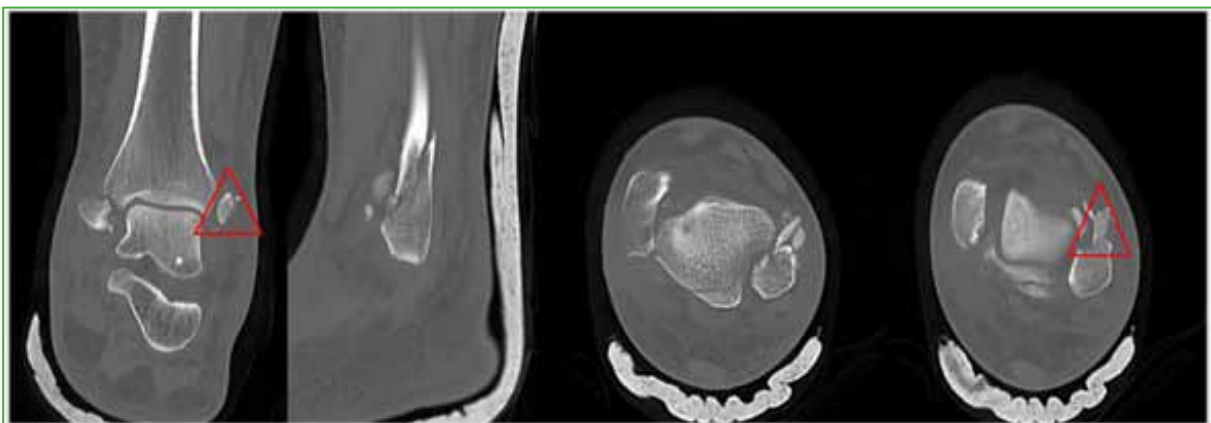


Figure 2. Initial computed tomography of the left ankle. Wagstaffe-Le Fort fragment, increased anterior and sagittal translation of the distal fibula in the axial section.



Figure 3. Anterolateral approach. Note the rotated and displaced Wagstaffe-Le Fort fragment.

The patient was positioned supine, and a medial approach to the ankle was performed to achieve anatomical reduction of the medial malleolus, followed by fixation with cannulated screws. The outcome was satisfactory according to the image intensifier evaluation. Dynamic evaluation of the integrity of the syndesmosis was performed and no increase in the medial clear space was detected after the forced external rotation maneuver or Cotton test.

The patient remained hospitalized for pain management and for a CT scan in which adequate reduction of the fractures was observed, with no loss of tibiotalar congruence (Figure 4). After four weeks of physical therapy without weight-bearing, evolution was adequate, followed by progressive limb weight-bearing. After six months, she had a pain-free gait and an AOFAS score of 82. The fractures had healed (Figure 5).



Figure 4. Control computed tomography of the left ankle. Anchor suture (red circle), Wagstaffe-Le Fort fragment (blue arrow), and reduced anterior cortex (yellow arrow).



Figure 5. Anteroposterior and lateral radiographs of the left ankle, control at 6 months. Complete consolidation.

DISCUSSION

Injuries affecting the syndesmosis may compromise the bone integrity of the tibia or fibula, their respective ligamentous structures, or both components. These injuries alter the anatomy and biomechanics of the ankle in a way that, after surgical stabilization, residual widenings of more than 1 mm decrease the tibiotalar contact area by 42%, altering the patterns of support and distribution of mechanical loads on the joint and predisposing to the development of long-term pain and premature degenerative changes.⁶

It has been demonstrated that instability in external rotation of the distal tibiofibular joint increases by 24% with an AITFL tear and by up to 11% with a tear of the posterior-inferior tibiofibular ligament;⁷ thus, anatomical reduction is defined as the physiological bone restoration of the ankle and the recovery of physiological tension of the ligaments that comprise the ankle.⁸

According to the literature, fractures with avulsion of the AITFL are not rare; they are detected in up to 25.8% of unstable ankle injuries requiring surgical management, and their diagnosis increases significantly when a CT scan is requested. In addition, a correlation has been demonstrated between Danis-Weber type B and C fractures with Wagstaffe-Le Fort type II and III injuries, respectively.⁴ Likewise, the size of the avulsed fragment determines the type of fixation, although there is still no clear consensus. Fragments larger than 5 mm could be fixed with a 2.7 mm screw with a washer;⁹ however, for small fragments that cannot be fixed by screws, the use of transosseous sutures or anchor sutures for anatomic repair is a reasonable option, offering a good biological and mechanical support that should be considered by surgeons.⁵

Bone and ligament stabilization of unstable ankle injuries has been shown to reduce the need for syndesmotic transfixation in up to 83% of cases.¹⁰

In our case, we present a quadrimalleolar-equivalent injury, as it consists of a type II posterior malleolus fracture according to the Bartoníček and Rammelt classification, a type C medial malleolus fracture according to the Herscovici classification, a type B fibula fracture according to the Danis-Weber classification, and an avulsed fibula fracture of the Wagstaffe-Le Fort fragment according to the Park type II classification.

In this patient, a 360° approach was used, thus achieving the reduction and fixation of each of the components, achieving anatomical reduction and avoiding additional fixation of the syndesmosis with a rigid or dynamic system.

CONCLUSIONS

Fracture with avulsion of the AITFL at its fibular insertion or Wagstaffe-Le Fort injury should be suspected, ideally diagnosed with computed tomography, and properly stabilized. This will enable the management and approach of unstable ankle injuries from a 360° perspective, resulting in proper reconstruction of the bone and ligament anatomy as a more anatomical treatment method than simply using reduction clamps and position screws, which cause high rates of malreduction.

Conflict of interest: The authors declare no conflicts of interest.

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