



Case Report

Tibial shaft fracture and ankle injury – Case report[☆]



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ABSTRACT

The authors report on a case of tibial shaft fracture associated with ankle injury. The clinical, radiological and surgical characteristics are discussed. Assessment of associated injuries is often overlooked and these injuries are hard to diagnose. When torque occurs in the lower limb, the ankle becomes susceptible to simultaneous injury. It is essential to make careful assessment based on clinical, radiographic, intraoperative and postoperative characteristics in order to attain functional recovery.

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Fratura diafisária da tíbia e lesão do tornozelo – Relato de caso

RESUMO

Os autores relatam um caso de fratura diafisária de tíbia associado à lesão do tornozelo. As características clínicas, radiológicas e cirúrgicas são discutidas. A avaliação de lesões associadas são muitas vezes negligenciadas e de difícil diagnóstico. Quando um torque no membro inferior ocorre, o tornozelo fica suscetível a uma lesão simultânea. É essencial uma avaliação cuidadosa baseada no aspecto clínico, radiográfico, intra e pós-operatório para recuperação funcional.

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Palavras-chave:

Fixação interna de fraturas

Instabilidade articular

Tornozelo

Introduction

The first description of the association of diaphyseal tibial fractures with additional ankle injury was made by Weber¹

in 1972. As the tibial injury is visible and obvious, a potential associated ankle injury may be neglected. Distal tibiofibular syndesmosis instability may lead to subluxation of the talus. Once undiagnosed, ankle arthrosis may take place even if the

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Fig. 1 – Image of the open diaphyseal fracture of the leg with no evidence of injury in the ankle joint.

treatment for the diaphyseal tibial fracture has provided excellent reduction, stabilization, and consolidation.²

Clinical report

Male patient, 28 years old, involved in a motorcycle accident with open fracture of the right leg (Fig. 1) classified as Gustilo IIIA.³ He underwent cleaning, wound lavage, debridement of tissue lesions, and transarticular external fixation of the leg bones at the ankle joint aiming to provide local damage control.

On the sixth day after the trauma, with the improvement of the soft-tissue envelope of the left leg, internal fixation was performed with a locked intramedullary nail for the tibial fracture. During the surgical procedure, anterior dislocation of the ankle joint was observed (Fig. 2A and B). The authors opted for open reduction and internal fixation of the ankle fracture-dislocation with plate and screws in the fibula; instability of the ankle syndesmosis was proven with a positive Cotton⁴ test. We associated the stabilization of the tibiofibular mortise using a positioning screw through the fibular cortex and the lateral cortex of the tibia, proximal to the distal tibiofibular joint, without a direct approach to the former. Final



Fig. 2 – Radiographies images after insertion of the intramedullary nail, which shows dislocation of the ankle and ligament instability. (A) Anteroposterior and (B) lateral view.

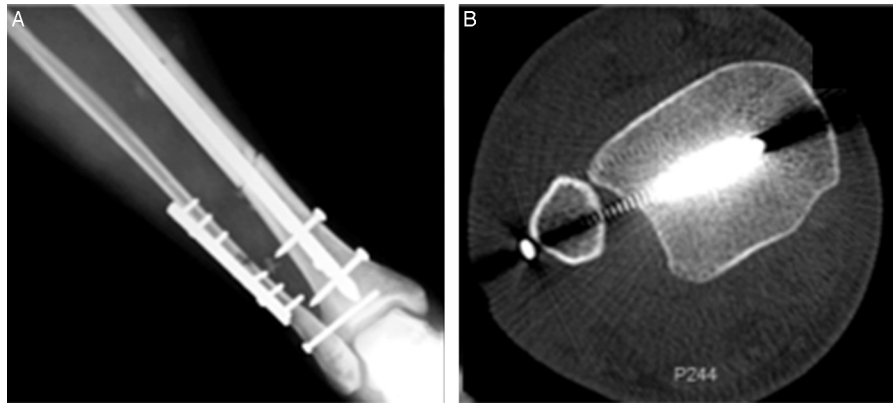


Fig. 3 – (A) Radiography after open reduction and internal fixation of the fibula with a suprasyndesmotric tricortical screw on anteroposterior view. (B) Axial plane CT scan showing the incongruity of the distal tibiofibular joint and its subluxation.

radiography revision showed a joint incongruity of the fibula with a multifragmentary fracture line on the first postoperative day. Axial computed tomography of the ankle confirmed the existence of a previous tibiofibular subluxation (Fig. 3A and B).

During hospitalization, six days after surgery, the patient underwent the third surgical procedure aiming open reduction, ligament reconstruction, and stabilization of the distal tibiofibular joint after revision of previous osteosynthesis.

During surgery, avulsion of the articular capsule of the ankle joint at the superior and lateral regions was observed, as well as of the anterior tibiofibular ligament (Fig. 4). The surgical technique adopted was the removal of the fibular plate in order to review the reduction of the ankle fracture.

Under direct view, the authors proceeded to the reduction of the distal fibula to the fibular notch of the tibia, with temporary fixation of the joint using smooth Kirschner wire (Fig. 5). Once the joint reduction was attested, the osteosynthesis of the fibular fracture was addressed using a long reconstruction plate, as a bone defect was observed in the area of the fracture fragmentation. Autologous cancellous bone graft was used for defect reconstruction. Suture of the articular capsule, anterior tibiofibular ligament and anterior syndesmosis was executed



Fig. 4 – Intraoperative clinical picture showing torn articular capsule and anterior tibiofibular ligament.

at the ankle. For protecting the ligament reconstruction, two positioning screws were applied. The locked intramedullary nail used for the treatment of the diaphyseal tibial fractures did not present complications and was maintained.

Active ankle motion was stimulated immediately after the procedure. Eight weeks after the last procedure, the positioning screws of the distal tibiofibular joint were removed.

Currently, the patient presents no pain complaints and walks with full weight bearing and without assistance. The range of motion at the end of treatment was 20° of dorsiflexion and 40° of plantar flexion, symmetrical to the contralateral. The final functional evaluation was excellent, totaling 99 points in the American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Scale questionnaire.



Fig. 5 – Intraoperative image of temporary stabilization after open reduction of the distal tibiofibular joint.

Discussion

Diaphyseal tibial fractures associated with ligament injuries in the ankle present a high potential for instability and are often neglected, posing a risk of complications such as the development of secondary osteoarthritis and unfavorable functional performance when undiagnosed and untreated.^{2,5}

For the reported patient, intraoperative evaluation with Cotton test proved sufficient and efficient to assess the syndesmosis, waiving the need for other tests to prove ligament incompetence.⁶

Control radiographies after the second surgery showed subluxation of the ankle, although this was not observed in the final moments of surgery. A CT scan of the ankle confirmed the poor reduction and made it possible to identify the inadequate route taken by the positioning screw. It was shown to be effective auxiliary tool, not only for elucidating possible diagnostic uncertainties in the assessment of the axial sections,⁷ but also for helping to plan the definitive treatment.

In literature, intraoperative temporary stabilization with Kirschner wires is an alternative to clamps, with a reported decrease in the rates of poor reductions of neglected syndesmosis, as the technique employed in the third operative procedure in this case.⁷ Adequate reduction of the distal tibiofibular joint has been shown to be an important prognostic factor for functional outcome in ankle injuries with syndesmotom injury.⁷⁻⁹

The possible variations in the use of positioning screws, which protect the ligament repairs of the ankle joint during free movement, are the subject of debate. The number, diameter, and fixation in three or four cortices are also still debated in the literature.¹⁰ In the present patient, the option to use two 3.5-mm screws was due to the poor quality of the fixation of the first screw installed, the most distal being tricortical, which reached to the tibia in the metaphyseal area where the lateral cortex was thin.

The literature suggests that there are no differences in outcome between patients who have or have not undergone removal of the supra-syndesmotom positioning screws before weight bearing gait.¹¹ With the present patient, the screws were removed after eight weeks.

In the short-term follow-up, joint function is adequate and symmetric, and the patient presents no complaints. We think of no reason for a diverse evolution of ankle fractures when the physiological and biomechanical relationships are maintained after consolidation.

Conclusion

The literature describes that ankle injuries associated with diaphyseal fractures of the tibia are frequently neglected due to its difficult diagnosis, such as in the present case. Careful pre- and intraoperative assessments based upon both clinical practice and radiography are required; the possibility of associated injury should be kept in mind.

Conflicts of interest

The authors declare no conflicts of interest.

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