Ipsilateral tibial shaft fracture and distal tibial triplane fracture with an intact fibula: a case report

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ABSTRACT

We present a case of an ipsilateral tibial shaft fracture and a distal tibial triplane fracture with an intact fibula in a 14-year-old boy. Computed tomography revealed the distal tibial triplane fracture with a 2.6-mm displaced Tillaux fragment and a posterior malleolar shear fragment. Open reduction and internal fixation was performed to optimise healing and outcome. This is a rare injury, for which a high index of suspicion is needed for diagnosis. Missing the intra-articular distal tibial triplane fracture could result in a disabling angular deformity (mostly varus) or limb-length discrepancy secondary to premature partial closure of the distal physis.

Key words: ankle joint; tibial fractures

INTRODUCTION

A triplane fracture of the distal tibia appears as a Salter-Harris type-III fracture on anteroposterior radiographs and as a Salter-Harris type-II fracture on lateral radiographs, but it is actually a Salter-Harris type-IV fracture. The mechanism is external rotation of the foot and ankle with the tibia fixed, the intact tibiofibular ligament may result in avulsion of the unfused anterolateral corner of the tibial physis.1–3 A 3-part fracture may result from further rotation beyond this point where the remainder of the tibial physis also fractures.4 This is a rare injury, for which a high index of suspicion is needed for diagnosis.1 We report one such case in a 14-year-old boy who had an ipsilateral tibial shaft fracture and a distal tibial triplane fracture, with an intact fibula.

CASE REPORT

In December 2008, a 14-year-old boy presented with an injury to his right leg sustained while playing rugby. The injury involved internal rotation of the tibia with the foot fixed on the ground while being tackled by another player. He had pain in the midshaft of the tibia. The ankle was tender on palpation...
anteriorly and showed minimal swelling. The knee was normal. All injuries were closed and the limb manifested no neurovascular abnormality.

Radiographs showed a 5-mm laterally displaced spiral fracture at the junction of the middle and distal thirds of the tibia with an intact fibula (Fig. a). Based on anteroposterior radiographs of the ankle, a Salter-Harris type-III fracture was suspected at the distal tibial physis. No fractures of the distal tibial growth plate were visible on lateral radiographs.

The patient was initially treated with an above-knee plaster-of-Paris backslab. Computed tomography revealed a distal tibial fracture with a 2.6-mm displaced Tillaux fragment (on the axial view) and a posterior malleolar shear fragment (Fig. b). This injury was considered unstable, and an open reduction and internal fixation through a medial approach was performed.

Figure  (a) Radiographs showing a Salter-Harris type-III fracture of the tibial shaft. (b) Computed tomographic scans showing a Salter-Harris type-II triplane fracture of the distal tibia with a posterior shear fragment and a 2.6-mm displaced Tillaux fragment. (c) Open reduction and internal fixation of the tibial shaft (using a plate and screws) and the distal tibia (using a lag screw). (d) At week 12, the fractures are united.
The tibia was reduced and fixed with a plate and screws. Surgical exposure of the distal tibial triplane fracture confirmed a 2.6-mm displaced Tillaux fragment and a posterior malleolar shear fragment. One lag screw with a washer was inserted posteromedially to pick up both fragments (Fig. c). The patient was discharged the following day with crutches and an above-knee cast, with instructions not to bear weight.

At week 1, sutures were removed and the wounds appeared to be healing well. Non-weight bearing in a cast for 6 weeks was instructed to protect the fixation. At week 6, the patient had no more tenderness and radiographs were satisfactory. He was allowed full weight bearing in a removable below-knee splint. At week 12, the fractures had united clinically and radiologically (Fig. d). The patient was walking with a normal gait, and the range of ankle movement was equal to that of the opposite side. The patient was allowed to return to normal activities including contact sport. The metalwork is to be removed only if it caused pain.

**DISCUSSION**

The Tillaux fragment in the distal tibial triplane fracture is an unstable, intra-articular injury that needs to be reduced accurately (<2 mm) for optimal healing. In our patient, the distal tibial triplane fracture had a 2.6-mm displaced Tillaux fragment and a posterior malleolar shear fragment. Tibial shaft fractures with an intact fibula show a higher rate of delayed, non- and mal-union than those with fibular fractures, especially when the tibial shaft fracture is displaced. Hence, an open reduction and internal fixation was performed to optimise healing and outcome.

In our patient, the symptoms of the tibial shaft fracture masked the distal tibial triplane fracture. Had the index of suspicion for possible associated injuries been low, the distal tibial injury could have been missed. In which case, a disabling angular deformity (most likely varus) or limb-length discrepancy secondary to premature partial closure of the distal physis may have ensued. The full extent of the injury was not revealed on radiographs, but became very clear on computed tomography.

**REFERENCES**