Three-level tibial fracture treated by minimally invasive techniques

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Pilon and tibial plateau fractures require anatomical reconstruction of the joint surfaces. As individual entities their management is complex and requires skilful planning and surgery. These injuries are uncommonly encountered individually, but as a combined injury, the incidence is exceptionally rare, and the tibial shaft being fractured as well is unheard of.

We report such a case managed by modern osteosynthesis techniques with a pleasing outcome.

Case report

A 37-year-old gentleman presented to our orthopaedic unit following a motorcycle accident cornering at approximately 60 mph. After resuscitation following ATLS guidelines, the following limb injuries were identified and classified according to the AO-ASIF and Gustilo-Anderson classifications:

1. Closed fracture right humeral shaft (spiral fracture, proximal third) [AO 12 B1].
2. Closed right tibial plateau fracture (Fig. 1b and d) [AO 41 B2.2].
3. Open (Gustilo II) right multifragmentary middle third diaphyseal tibial fracture [AO 42 A 1.1] (Fig. 1a and c).
4. Closed right tibial plafond fracture [AO 43 B 2.2] (Fig. 1a and c).

The limbs were all neuro-vascularly intact. Intravenous antibiotics and antitetanus prophylaxis was administered in the emergency department and the patient was taken to the operating room 2 hours after admission. Wound debridement and washout was performed and internal fixation of the right open tibial diaphyseal fracture utilising an eight-hole locking compression plate (L.C.P.) (Stractec, Welwyn, UK).

The pilon fracture was reduced using K-wires and a joy sticking technique and was then stabilised by two percutaneous lag screws and a buttress plate using a six-hole L.C.P.

The fracture of his humeral shaft was treated non-operatively with a humeral brace.

After further imaging (CT scan of his proximal tibia (Fig. 1d)), he returned to theatre 2 days after the initial injury, for delayed primary closure of the wound of his right tibia, as well as for minimally invasive fixation of his medial tibial plateau fracture with a T plate (L.C.P.).

His postoperative recovery was uneventful and he mobilised partial weight bearing and was discharged home 11 days after his initial accident. On review at 28 weeks, he was pain free with full function of his lower limb (knee 0–140°, ankle 10° dorsiflexion to 45° plantarflexion)
Figure 1 Preoperative radiographs: (a) AP tibia, (b) AP knee, (c) lateral knee, and (d) CT tibial plateau.
and his fractures were clinically and radiologically united (Fig. 2).

Discussion

This patient had a high velocity injury to his tibia with the inevitable severe soft tissue damage associated with such a fracture configuration. He had good bone stock enabling the choices of implants we used. We were then able to utilise early active mobilisation of both his ankle and knee.

Locking compression plating is a new advent in trauma surgery. The implants act as an internal fixator. They are geared for situations in which it is essential to leave a large soft tissue sleeve.8

Historically, high rates of infection6 associated with open reduction and internal fixation of pilon fractures may be due to attempts at immediate fixation through swollen, compromised tissues. Staged procedures are performed with initial restoration of the fibula length and tibial external fixation, allowing the soft tissues to recover, performing delayed anatomic reduction and internal fixation with only minimal wound problems.1,7 With minimally invasive techniques these wound problems seem to be of lesser importance as the soft tissues are only minimally disturbed.

A ring fixator could have treated this combination of injuries just as successfully. External fixation offers advantages in the treatment of soft tissue injury associated with pilon fractures; however, malunion of fractures treated with this method is greater than in the fractures treated with internal fixation.5 We had no wound problems which pin sites may have led to.

We have achieved a highly successful outcome with minimally invasive techniques and commend this technique.

References


Figure 2  Postoperative radiographs: (a) AP, and (b) lateral.
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