Symptomatic fibular non-union after union of accompanying tibial shaft fracture

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Introduction

Seventy-five percent of tibial fractures have associated fibular fractures. The type of fracture varies with the type of injury. A twisting force will result in a spiral fracture of both bones at different levels. A transverse or short oblique fracture, usually at the same level, will result from an angulatory force.

Fibular fractures have been regarded as an insignificant accessory to the principal tibial injury. When surgical treatment is undertaken, attention is directed to stabilisation of the tibia. The fibular fracture is usually left alone. Stabilisation of the tibia allows conditions suitable for a healing of the fibular fracture, characteristically before the tibia, in about 6 weeks.

Tibial non-union is often associated with early fibular union or an intact fibula. Very little has been reported about non-union of fibular fractures in association with united tibial shaft fractures.

We report a case of surgical management of a symptomatic non-union of the fibula after union of the accompanying tibial shaft fracture.

Case report

A 29-year-old male presented with a transverse fracture of the junction of middle and distal thirds of the right tibia and a comminuted fracture of right distal fibula (Fig. 1) following a road traffic accident. He underwent internal fixation with a locked unreamed intramedullary tibial nail. He was then discharged with partial weight bearing for 12 weeks and full weight bearing after that. Follow up showed tibial union at 6 months.

At 1 year he was complaining of pain laterally and difficulty walking. There was tenderness over the fibular fracture site and ankle movements were restricted due to pain. The radiographs showed non-union of the distal fibular fracture with a united tibial fracture (Fig. 2). The fibular fracture was treated with a percutaneous six hole locking compression plate held with one proximal and one distal locking screw. Radiographs demonstrated union at 2
months (Fig. 3) and there was clinical improvement with absence of limping. The plate was causing discomfort, necessitating removal and the patient became asymptomatic.

Discussion

The small mechanical stresses, the good soft tissue coverage and endosteal vascular supply create the ideal environment for fibular union.

A non-union of the fibular shaft appears to have been recognised only in patients in whom the fibular fracture has been a component of an ankle injury or in association with tibial non-union. Severely displaced or comminuted fractures of the distal third of fibular shaft and high energy injuries with soft tissue disruptions are both well recognised and self evident factors to prolong long bone fracture repair. Non-union of the proximal third of the fibula is extremely rare as it is the most common entrance site of the nutrient artery.

Rigid fixation of the tibia could cause lengthening at the fracture site with decreased contact area of the fibular fracture ends. The amplitude of micro movements at the fracture, which promote union at some extent, is greater with non operative management rather than internal fixation. Non-union of fibula may indicate instability of the fractured tibia but is rare in presence of tibial union.

In a report of 440 adult patients with tibial and accompanying fibular fractures, 293 patients were treated conservatively with no cases of fibular non-union. Of 147 patients who underwent intramedullary nailing of the tibia, eight had delayed union of the fibula. In four of those patients the fibula eventually united while four illustrated radiographically

Figure 1 Initial injury radiograph.

Figure 2 Fibular non-union with united tibia 6 months post in nailine.

Figure 3 Fibular union following percutaneous locking plate.
indisputable non-union. Only one patient was symptomatic. All eight patients had sustained a high energy motor vehicle accident. The authors suggested delayed fibular union or apparent non-union should probably be left alone.

In a report of three cases of painful non-union of isolated paediatric fibular fractures treated initially conservatively, all three became asymptomatic following partial fibulectomy or cancellous screw fixation.

Conclusion

The symptomatic non-union of fibular fractures combined with united tibial fractures composes a rare clinical condition. The necessity of surgical intervention of a fibular non-union is indicated only if the patient is symptomatic. Resection of the distal fragment and internal fixation with or without the use of bone graft have been used to achieve union.

References