CASE REPORT

The adult Tillaux fracture: one not to miss

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SUMMARY

This case is a rare adult type Tillaux fracture. This fracture should be diagnosed in the emergency department. The fracture requires careful evaluation with awareness of associated injury. Standard radiological views (antero-posterior and lateral) of the ankle may not clearly show the fracture displacement hence, an oblique view is required. The fracture should be managed by the emergency physician, if the displacement is less than 2 mm, by immobilising with a non-weight bearing cast or ankle braces for 6 weeks. If the fracture fragment is displaced more than 2 mm, it should be treated by closed reduction failing which open reduction and internal fixation is the standard practice.

BACKGROUND

Fractures of the anterolateral aspect of distal tibia are usually avulsion fractures of anterior tibial tubercle, caused when the anterior-inferior tibiofibular ligament fails to rupture during the injury. This is called juvenile Tillaux fracture in adolescents (Salter Harris type III fracture) and Tillaux fracture in adult. This type of adult Tillaux fracture is classified as type A and if associated with medial injury, it is called type B.¹ This was first described by Cooper² in 1822 and then by Tillaux³ in 1848. The same injury to the posterior lateral tibia was also described by Chaput⁴ in adult and hence named Tillaux–Chaput fracture.

Clinical anatomy: at the lower end of tibia, about 5–6 cm above the ankle joint line, there is a concave shallow triangle facing laterally to receive distal shaft of fibula. At the inferior border of this depression there are anterior and posterior tibial tubercles. The interosseous ligament attaches to tibia in this groove and to a similar area on the adjacent fibular shaft forming a syndesmosis. The antero-inferior tibiofibular ligament attaches to the anterior tubercle and the anterior aspect of the lateral malleolus and the postero-inferior tibiofibular ligament attaches to the posterior tibial tubercle on the posterior aspect of the lateral malleolus.⁵ Standard radiological views of the ankle may not show the adult Tillaux fracture, hence an oblique view may be required. We describe a case report of this rare Tillaux fracture in an adult. If the fracture is not diagnosed, the patient may progress to premature degenerative arthritis and restricted ankle movement.

CASE PRESENTATION

A 31-year-old female nurse with no significant medical history presented to the emergency department after she slipped and fell on the ice twisting her left ankle. Her left ankle swelled immediately

and she was unable to bear weight. It was a low-energy closed external-rotational injury. On examination, there was a swelling over the lateral malleolus with limited ankle movements. She had tenderness over the anterior-inferior tibiofibular ligament with no tenderness over the medial and lateral malleoli. A standard radiograph of the ankle joint (figure 1) was carried out, which showed a suspicious anterolateral fracture of tibial plafond. Following this an oblique view of the ankle (figure 2) was carried out which clearly demonstrated anterolateral fracture of tibial plafond. There was no radiographic evidence of diastasis of the distal tibiofibular syndesmosis. The fracture was isolated, intra-articular and displacement was minimal, at less than 2 mm. The patient was treated conservatively in a non-weight bearing short-leg cast in neutral position for 1 week and then in a non-weight bearing ankle brace for 5 weeks.

DISCUSSION

Adult Tillaux fracture is a rare fracture. It is an avulsion fracture of the anterolateral part of the tibial plafond. It is also called Tillaux–Chaput fracture. It is similar to juvenile Tillaux fracture, which is a transition fracture. Closure of the distal tibial epiphysis occurs at 12–14 years in girls and 15–18 years in boys,⁶ first in the middle, then in medial and finally in the lateral part of the epiphysis. As the lateral epiphysis is still open and the last to fuse, it is most vulnerable to fracture.

Transitional period refers to the time of epiphyseal fusion from adolescent to skeletally mature bone. Von Laer classified transitional ankle fractures into biplane and triplane. The biplane fracture is limited to fracture of epiphysis and is analogous to Tillaux fracture.⁷ The triplane fracture is Tillaux fracture with associated metaphyseal fracture.⁷ Triplane fracture is intrinsically unstable and needs internal fixation. Complete fusion of the epiphysis take approximately 18 months during which biplane and triplane fractures occur.

In adult Tillaux fracture, the avulsed fragment is triangular and in juvenile Tillaux fracture, it is quadrangular.⁸ The mechanism of injury is external rotational force of the foot on the leg and deforming force is antero-inferior tibiofibular ligament.^{7 8} In standard radiographic views of the ankle it may be difficult to appreciate the adult Tillaux fracture, hence an oblique view should be performed, if suspected. It can rarely be associated with injury of the medial malleolus or deltoid ligament and hence the syndesmosis should be carefully assessed.⁹

If the fracture displacement is less than 2 mm, it can be managed conservatively by immobilisation in a non-weight bearing cast or ankle braces for

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Figure 1 Routine antero-posterior of the ankle.

Figure 2 Oblique view of the ankle.

6 weeks. If the displacement of the fragment is more than 2 mm, then CT scan may be conducted to assess the fracture

pattern and displacement, accurately. Then a close reduction under general anaesthesia by axial traction and internal rotation of foot, followed by immobilisation in a cast with the foot in internal rotation is the practice. This may fail because of interposition of bony fragments, periosteum or soft tissue between the fracture fragment and tibia.⁶ If displacement is more than 2 mm after attempted close reduction, then open reduction and internal fixation is indicated to achieve anatomical position.⁶

Learning points

- ▶ Standard radiographs of the ankle may not reveal this fracture and if there is a high degree of suspicion, then additional oblique views must be taken.
- ▶ If the fracture displacement is less than 2 mm, it can be managed conservatively by immobilisation in a non-weight bearing cast or ankle braces for 6 weeks.
- ▶ If the displacement of the fragment is more than 2 mm, then CT scan may be performed to assess the fracture pattern and displacement accurately.

Competing interests None.

Patient consent Obtained.

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