



POSNA

The Core Curriculum

Fractures of the talus

Objectives

1. Describe (draw) the blood supply to the talus.
2. Describe the mechanism(s) of injury for talar fractures.
3. Describe a practical approach to obtaining adequate imaging studies of an acute fracture of the talus.
4. Describe a strategy for management of talar fractures. Include indications for and technique of surgery, when indicated.
5. List complications of talar fractures in children.
6. Discuss diagnosis, imaging, and management of lateral process fractures.
7. Describe the location, natural history, symptomatology, and diagnostic approach to osteochondral fractures of the talus.

Discussion points

1. Are talar neck fractures extra or intraarticular?
2. How does one perform a closed reduction of a talar neck fracture?
3. What are the consequences of failing to correct a varus displacement of a talar neck fracture?
4. What are the advantages of posterolaterally placed screws for fixation of a talar neck fracture?
5. How much displacement is necessary to produce avascular necrosis in a child?
6. What evidence is available to support non-weightbearing treatment of avascular necrosis following talar neck fractures?
7. What imaging modality is presently preferred for the diagnosis of avascular necrosis? of an osteochondral fracture? for assessment of displacement of a lateral process fracture?
8. What treatment modality for osteochondral fractures is best supported by reported experience?

Discussion

Fractures of the talus are fortunately more rare in the child than the adult, for the difficulty of treatment and frequency of complication is high in both groups. Traditionally, the mechanism of injury has been described as forced dorsiflexion, recently supination has also been incriminated by impingement of the talus against the medial malleolus. Talar neck fractures are extra-articular, at the site of penetration of the major portion of the blood supply to the talus. Inasmuch as so much of the entire surface of the talus is articular, the constricted neck renders the talus particularly

vulnerable to vascular injury accompanying fracture. There is a vascular ring about the neck, similar to that about the femoral neck. The artery of the tarsal canal from the posterior tibial and the artery of the tarsal sinus from the perforating peroneal provide most of the circulation.

Talar neck fractures are usually not hard to diagnose, with localized tenderness and swelling always present. Letts and Gibeault however did report some fractures not suspected from the initial exam in toddlers. The routine 3 radiographs of the foot are usually diagnostic, the beam should be centered on the hindfoot. Canale and Kelly described a useful view of pronating the foot 15 degrees and angulating the tube 75 degrees to the table top. Less than 5 mm of displacement and no varus should be accepted. Closed reduction may be accomplished by plantarflexion of the foot, with valgus positioning of the distal fragment. If internal fixation is necessary, posterolaterally placed cannulated screws are presently regarded as optimal.

The risk of avascular necrosis seems to be related to displacement, but a number of nondisplaced talar fractures in children have been reported as developing avascular necrosis. Hawkins sign, subchondral lucency of the talar dome, is a good prognostic sign. MRI is presently the favored imaging method for detection of early cases. Relief from weightbearing is recommended for avascular necrosis, although the benefits have not been established.

Osteochondral fractures comprise an important segment of talar fractures. Posteromedial lesions have been reproduced by plantarflexion and inversion; the anterolateral by dorsiflexion and inversion. This lesion should be suspected if symptoms persist weeks after an ankle sprain. Plain radiography is generally normal, MR imaging is now regarded as superior for early recognition although CT gives better delineation of the defect. CT arthrography best assesses the status of the overlying cartilage. Most studies report arthroscopic intervention is the treatment of choice, but Higuera still recommends conservative treatment in children for all but the most severe lesions. Subchondral drilling (which has also been reported in a retrograde direction) and abrasion arthroplasty are presently favored, attempting to induce recruitment of pluripotential cells into differentiation into fibrocartilage.

Fractures of the dome are unusual in children. Lateral process fractures, formerly unusual in children, are being reported in much greater numbers in snowboarders. This fracture felt to be a result of dorsiflexion and inversion and is best seen on internal rotation views of the ankle. Internal fixation is recommended for > 2 mm displacement. CT scanning is helpful for delineating the fracture pattern and amount of displacement.

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