Intra-operative medial distraction technique for intraarticular calcaneus fractures.

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My disclosure is in the Final AOFAS Mobile App.

I have no potential conflicts with this presentation.
The intraarticular fracture constitute approximately 75% of all calcaneus fractures which are most common in tarsal injuries. Calcaneal fractures are a challenging clinical problem due to the complex anatomy of the os calcis. The treatment of these injuries remains controversial. Open reduction and internal fixation (ORIF) through lateral “L” incision is a popular method currently because of its advantage for exposure and reduction. However there are still some patients with inadequate correction of alignment and length of the calcaneus postoperatively. In order to further improve the result, we fixed some calcaneal fractures using intra-operative medial distraction which can make the reduction better.
Methods

- 27 patients with intra-articular calcaneus fractures were treated using ORIF (open reduction and internal fixation) assisted by medial distraction technique from Sep 2012 to Nov 2013.
- There were 18 males and 9 females with an average age of 48.52 years (range, 23 - 69 years). They included 3 cases of Sanders type II, 11 of III and 13 of IV.

Preoperative Radiograph
Intra-operative
Postoperative Radiograph

15 months after surgery
Results

- The mean duration of surgery was 71.59 minutes (range, 65 - 93 minutes). 26 patients were followed up for 18.31 months in average (ranged from 13 to 26 months). All of the cases healed well, and the mean time of bone union was 10.15 weeks (range, 8 - 17 weeks).

- Complications were observed in 1 patient with painful fixation. None of the patients experienced a nonunion or an adverse event related to the neurovascular structures. The mean AOFAS score was 87.38 at 1 year after surgery.
Discussion-designing mechanism

- Calcaneal fractures are often caused by fall from height resulting in central compression of the posterior articular surface and bulging of lateral wall, which often leads to varus deformity of the heel.
- Reduction with Kirschner and clamp alone is difficult and takes a long time, which is likely to cause laceration, infections and other complications are more common.
- Satisfactory articular exposure and correction of calcaneal varus deformity are achieved under distraction which also makes the following fixation and other operations easier, prompt and more adequate.
Discussion-advantages and disadvantages

Advantages
◆ ① medial distraction makes it more convenient to correct heel varus and lateral bulging deformity, and axial restoration;
◆ ② distraction device is more effective for traction than the clamp, which can make it easy to deal with the articular surface unhurriedly. Application of clamp may lead to infection, or laceration;
◆ ③ it does not effect the lateral operation and can provide a better exposure, thereby it shortens the operation time.

Disadvantages
◆ ① it can cause extra medial trauma and the risk of wound complications increases due to two nail holes;
◆ ② drilling Kirschner may diminish the blood supply of talus so that there is a potential risk of avascular necrosis.
Discussion-intra-operative notes

◆ ① Kirschner wire of distraction is 2.5 mm to prevent cutting;
◆ ② anterior Kirschner drilling point should be chosen at the area with good bone mass of talar neck or head to avoid loosening; posterior point is at calcaneal tuberosity; the K-wire can be drilled angulately to the calcaneus in order to facilitate the correction of heel varus;
◆ ③ K-wire should be drilled with caution to avoid injury of medial important structures;
◆ ④ a little valgus and over-distraction should be seen at intraoperative fluoroscopy after reduction to compensate the postoperative loss; it is out of question that restoration of axis, height, length and width should also be confirmed by fluoroscopy.
Discussion-intra-operative notes

◆ ⑤ degree of distraction can be decided according to the preoperative plan or intraoperative contralateral comparison; if the subtalar joint is tightened by over-distraction to restrain reduction of articular surface, the distraction can be released a little and regain distraction after satisfactory reduction;

◆ ⑥ temporary fixation can be performed with K-wires and then plate and screws are placed. The surgeon should angle the ST (sustentaculum tali) lag screw approximately 30° from posteriorly and laterally to anteriorly and medially to land centrally in the ST.
Conclusion

It is concluded that ORIF assisted by medial distraction may be an effective treatment for intra-articular fractures of the calcaneum. It makes the correction of axis and length adequate, and provides sufficient exposure of articular surface.