Comments on Jacquot et al. “Balloon reduction and cement fixation in intra-articular calcaneal fractures: a percutaneous approach to intra-articular calcaneal fractures”

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Received: 7 June 2011 / Accepted: 24 June 2011 / Published online: 20 July 2011
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Dear Editor:

We read with great interest the paper by Jacquot et al. [1]. The authors concluded that a percutaneous approach and local balloon reduction followed by polymethylmethacrylate (PMMA) fixation may be promising and may be used in cases with closed fractures as a primary reduction and fixation tool. This study described a new and minimally invasive method for treating closed intra-articular calcaneal fractures. The limited series achieved good outcomes with minimal complications. However, there are some concerns regarding this study.

First, which fracture types would be suitable for local balloon reduction and PMMA fixation? The authors used this technique to reduce joint fragments and achieved good reduction, but we do not think this technique is suitable to all joint-depression fractures. In some calcaneal fractures with malalignment, varus or valgus angulation, local balloon reduction alone might make it difficult to restore calcaneal alignment, and perhaps other reduction methods, such as percutaneous Schanz pin indirect reduction and temporary fixation should be applied. Gupta et al. also used local balloon for calcaneal fractures reduction but only for minimal ($<5^\circ$) varus calcaneal fractures [2]. For comminuted fractures (Sanders type III and type IV), the posterior articular fractured into more than two fragments, and it was difficult to reduce all fragments into contact with their subtalar counterparts using a balloon only, especially the central

fragment. Case 2 of Jacquot's patients was a Sanders IIIBC fracture; the central fragment was not reduced anatomically and a step was present [1]. Perhaps the short-term outcome was not influenced but it does suggest a limitation of this technique. As is known, the balloon technique was used for vertebral compression fractures just to restore the height of the vertebral body, not to reduce articular fragments. The author has given us a good choice for treating intra-articular calcaneal fractures, but the patients should be selected. For comminuted and severely malaligned calcaneal fractures, open reduction may still be required, as inadequate joint reduction and redislocation of the fragments in highly unstable fractures may occur in a considerable percentage of cases with indirect reduction techniques [3].

Second, the authors reported in the paper that inflation was stopped when reduction did not improve, regardless of how much more pressure was applied. We are interested to know whether failure occurred when using this technique, and which type of fracture was difficult to reduce. Following reduction failure, what technique can be attempted next?

Best Regards
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