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Intermediate Results of Osteosynthesis of Calcaneal Fractures by Nailing

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Abstract: Surgical approaches for the treatment of open calcaneal fractures are frequently associated with skin complications. The development of minimally invasive techniques could limit them. We performed a retrospective study of 12 patients with displaced and closed calcaneal articular fracture treated with locked percutaneous calcaneal nailing using a Calcanail® nail. The short-term functional and radiographic results of percutaneous nailing of calcaneal fractures are satisfactory, with an average AOFAS score of 82 and an average Böhler angle of 0.7 ° preoperatively at 32 ° postoperatively. -operative.
Keywords: Results, Calcaneal fractures, Calcanail

INTRODUCTION

Surgical approaches for the treatment of open calcaneal fractures are frequently associated with skin complications. The development of minimally invasive techniques could limit them.

MATERIALS AND METHODS

We performed a retrospective study of 12 patients with displaced and closed calcaneal articular fracture treated with locked percutaneous calcaneal nailing using a Calcanail® nail. The outcome criteria were the AOFAS hindfoot score, the Böhler angle, and the occurrence of skin complications. The mean follow-up was 10 months (6-15 months).

RESULTS

The average age was 28, the right side was 9 times and the left side 5 times. The fracture was bilateral in 2 cases.

The etiologies were dominated by falls (75%) and road accidents (25%). The phlyctenes were initially present in 2 patients; these 2 patients were operated after regression of the phlyctenes.

Based on Duparc's classification, Type V and Type I fractures were predominant in our series; respectively 41.6% and 33.3% (Table 1). The average operative time was 3 days post-traumatic, with extremes of 2 and 5 days.

All our patients were placed in lateral decubitus and operated under spinal anesthesia. The control of the reduction was ensured by a fluoroscope (Figure 1).

Postoperatively, the mean AOFAS score was 82. No cases of skin complication or infection were noted. We had 4 minor complications: 2 cases of dystrophy and 2 cases with discomfort on the lower locking screw requiring ablation at a distance. We analyzed our anatomical results through radiographic controls (Figure 2) and CT reconstructions. The average Böhler angle increased from 0.7 ° pre-operatively to 32 ° postoperatively.

Table-1: Fracture type according to the Duparc classification in our series

Type	I	II	III	IV	V
Number of cases	4	1	1	1	5
Percentage	33,3%	8,3%	8,3%	8,3%	41,6%

Fig-1: Scopic control of the reduction with a spatula

Fig-2:Radiographic control after nailing Calcanail®

DISCUSSION

The reduction in open osteosynthesis of thalamic fractures of the calcaneus is considered the best therapeutic method, but complications related to the lateral approach are evaluated between 15 and 30%. The extensive approach required to place the anatomic plates and the stiffness related to the trauma of the fibular sheath have led some authors to propose a less invasive approach [1-3].

The advantages of the Locked Nail Technique are: the creation of a working channel that also provides significant bone autograft, intra-focal reduction of displaced articular surface in separation or depression fractures, insertion a locked nail that keeps the articular surface reduced to the right height, the possibility of moving from an osteosynthesis to a reconstruction arthrodesis with the same approach and the same instrumentation, in the case where the articular surface is badly damaged [2-4].

Minimally invasive posterior approach and operative technique help to reduce iatrogenic damage and surgical complications. There were no healing problems in our series. Good preoperative planning is mandatory, especially the precision of fragment volume and depressed movements should be clearly analyzed on preoperative CT [5,6]. Another advantage of the posterior approach is the preservation of the peroneal tendons, the conflict is avoided and the subtalar mobility preserved. In some multifragmentary fractures, the posterior facet can be severely damaged, so reduction and fixation of the articular surface is not feasible [6]. Osteosynthesis in this case would result in a poor result and primary subtalar arthrodesis may be preferable [7-9]. With this technique, the intraoperative choice between arthrodesis or internal fixation is possible since it will be easy to convert osteosynthesis into subtalar arthrodesis by simply increasing the length of the nail in order to bridge the subtalar joint. Instrumentation remains the same.

The short-term functional and radiological findings of percutaneous nailing of calcaneal fractures are satisfactory. Our functional results were good with average AOFAS score at 82. This is consistent with the Holms series [10] which averaged 78 points. And he had no degradation of results in evolution. Surgical revision by subtalar arthrodesis was not necessary. This reflects the strong stabilization provided by the nail, with a good anchorage in the subchondral bone.

We analyzed our anatomical results on the 10 months of follow-up thanks to the radiographic controls and the reconstructions scans. This technique offered an excellent reduction in 75% of cases and a fairly good reduction in 25% of cases. The mean Böhler angle decreased from 0.7 ° pre-operatively to 32 ° postoperatively immediately and did not decrease during the follow-up period, demonstrating the stability of the reduction.

CONCLUSION

Surgical treatment of displaced calcaneal fractures by percutaneous nailing using Calcanail® has provided good short-term clinical and radiological

results with acceptable anatomic correction at the cost of minimal morbidity.

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