
Advantages of Regenerative Medicine in the Management of a Rare Entity: A Case Report

Stratigoula Valavani^{1*}, Maria Chiara¹ and Pierre Paul²

¹Center for Orthopedics and Traumatology, Merignac, Aquitaine, France

²Centre Hospitalier Universitaire Toulouse, Batiment, Toulouse, France

***Corresponding author:** Stratigoula Valavani, Center for Orthopedics and Traumatology, Merignac, Aquitaine, France.

E-mail: valavani@orthopedics.sv.fr

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Abstract

The follow-up of calcaneal fractures has shown that they are difficult to manage and lead to multiple complications such as malunion and subtalar osteoarthritis. Pseudarthrosis of the calcaneus is an extremely rare complication, which was described in the literature through case reports.

In the existing literature, only seven studies, including thirteen patients have reported the nonunion. However, to the best of our knowledge, no study elucidates the role of new techniques of regenerative medicine such as Bone Marrow Concentrates (BMC) or Platelet Rich Plasma (PRP) in the management.

We report a case of a patient with a pseudarthrosis after a calcaneal fracture treated with BMC injection in the non-union site, without the need for surgical approach.

Keywords: Pseudarthrosis; Malunion; Bone marrow concentrate; Regenerative

Introduction

Fractures of the calcaneus are difficult to manage and lead to multiple complications such as malunion and subtalar osteoarthritis [1]. The nonunion is only rarely found, and many studies concerning complications after calcaneal fractures do not describe this complication [2-4].

In the available literature, only seven studies, including thirteen patients have reported the nonunion [2,5,6].

However, to the best of our knowledge, there is no study that elucidates the role of new techniques of regenerative medicine such as Bone Marrow Concentrates (BMC) or Platelet Rich Plasma (PRP) in the management. In this paper, we report a case of a patient with a pseudarthrosis after a calcaneal fracture. The current study highlights the advantages of BMC injection, such as having a good union while avoiding the complications of surgical approaches and without sacrificing the subtalar joint.

Case Report

A female patient, aged 40, sustained a closed fracture of the right calcaneus caused by a fall from the stairs. The fracture was a joint-depression type according to the Essex-Lopresti classification, and of type IIA fracture according to the Sanders classification. After 8 days, the fracture was managed, using percutaneous reduction and fixation followed by an active range of motion exercises and 3 months of non-weight bearing. Initial recovery was without complications. Seven months later the patient returned to the outpatient department complaining of pain at the heel where she was unable to bear weight. Radiological assessment, including CT scan of the foot, revealed a calcaneal non-union with subtalar arthritis (Figure 1). The injection of lidocaine in the subtalar joint did not reduce pain.

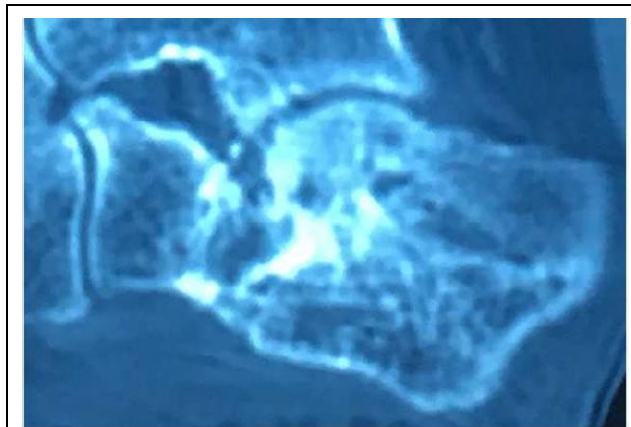


Figure 1: CT-scan showing the nonunion.

Under general anesthesia, bone marrow aspirate was sampled from the iliac crest; BMC was prepared by centrifugation and injected at the fractured side. Four months after the injection, the patient was ambulant without the support and was completely pain-free. Moreover, after one year the radiological follow up by CT scan showed a satisfactory filling of the pseudarthrosis (Figure 2 and 3).

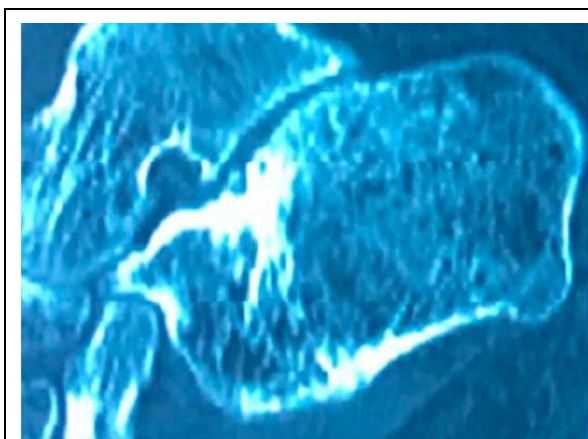


Figure 2: CT-scan 12 months after BMC.



Figure 3: Comparative X ray of both ankle 12 months after BMC.

Discussion

The nonunion after calcaneal fracture may be underestimated because of rare reporting. The current literature consists of few case reports published in seven studies including thirteen patients (Table 1). Thomas was the first who reported a case of nonunion after calcaneal fracture in 1993 [5]. Because of underreporting no similarities that could indicate a risk factor of nonunion could be found.

Table 1: Summary of the literature.

Study	Gender	Age	Treatment of the nonunion	Follow up
Thomas and Wilson [5]	Female	36	Osteotomy, plate, bone graft	3
Thermann et al. [7]	Male	49	Subtalar arthrodesis	62
Gehr et al. [8]	Male	38	Osteotomy, screws, bone graft	2
Karakurt et al. [3]	Male	42	Bone graft	8
Zwipp and Rammelt [4]	Female	61	Subtalar arthrodesis,	--
	Female	45	Calcaneocuboid arthrodesis	--
Schepers and Patka [2]	Female	53	Subtalar arthrodesis	3
	Male	49	Subtalar arthrodesis	14
	male	39	Subtalar arthrodesis	6
Kumar [6]	Female	29	Subtalar arthrodesis, screws, bone graft	12
Our report	Female	40	BMC	12

Conclusion

Pseudarthrosis of the calcaneus is an extremely rare complication. The current study has demonstrated that BMC injection can lead to a good union while avoiding the complications of surgical approaches and without sacrificing the subtalar joint. More studies with larger number of patients are needed to systematize this treatment.

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