

Recalcitrant Calcaneal Intraosseous Lipoma Treated with a Cadaveric Femoral Head Allograft Plug and Internal Fixation: A Case Report

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Statement of Purpose

The primary aim of this case report is to illuminate a possible treatment option for recurrent, symptomatic, benign calcaneal neoplasms. A secondary aim is to offer a surgical alternative for a wide range of benign bone tumors in the foot or elsewhere.

Introduction

Intraosseous lipomas (IOLs) are a poorly characterized neoplasm that make up <0.1% of primary benign bone tumors. Though among the rarest bone tumors, nearly a third reside in the calcaneus, with other common locales noted in the femur, tibia, and humerus. Generally they are clinically silent, but can become problematic with increasing size. Geographically, most reside in the boundaries of Ward's/Neutral Triangle and temporally become symptomatic in the 4th decade of life.

Non-surgical options include anti-inflammatories, non-weightbearing restrictions, and contrast therapy [1]. There is a brevity of surgical options for symptomatic IOLs of the calcaneus. The most common approach includes curettage with backfilling of polymethyl methacrylate (PMMA) cement, with or without interposed antibiotics [2]. Toepfer et al. utilized endoscopic resection of IOLs, followed by addition of tricalcium phosphate bone chips with good success [3]. If there is concern for pathological fracturing or osseous instability, then bone grafting with internal fixation can be considered. Only two reports on this method were found [4,5]. These authors used a lateral approach for decortication of the IOL. They applied a calcium phosphate substitute with an anatomical plate, with hardware removal at 14 months. External fixation can also be considered [1].

The most inclusive data published about IOL surgical intervention comes from a retrospective analysis [6] of 29 patients with IOLs, ten of which were located in the calcaneus. Nine of the 10 were treated with curettage and bone grafting, with three of those treatments also applying phenol. One patient was treated with curettage and an unidentified bone substitute. Twenty-seven of the 29 patients that were surgically treated had no radiographical recurrence at an average follow-up of 32 months, with two patients lost to follow-up.

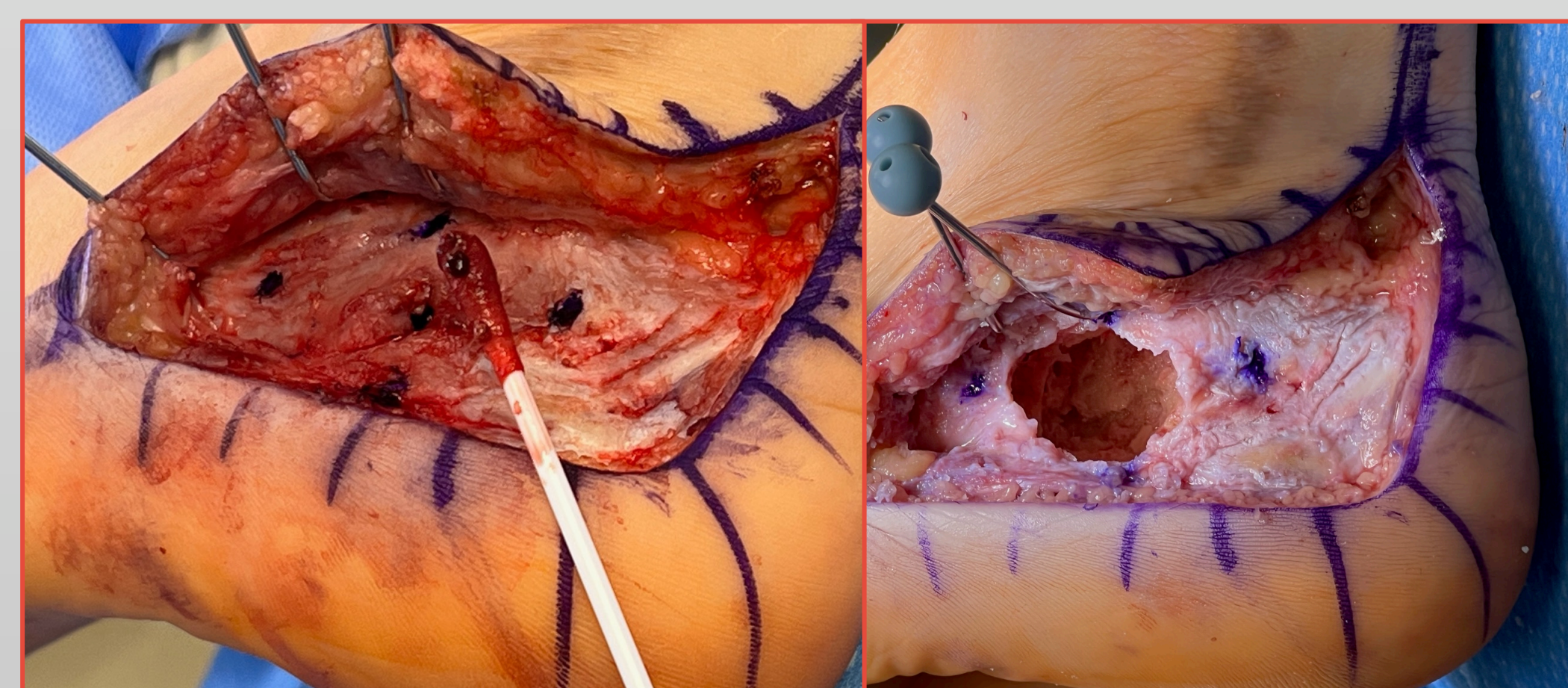
Patient Data

- The patient was a 22-year-old Caucasian male veteran complaining of left lateral heel pain for 2 years, antalgic gait, fatigue, and arthralgias.
- Patient had undergone two previous IOL excision attempts.
- Advanced imaging displayed a neoplasm encompassing the full breadth of the mid-calcaneus in the axial plane measuring 3.1 cm x 2.3 cm x 2.6 cm. Subcortical cystic changes were noted at the inferolateral talus. Surgical bone biopsies were negative.



Methodology

Attention was focused to the lateral hindfoot where a lateral extensile incision was made. A full-thickness fasciocutaneous flap was raised and retracted. Upon direct visualization of the lateral calcaneal wall, there was noted to be discolored bone with a central opening. Upon debridement there was noted to be a significant amount of cancellous bone chips within the tumor walls, likely from previous grafting attempts. The perimeter of the tumor was meticulously mapped utilizing direct visualization, fluoroscopy, and preoperative MRI views. Next a temporary guidewire compatible with a 15 mm femoral OATS reamer was used to remove a central core of the tumor. This provided excellent visualization into the walls of the tumor.



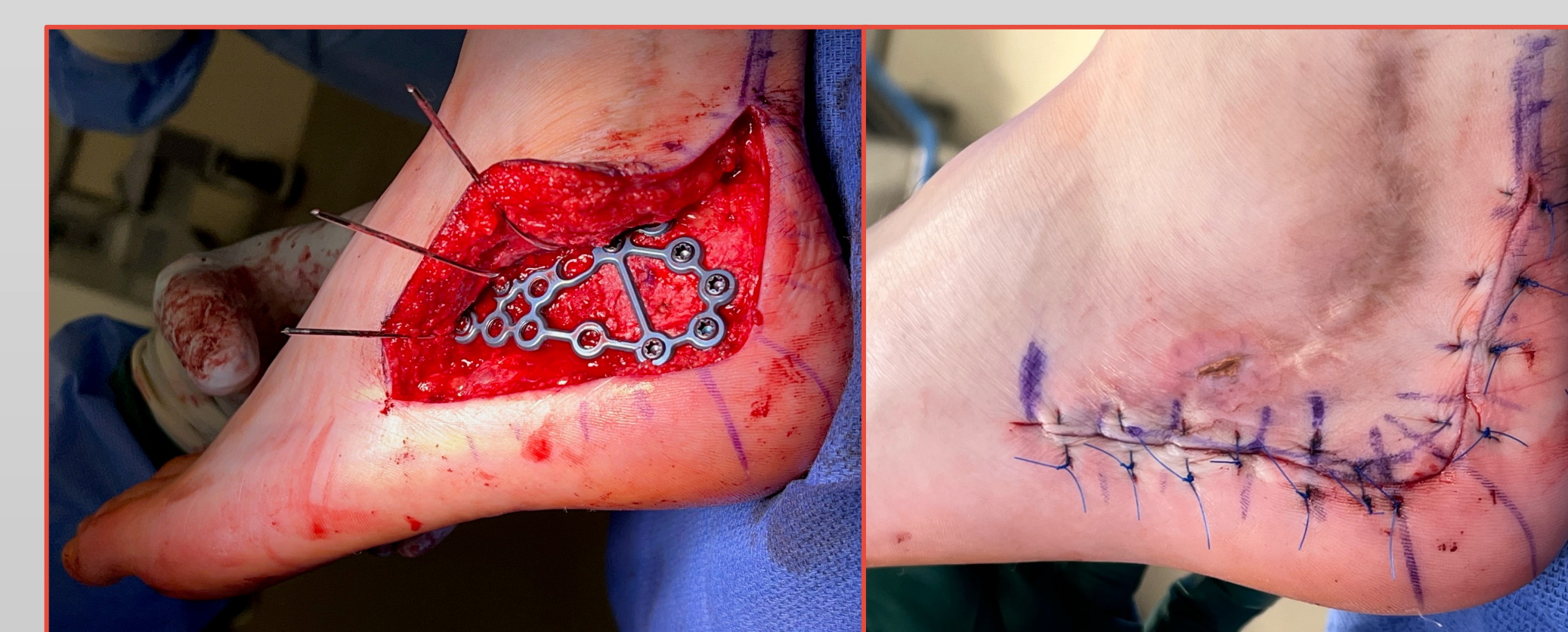
The remaining tumor was resected with use of bone cutting burs until all fibrotic and sclerotic bone had been removed and normal bleeding margins were visualized. Resection was completed beyond the borders of the tumor. Care was taken to preserve the plantar and medial cortex of the calcaneus.

Next the graft site was further prepared by fenestration to promote osteoprogenitor cell recruitment to the area. A 20 mm femoral OATS reamer was utilized to create a plug from the femoral head allograft. After graft placement, additional demineralized bone matrix and tibial autograft were packed around the allograft to fill any additional osseous deficits.



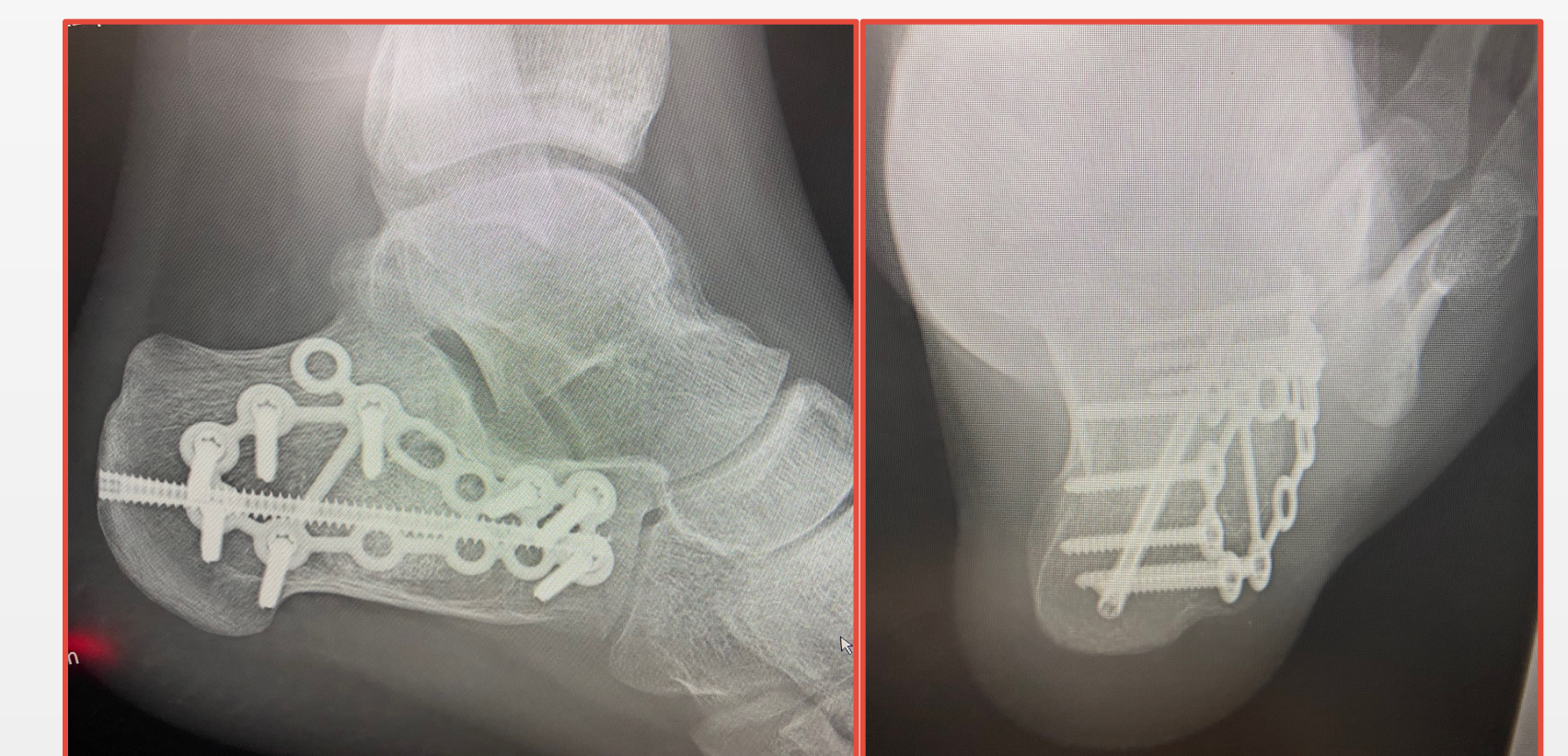
Internal fixation was warranted to allow for stabilization of the graft site and additionally to reduce risk of a calcaneal fracture post-operatively. A 5.0 mm lag screw was then inserted from posterior to anterior across the femoral head allograft in accordance with AO principles. We further stabilized our construct with use of a calcaneal perimeter plate. The plate was positioned in a manner to allow for lateral buttressing as well as to function as a neutralization plate for our graft site.

The fasciocutaneous flap was closed with minimal tension utilizing vertical mattress and Allgower-Donati suture technique [7].



Results

Incorporation of the allograft was achieved radiographically in two months. Fixational hardware remained intact. The patient transitioned to full weightbearing in regular shoe gear after 3 months. The patient was able to return to work and notes minimal pain with ambulation. At 12 months follow-up there have been no signs of recurrence. The only remaining chief physical finding relates to neuritis along the sural nerve distribution, distal to the incision site. Otherwise, there is no discomfort with palpation of the lateral calcaneus or with subtalar joint inversion and eversion.



Discussion

To the authors' knowledge, this is the first report detailing the treatment of an IOL with a femoral head allograft in addition to internal fixation. Secondly, fixation with a posterior-to-anterior calcaneal screw to prevent graft translation and rotation has not been described previously for other treatments of IOLs.

References

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Disclosures

The authors have no financial disclosures to report.