



# Treatment of Adenocarcinoma of the Prostate Metastasized to the Calcaneus

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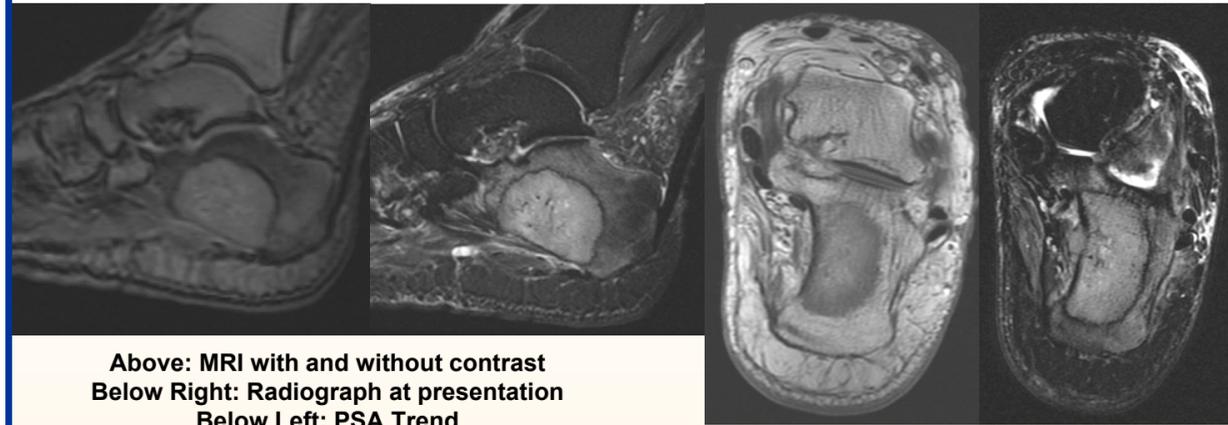
## Statement of Purpose

Metastasis of prostate cancer to the calcaneus is an uncommon finding, but painful and lifestyle limiting to the patients it affects. We present a novel treatment method for calcaneal metastasis that decreases tumor load, pain, and morbidity when compared to prior surgical and conservative treatment described in the literature..

## Literature Review

- **Radiofrequency Ablation (RFA) with PMMA to fill bone void** has been used for palliative cancer treatment for years. It uses radiofrequency to cause a small zone of thermal, killing cancer cells and reducing tumor load. On average, RFA decreases pain 6.5/10 when used on skeletal metastasis.
- Previous literature presents only two cases of calcaneal metastasis of prostate adenocarcinoma. Agrawal et al in 2008 presented a case with recalcitrant heel pain. Steroids and NSAIDs failed to provide relief. The patient was treated with isolated beam radiation therapy for six weeks with satisfactory pain reduction.
- Surgical treatment was presented by Bibbo et al in 2010. A lateral approach was used with excision and treatment using four rounds of H2O2/Ar-beam Photocoagulation/high speed burr, then the defect was filled with polymethylmethacrylate (PMMA). After an eight-week delay to prevent post-operative soft tissue loss, the patient underwent radiation therapy. At eight months post-operative, this patient was ambulating with minimal pain and an assistive device.

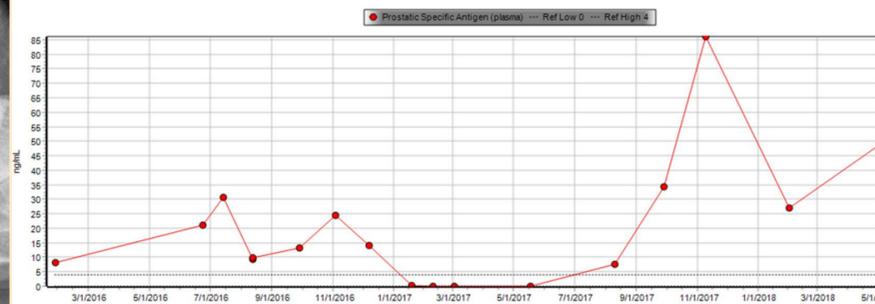
## Case Report



Above: MRI with and without contrast  
Below Right: Radiograph at presentation  
Below Left: PSA Trend

The patient presented with recalcitrant heel pain of three-week duration and a history of Gleason stage 5+3 prostate adenocarcinoma. At presentation, the patient had been undergoing radiation and chemotherapy since his diagnosis three months prior, to which he appeared to be responding. The patient was initially treated with CAM boot offloading for pain control and MRI. MRI revealed a 4.5cm x 3.0cm x 3.0cm mass in the calcaneus, which extended into the soft tissue. Percutaneous biopsy was performed and 15cc of sanguineous fluid was aspirated; cortical and cancellous bone were also sent. Histology confirmed the diagnosis of metastasis. Of note, his bone scan in February did not show any evidence of calcaneal uptake. His PET/CT in early May, which showed treatment progress, did not include the lower extremity.

In conjunction with the oncology team, the decision was made for the patient to undergo four rounds of palliative radiation beam therapy to reduce tumor size, followed by intervention. Percutaneous RFA was performed to destroy the lesion and the void was filled with PMMA under fluoroscopy from a medial approach. He was protected weight bearing in a boot for four weeks, then transitioned to a shoe. Time from initial presentation to RFA was six weeks. The patient's prostate specific antigen (PSA) was 21.2 in May and dropped to 9.29 at completion of his heel metastasis management. The patient went on to have continued care with androgen therapy, chemotherapy and medical management.



## Results

Immediately post-operative, the patient had no complications. The patient remained free of recurrence to his calcaneus at 24 months, although he has evidence of progressive disease elsewhere. He ambulates without pain and without an assistive device in standard shoe gear.



Radiograph 2 years post operative showing PMMA in situ

## Discussion

- **Recalcitrant heel pain in patients with prostate adenocarcinoma should include metastasis in the differential and have a high index of suspicion. Metastasis to bone occurs in roughly 84% of patients with prostate adenocarcinoma with 90% occurring in the spine; other common sites are ribs, long bone and skull. As such, the likelihood calcaneal metastasis will be identified on routine imaging is low; PET/CT scan protocols for prostate adenocarcinoma stop at midhigh or midcalf. Bone scans include the complete lower extremity, but are not routinely used in imaging protocols to track disease progression.**
- **Similar treatment with RFA and PMMA has long been used for metastasis of solid tumors to vertebra with good success; cross application to other bones has also been described. The minimal invasiveness decreases associated complications, to which this patient population is particularly prone, while still reducing tumor load and pain. Post-operative complications can delay radiation therapy and chemotherapy until resolved. When compared to the Bibbo study, our protocol reduced treatment time by half using a minimal approach and by starting with localized radiation therapy. Although this case study is of only one patient, the two-year follow-up shows promise as a viable treatment modality for prostate adenocarcinoma metastasized to the calcaneus.**

## References

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