

OSTEOID OSTEOMA: Treatment with Percutaneous Radiofrequency Ablation

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DEFINITION

Osteoid osteoma is a common bone tumor composing approximately 10% of all benign bone tumors. It is usually found in children and young adults and has a hallmark presentation of localized pain, usually worse at night, with relief of symptoms using aspirin or nonsteroidal anti-inflammatory drugs.¹ The majority of these tumors arise in the cortex of long bones, but lesions involving the foot have been documented.²

Over the years, treatment of osteoid osteomas included the use of long-term NSAID therapy as well as surgical resection. The surgery would usually entail marginal or wide excision of the tumor. More recently the use of percutaneous radiofrequency (RF) ablation has been shown to be very effective in treatment of osteoid osteomas.¹⁻⁷ RF ablation is a technique whereby an alternating electrical current is emitted from an electrode placed directly into an area of tissue. The alternating current causes the local ions to vibrate, producing heat and inducing cell death by coagulative necrosis.³

RF ablation can be performed under intravenous sedation or general anesthesia using computed tomography (CT) imaging guidance. The tumor is found using CT imaging. An ablation needle is then placed up to the level of the cortex of the bone after which a drill is used over the

needle to enter the tumor region. The drill is removed and then the electrode is used to heat and ablate the region for approximately 6 to 8 minutes. A biopsy of the tumor can be taken prior to ablating the region.

CASE STUDY

A 17-year-old male presented to the clinic with a history of a painful lateral right foot and ankle region for approximately 18 months. The pain would worsen at nighttime. The patient was active in snowboarding and motorcycle riding, but did not recall any specific injury. He had stopped the majority of any physical activities, but was still having pain in the aforementioned region.

Upon physical examination, there was no appreciable edema along the lateral foot and ankle. The patient had normal, pain-free ankle joint motion, but displayed some pain with attempted subtalar joint motion. He also demonstrated pain with palpation along the lateral calcaneal region in the area of the sinus tarsi. Radiographs showed no visible coalitions, fractures, joint narrowing, or tumors. A magnetic resonance image (MRI) was ordered and showed an 8-mm round lesion near the cortex of the lateral calcaneus adjacent to the sinus tarsi. There was extensive reactive marrow edema throughout the calcaneus, adjacent to this lesion (Figures 1, 2). This was

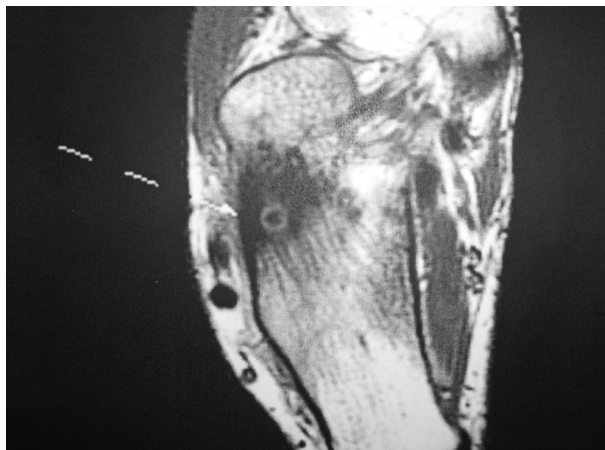


Figure 1. Magnetic resonance image showing 8-mm round lesion near the cortex of the lateral calcaneus with extensive reactive marrow edema throughout the calcaneus.



Figure 2. Magnetic resonance image showing 8-mm lesion adjacent to the sinus tarsi.

read by radiology as a probable osteoid osteoma and a CT scan was suggested to further confirm this diagnosis. The CT scan coupled with the previous information led to the diagnosis of an osteoid osteoma (Figure 3).

A 2-month course of NSAIDs was attempted on this patient without success. It was decided at that time to go ahead with the radiofrequency ablation. The patient was placed in supine position in the CT gantry. Preliminary scout CT images were performed through the lesion. The patient was placed under a general anesthetic. A small incision was made along the medial calcaneus through which a biopsy bone needle was advanced to the area of the tumor (Figure 4). A bone biopsy was taken, and then the radiofrequency ablation was performed under CT guidance to verify placement. This was performed for 8 minutes. No complications were noted during the procedure.

The patient was seen postoperative and related significant improvement in symptoms of pain within 1 month of the procedure. A follow up MRI was performed at this time showing healing bone in the area of the RF ablation (Figure 5). The patient is now approximately 6 months post procedure and back to full activity without any symptoms of pain.

Percutaneous radiofrequency ablation has been shown to be a safe and effective alternative in treating osteoid osteomas. Following failed conservative treatment it should be considered, along with surgical excision, as a viable treatment option.

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Figure 3. Computed tomography scan showing intra lesion nidus consistent with osteoid osteoma.

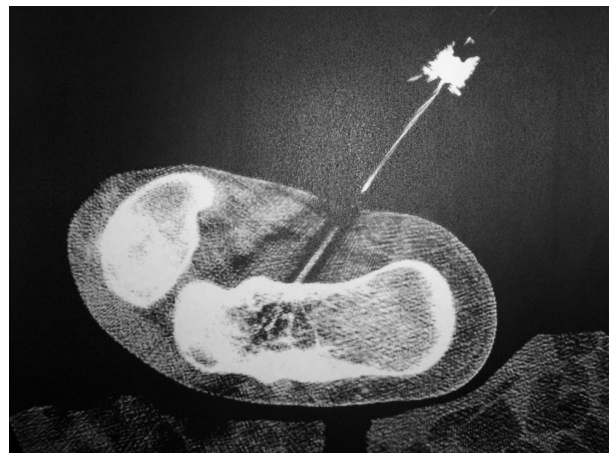


Figure 4. Radiofrequency ablation needle under computed tomography guidance.



Figure 5. Magnetic resonance image 1 month post-radiofrequency ablation. Note the typical halo sign following thermal ablation technique.