

Osteoid Osteoma Radiofrequency Ablation Treatment using a Kirschner Wireguided with a Scope: A Case Report and Literature Review

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Abstract

Introduction: Osteoid osteoma is a benign tumor and is the third most common bone tumor. It is <2cm and characterized by very intense clinical pain at night which lets up after taking two nonsteroid anti-inflammatory drugs. Conventionally, the surgical treatment performed was resection or curettage. At present, the recommended treatment is computed tomography (CT)-guided radio frequency due to the high efficacy rate and low comorbidity.

Case Report: A 29-year-old male patient diagnosed with an osteoid osteoma in a small right femoral trochanter. Due to the location of the tumor, we opted for a percutaneous treatment, but it was not possible to be submitted to CT-guided radio frequency due to the high costs. Thus, the scope-guided Kirschner wire radioablation technique was developed.

Discussion: At present, CT-guided radio frequency ablation is the most commonly used method due to its safety, high efficacy (over 90%), and minimally invasive. However, there are disadvantages: Problems with sterility of the radiological set, radiation, and high risk of thermal the skin and soft tissue necrosis. New treatment methods are under development, but they are even more costly.

Conclusion: Due to its high costs, many patients, especially from underdeveloped countries, donot undergo this treatment and are reserved to open surgical treatment with resection or curettage. Therefore, the development of low-cost minimally invasive percutaneous techniques is necessary.

Keywords: Osteoid osteoma (MeSH ID: D010017), case report (MeSH ID: D002363), rare diseases (MeSH ID: D035583), literature review (MeSH ID: D016454).

Introduction

Osteoid osteoma is the third most common bone tumor, usually observed in long bones of the lower limbs, especially in adolescents and young adults [1]. It is a benign tumor first defined by Heine in 1927 and described by Jaffe in 1935 [2]. It is smaller than 2 cm and its clinical characteristic is severe pain at night which lets up after taking two nonsteroid anti-inflammatory drugs (NSAIDs)[3]. This pain can cause functional limitations.

Radiographically, osteoid osteoma appears as a small tumor (<2 cm) with a radiolucent niche and a dense reaction sclerosis [4]. Computed tomography (CT) demonstrates low central attenuation nidus with surrounding sclerosis reaction [5]. Magnetic resonance imaging (MRI) demonstrates the tumor demarcated by bone and soft tissue

edema [5]. Histologically, the lesion is composed of a central niche containing immature bone with an extensive surrounding sclerotic reaction zone [6].

The natural history shows a spontaneous tumor regression, but chronic NSAID use can cause serious complications, which justifies the surgical treatment in the most cases [7].

Conventionally, the surgical treatment performed was tumor resection and curettage, but its disadvantages are the difficulty of locating the tumor intraoperatively, large bone removal that can lead to fractures and a high recurrence rate that requires reoperating. Rosenthal et al.(1992) developed a minimally invasive procedure guided by CT-guided percutaneous radio frequency ablation. With

this technique, the success rate varies between 79% and 100% [6]. Recently, new techniques have been developed, such as percutaneous cryoablation and the use of CT-guided percutaneous microwaves, which promise good results but are very costly [3, 5, 8].

This project presents a case report of a 29-year-old patient with osteoid osteoma in a small right proximal femur trochanter (difficult to locate for surgical resection treatment due to proximity to vascular-nerve bundle) who was treated by radioablation using guided Kirschner wire, presenting excellent post-operative response and good evolution. This technique has the following advantages: It is minimally invasive, shortterm, and lowcost.

Case Report

AAB, 29-year-old male, complained of the right hip pain radiating to the anterior region of the right thigh beginning about a year and a half ago, occurring any time of day (most intense at night) and improving with NSAID use. As for the physical examination, no

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© 2019 by Journal of Bone and Soft Tissue Tumors | Available on www.jbstjournal.com | doi:10.13107/jbst.2019.v05i03.015

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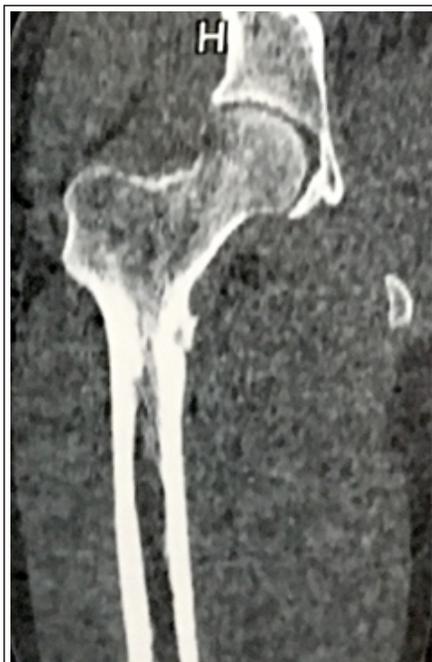


Figure 1: Computed tomography image showing pre-operative coronal section focal hyperdensity in the small right femoral trochanter.

changes. It presented radiography of the pelvis without alteration. CT, focal hyperdensity to the small trochanter. MRI, suggestive of osteoid osteoma in the medial cortex near the small trochanter and bone scintigraphy with small right trochanter uptake, thus opting for surgical treatment due to the chronicity of the disease.

Regarding the surgical treatment, CT-guided percutaneous radio frequency was not possible due to the high cost and the open surgical technique was not chosen due to the high risk of comorbidities that the patient could have due to the location of the tumor, then by scoping-guided percutaneous radioablation with Kirschner wire (K wire). The patient presented excellent response to treatment, noticed soon after the effect of spinal anesthesia, in which he no longer felt pain. The patient was only hospitalized for 1 day.

In outpatient returns, the patient had no complaints and no change at the physical examination. The new CT scan no longer showed the tumor.

Surgical technique

The patient was in the supine position under spinal anesthesia and received a prophylactic dose of 2 g of cefazolin antibiotic. He underwent a small incision in the lateral region of the right hip. The 2.0 K wire was passed with a perforator under scopic view

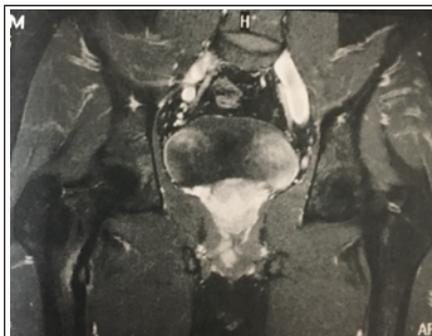


Figure 2: Magnetic resonance imaging of the pre-operative coronal section where we see a small oval area in the middle of the medial bone cortex of the proximal femoral shaft, just below the small trochanter, measuring about 6mm, associated with regional bone cortical thickening, surrounded by bone edema.

until the tip touched the tumor at the small trochanter. He then touched the blend two bipolar electric scalpels at the outer end of the 10-watt K wire. At this time, care was taken so that the K wire did not touch soft parts. Contact between the electric scalpel and K wire lasted 5s. Then, the K wire was removed and the patient underwent mechanical washing, suturing, and sterile dressing.

Postoperatively, he was instructed to walk with crutches and progressive weight loss for 6 weeks.

Today, the patient is fully recovered with no complaints and no changes at the physical examination.

Discussion

Osteoid osteoma is the third most common bone tumor [1]. The tumor tends to disappear within 6–15 years without treatment and this time may be reduced to 2–3 years with daily use of NSAIDs [1,7]. However, many patients may have gastric and renal complications with the use of this drug, and the patient may get frustrated about waiting a long time for the tumor to disappear.

For many years, the alternative treatment was surgical resection or curettage. However, this technique has disadvantages: Difficulty finding the niche during surgery and reaching deep lesion (such as hip joint) tumors, very aggressive, and high-risk complications including stress fractures and a prolonged hospital stay, it also sometimes requires filling the resection space with a bone graft [7, 9]. The main advantage is the possibility of histopathological study, which is not possible percutaneously [1].

At present, CT-guided radio frequency ablation is the most commonly used method



Figure 3: Bone scintigraphy image where we see moderate osteoblastic activity increase in the right proximal femur with primary bone lesion characteristics that show low local aggressiveness.

due to its safety, high efficacy (over 90%), and minimally invasiveness [3,10]. A study comparing CT-guided percutaneous radio frequency and open surgery with resection or curettage showed that recurrence was similar in both technique and duration of surgery, and hospitalization was slightly shorter with radio frequency [1]. In the study by Doyle et al. (2018), efficacy rate with radio frequency was 100% and all patients had complete symptom resolution within 1 week [10]. However, its disadvantages include problems with sterility of the radiological set, radiation, and high risk of thermal skin and soft tissue necrosis [1,7].

Due to the existing radio frequency disadvantages, new CT-guided percutaneous methods are being developed such as: Cryoablation [5,8] and microwave ablation [3] which are even more expensive techniques than radio frequency [5].

The case report presented in the article is from a patient with osteoid osteoma located in the small trochanter of the right proximal

femur diagnosed by exams that showed characteristic images of the lesion. Due to tumor location, a less invasive procedure was chosen. However, due to the high costs of CT-guided radiofrequency, the patient cannot undergo this type of treatment. Therefore, it was decided to use a lowcost, minimally invasive alternative technique which was radioablation using scoped-guided K wire. The patient had an excellent result in the immediate post-operative period with only 1 day of hospitalization.

Conclusion

Osteoid osteoma currently has CT-guided radiofrequency as the main treatment method. However, with its high costs, many patients, especially from underdeveloped countries, are not submitted to this treatment and are reserved to open surgical treatment with resection or curettage. Therefore, it is necessary to develop minimally invasive and low-cost percutaneous techniques. Thus, the technique of radioablation using scoped-guided K wire was created. Further studies with larger numbers of patients are needed to evaluate the efficacy, advantages, and disadvantages of this treatment.



Figure 4: Computed tomography image of post-operative coronal section where we did not find the

References

1. Göksel F, Aycan A, Ermutlu C, Gölge UH, Sarisözen B. Comparison of radiofrequency ablation and curettage in osteoid osteoma in children. *Acta Ortop Bras* 2019;27:100-3.
2. Gurkan V, Erdogan O. Foot and ankle osteoid osteomas. *J Foot Ankle Surg* 2018;57:826-32.
3. Rinzler ES, Shivaram GM, Shaw DW, Monroe EJ, Koo KS. Microwave ablation of osteoid osteoma: Initial experience and efficacy. *Pediatr Radiol* 2019;49:566-70.
4. Hage AN, Chick JF, Gemmete JJ, Grove JJ, Srinivasa RN. Percutaneous radiofrequency ablation for the treatment of osteoid osteoma in children and adults: A comparative analysis in 92 patients. *Cardiovasc Intervent Radiol* 2018;41:1384-90.
5. Santiago E, Pauly V, Brun G, Guenoun D, Champsaur P, Le Corroller T. Percutaneous cryoablation for the treatment of osteoid osteoma in the adult population. *Eur Radiol* 2018;28:2336-44.
6. Shields DW, Sohrabi S, Crane EO, Nicholas C, Mahendra A. Radiofrequency ablation for osteoid osteoma-recurrence rates and predictive factors. *Surgeon* 2018;16:156-62.
7. Cuesta HE, Villagran JM, Horcajadas AB, Kassarian A, Caravaca GR. Percutaneous radiofrequency ablation in osteoid osteoma: Tips and tricks in special scenarios. *Eur J Radiol* 2018;102:169-75.
8. Miyazaki M, Saito K, Yanagawa T, Chikuda H, Tsushima Y. Phase I clinical trial of percutaneous cryoablation for osteoid osteoma. *Jpn J Radiol* 2018;36:669-75.
9. Erdogan O, Gurkan V. Hand osteoid osteoma: Evaluation of diagnosis and treatment. *Eur J Med Res* 2019;24:1-5.
10. Doyle AJ, Graydon AJ, Hanlon MM, French JG. Radiofrequency ablation of osteoid osteoma: Aiming for excellent outcomes in an Australasian context. *J Med Imaging Radiat Oncol* 2018;62:789-93.

Conflict of Interest: NIL
Source of Support: NIL

How to Cite this Article

de Assis Serra Baima Filho F | Osteoid Osteoma Radiofrequency Ablation Treatment using a Kirschner Wire-guided with a Scope: A Case Report and Literature Review | *Journal of Bone and Soft Tissue Tumors* | Sep-Dec 2019;5(3):2-4.