CASE REPORT

Bifocal osteoid osteoma of the talus treated with thermal ablation and navigation 3D – case report

Dwuogniskowy kostniak kostnawy kości skokowej leczony termoblacją z wykorzystaniem nawigacji 3D – opis przypadku

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Abstract

Osteoid osteomas (OO) are common bone tumours. They are responsible for 10% of all benign bone tumours. Most often, they are located in long bones, especially of the lower limb. Less than 3% of all osteoid osteomas occur in the foot[1]. Such rare presentation affects placing an accurate diagnosis, making it difficult and taking longer. Simultaneous manifestation in more than one focus is extremely rare[2–5]. In this publication, we present a bifocal osteoid osteoma of the talus. In the treatment, we used radiofrequency thermal ablation (RFA) and an intraoperative 3D navigation system. Complete recovery was achieved.

Key words: osteoid osteoma of the talus, thermoablation, navigation

Słowa kluczowe: kostniak kostnawy kości skokowej, termoablacja, nawigacja

Streszczenie


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Introduction

Osteoid osteomas (OO) are a common bone tumour. They are responsible for 10% of all benign bone tumours. Diagnosis is based on the co-occurrence of the classic radiological and clinical images. The nidus surrounded by sclerotic tissue is visible in CT scans. The main symptom is severe nocturnal pain, which is easily relieved by the administration of salicylates. Long bones are the most common location. Less than 3% of all osteoid osteomas occur in bones of the foot, with the talus most commonly affected [1]. Nocturnal pain occurs only in half of these cases, which makes the diagnosis more difficult [7]. Multicentric OO, which means it has 2 or more nidi, is extremely rare. It was described only by several authors [5]. We present a case of a bifocal osteoid osteoma of the talus.

Case report

A 13-year-old male patient was referred to the orthopaedic outpatient clinic because of pain in dorsal side of the left foot. The pain was growing at night, without any connection to activity. There were no improvement after ibuprofen admission. The physical examination only revealed tenderness upon palpation of the dorsum. Plain radiographs and MRI scan showed no changes (Fig. 1A-B). Elevated ASO (347 UI/ml N<100) was the only disturbance in lab tests. No rheumatological disease was diagnosed to be the cause of the symptoms. After 2 months, the patient returned with exacerbated pain of left calcaneus. X-rays showed bilateral excessive sclerotisation of the calcaneal apophysis. A suspicion of Sever’s disease was made and adequate conservative treatment was prescribed (heel pads, physiotherapy). A repeat x-ray was ordered after 4 months because of persistent symptoms. It revealed a bone island in the neck of the talus (Fig. 2). A CT scan showed two sclerotic centres in the talus with nidi within (Fig. 3). The aspirin test was positive. A diagnosis of osteoid osteoma was made with-

Fig. 1A-B. Initial MRI scans – both osteoid ostaomas were visible. It was missed.

Fig. 2. Lateral X-ray of the calcaneus. Two osteosclerotic changes visible in the neck of the talus.

Fig. 3. CT scan showing two sclerotic centres in the talus with nidi within.
out histopathological confirmation. The patient was qualified for minimal invasive treatment. Percutaneous thermoablation with intraoperative 3D navigation was performed (Medtronic O-Arm StealthStation). An electrode was inserted in both centres, and thermal ablation was done (90°C, 6 min, RF-Medical BT1510) (Fig. 4A-E). There were no complications during procedure. The patient was discharged the next day. He was taught to use one crutch with partial weight bearing. 12 weeks after surgery, a follow up x-ray showed shadows that could be a osteolytic gap in the area of ablation, however CT and MRI scans showed a normal shape of bone (Fig. 5A-B). Additionally, the MRI scan showed typical edema surrounding both centres and good blood supply of the rest of the bone. The patient has remained asymptomatic since the thermoablation. Discontinuation of crutch use was advised and the treatment was finished.

**Discussion**

The diagnosis of an osteoid osteoma is made on the co-occurrence of classical symptoms and radiological images. Biopsy is not essential, and according to publications, it should...
not be performed routinely, mainly because of high rates of non-diagnostic samples [8, 9]. Localisation in the foot is rare and can create many diagnostic and treatment challenges for an orthopaedic surgeon [6, 7]. Nocturnal pain is present only in half of all patients [7].

Symptoms are often mistakenly linked to common injuries of that area. Visualization of the nidus in plain X-rays, which are the first step in diagnosis, is difficult because of the irregular shapes of bones, and overlapping shadows. Various imaging modalities have different sensitivity in foot OO: plain radiograph 66,4%, CT 96,4%; bone scan 96,5%, MRI 65,3% [10]. This is why CT is recommended as the first step in the diagnostic track of bone tumours which in clinical or radiological presentations suggest an osteoid osteoma[11]. Bone scan can also confirm active disease.

In the treatment of OO of the talus, we use percutaneous thermoblation, classic or arthroscopic resection [12]. Of these methods, thermal ablation has the smallest effect on the mechanical durability of the bone and has comparable efficacy. In our case, en block resection would cause a high increase of fracture risk because of removal of a fragment of minimum size 20x15x10 mm, whereas the neck of talus itself is about 35x25 mm. Also excessive exposition of this area would be hazardous to blood supply and cause AVN [13].

We used a cone-beam intraoperative CT and navigation system (Medtronic StealthStation + O-Arm) to accurate introduction of the electrode. This set allows for much lower radiation exposure compared to the classic CT-guided technique [14].

The postoperative scheme depends on the author, but generally in weaker bones, weight-bearing should be avoided [9]. Follow-up generally is based on symptoms and VAS score, with no need for additional imaging if patient is asymptomatic.

Conclusion

Thermal ablation with intraoperative 3D navigation is the method of choice in the treatment of osteoid osteoma, also in multi-focal cases. It’s safe and effective.

References