

## Osteoid osteoma of the hand and wrist: a report of 25 cases

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### Abstract

**Background:** The hand and wrist bones are infrequent sites for osteoid osteoma, and its diagnosis can be difficult. This paper reports 25 cases of osteoid osteoma in the hand and wrist.

**Methods:** Records of the 25 patients who had pathological conditions of osteoid osteoma of the hand and wrist were reviewed and analyzed.

**Results:** Twenty-five cases of osteoid osteoma of the hand and wrist were treated in 20 years period. The average age was  $25.2 \pm 7.6$  years (range, 16 to 46 years) with men to women and right to left side ratio of 5.25 and 4 respectively. The most common site was in the proximal phalanx (ten cases). The diagnosis was made using x-rays, three-phase Technetium bone scans, CT, and MRI and all the diagnoses were confirmed by histological examination. The average time from the onset of symptom to successful treatment was  $16.3 \pm 11.1$  months, and at a mean follow-up of  $36.6 \pm 46.9$  months. Five recurrences of disease took place in which three of them were operated elsewhere. All five patients subsequently were treated and cured by reoperation.

**Conclusion:** Osteoid osteoma is relatively rare lesions in the hand and wrist that can be a persistent source of hand and wrist pain. Patients under age of 40 who have otherwise unexplained pain should be evaluated.

**Keywords:** Wrist, Hand, Tumor, Osteoid osteoma.

### Introduction

Osteoid osteoma usually a symptomatic disease in the second or third decades of life, rarely found in patients over 40 years of age, and approximately twice as many men as women are affected (1-3).

Osteoid osteoma is also a relatively uncommon benign osteoblastic tumor, first described by Jaffe in 1935. It consists of an area of variably calcified osteoid tissue commonly called a nidus within a stroma of

relatively loose vascular connective tissue with a rim of sclerotic reactive bone, less than 1 cm in diameters, surrounding the lesion (4).

The most common and earliest symptom is gradual increasing pain. The pain is more severe at night and often often relieved by nonsteroidal anti-inflammatory agents (NSAID).

The second most common complaint is swelling, which often occurs in form of painless osteoid osteoma (4-6).

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The most frequent location of the osteoid osteoma is the lower extremity.<sup>2, 8</sup> Between 19% and 31% of all osteoid osteoma present in the upper extremity, and of all cases of osteoid osteoma cases, lesions in the hand and wrist comprised 5 to 15% (2,4,5).

### Methods

Records of the 25 patients (who had pathological reports of osteoid osteoma for hand and wrist) were reviewed. All patients underwent surgery by hand surgeon, in microsurgical unit of Shafa Yahyaian hospital between 1992 and 2011.

All patient data including signs, symptoms, history of trauma, night pain, relief of pain by NSAIDs and duration from onset of symptoms to operation were recorded.

The diagnosis was made using plain X-rays, three- phase technetium bone scans, CT and MRI, and histological examinations confirmed the diagnosis in all cases.

### Statistical Analysis

Statistical analyses were conducted using the Microsoft Excel software package. The means and standard deviations (SD) were also derived to analyze the measured data statistically.

### Results

This paper reports on 25 cases of osteoid osteoma in the hand and wrist at 20 years period. There were twenty-one men and four women, with an average age of  $25.2 \pm 7.6$  (range: 16-46) years.

Twenty osteoid osteoma were in the right and five in the left side of hands. Fifteen were in the finger phalanges (ten proximal and five distal phalanges), four in the metacarpals, five in the wrist (two in scaphoid, two in capitate and one in trapezium) and one in the styloid of radius.

The most common and earliest symptom was pain. The pain was gradually increased and initially intermittent, but later became more constant and severe. The pain was unaffected by activity and twenty-one of these patients had night pain and in 17 patients partial pain relief obtained by aspirin

(five patients had no relief and 3 were not investigated). Blood analyses were normal for all patients, but a history of trauma prior to the onset of symptoms found in five patients.

Physical examination at presentation revealed local swelling and point tenderness. Whenever the osteoid osteoma was close to a joint, restriction of motion and muscle atrophy were sometimes present. The physical findings varied with the site of the tumor. In the phalanges, osteoid osteoma induced marked fusiform soft tissue swelling. Proximal phalanx involvement was characterized by a grossly enlarged phalanx with hypertrophy of the soft tissues, and distal phalanx involvement caused finger clubbing, with enlargement of the phalanx, and sometimes hypertrophy of the nail and obliteration of the normal angle between the base of the nail and the skin.

The diagnosis was made using plain x-rays, three-phase Technetium bone scans, CT and MRI.

Only thirteen patients had the characteristic appearances of osteoid osteoma on x-ray and twelve non-specific appearances on initial x-rays.

Three-phase TC- 99 bone scans were done on twenty patients, showed an intense well-defined focal area increased activity during all the three-phase of the scan in eighteen patients. In two cases, the bone scans were non- specific, showing a diffuse increase in isotope uptake. Eighteen CT scans were performed and showed the osteoid osteoma in every case as an obvious lytic lesion with a central granular opacity surrounded by a well-defined sclerotic margin.

The MRI was performed on fifteen cases, and clearly showed an intense soft tissue reaction around the lesion.

The mean delay from the onset of symptoms to definitive treatment was  $16.3 \pm 11.1$  months (range, 3months to 4 years).

Three patients had been treated surgically in another center previously. Twenty-one patients were treated surgically with exci-



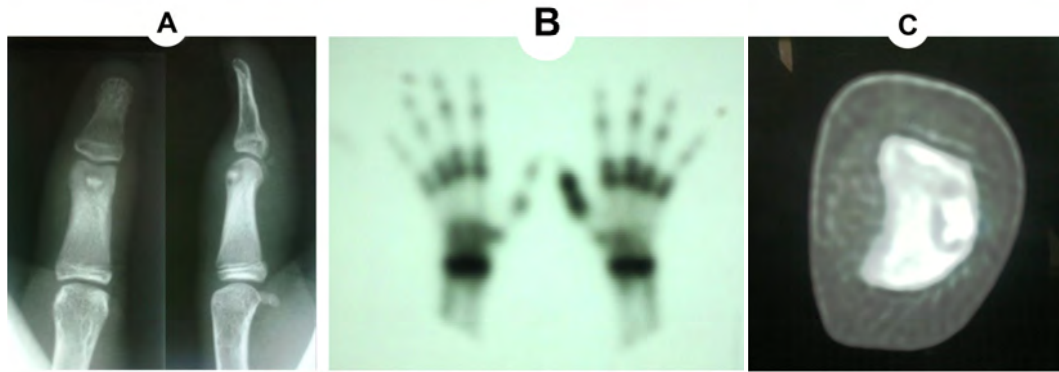


Fig. 2. Osteoid osteoma of proximal phalanx of thumb. A: Anteroposterior and lateral radiography (nidus with lytic lesion). B: Bone scan. C: CT scan (axial view).

(2).

We evaluated relief of pain with NSAID only in 21 patients and found relief of pain in 16 cases (76%).

Physical examination often revealed local tenderness and soft-tissue swelling. When the tumor was located near a joint, it may reduce range of motion and mimic primary arthritis. In the phalanges, typically a fusiform soft-tissue swelling existed with enlargement and clubbing of the phalanges. The mechanism that developed this feature was unclear, but it appeared to be in response to a presumably humoral substance produced by the tumor. This may directly induced proliferation of connective tissue, bone changes and dilation of blood vessels.

Furthermore the edema, produced by local

hyperaemia and inflammatory factor release, increases the distance through which oxygen must diffuse before reaching the cells, possibly causing a localized hypoxaemia. This stagnant hypoxia can indirectly induce enlargement of the finger and clubbing of the distal phalanx (4).

Initial x-ray examinations were often normal, as was the case in 12 of our cases, but a three-phase technetium-99<sub>m</sub> bone scan detected the lesion which was characterized by an intense well-defined focal area of increased uptake, and is readily apparent in all three phases and only in one patient diffuse increase in isotope uptake was seen.

When the bone scan was positive or equivocal with normal radiographs, computed tomograms employed. This was su-

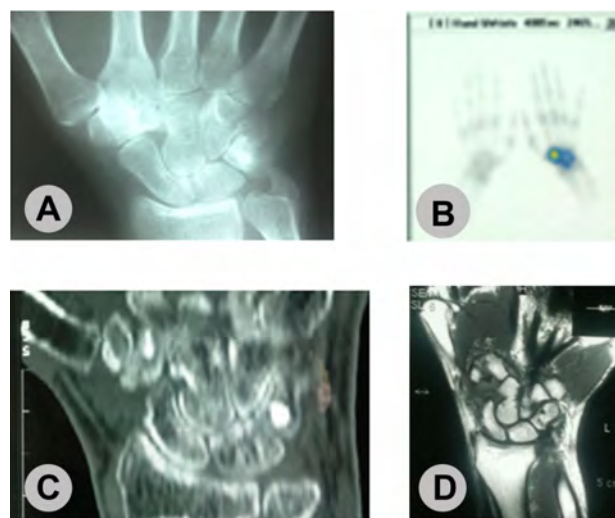


Fig. 3. Osteoid osteoma of trapezoid bone of 31 years old man with wrist pain since 18 month ago. A: Anteroposterior radiography shows sclerosis at trapezoid bone. B: Bone scan shows increased local uptake. C: CT scan shows nidus at trapezoid (incidental bone island at triquetrum). D: The MRI shows diffuse edema at wrist.

perior to conventional radiography and MRI, not only for diagnosis, but also for surgical planning and follow-up of osteoid osteoma of the small bones in hand. The wrist MRI showed the tissue reaction around the tumor (1,2,11,12).

Specialized imaging techniques may hasten the diagnosis, but only an accurate clinical history with a high index of suspicion allows one to arrange the appropriate investigations.

Treatment of osteoid osteoma consisted of curettage or en bloc excision of the tumor, which resulted in almost immediate relief of pain. Pre-operative CT assessment of the lesion greatly assist the surgeon and increases the likelihood of an adequate surgical excision. Packing the defect after curettage with cancellous bone chip may not be necessary, but incomplete removal may lead to recurrence or continuation of symptoms. Nowadays the operative treatment is not the only modality recommended to the patients and their family but it is also an alternative choice.

### Conclusion

Osteoid osteomas, relatively rare lesions in the hand and wrist that can be a persistent source of hand and wrist pain. Patients under age of 40 who have otherwise unexplained pain should be evaluated. Relief of pain with oral NSAID, most notably aspirin, should suggest the possibility of osteoid osteoma. Examination may demonstrate localized swelling or joint effusion. Point tenderness is also an important symptom in hand and wrist osteoid osteoma. Radiographs should be examined for sclerosis in

the region of pain. If radiographs are nonconclusive, a bone scan should be considered. Finally, if the nidus cannot be clearly visualized by radiography and bone scan, a CT scan should be recommended.

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