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CASE REPORT

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Intra-articular osteoid osteoma of the capitulum: A diagnostic challenge

Hooman Shariatzadeh[1] | **Mehrdad Bahrabadi**[2] | **Shayan Amiri**[2] | **Fatemeh Jahanshahi**[3,4] | **Samad Joudi**[5] | **Marjan Bahrabadi**[6]

[1]Department of Orthopaedic Surgery, Shafa Yahyaian Hospital, Iran University of Medical Sciences, Tehran, Iran

[2]Department of Orthopaedic Surgery, Rasool Akram Medical Complex, Iran University of Medical Sciences, Tehran, Iran

[3]Student Research Committee, Faculty of Medicine, Iran University of Medical Science, Tehran, Iran

[4]Urology Research Center, Tehran University of Medical Sciences, Tehran, Iran

[5]The University of Texas Health Science Center, Houston, Texas, USA

[6]Ferdowsi University of Mashhad, Mashhad, Iran

Correspondence

Mehrdad Bahrabadi, Department of Orthopaedic Surgery, Rasool Akram Medical Complex, Iran University of Medical Sciences, Tehran, Iran.
Email: mehrdad.bahrabadi@gmail.com

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Abstract

Here, we describe the first case of intra-articular osteoid osteoma of the capitulum, which is presented as elbow pain, extension lack, and sensation of click in joint flexion. Surgical treatment either arthroscopic or open is more in use in this location of the tumor than cortical osteoid osteoma.

KEYWORDS

capitulum, intra-articular, osteoid osteoma

1 | INTRODUCTION

Osteoid osteoma (OO) was first described by Jaffe in 1935.[1] It is a benign bone-forming tumor composed of a central fibrovascular tissue called nidus, and a reactive peripheral zone of calcification both best visible on computerized tomography (CT) scans. OO is classified according to its anatomical location and to cortical, cancellous, or subperiosteal/subchondral.[2] The most common location is cortical, and the least common is subperiosteal/subchondral. Juxta-articular and intra-articular OO have been reported accounting for almost 10% of the tumor.[3,4] In intra-articular OO, diagnosis might be difficult and prolonged due to diffuse joint pain, mimicking more common differential diagnoses, including inflammatory arthritis or osteochondritis dissecans.[5] The time to diagnosis in intra-articular OO is almost three times more than extra-articular tumor.[6] We informed the patient that data from the case would be submitted for publication and achieved her consent.

2 | CASE PRESENTATION

A 24-year-old right-handed female individual presented to our clinic complaining of left elbow pain and a click on elbow flexion. Pain was present during the day and increased at night and has been present for one year. Her pain was responsive to nonsteroidal anti-inflammatory medications. Other conservative treatment such as

physical therapy did not improve her pain. She has noticed a click during flexing her elbow when approaching to 90 degrees in the past six months. There was no history of trauma other joint pain, or infection, and her family history regarding similar lesions was negative. Her past medical and surgical history was not significant.

On physical examination, the range of motion of the elbows from extension to flexion was 0–140 on the right and 20–140 on the left. Pronation and supination of the forearms were not restricted. There was no warmth, redness, or other abnormalities in the overlying skin. No deformity was evident of the ulnar or radial shaft suggestive of a developmental growth disturbance of the forearm bones. No muscle weakness or sensory disturbance was recognized in the right limb. Color and capillary refill of all digits were normal. Her symptoms have been attributed to lateral epicondylitis and recently to radial head subluxation because of the click on elbow motion. Findings from the general physical examination were normal. Laboratory investigations and urine examination were normal.

Plain radiographic examination of the left elbow revealed a very fade sclerotic, calcified cortical margin in capitulum (Figure 1). The structure of the proximal ulna and radius was normal. The multidirectional thin-cut computed tomography (CT) scans showed a depression in the articular surface of the capitulum entering the joint surface. It was well demarcated with a distinct cortical rim (Figure 2). A nonenhanced T1-and T2-weighted magnetic resonance image (MRI) showed diffuse bone edema in capitulum, along with considerable joint effusion (Figure 3). Patient did not choose to do bone scan due to potential risks. Although these findings suggested an osteoid osteoma arising from the joint surface of the capitellum, the diagnosis was not established.

After discussion with the patient, surgical exploration was performed 1 week after the initial presentation through a lateral approach. A 10 cm curved incision was made at the lateral aspect of the elbow. Proximally, the radial nerve was identified and protected, while distally, it was retracted anteriorly with the mobile wad. The extensor origin was mobilized proximally and split distally. The anterior joint capsule appeared, and lesion came to our sight through cartilage of capitulum (Figure 4A). It was a 4 mm circular white lesion covered with hyaline cartilage. Intraoperative fluoroscopy confirmed adequate resection of the tumor. After removing the lesion with curettes, the cavity was left open (Figure 4B), and the specimen was sent to histopathology. After surgery, the elbow was immobilized at 90 of flexion and neutral forearm pronation and supination. Patient experienced immediate pain relief the night of surgery. After 1 week, splint was removed and active motion exercises of the elbow and the forearm were encouraged. No complication related to the surgery or postoperative management was encountered. The patient regained nearly normal range of elbow motion by 2 months after surgery. Click disappeared after surgery. We re-examined the patient after surgery and confirmed the absence of tumor recurrence two years later. Pathology was consistent with the diagnosis of osteoid osteoma.

3 | DISCUSSION

Intra-articular and juxta-articular osteoid osteomas behave differently from other osteoid osteomas. This difference is present both in clinical and imaging properties of this tumor. This may lead to delay in diagnosis and implementation of more therapeutic approaches including surgical procedures, which will be discussed in detail below.

Pain as the main symptom of OO tends to be less severe, and the response to salicylates is less dramatic in

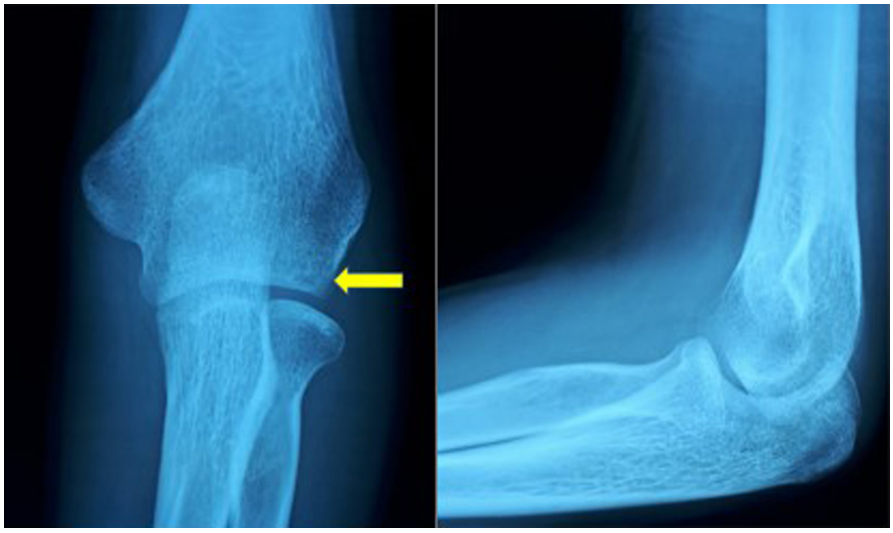

FIGURE 1 Anteroposterior and lateral plain radiographs of the elbow. Arrow shows the lesion, which is very hard to be found

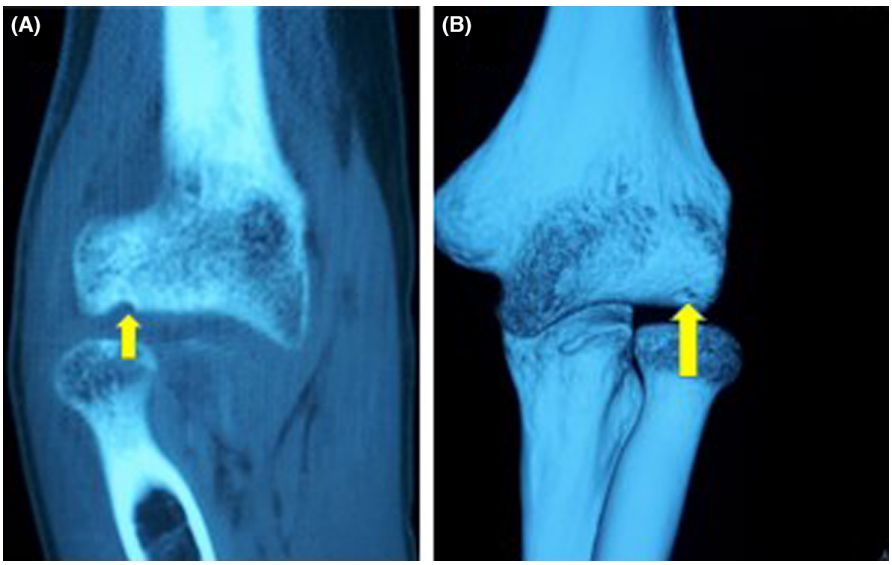

FIGURE 2 Computerized tomography (CT) scan of the patient. (A) Coronal view. (B) Three-dimensional view. Arrows show depressed area in joint surface representing tumor

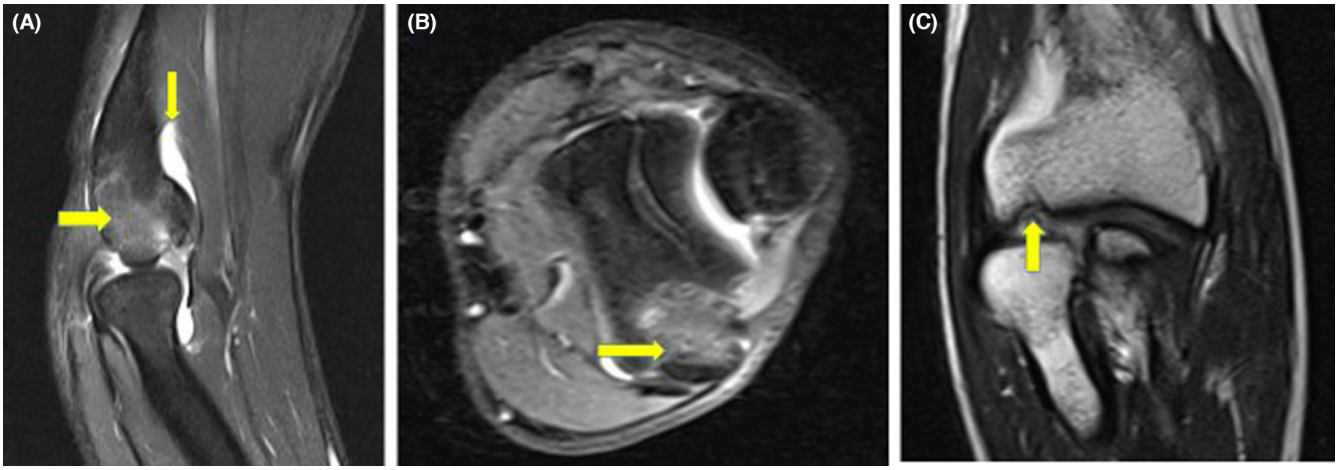

FIGURE 3 Magnetic resonance image (MRI) of the patient. (A) Sagittal view: Horizontal arrow shows bone edema, and Vertical arrow shows significant joint effusion. (B) Axial view: Arrow shows bone edema. (C) Coronal view: Arrow shows defect in joint surface

intra-articular OO compared to the diaphyseal lesions.[7–10] In addition, nocturnal pain is also less prominent in intra-articular OO.[3] These findings, which lead to delay in diagnosis, were also present in our patient.

Joint symptoms including synovitis, diminished range of motion, warmth, and muscle atrophy are common findings in intra-articular OO and are misleading in the way of reaching to diagnosis. Sherman first noticed a case of OO of the elbow, which presented as a hypertrophic arthritis.[11] Edeiken et al. further described subperiosteal juxta-articular OO as a lesion causing synovitis and effusion. This picture was consistent with chronic arthritis rather than OO.[2] Symptoms of muscle atrophy and local warmth, which is common to intra-articular location of the tumor, were described by Brabants et al.[7] In fact in intra-articular OO, a concomitant synovitis leading to a degenerative join disease has been reported.[12,13] Imaging properties of juxta- and intra-articular OOs are also unremarkable.[3] Plain radiographs may show decalcification and joint narrowing. This will suggest arthritis or degenerative joint disease or even osteomyelitis.[11]Bone scan shows more diffuse uptake compared to localized uptake of classical osteoid osteoma.[14–17]This diffuse uptake is again in favor of a joint problem such as synovitis rather than a bony tumor.

Computerized tomography, which is diagnostic modality of choice for OO, is less helpful in intra-articular OO compared to other locations. This is due to the absence of reactive sclerosis in intra-articular OO.[18,19] In addition, when the tumor is abutting the joint surface, such as in our case, only half of the nidus can be seen on CT scan. This picture is similar to osteochondritis dissecans. Due to complexity of bony structures in elbow and subtalar joints, which are the most common locations of juxta-articular osteoid osteomas, CT scan is less beneficial in detecting nidus in these anatomical locations.[7]

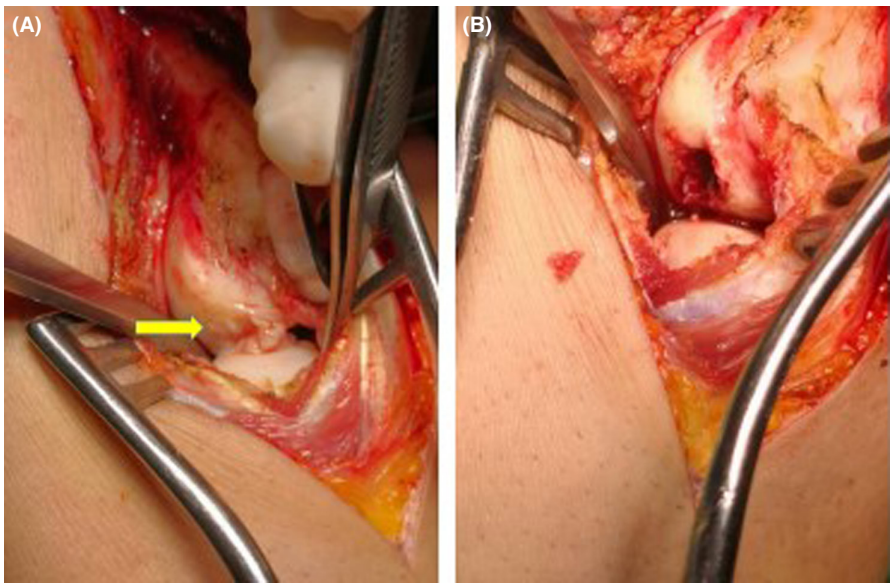

FIGURE 4 Intraoperative photography of the patient. (A) Arrow shows the intra-articular osteoid osteoma. (B) The tumor cavity was left open after removing the tumor

The MRI may be misleading in intra-articular OO due to overestimation of bone pathology. In intra-articular OO, it may show synovial proliferation, joint effusion, and bone edema.[20] These findings are not specific for OO and may be seen in arthritis, osteomyelitis, trauma, osteochondritis dissecans, or bone infarct.

The similarity of juxta-articular osteoid osteoma to other diagnostic entities has some therapeutic impacts on patients. This imitation leads to delay in diagnosis, implementation of different treatment options, and perhaps using more surgical procedures on uncertain diagnostic conditions. Zupank et al. reported on a juxta-articular osteoid osteoma of the capitulum, which was treated surgically (Bosworth-Boyd) as lateral epicondylitis before the diagnosis was established through arthroscopic curettage of nidus.[10] Diagnostic arthroscopy without finding the etiology of pain in osteoid osteoma of knee bones was also reported by other authors.[21]

A main advantage of surgical procedures either open or arthroscopic for treatment of OO is the possibility of tissue sampling. This is especially true when the diagnosis in uncertain, which is common in intra-articular OO. Due to potential risks of RFA, and the need to reach a diagnosis in ambiguous lesions, surgical procedures either open or arthroscopic are more encouraged.

4 | CONCLUSIONS

Intra-articular osteoid osteoma is a diagnostic challenge, which needs more vigilance.

Surgical procedures either open or arthroscopy are encouraged in intra-articular osteoid osteoma for obtaining tissue biopsy and treating osteoid osteoma.

The RFA has some potential risks including long-lasting thermal damage to cartilage and bone. Therefore, it should never be used or be applied with extreme caution in intra-articular osteoid osteoma.

AUTHOR CONTRIBUTIONS

All authors contributed in preparing this article.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ETHICAL APPROVAL

Ethical approval was obtained from the ethics committee of Iran University of Medical Sciences. This study was also in accordance with the Helsinki Declaration and its later amendments and prior entering.

CONSENT

Written informed consent was obtained from the patient to publish this report.

DATA AVAILABILITY STATEMENT

All data and materials are available.

ORCID

Mehrdad Bahrabadi https://orcid.org/0000-0002-8798-0253
Fatemeh Jahanshahi https://orcid.org/0000-0002-1941-7370

REFERENCES

1. Jaffe HL. Osteoid-osteoma: a benign osteoblastic tumor composed of osteoid and atypical bone. *Arch Surg*. 1935;31(5):709-728.
2. Edeiken J, Depalma AF, Hodes PJ. Osteoid osteoma (roentgenographic emphasis) (1976-2007). *Clin Orthop Relat Res*. 1966;49:201-208.
3. Rolvien T, Zustin J, Mussawy H, Schmidt T, Pogoda P, Ueblacker P. Intra-articular osteoid osteoma as a differential diagnosis of diffuse mono-articular joint pain. *BMC Musculoskelet Disord*. 2016;17(1):1-6.
4. Traore SY, Dumitriu DI, Docquier P-L. Intra-articular osteoid osteoma mimicking juvenile arthritis. *Case Rep Orthop*. 2014;2014:1-5.
5. Mavrogenis AF, Dimitriou R, Benetos IS, Korres DS, Papagelopoulos PJ. Juxta-articular osteoid osteoma of the talar neck: a case report. *Clin Podiatr Med Surg*. 2010;27(4):629-634.
6. Szendroi M, Köllo K, Antal I, Lakatos J, Szoke G. Intraarticular osteoid osteoma: clinical features, imaging results, and comparison with extraarticular localization. *J Rheumatol*. 2004;31(5):957-964.
7. Brabants K, Geens S, Van Damme B. Subperiosteal juxta-articular osteoid osteoma. *J Bone Joint Surg Br Vol*. 1986;68(2):320-324.
8. Mullin D, Rodan B, Bean W, Sehayik S, Sehayik R. Osteoid osteoma in unusual locations: detection and diagnosis. *South Med J*. 1986;79(10):1299-1301.
9. Kenzora JE, Abrams RC. Problems encountered in the diagnosis and treatment of osteoid osteoma of the talus. *Foot Ankle*. 1981;2(3):172-178.
10. Zupanc O, Šarabon N, Stražar K. Arthroscopic removal of juxtaarticular osteoid osteoma of the elbow. *Knee Surg Sports Traumatol Arthrosc*. 2007;15(10):1240-1243.
11. Sherman MS. Osteoid osteoma: review of the literature and report of thirty cases. *JBJS*. 1947;29(4):918-930.
12. Cronemeyer R, Kirchmer N, De Smet A, Neff J. Intra-articular osteoid-osteoma of the humerus simulating synovitis of the elbow. A case report. *JBJS*. 1981;63(7):1172-1174.
13. Snarr JW, Abell MR, Martel W. Lymphofollicular synovitis with osteoid osteoma. *Radiology*. 1973;106(3):557-560.
14. Mitnick JS, BraunStein P, Genieser N. Osteoid osteoma of the hip: unusual isotopic appearance. *Am J Roentgenol*. 1979;133(2):322-323.
15. Swee RG, McLeod RA, Beabout JW. Osteoid osteoma: detection, diagnosis, and localization. *Radiology*. 1979;130(1):117-123.
16. Bleifeld C. Osteoid osteoma; articular communication and minimal pain. *N Y State J Med*. 1981;81(9):1371-1372.
17. Shereff MJ, Cullivan WT, Johnson K. Osteoid-osteoma of the foot. *JBJS*. 1983;65(5):638-641.
18. Bauer TW, Zehr RJ, Belhobek GH, Marks KE. Juxta-articular osteoid osteoma. *Am J Surg Pathol*. 1991;15(4):381-387.
19. Pikoulas C, Mantzikopoulos G, Thanos L, Passomenos D, Dalamarinis C, Glampedaki-Dagianta K. Unusually located osteoid osteomas. *Eur J Radiol*. 1995;20(2):120-125. doi:10.1016/0720-048X(95)00636-5
20. Helms CA. *Fundamentals of Skeletal Radiology*. Elsevier Health Sciences; 2013.
21. Georgoulis AD, Papageorgiou CD, Moebius UG, Rossis J, Papadonikolakis A, Soucacos PN. The diagnostic dilemma created by osteoid osteoma that presents as knee pain. *Arthroscopy*. 2002;18(1):32-37.

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