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Diagnostic Dilemma of Osteoblastoma-like Osteosarcoma in a Pediatric Patient: A Case Report

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ABSTRACT

Introduction: Osteoblastoma-like osteosarcoma is a rare subtype of osteosarcoma, constituting only 1% cases. Due to its similarity with osteoblastoma in clinical, radiological, and pathological features, distinguishing between the two can be challenging. This study reports a rare case of osteoblastoma-like osteosarcoma in a 12-year-old girl, emphasizing the diagnostic challenges and the critical role of immunohistochemistry (IHC) in confirming the diagnosis.

Case Presentation: A 12-year-old girl presented with pain and swelling in her right knee after a fall. Initially, the symptoms had been present for 6 months, with worsening pain over the last 2 months, requiring the use of a walking crutch. MRI findings raised suspicion of a Giant Cell Tumor (GCT), but core biopsy results suggested osteoblastoma-like osteosarcoma. Immunohistochemistry (IHK) for P53 was strongly positive, further supporting the diagnosis of osteoblastoma-like osteosarcoma.

Clinical Discussion: Osteosarcoma and osteoblastoma-like osteosarcoma share many similarities, making diagnosis difficult. A thorough clinical evaluation, advanced imaging, and histopathological analysis, including IHC, are crucial for an accurate diagnosis. This case highlights the importance of a multidisciplinary approach, involving clinicians, radiologists, and pathologists, to establish the correct diagnosis and determine an appropriate treatment plan.

Conclusion: Osteoblastoma-like osteosarcoma is a rare and challenging tumor to diagnose due to its similarity with other bone lesions. A multidisciplinary approach, along with the use of immunohistochemistry, is essential for accurate diagnosis and effective treatment.

Keywords: immunohistochemistry, osteoblastoma, osteosarcoma

INTRODUCTION

Osteoblastoma-like Osteosarcoma is an uncommon form of Osteosarcoma. It shares similarities with osteoblastoma in terms of clinical, radiological, and pathological characteristics. The occurrence of Osteoblastoma-like Osteosarcoma is limited to only 1% of all cases of Osteosarcoma. [1,2] Osteoblastoma-like osteosarcoma, although infrequent among osteosarcoma cases,

represents a minority of occurrences within this category. Its precise frequency and occurrence rates are uncertain due to its rarity, yet it primarily manifests in children, adolescents, and young adults. Studies have suggested a slightly higher occurrence in males when compared to females.[3]

The differentiation of osteoblastoma-like osteosarcoma from conventional osteosarcoma and other bone tumors can pose a challenge due to similarities in clinical and histological characteristics.[4] Advanced imaging methods like magnetic resonance imaging (MRI) and computed tomography (CT), in addition to histopathological analysis, are essential in accurately diagnosing the condition. These diagnostic tools play a vital role in establishing a precise and definitive diagnosis.[5]

The treatment of osteoblastoma-like osteosarcoma necessitates a comprehensive approach that combines various disciplines, such as surgery and additional therapies. The primary treatment method involves extensive surgical removal of the tumor to achieve complete eradication while ensuring clear margins. Depending on the extent of the disease and individual patient considerations, chemotherapy and radiotherapy may be considered in specific instances. [1,6]

We present a case of a 12-year-old girl diagnosed with osteoblastoma-like osteosarcoma, initially suspected to have a Giant Cell Tumor (GCT), to highlight the importance of differential diagnosis and the role of immunohistochemistry in confirming the diagnosis.

CASE PRESENTATION

A 12-year-old girl presented with complaints of pain and swelling in her right knee following a fall. The symptoms had been present for 6 months, with worsening pain over the last 2 months, leading to difficulty walking and the need for a crutch. One year ago, the patient also fell in the same area. There was no history of fever, weight loss, or lumps in other areas. On clinical examination, swelling and redness were noted in the right knee, with tenderness upon palpation. The circumference of the affected knee was 42 cm, compared to 35 cm on the healthy side. The patient experienced pain and limited movement of the right lower limb (Figure 1).

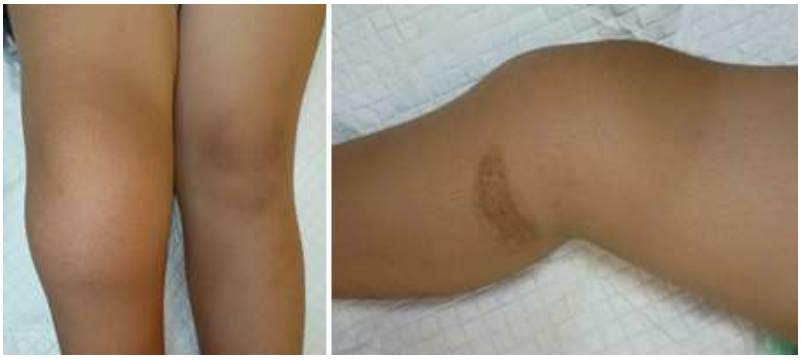

Figure 1. Clinical Condition of the Right Knee

The examinations revealed a complete blood count showing hemoglobin at 12.7 g/dL, red blood cell at 4.40/µL, white blood cell at 8,980/µL, ESR at 18 mm/hour, CRP at 0.88 mg/dL, ALP at 114 U/L, and an elevated LDH level of 265 U/L above normal limits. The patient underwent X-ray examination of the Genu Ap / Lateral and was found to have a Primary bone tumor on 1/3 proximal right os. tibia susp. Aneurysmal Bone Cyst (ABC), DD Giant Cell Tumor (GCT), and Soft Tissue Swelling of the right Genu region. With these results, we did CPC patients. The results of the first MRI and biopsy examinations for CPC patients were as follows (Figure 2).

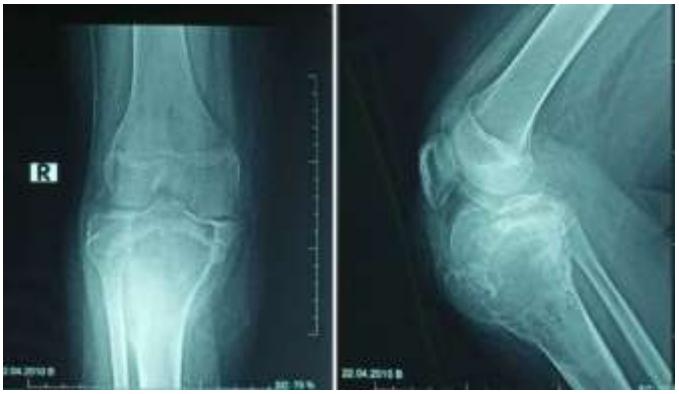

Figure 2. X Ray Right Knee

Two weeks later, the patient underwent an MRI examination of cruris dextra, and confirmed an aggressive bone tumor involving the epiphysis, metadiaphysis, and diaphysis of the proximal right os. tibia, with expansion to the anterior-posterior compartment of the right cruris region, ACL and PCL supporting Giant cell tumor (GCT) according to Campanacci type III with secondary ABC (Figure 3).

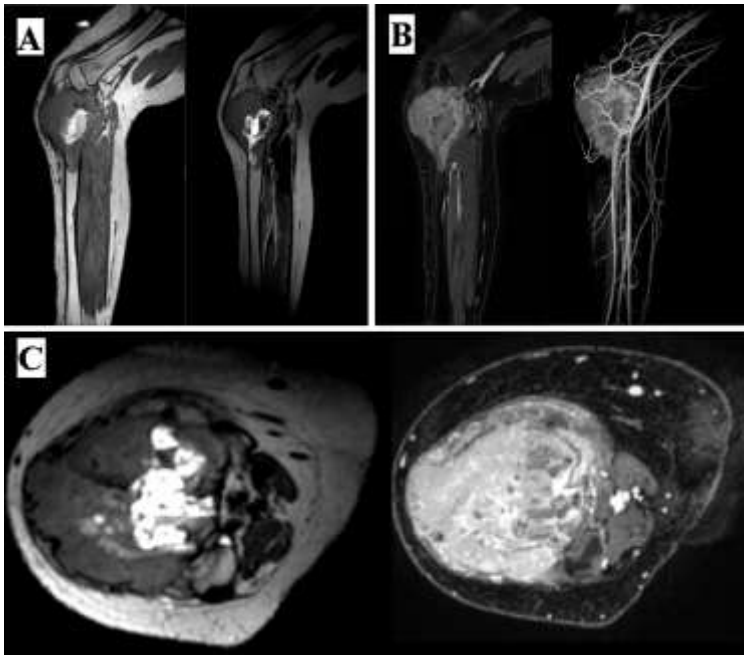

Figure 3. (A) MRI Cruris Dextra Sagittal Section, (B) MRI Cruris Dextra Sagittal Section with MRA 3D, and (C) MRI Cruris Dextra T1 & T2 Axial Section.

Core biopsy results showed suspicion of osteoblastoma-like osteosarcoma with differential diagnosis of Aggressive Osteoblastoma. We then conduct CPC again by inviting a radiologist and pathologist to conclude that the Primary bone tumor is R proximal, which suggests. Malignant dt susp Osteoblastoma Like Osteosarcoma dd Aggressive Osteoblastoma Staging IIB (G2 T2 M0) for IHK P53 examination (Figure 4).

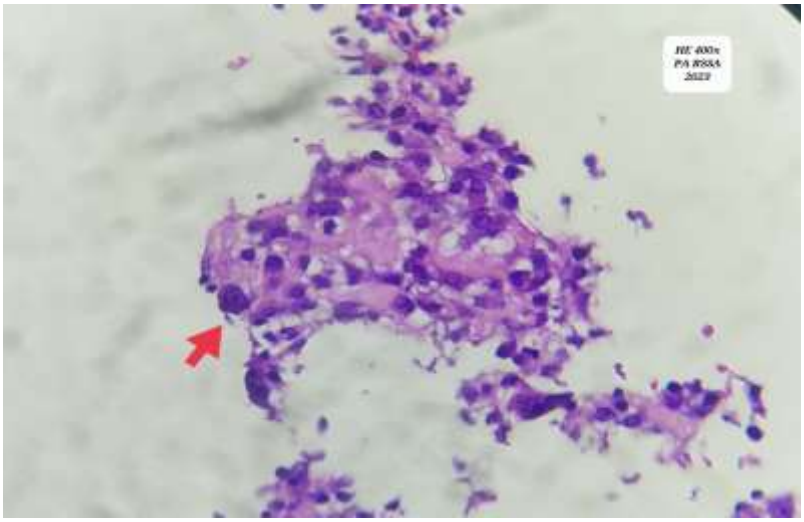

Figure 4. Core Biopsy of Proximal Right Tibia

After 1 week, the patient underwent examination for IHK P53, with results indicating a more osteoblastoma-like osteosarcoma. Based on the CPC results, we planned chemotherapy for the patient (Figure 5).

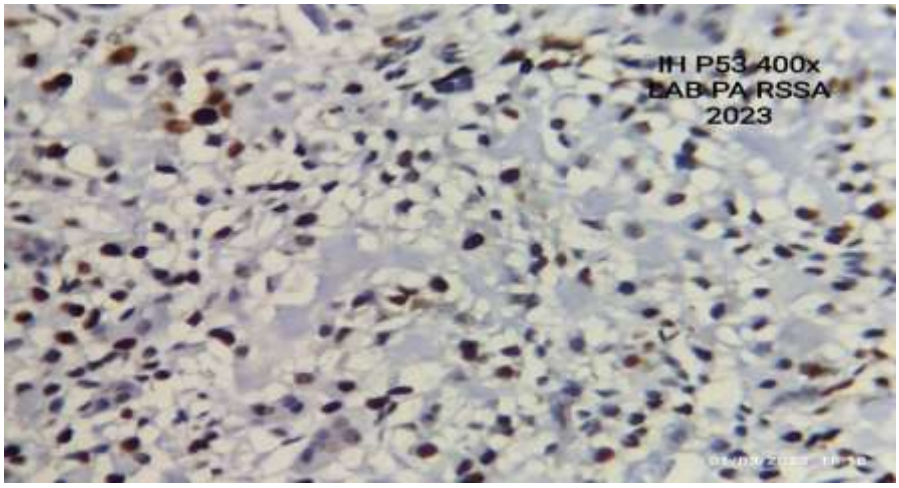

Figure 5. Picture of IHK P53

CLINICAL DISCUSSION

Osteoblastoma-like osteosarcoma is one of three categories of osteoblastic tumors, alongside osteoid osteoma and osteoblastoma. This rare form of osteosarcoma typically presents with pain, swelling, and a limited range of motion. [3,7] It affects individuals across a broad age range, spanning from 6 to 70 years old, with an average age of 25 years, and is more frequently observed in males, with a ratio of 1.22:1 male to female. The tibia, vertebrae, hand, and femur are the most commonly observed sites for Osteoblastoma-like Osteosarcoma.[8]

Osteoblastoma-like osteosarcoma is a less severe form of osteosarcoma that bears similarities to osteoblastoma. Typically, this type of tumor is characterized by a more extended clinical history and less aggressive radiographic characteristics compared to typical osteosarcoma. Additionally, when present, the periosteal reaction may exhibit benign traits, such as being lamellar and uninterrupted, as observed in our case. Occasionally, radiographs may show cortical destruction and indistinct boundaries, indicating the malignant nature of the tumor. However, features on radiographs that suggest malignancy can

also be observed in about one-fourth of osteoblastomas. [2,9]

In addition, Osteoblastoma-like Osteosarcoma has radiological imaging similar to that of Osteoblastoma. Typically, patients present with osteolytic lesions, characterized by a dilated and thickened cortex. The radiological imaging is identical to that of other benign tumors of the bone. Our patient had an imaging similar to a Giant Cell Tumor on X-ray and MRI.[10]

Histologically, the distinctive features of osteoblastoma-like osteosarcoma include round-oval tumor cells with variable plumpness, exhibiting osteoblastic characteristics. These cells possess large nuclei, which may contain noticeable nucleoli, and demonstrate mild mitotic activity. The presence of lace-like osteoid is also observed.[5] Additionally, the tumor may contain solid cellular areas devoid of bone production. Another notable characteristic is the absence of maturation towards the outer edge of the lesion, distinguishing it from osteoblastoma and aggressive osteoblastoma. Osteoblastoma-like osteosarcoma exhibits an infiltrative growth pattern where bone trabeculae become entrapped. Our cases are similar to existing theory; it is essential to distinguish this tumor from conventional osteosarcoma, which typically presents with a shorter clinical history, more pronounced radiographic findings, and histologic features indicative of higher grade. [3,9,11]

Treatment options for Osteoblastoma-like Osteosarcoma may include adjuvant therapy in the form of pre- and postoperative chemotherapy. In addition, patients can also be treated with curettage, local excision, or wide excision, with a greater success rate of wide excision compared to local excision or curettage. The recurrence rate of Osteoblastoma-like Osteosarcoma reaches 21% in patients with inadequate local excision in the exact location. Therefore, wide excision is the surgical option for patients with Osteoblastoma-like Osteosarcoma.[12]

CONCLUSION

Osteoblastoma-like osteosarcoma is a rare and challenging diagnosis due to its similarities with other bone lesions, particularly osteoblastoma. A multidisciplinary approach involving clinicians, radiologists, and pathologists is essential to establish an accurate diagnosis. Immunohistochemistry plays a critical role in differentiating this tumor from other benign and malignant bone lesions. Early diagnosis and appropriate treatment, including surgical resection and chemotherapy, are crucial for favorable outcomes.

Declaration by Authors

Ethical Approval: This study has been approved by the Dr. Saiful Anwar General Hospital Ethics Commission with number 400/023/CR/102.7/2025, which was issued on September 2, 2025

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REFERENCES

1. Limaiem F, Byerly DW, Mabrouk A, Singh R. (2025). Osteoblastoma. Treasure Island (FL): StatPearls Publishing.
2. Gambarotti M, Dei Tos AP, Vanel D, et al. Osteoblastoma-like osteosarcoma: high-grade or low-grade osteosarcoma? Histopathology. 2019;74(3):494-503. doi:10.1111/his.13746
3. Ozger H, Alpan B, Söylemez MS, et al. Clinical management of a challenging malignancy, osteoblastoma-like osteosarcoma: a report of four cases and a review of the literature. Ther Clin Risk Manag. 2016; 12:1261-1270. doi:10.2147/TCRM.S102966
4. Mesfin A, Boriani S, Gambarotti M, Bandiera S, Gasbarrini A. Can Osteoblastoma Evolve to Malignancy? A Challenge in the Decision-Making Process of a Benign Spine Tumor. World Neurosurg. 2020; 136:150-156. doi: 10.1016/j.wneu.2019.11.148
5. Hussain S, Mubeen I, Ullah N, et al. Modern Diagnostic Imaging Technique

Applications and Risk Factors in the Medical Field: A Review. Biomed Res Int. 2022; 2022:5164970. doi:10.1155/2022/5164970
6. Patrichi AI, Gurzu S. Pathogenetic and molecular classifications of soft tissue and bone tumors: A 2024 update. Pathol Res Pract. 2024; 260:155406. doi: 10.1016/j.prp.2024.155406
7. Atesok KI, Alman BA, Schemitsch EH, Peyser A, Mankin H. Osteoid osteoma and osteoblastoma. J Am Acad Orthop Surg. 2011;19(11):678-689. doi:10.5435/00124635-201111000-00004
8. Nie Z, Peng H. Osteosarcoma in patients below 25 years of age: An observational study of incidence, metastasis, treatment and outcomes. Oncol Lett. 2018;16(5):6502-6514. doi:10.3892/ol.2018.9453
9. Hermann G, Klein MJ, Springfield D, Abdelwahab IF. Osteoblastoma like osteosarcoma. Clin Radiol. 2004;59(1):105–108. doi: 10.1016/j.crad.2003.08.010
10. De Salvo S, Pavone V, Coco S, Dell'Agli E, Blatti C, Testa G. Benign Bone Tumors: An Overview of What We Know Today. J Clin Med. 2022;11(3):699. doi:10.3390/jcm11030699
11. Wu W, Zhao G, Chen J, Qian S, Shu Q. Osteoblastoma-Like Osteosarcoma of the Cuboid and Skull: A Case Report and Review of the Literature. J Foot Ankle Surg. 2020;59(1):156-161. doi: 10.1053/j.jfas.2019.05.007
12. Wu M, Xu K, Xie Y, et al. Diagnostic and Management Options of Osteoblastoma in the Spine. Med Sci Monit. 2019; 25:1362-1372. doi:10.12659/MSM.913666

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