Osteoblastoma of the rib: A rare benign tumor with an unusual location

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INTRODUCTION: Osteoblastoma is a rare benign bone tumor commonly located at spine and long bones. However, rib involvement has been reported less frequently.

PRESENTATION OF CASE: In this report, we describe a young adult male presenting with left posterolateral chest wall pain. Chest computed tomography showed a calcified tumor in the left third posterior segment of the rib. Radical mass resection was performed and histopathology confirmed a benign osteoblastoma. At last follow-up, 10 months postoperatively, the patient has eventually relieved of the unbearable chest pain. Imaging evaluation revealed no evidence of recurrent tumor.

DISCUSSION: Osteoblastoma is an uncommon primary bone tumor accounting for only 1% of all bone tumors. Ribs are involved in less than 5% of patients. The disease has usually good prognosis with a tendency for local destruction and recurrence.

CONCLUSION: Radical surgery remains the treatment of choice to prevent recurrences and to provide a definite diagnosis differentiating it from osteoblastoma-like osteosarcoma.

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1. Introduction

Osteoblastoma is an unusual tumor representing only 1% of all primary bone tumors. Practically, any part of the skeleton can be involved. The most common sites are the spine (34%) and long bones (30%) whereas thoracic cage involvement occurs very rarely. In this report, we describe a 20-year-old male who developed osteoblastoma of the third left posterior rib presenting with a persistent chest pain. The patient underwent tumor resection exhibiting an uneventful clinical course till the time this report is written.

2. Case report

A 20-year-old male was referred to the authors’ department in July 2011 with a six-month history of pain at left lateral hemithorax. The pain was continuous albeit partially alleviated by common analgesics. However, it had been more intense the last month before admission thus forcing our patient to seek medical assistance. His past medical history was unremarkable.

On clinical examination, tenderness was noted between the third and fifth left ribs posteriorly. Sometimes, the pain was radiated to the ipsilateral shoulder girdle. The lung fields were resonant and clear. Basic laboratory tests were within normal range. Chest radiograph revealed an increased radio-density at the level of the left posterior third rib. Further imaging evaluation with multislice chest computed tomography demonstrated an expansile lesion involving the posterolateral segment of the left third rib. The mass was rather well-demarcated and ossified with a diameter of 6.4 cm × 4.3 cm without involvement of adjacent ribs, pleura, soft tissues and the underlying lung (Fig. 1).

A radical resection of the mass through left lateral thoracotomy at the third intercostal space was carried out. Grossly, a whitish-gray and stony-hard mass measuring 9.5 cm × 5 cm × 5 cm was found arising from the third rib. The tumor was sharply defined with no apparent cortical disruption and extension to contiguous soft tissues and ribs. Microscopically, the tumor was consisted of numerous irregular and broad anastomosing trabeculae of osteoid and immature woven bone. The trabeculae were lined by a single layer of osteoblasts within a loosely textured fibrovascular stroma (Fig. 2). Based on these findings, benign osteoblastoma was diagnosed. The postoperative course was uneventful and the patient was discharged on the tenth day. On follow-up examination at six months, he was well and active without any evidence of tumor recurrence.

3. Discussion

Osteoblastoma is an uncommon primary bone tumor accounting for only 1% of all bone tumors and approximately 3.5% of all benign bone tumors. The most commonly involved sites are the spine and long bones, followed by the feet, hands, skull, maxilla,
Osteoblastoma affects twice as many males as females. Roughly, 90% of cases are diagnosed before the fourth decade of life. Progressive pain is the main symptom, localized at the tumor site. It is usually a dull pain, sometimes worse at night and is not relieved with salicylates, as it occurs with osteoid osteomas. The involved bone may be expanded and appear as a palpable mass with associated tenderness and swelling. Moreover, osteoblastomas may occasionally be asymptomatic and are diagnosed incidentally on routine radiological evaluation.

The radiographic appearance of osteoblastoma is however nonspecific as it may arise in an intramedullary, intracortical or periosteal location thus providing features that can be easily misconstrued as typical findings of other benign or malignant bone tumors. Particularly, rib osteoblastoma radiologic findings have not been well identified because of its rarity. Nevertheless, three patterns are more frequently described: a lesion >2 cm in diameter with more striking periosteal reaction; a lesion with very expansive behavior, similar to an aneurysmal bone cyst, and multiple central small calcifications, a thin shell of peripheral periosteal bone as well as a well-defined margin; and a more aggressive type with bone expansion and destruction, adjacent soft tissue permeation and intermingled matrix calcification. Furthermore, CT scans and MRI are valuable tools in diagnosis as they can provide useful information regarding the size, precise location, and any soft tissue extension of the lesion as well as the planning of a surgical procedure.

Histologically, osteoid osteoma and osteoblastoma are similar primary bone tumors, containing osteoblasts that produce osteoid and woven bone. Osteoblastoma, however, is larger, tends to be more aggressive, and can undergo malignant transformation, whereas osteoid osteoma is small and benign demonstrating self-limited growth potential. Osteoid osteoma differs also clinically from osteoblastoma in that it produces excruciating pain which is worse at night but can be relieved by analgesics. Malignant degeneration of osteoblastoma and progression to osteosarcoma has been rarely described and mostly in recurrent tumors. Pathologically, there is a subset of osteosarcomas that resembles and can be misdiagnosed as osteoblastoma. The absence of dysplastic changes and mitoses, the orderly arrangement of normal appearing osteoblasts as well as the lack of permeative growth or infiltration beyond the borders of the tumor into adjacent structures are essential histological findings for differentiating osteoblastoma from osteosarcoma. Osteoblastoma’s recurrence rate is as high as 22% despite its benign nature and is contingent upon the size, location, and resectability of the entire lesion. The natural history of osteoblastomas, when they are not amenable to resection, is to continue to expand and damage the bone and contiguous structures. Their clinical outcome correlates with the location such that tumors in short and flat bones as well as in the central neural axis exhibit more aggressive behavior. Therefore, the treatment is radical surgical resection for minimizing the likelihood of a local recurrence.

Osteoblastoma is a rare benign bone tumor which can mimic various other benign or malignant bone tumors thus rendering its diagnosis more challenging for the treating physician. There have been a handful of reported cases involving the ribs. The disorder generally portends a good prognosis with a tendency for local destruction and recurrence. Radical surgery remains the treatment of choice to prevent recurrences and to provide an accurate diagnosis distinguishing it from osteoblastoma-like osteosarcoma.

Conflict of interest statement

None.

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Ethical approval

Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

Authors’ contributions

SK prepared the manuscript and approved the final version. SA performed pathology tests from surgical specimen. TS carried out surgical resection of the tumor.

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