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Chondroblastic Osteosarcoma of the Clavicle: A Rare Case Report

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ABSTRACT

Introduction: Osteosarcoma is the most common primary malignant bone tumor, typically arising in the metaphyseal regions of long bones. Clavicular osteosarcoma is exceedingly rare, accounting for less than 1% of all osteosarcomas. Chondroblastic osteosarcoma is a histologic subtype characterized by the presence of chondroid matrix in addition to the typical osteoid component. This case report aims to present the diagnosis and management of a rare case of chondroblastic osteosarcoma of the clavicle and discuss the relevant literature on the topic.

Case Presentation: A 21-year-old male presented with a growing lump on his left neck since nine months ago. The patient underwent biopsy which revealed chondroblastic type osteosarcoma in the left medial clavicle. He had received four series of neoadjuvant cisplatin and doxorubicin. Tumor resection was done with thoracic surgeon backup. Postoperative care included immobilization with collar brace and arm sling, active distal range of motion exercises, and regular wound care.

Discussion: Clavicular osteosarcoma is exceedingly rare, accounting for less than 1% of all osteosarcomas. Clavicle has a unique characteristic from other long bone and flat bone which supported the fact that that clavicle had low incidence of bone tumor. Neoadjuvant chemotherapy, followed by surgical resection and postoperative adjuvant chemotherapy, has been the mainstay of treatment for osteosarcoma. primary goal of surgery is to achieve wide en bloc resection with negative margins while preserving function. Prognosis of clavicular osteosarcoma is not well-established due to the rarity of the condition. Long-term follow-up is crucial for monitoring local recurrence and detecting distant metastases.

Conclusion: The diagnosis and management of clavicular osteosarcoma can be challenging due to its uncommon location and proximity to vital structures. A multidisciplinary approach is essential for optimal management and improved survival outcomes in such cases. Further studies and case reports are necessary to better understand the prognostic factors and long-term outcomes for patients with clavicular osteosarcoma.

Keywords: chondroblastic osteosarcoma, clavicle, primary malignant bone tumor, tumor resection.

INTRODUCTION

Osteosarcoma is the most common primary malignant bone tumor, accounting for approximately 35% of all primary bone sarcomas, with a predilection for the

metaphyseal regions of long bones such as the distal femur, proximal tibia, and proximal humerus (1). Clavicular osteosarcoma, however, is exceedingly rare, representing less than 1% of all osteosarcomas (2). Chondroblastic osteosarcoma is a histologic subtype characterized by the presence of chondroid matrix in addition to the typical osteoid component, and it accounts for approximately 25% of all osteosarcomas (3). The rarity of clavicular osteosarcoma poses diagnostic and therapeutic challenges, given the clavicle's anatomical proximity to vital structures and the scarcity of literature to guide management. In this report, we present the case of a 21-year-old male with chondroblastic osteosarcoma of the clavicle and discuss the relevant literature on the topic.

CASE REPORT

A 21-year-old male, with a BMI of 32.1 kg/m2, presented with a chief complaint of a lump on his left neck that had been progressively enlarging for the past nine months. The patient reported that the lump was associated with pain which tended to subside upon moving the shoulder. There was no history of defecation disorders, weight loss, prolonged cough, decreased appetite, lumps in other body parts, night sweats, or recurrent fever. Patient had a history of falling on his left arm but did not have further complained other than local pain. The patient had a family history of lymph node disease in his uncle. He had undergone four series of neoadjuvant cisplatin and doxorubicin chemotherapy (July, August, September, and October 2022). The patient was a senior high school student with no significant past medical history.

Physical examination of the left shoulder region revealed a lump measuring 8 x 3.5 cm, with minimal tenderness and an ill-defined margin [Figure 1]. There was no evidence of venectasis, shiny skin, or deformity, but a post-biopsy scar was present. Active range of motion (ROM) in the left shoulder was limited.

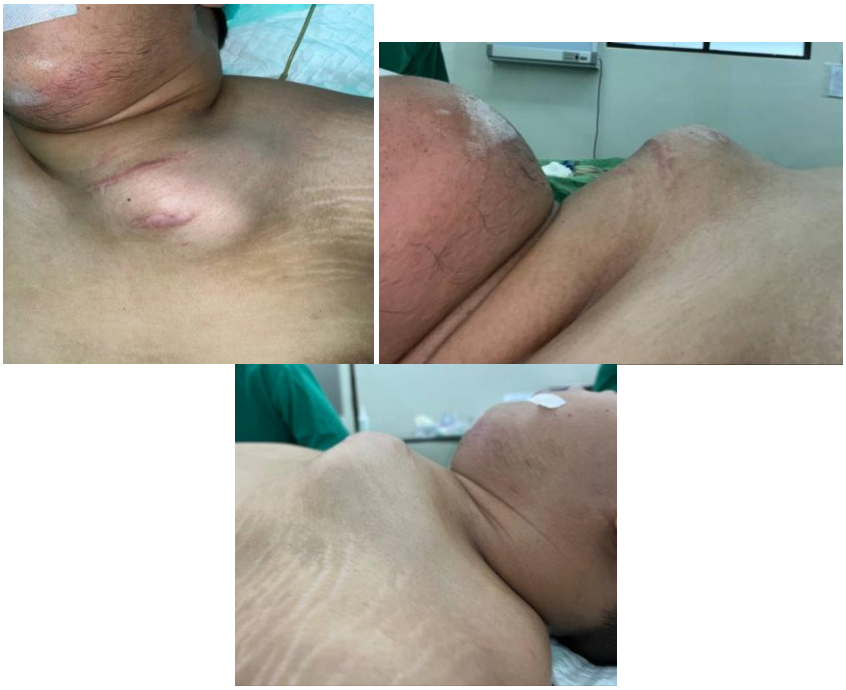


Figure 1. Clinical presentation of the lump at left clavicle proximal third with the size of size 8 x 3.5 cm, hard consistency, immobile, ill-defined margin, and minimal tenderness.

Imaging studies, including left shoulder X-ray [Figure 2], chest CT-scan [Figure 3], and bone survey X-ray [Figure 4], demonstrated permeative lytic lesions with pathological fracture involving the left clavicle and a primary malignant bone tumor, suspicious

for osteosarcoma. The MRI of the left shoulder [Figure 5] revealed a pathological fracture with primary malignant bone tumor in the medial clavicle, involving the periosteum and adjacent soft tissue, extending into the sternoclavicular joint and sternum. Multiple suspicious lymphadenopathies were also noted in the neck, supraclavicular, infraclavicular, and axillary regions. Biopsy results from the supraclavicular region indicated a lipomatous tumor. Laboratory results were within normal limits, except for a mildly decreased platelet count of 114 x 10^3/µL (normal range: 150-440 x 10^3/µL).

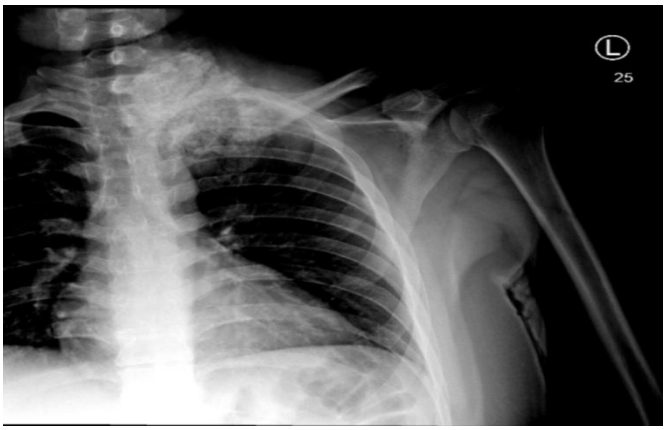


Figure 2. Left shoulder X-ray AP view revealed a permeative osteolytic lesion with a pathological fracture involving the medial clavicle and the sternoclavicular joint, along with an adjacent soft tissue mass, suggestive of a primary malignant bone tumor, suspicious for osteosarcoma.

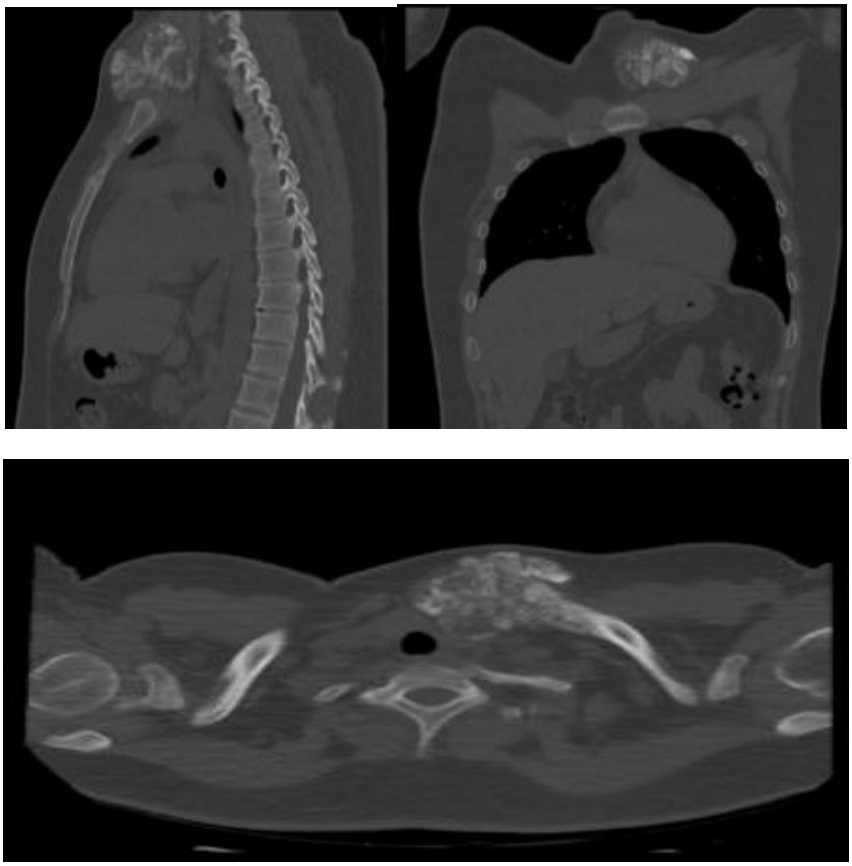


Figure 3. CT scan of thorax shows permeative lytic and sclerotic lesion in the left third medial clavicle with wide transitional zone. Matrix chondroid showed rings and arcs calcification and endosteal scalloping with broaden ossified soft tissue. CT-Scan showed primary malignant bone tumor of chondroblastic osteosarcoma with differential diagnosis of chondrosarcoma.

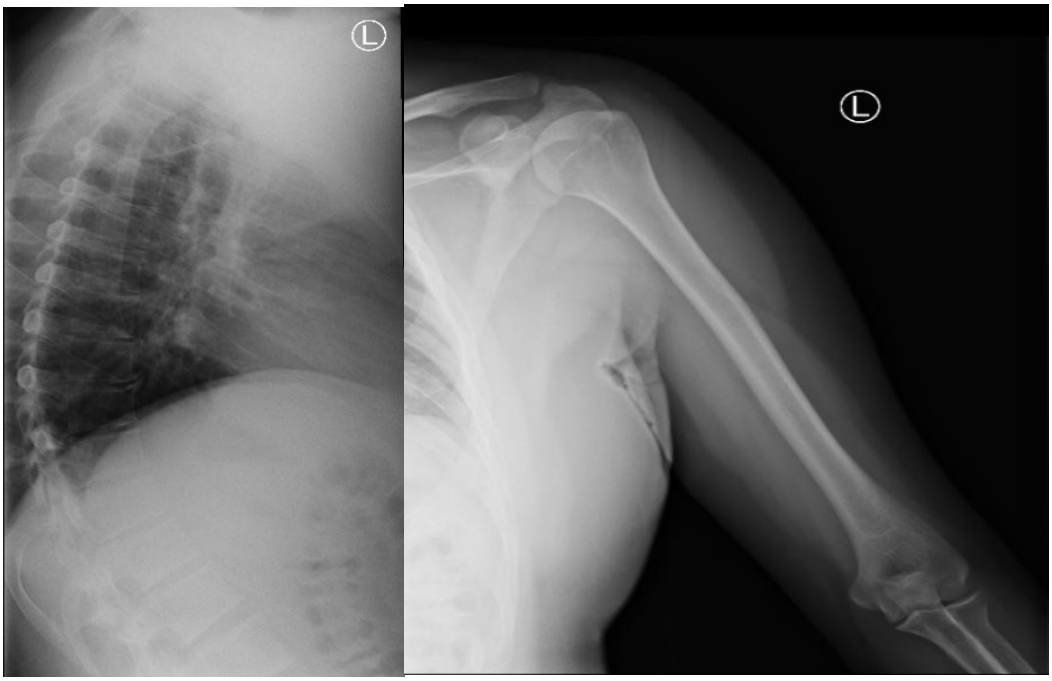


Figure 4. Bone survey showed oval opacity with soft tissue density, partial ill defined margin, and inner calcification at left C7-T1. No metastasis on lungs, heart, nor other bones.

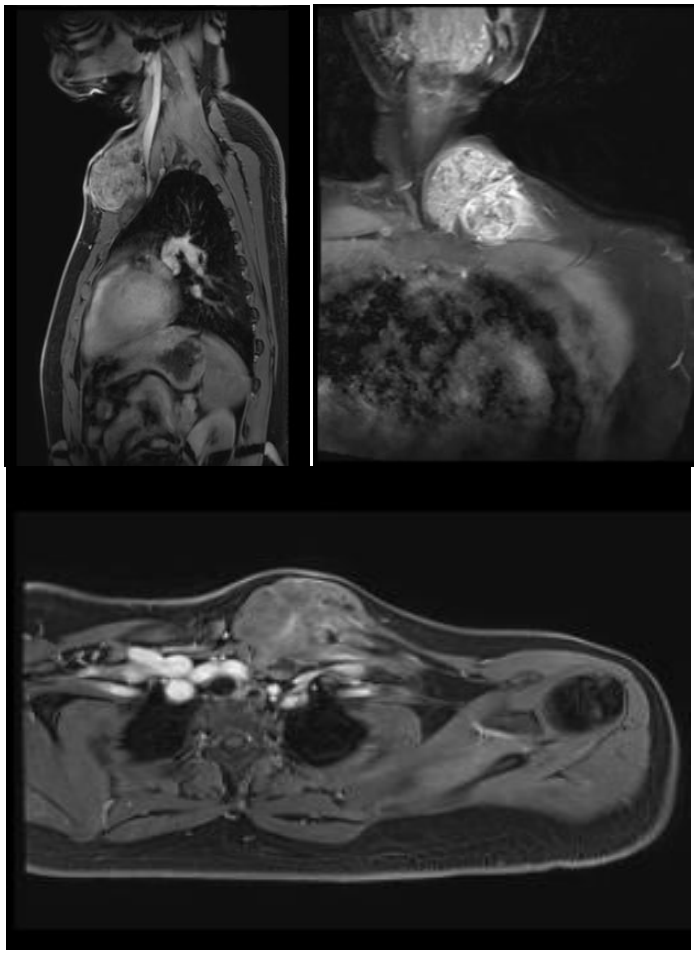


Figure 5. The MRI of the left shoulder revealed a pathological fracture with primary malignant bone tumor in the medial clavicle, involving the periosteum and adjacent soft tissue, extending into the sternoclavicular joint and sternum. Multiple suspicious lymphadenopathies were also noted in the neck, supraclavicular, infraclavicular, and axillary regions.

The patient was diagnosed with primary malignant bone tumor of the left medial clavicle, chondroblastic type osteosarcoma, following neoadjuvant chemotherapy (4 series). The treatment plan involved tumor resection with thoracic surgeon backup.

During the operation, the tumor mass was excised widely along with the distal clavicle and the proximal manubrium sterni [Figure 6]. Incision was made from the anterior approach and lengthen to the medial and lateral. Tumor mass was released from the adjunctant soft tissue. Tumor mass [Figure 7] was located from the distal clavicula until manubrium sterni. Durante bleeding was around 200ml. A drain was placed, and the wound was closed in layers. Histopathological examination of the left supraclavicular biopsy [Figure 8] showed hyperplasia of mesenchymal neoplastic cell with the shape of oval until stellate, pleomorphic nucleus, irregular membrane, small prominent nucleolus. Beside those cells, there were differentiated chondroblast cell inside the lacuna between the chondroid matrix which had pleomorphic, hyperchromatic nucleus and small prominent nucleolus. Mitosis was also found. This patient was confirmed with the diagnosis of chondroblastic type osteosarcoma.

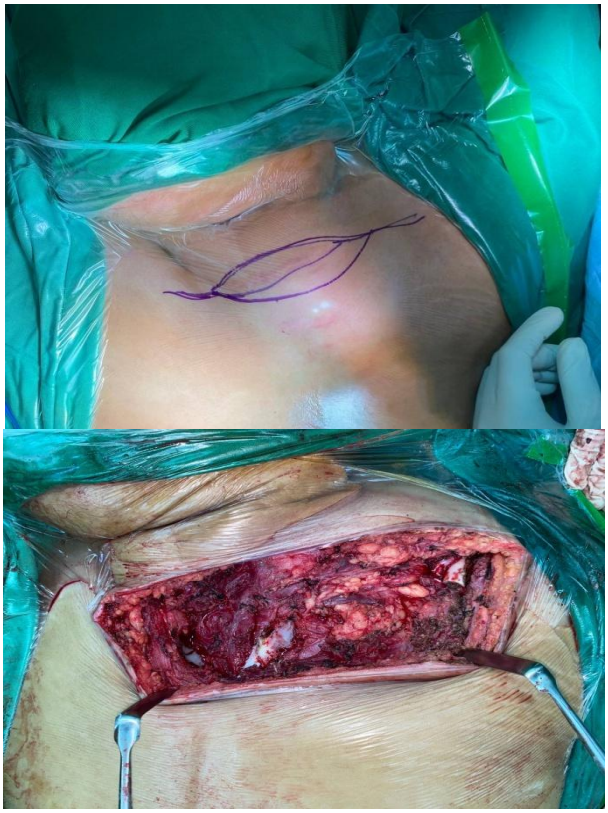
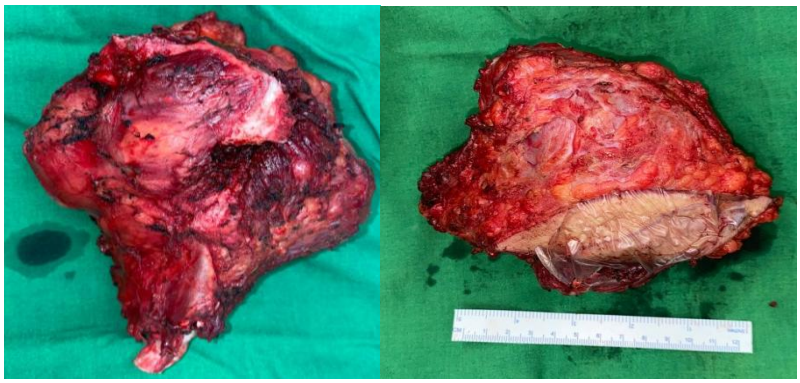


Figure 6. Surgical site of tumor wide resection. Incision was made from the anterior approach and lengthen to the medial and lateral. Tumor was located along the distal clavicle and proximal manubrium sterni.



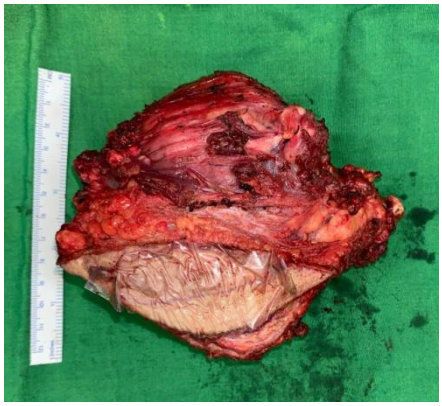
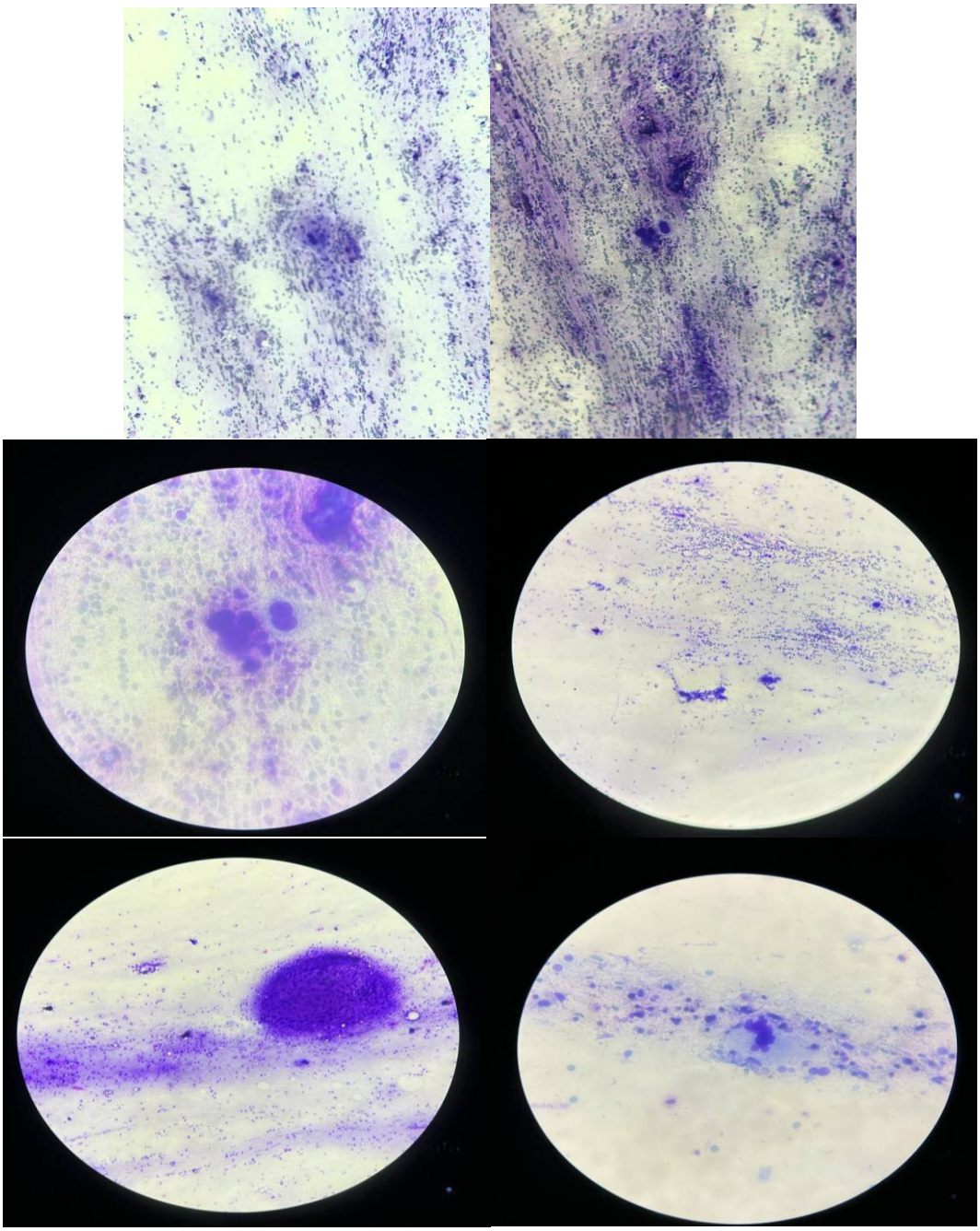


Figure 7. Gross appearance of chondroblastic osteosarcoma



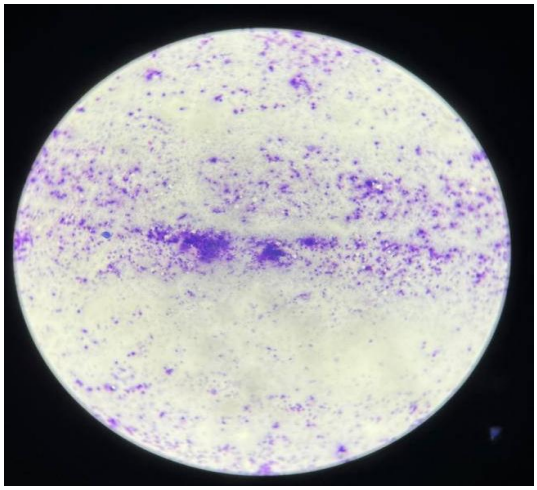


Figure 8. Histopathologic examination of the tumor. The result showed hyperplasia of mesenchymal neoplastic cell with the shape of oval until stellate, pleomorphic nucleus, irregular membrane, small prominent nucleolus with no necrotic area. There were differentiated chondroblast cell inside the lacuna between the chondroid matrix which had pleomorphic, hyperchromatic nucleus and small prominent nucleolus. Mitosis was also found.

Postoperative assessment revealed no active bleeding and good distal vascular perfusion. The patient was treated with ceftriaxone, analgesics, and immobilized using a collar brace and arm sling. We diagnosed the patient with Primary Malignant Bone Tumor ec Ostesarcoma HUVOS Grade I. Active distal ROM exercises were prescribed and the patient was monitored for 24 hours. Wound care was performed every three days or when necessary, and the patient was instructed in bladder training.

DISCUSSION

The diagnosis and management of clavicular osteosarcoma can be challenging due to its uncommon location and proximity to vital structures. A multidisciplinary approach, involving orthopedic oncologists, radiologists, pathologists, and thoracic surgeons, is essential for optimal management and improved survival outcomes in such cases (4). Clavicular osteosarcoma is exceedingly rare, accounting for less than 1% of all osteosarcomas (2). Clavicle has a unique characteristic from other long bone and flat bone. This is the first bone that ossified in the embrio with two primary ossification centers at 6 weeks and fused at the age of 25. It contained less amount of red marrow because there is not significant medullary cavity so the vascular supply is poor. This fact is supporting that clavicle had low incidence of bone tumor (4). Histopathology of tumour might change post neoadjuvant chemotherapy and eventually affect its Huvos score. Huvos score could be used as outcome predictor postoperative chemotherapy regimen. A study showed that patient with tumor necrosis of more than 90% corresponding to grades III and IV Huvos score had good prognosis, while patient with tumor necrosis of less than 90% corresponding to grades I and II had bad prognosis. In this case, we did not find any necrotic area in histopathology. This is because our patient had received neoadjuvant cisplatin and doxorubicin chemotherapy for four months (5).

Neoadjuvant chemotherapy, followed by surgical resection and postoperative adjuvant chemotherapy, has been the mainstay of treatment for osteosarcoma (6). The primary goal of surgery is to achieve wide en bloc resection with negative margins while preserving function (7). In our case, the patient underwent tumor resection with thoracic surgeon backup after receiving neoadjuvant chemotherapy, which is in line with the current standard of care for osteosarcoma.

The prognosis of clavicular osteosarcoma is not well-established due to the rarity of the condition. However, factors such as tumor

size, histologic subtype, and response to neoadjuvant chemotherapy have been reported to influence the prognosis of osteosarcoma in general (8). In our case, the patient had chondroblastic osteosarcoma, which is considered an intermediate-grade subtype in terms of aggressiveness (9). The patient's response to neoadjuvant chemotherapy and the achievement of negative surgical margins may have a favorable impact on his prognosis.

Long-term follow-up is crucial for monitoring local recurrence and detecting distant metastases. Pulmonary metastases are the most common form of distant spread in osteosarcoma, occurring in approximately 15% of cases (10). In our case, no metastases were identified at the time of diagnosis, but long-term surveillance with periodic imaging studies is necessary to monitor for potential disease progression.

CONCLUSION

In conclusion, this case report highlights the diagnostic and therapeutic challenges associated with the rare occurrence of chondroblastic osteosarcoma in the clavicle. A multidisciplinary approach is essential for optimal management and improved survival outcomes in such cases. Further studies and case reports are necessary to better understand the prognostic factors and long-term outcomes for patients with clavicular osteosarcoma.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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