

Case Report

Chondrosarcoma of the Sternum: A Rare and Challenging Entity

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Abstract:

Background: Chondrosarcoma is a relatively common primary malignant bone tumor, with the sternum being an unusual location. When this tumor arises in the sternum, clinicians encounter diagnostic and therapeutic complexities. Indeed, the sternal location warrants attention due to its potential for local invasion, metastasis, and poor prognosis. Nonetheless, optimal treatment strategies remain contentious, hampered by the limited number of reported cases and a scarcity of dedicated research on sternal chondrosarcomas.

Case presentation: A 82-year-old male, presented with sternal pain. CT scan, revealed loss of sternal continuity and a destructive mixed lesion involving the sternal body with extensive cortical lysis and infiltration of adjacent soft tissues. A biopsy confirmed the diagnosis of grade II chondrosarcoma without evidence of metastasis. The patient underwent surgical resection due to the absence of metastasis.

Discussion: sternal chondrosarcoma is a relatively frequent primary malignant bone tumor. Imaging techniques, including X-ray, CT, MRI, and PET scans, play a crucial role in diagnosis. Management of this tumor involves surgical resection with the goal of complete tumor removal. Prognosis depends on factors such as cancer stage, histological grade, tumor size, presence of metastases, and response to treatment. High grade and larger tumors, the presence of metastases are associated with a poorer prognosis.

Keywords: Bone neoplasms, Chondrosarcoma, elderly

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Introduction

Chondrosarcoma is a frequent tumor among the primary malignant bone tumors (1/3 of the primary malignant bone tumors), it comes in second place after osteosarcoma(1). It occurs in adults after the age of forty, its evolution is slow and often relatively asymptomatic(2). The most common locations are the pelvis and the proximal femur (3). The treatment is based on a large surgical excision(1). The sternum is an unusual location for chondrosarcoma development, and its occurrence poses diagnostic and therapeutic challenges for clinicians.(3)

Despite its rarity, chondrosarcoma of the sternum warrants attention due to its potential for local invasion, metastasis, and poor prognosis(4). The optimal treatment strategies for this tumor remain

controversial, partly due to the limited number of reported cases and the lack of large-scale studies focusing specifically on sternal chondrosarcomas.(4, 7) We report in this article a case report of sternal chondrosarcoma in elderly patient.

Case report:

An 82-year-old male with a medical history of atrial fibrillation under anticoagulation and hypertension under Angiotensin-Converting Enzyme inhibitor, presented to the internal medicine department with sternal pain. Physical examination revealed a painful sternal swelling, while cardiac and pulmonary auscultations were unremarkable, and blood pressure was within normal limits. Electrocardiogram results revealed atrial fibrillation, while cardiac echography and cardiac enzyme levels were normal.

Radiological findings from a standard sternal radiograph demonstrated loss of sternal continuity. Subsequent thoracic CT scan revealed a destructive mixed lesion involving the sternal body with extensive cortical lysis of suspicious appearance and infiltration of adjacent soft tissues (Figure 1). Extensive investigations, including thoracic-abdominal-pelvic CT scan, vesico-prostatic and cervical ultrasound scan, were performed to identify a possible primary tumor; however, no abnormalities were found. Laboratory analysis showed no evidence of renal failure, hypercalcemia, anemia, or monoclonal peak on PSA testing.

A surgical biopsy was performed, and histopathological examination confirmed the diagnosis of grade II chondrosarcoma (Figure 2, 3). No evidence of metas-

tasis was found. The patient was subsequently referred for surgery. During the intraoperative procedure, a well-defined mass consistent with preoperative imaging findings was identified. Sternal tumor resection followed by reconstruction with titanium mesh was performed. Postoperatively, the patient has shown a favorable recovery trajectory, characterized by the absence of significant adverse events. The definitive histopathological examination of the surgical specimen revealed incomplete excision margins, leading to the patient being referred for adjuvant radiotherapy.

sternal tumor resection and reconstruction with titanium mesh with a favorable postoperative course

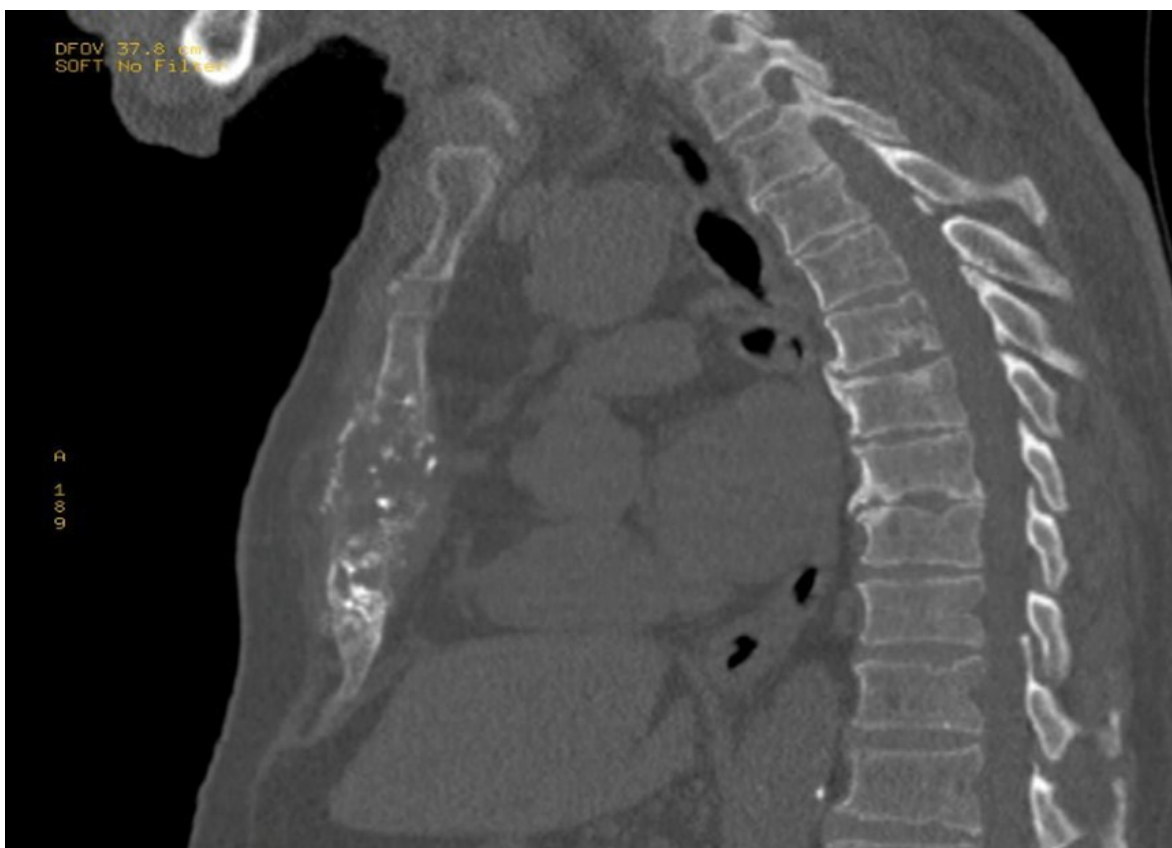


Figure 1: CT scan reconstruction revealed a destructive mixed lesion involving the sternal body with extensive cortical lysis of suspicious appearance and infiltration of adjacent soft tissues

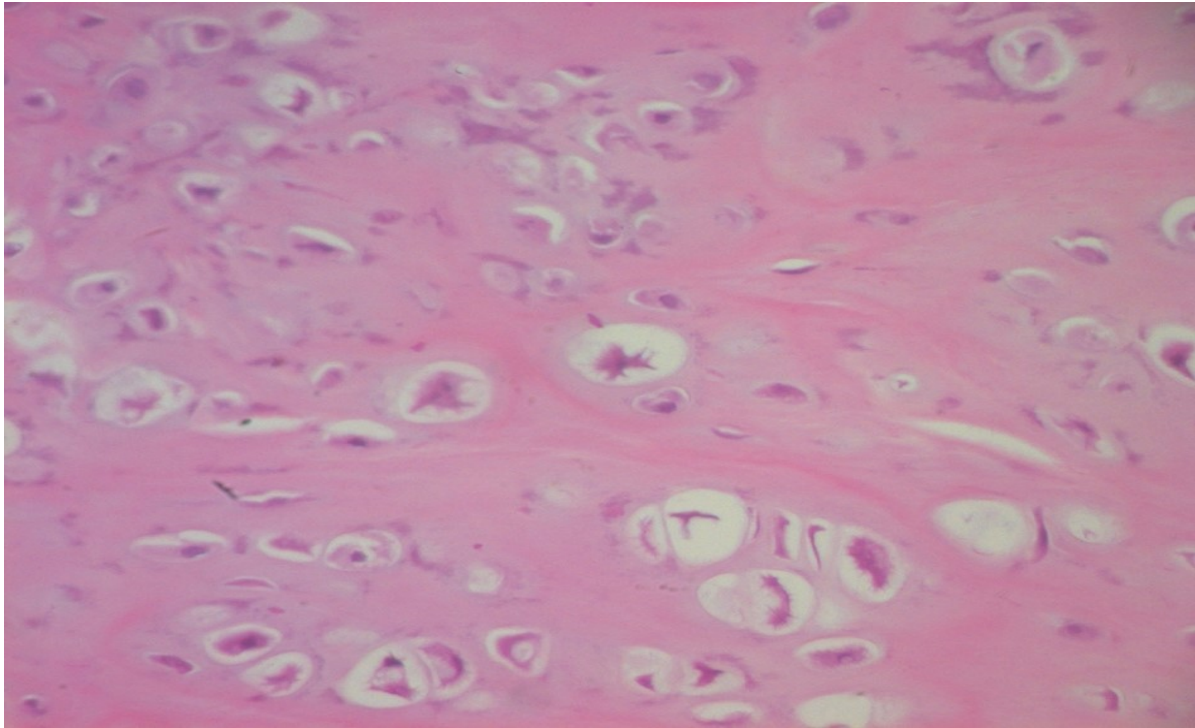


Figure2: HE stain *400: proliferation of enlarged chondrocytes with pleomorphic atypical nuclei

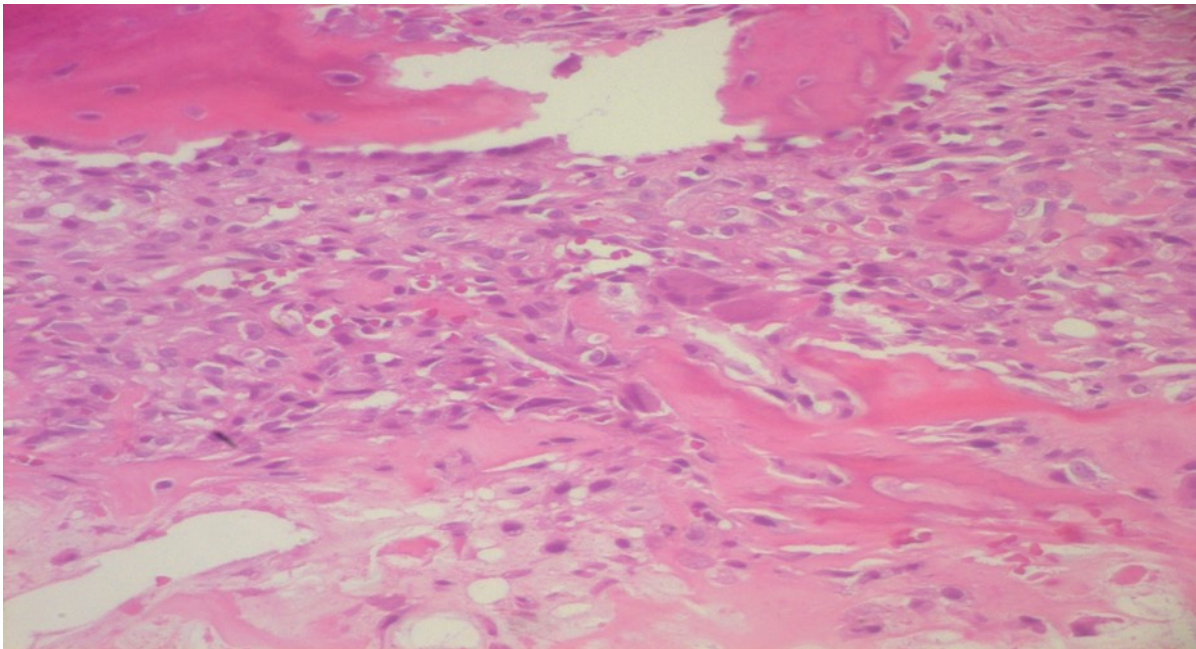


Figure 3: HE stain*100: permeation of intertrabecular space by neoplastic cells

Chondrosarcoma is a malignant tumor originating from cartilaginous tissue, typically occurring in the extremities and the axial skeleton(2). Primary chondrosarcoma of the sternum is an exceptionally rare presentation and it represents less than 1% of malignant bone tumors(4). Our patient's atrial fibrillation history and concurrent chest pain initially steered suspicion towards a cardiac source, obscuring the less common possibility of sternal chondrosarcoma. This highlights the challenge of differentiating a rare presentation from a more established diagnosis. Radiographic imaging, such as the thoracic CT scan, played a crucial role in revealing the distinct characteristics of the tumor. (7). X-ray imaging is often the initial modality used for evaluating suspected sternum tumors. In chondrosarcoma of the sternum, X-rays may reveal irregular or lytic areas within the bone(8). Computed tomography (CT) scans are frequently employed to obtain more detailed images of the sternum and surrounding structures. CT scans can provide cross-sectional views and help evaluate the extent of the tumor, including its size, location, and involvement of adjacent tissues. CT scans can also aid in identifying any cortical destruction or invasion into adjacent structures, such as the ribs or mediastinum(12).

Magnetic resonance imaging (MRI) is another valuable imaging modality for assessing chondrosarcoma of the sternum (9). Chondrosarcomas appear as heterogeneous lesions on MRI, with areas of low to intermediate signal intensity on T1-weighted images and high signal intensity on T2-weighted images(9). In addition to these imaging modalities, positron emission tomography (PET) scans can be utilized to determine the extension of disease (10).

Overall, a combination of X-ray, CT, MRI, and PET imaging plays a crucial role in the evaluation of chondrosarcoma of the sternum. These imaging techniques aid in establishing a diagnosis, assessing tumor extent, and identifying potential metastatic disease, thereby facilitating appropriate treatment decisions.

Management of sternal chondrosarcoma typically involves surgical resection with the goal of achieving complete tumor removal(4). In our case, given the absence of metastasis and the patient's overall health status, the decision to pursue surgical removal was made.

The prognosis of sternum chondrosarcomas depends on several factors (tumor size, presence of metastases, and response to treatment) but the histological grade of the chondrosarcoma is the most important factors in determining prognosis (4),(7). Sternal chondrosarcoma can occur at any age, but it's less frequent in elderly patients like the one presented here. This highlights how this case deviates from the typical presentation, adding to its unique character.

This case emphasizes the importance of considering sternal chondrosarcoma in the differential diagnosis for sternal swelling, even in patients with cardiovascular disease history. By including this possibility early on, clinicians can avoid delays in diagnosis and ensure a more complete evaluation for the patient.

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