Case Reports

Chondromyxoid Fibroma of the Sternum in a 63-Year-Old Woman

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Primary chondromyxoid fibroma is a benign bone tumor. Its localization in the sternum is quite rare; we found only 6 relevant reports. We report our diagnosis and treatment of a chondromyxoid fibroma in the sternum of a 63-year-old woman. The patient underwent subtotal sternectomy and chest-wall reconstruction with use of a titanium rib bridge system and Prolene mesh. The patient's clinical course was uneventful, and she had no local recurrence 41 months postoperatively. Our review herein of the 6 previous cases reveals that our patient is the oldest thus far to have been diagnosed with a sternal chondromyxoid fibroma.
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Chondromyxoid fibroma (CMF) is a benign bone tumor that constitutes 0.5% to 1% of primary bone neoplasms.[1] It typically occurs in the metaphyses of long bones such as the tibia; its localization in the sternum is extremely rare. We present a case of primary CMF of the sternum, and we review the few previously reported cases.

Case Report

In November 2010, a 63-year-old-woman was admitted to our hospital with chest pain and a 10-year history of swelling of the sternum. She had an irregular, palpable mass (diameter, 10 cm) in the upper two thirds of the sternum (Fig. 1). A radiograph revealed a bone tumor in the sternum. A computed tomogram (CT) showed an osteolytic lesion with discrete calcific deposits in the sternal bone marrow (Fig. 2). Positron emission tomography (PET) of the mass with ^{18}F-fluorodeoxyglucose (^{18}F-FDG) contrast medium revealed a maximal standardized uptake value (SUV max) of 5.7. Upon histologic analysis, a biopsy specimen obtained with use of an ultrasonographically guided Tru-Cut® needle (CareFusion Corporation; Waukegan, Ill) yielded a benign tumor. The tumor had a slightly lobular architecture and was

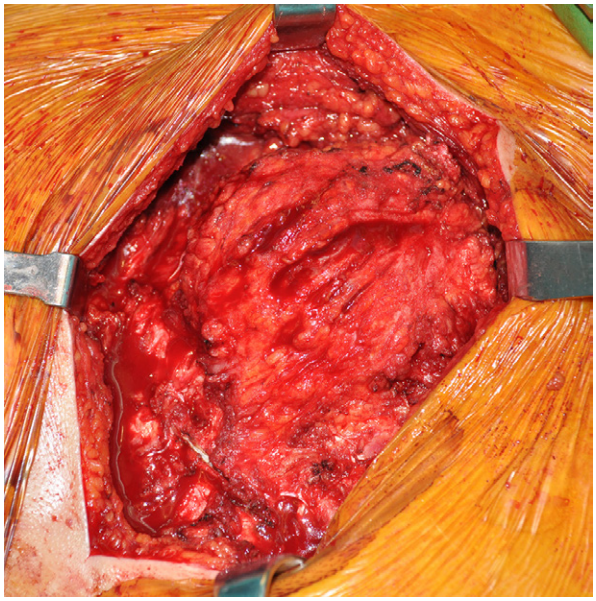

Fig. 1 *Intraoperative photograph shows a mass on the sternum.*

Key words: *Bone neoplasms/diagnosis/surgery; chest pain/etiology; chondroma/radiography/surgery; fibroma/diagnosis; fluorodeoxyglucose F18/diagnostic use; prostheses and implants; reconstructive surgical procedures/methods; sternum/pathology/surgery; thoracic neoplasms/diagnosis/surgery; treatment outcome*

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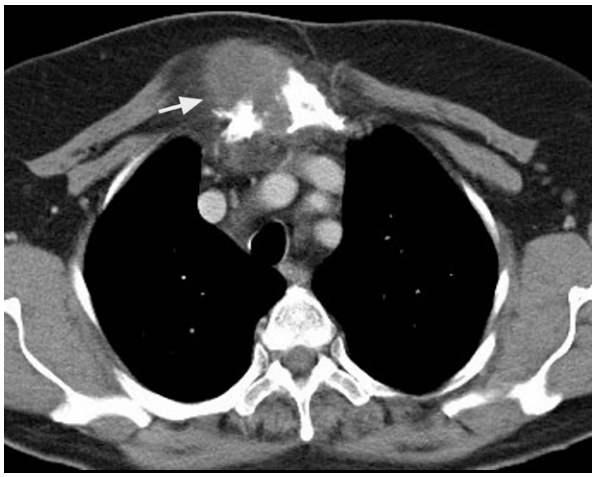

Fig. 2 *Computed tomogram shows an osteolytic lesion with discrete calcification in the bone marrow of the upper sternum.*

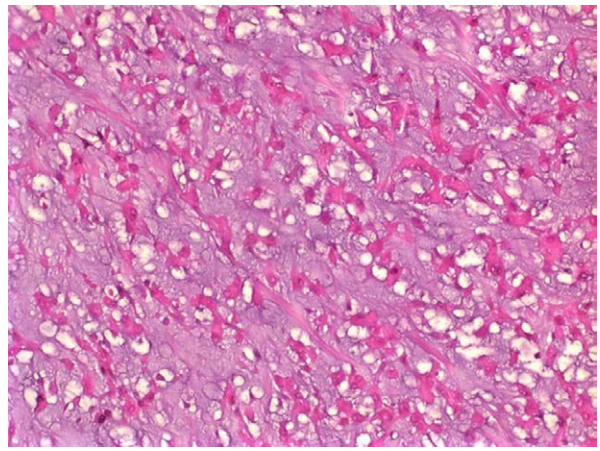

Fig. 3 *Photomicrograph shows moderate nuclear enlargement and prominent eosinophilic cytoplasmic processes (H & E, orig. ×200).*

TABLE I. Reports of Chondromyxoid Fibroma of the Sternum

Reference	Age (yr)	Sex	Symptoms (duration)	Diagnosis		Tumor Size (cm)	Follow-Up (mo)**
				Preoperative Histologic	Preoperative Radiologic		
Teitelbaum SL and Bessone L[2] (1969)	17	F	Precordial pain and mass (3 mo)	ABC and CMF	ABC	12 × 5.5	24
Alonso-Lej F and De Linera FA[3] (1971)	53	M	Dyspnea and mass (1 yr)	Benign lesion	Benign lesion	20 × 16 × 6*	18
Wuisman P, et al.[4] (1993)	43	M	Chest pain (6 mo)	CMF	Chondrosarcoma	Unspecified	12
Lyzak JS, et al.[5] (1996)	35	F	Chest pain (3 yr)	None	Chondrosarcoma	3.7 × 1.7	1.5
Song DE, et al.[6] (2003)	47	M	Chest pain (7 yr)	CMF	Chondrosarcoma	8 × 5.5 × 3	10
Takao E, et al.[7] (2006)	17	M	Chest pain (2 yr)	CMF	Malignant cartilaginous tumor	Unspecified	42
Current case	63	F	Chest pain and mass (10 yr)	Benign lesion	Chondrosarcoma	10 × 9 × 5	41

ABC = aneurysmal bone cyst; CMF = chondromyxoid fibroma; F = female; M = male

*Tumor (size, 24 × 18 × 14 cm) had spread to the mediastinum.
**No patient had evidence of neoplasm recurrence.

composed of a myxoid matrix populated by stellate and spindle cells, with moderate nuclear enlargement and eosinophilic cytoplasmic processes (Fig. 3). The diagnosis was CMF.

We performed a subtotal sternectomy and resected the mass with a clear surgical margin. Rigid sternal reconstruction was achieved with use of the STRATOS™ Strasbourg Thoracic Osteosyntheses System (MedXpert GmbH; Eschbach, Germany). After the ribs were prepared laterally to the margin of resection, the rib clips and connecting bar of the STRATOS were bent to proper shape and fitted to reconstruct the chest defect. The patient's clinical course was uneventful, and she had no local recurrence as of March 2014.

Discussion

To our knowledge, this is the 7th case of primary sternal CMF to be reported in the English-language medical literature (Table I).[2-7] The patients' ages have ranged from 17 to our patient's 63 years.

Clinically, the predominant symptom is chest pain, as in our patient. Radiologically, CMF most often presents as a sharply demarcated, lytic lesion with scalloped margins.[8] Some authors whose patients had a primary sternal CMF suspected a chondrosarcoma or malignant cartilaginous tumor preoperatively (Table I) because of cortical destruction and expansion shown on CT.[4-7] Our patient's CT showed an osteolytic lesion with discrete calcification in the bone marrow of the upper sternum. Low-grade chondrosarcoma, like CMF, can have a predilection for low ^{18}F-FDG uptake, so the differential diagnosis of primary bone malignancies can be confounding. Factors that might contribute to the lower avidity include a high proportion of acellular gelatinous matrix with respect to cellular density, and lower mitotic rates than those in higher-grade tumors.[9] In our patient's mass, FDG uptake evaluated by means of PET had an SUV max of 5.7. Because of the radiologic findings, we performed a biopsy in order to narrow the differential diagnosis.

Primary sternal tumors include chondroma, chondrosarcoma, and osteochondroma. Particular caution is required to differentiate chondrosarcoma from CMF. Because of the presence of pleomorphic cells with hyperchromatic nuclei, the histologic diagnosis of CMF might be difficult and result in an erroneous diagnosis of chondrosarcoma.[2] The preoperative histologic specimens were evaluated correctly in some previous cases.[2,4,6,7] In our patient, the preoperative histologic diagnosis was a benign lesion.

En bloc resection with clear margins is satisfactory treatment for CMF. As in our patient, no recurrence has been reported (Table I).

Chest-wall reconstruction with use of rigid material is necessary in cases of wall resections larger than 5 cm. In our patient, we used the STRATOS, which has rigid material composed of moldable titanium bars and rib clips. Gonfiotti and colleagues[10] used a STRATOS for sternal reconstruction after subtotal sternectomy for primary tumors in one patient. We have used this graft in 5 subsequent sternectomy patients and prefer it when large resections of the chest wall include the entire sternum, cartilage, and medial ends of the clavicle. All our patients thus treated were extubated in the early postoperative period, and paradoxical respiration was not observed during a mean follow-up period of 28 ± 9 months (range, 18–41 mo). In addition, we have used Prolene mesh, to avoid lung herniation.

In our experience, the STRATOS adapts progressively and well to each required sternal shape, because of the flexibility of the titanium bars and the absence of dead parietal spaces. We think that the STRATOS plus Prolene mesh should be considered in the reconstruction of large chest-wall defects (including the sternum), because it results in minimal morbidity, is easy to use, prevents paradoxical respiration, and provides a good cosmetic appearance, as in our patient with CMF.

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