Introduction

According to the World Health Organization (1), the chondroblastoma is a relatively benign tumour, characterised by highly cellular and relatively undifferentiated tissue, made up of rounded or polygonal chondroblast-like cells with distinct outlines and multi-nucleated giant cells of osteoclast type arranged singly or in groups. A cartilaginous intercellular matrix with areas of focal calcification is a characteristic of that tumour. The term benign chondroblastoma was suggested by Jaffe and Lichtenstein (2) to describe a rare tumour of the rib. Few cases of chondroblastoma of a 47-year-old man located in the body of the IX right rib have been reported in the literature. The patient presented a moderate right thoracic pain with an apparently palpable mass. Computed tomography (CT) scan showed a well-defined oval 49 mm × 43 mm lesion with the lytic bone destruction of the rib. A surgical resection was performed with an excellent outcome and no recurrence after 4-year follow-up. We also conducted a systematic review of literature where we evidenced that chondroblastoma could affect people of all age, but it’s most common in children and young adult. Surgical resection constitutes the treatment of choice.

Case presentation

A 47-year-old man, with no previous medical history, was admitted because of a solid, visible thoracic mass and persistent moderate pain in the right hemithorax for 4 months. The lesion has increased over 10 years, with no clinical feature. On physical examination, a fixed palpable mass with pressing pain was noted in the lateral arch of the IX rib. The overlying skin was normal with no sensor deficit. The patient had a history of right chest trauma 20 years ago. A plain radiography showed a well-defined lytic defect, measuring 45 mm of the IX right rib. Computed tomography (CT) scan demonstrates an area of extensive lytic bony destruction, measuring 49 mm × 43 mm × 37 mm, with conserved cortex. The margins were well delineated with some ossifying matrix (Figure 1). There was no evidence of extension to the adjacent soft tissue. A benign osseous lesion, such a chondroma, was suspected.
En bloc resection of the anterolateral arch of the IX right rib including 30 mm of the normal cortex and partial diaphragmatic resection were performed. Chest wall and diaphragmatic defect did not require any prosthetic reconstruction. We reconstructed the diaphragmatic defect with interrupted Vicryl 1 adjusting the diaphragm on the VIII rib, to create a tight closure with uniformly distributed tension. Functional outcome of the patients was excellent without pain or paradoxical motion. The final pathologic diagnosis was chondroblastoma; macroscopically it was a round and lucent lesion, measuring 55 mm x 45 mm x 40 mm in size. Microscopically, the tumour was constituted by sheets of mononuclear, polyhedral small cells admixed with giant cells (Figure 2) and zone of lacy calcification (chicken wire calcification) (Figure 3). Immunohistochemistry examination showed reactivity of neoplastic cells for S-100 protein, MNF116 cytokeratin (Figure 4), epithelial membrane antigen and Ki-67 Clone MIB-1 (1.5%). The excellent postoperative course was observed, with no complication and hospital discharge after two days. No recurrence and no lung metastases were found at 4 years follow-up.

**Discussion**

Chondroblastoma account for approximately 1% to 2% of all bone tumours and most patients are between 10 and 25 years of age at the diagnosis, with a male predominance (5,11,12). In our report, the age was 47 at the diagnosis,
a very uncommon age. No risk factors and pathogenesis are known for chondroblastoma. More than 75% of chondroblastoma lesion involves long bones; epiphyseal and epimetaphyseal regions of the distal and proximal femur, proximal humers and proximal tibia are the most common sites (6,13). Other locations are acetabulum, ilium, talus, calcaneus, patella, and temporal bone (14,15). Typically, chondroblastoma affects a single bone, but it can involve two distinct anatomic sites (16), and pain is the most common symptom, usually present for less than 1 year (6,7,17). Soft tissue swelling, mass, or joint effusion is present in about 20% of cases. Chondroblastoma is usually well-circumscribed, round or oval lesion (3) on the radiograph. CT scan can show matrix mineralization, cortical erosion and soft tissue extension. The aggressiveness of the lesion varies among studies. In larger chondroblastomas, there can be an extension into the metaphysis or cortical destruction with the periosteal new bone formation. Aggressive lesions tend to have a higher recurrence rate (9,12). The histological characteristics finding are the presence of chondroblast and chondromyxoid stroma surrounding neoplastic cell. The specific cells are uniform, round to polygonal with well-defined cytoplasmic borders, with mainly clear cytoplasm. Sometimes a nuclear groove or small nucleoli are present. Randomly distributed osteoclast-type giant cells are almost always present. Variable area of deposition of chondroid material accompanies the chondroblast (6,18). A distinctive microscopic finding is the existence of a zone of lacy calcification: “chicken wire” calcification. A reactivity of neoplastic cell for S-100 protein, vimentin and cytokeratin are most commonly observed in the immunohistochemical pattern. Chondroblastoma should usually be differentiated with giant cell tumour, chondromyxoid fibroma, osteosarcoma, eosinophilic granuloma, clear cell chondrosarcoma and chondroblastoma-like chondroma (19). Both giant cell tumours and chondroblastoma occur at the end of the bone. But at RX examination chondroblastoma is better demarcated. Moreover, chondroblastoma shows chondroid matrix, calcifications which are not a feature for a giant cell tumour. Chondromyxoid fibroma involves the epiphysis, have lobulated growth pattern with a myxoid background. A rare type of osteosarcoma cytological features is similar to chondroblastoma; however, in this kind of osteosarcoma the cells are arranged in a sheet-like pattern and permeate bony trabeculae (20-22). There is no accepted standard treatment for chondroblastoma. Earlier reports advocated “curettage” for the removal of these lesions, en bloc resection while following contemporary
articles take a more aggressive approach, like wide local excision. Curettage alone, or with associated cryosurgery is described (23,24). Radiotherapy has also been used but has substantially no current role, like chemotherapy. Local recurrence is the most frequent complication (14–18%) (4), particularly with subtotal resection. Metastasis, when it occurs, most frequently involves the lungs and tends to occur at the time of primary tumour recurrence and may develop along the malignant bony lesion. Pulmonary metastases are clinically non-progressive and can often be treated by limited surgical resection or simple observation. Recurrence may be treated with curettage and with marginal excision of the soft tissue component. Malignant transformation is rare; pulmonary metastases may develop along with the malignant bone lesion (25) and can often be treated by surgical resection or follow-up (26). Prognosis of these lesions is excellent, 90% successfully treated by curettage or en bloc resection. There are no international guidelines for an appropriate and cost-effective follow-up. Our follow-up included a physical examination and chest radiography every 3 months, and chest CT scan, bronchoscopy, abdominal ultrasound, brain CT scan and bone scan every 6 months for 3 years, then every year over the following 5 years. An extensive follow-up, with acceptable cost, may improve the outcome of patients through detection of asymptomatic recurrences; however, validation by prospective studies is required.

Conclusions
In conclusion, the peculiarity of this case is the long-time rib growth of a chondroblastoma in a middle age man.

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None.

Footnote
Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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