Chondroblastoma of the cervical spine

Case report

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A rare case of benign chondroblastoma of the cervical spine is described, and the differential diagnosis of benign lesions in the spine discussed.

KEY WORDS - chondroblastoma - vertebral column - vertebral tumors

BENIGN chondroblastoma, a rare primary bone tumor, was probably first recognized by Kolodny in 1927 as a "cartilage containing giant-cell tumor." Ewing in 1928 called it a "calcifying giant-cell tumor." Three years later Codman designated it "epiphyseal chondromatous giant cell tumor." The name "chondroblastoma" used today, given by Jaffe and Lichtenstein in 1942, recognizes the nonspecific nature of the giant cells and, more important, the cartilaginous nature of this neoplasm.

In most cases the chondroblastoma is located in the epiphyseal region of a long bone, although other bones may be involved. The recent AFIP publication on tumors of bone and cartilage does not mention the vertebral column as a location of chondroblastoma among 185 cases of this tumor, although Fig. 24 in that publication illustrates such an example.

Our review of the literature revealed only three cases of chondroblastoma situated in the spine. Because of the rarity of chondroblastoma in this location, the following case is documented.

Fig. 1. Radiograph of the cervical spine showing a large expansile lesion with ill-defined mottled calcific densities, originating from C-1 (arrowheads). The posterior arch of the atlas is present on the left side but is not seen on the right. The anterior tubercle of C-1 is poorly identified.
Wisniewski, Toker, Anderson, Huang and Malis

Case Report

A 17-year-old boy was hospitalized because of progressive neck stiffness dating from a fall 3 years earlier, and occasional “dizziness” or “fainting feelings.” There had been no pain or loss of consciousness. The patient had been previously in good health, and the family history was unremarkable.

Examination. The patient was found to have torticollis and neck movements were limited. Roentgenograms of the cervical spine showed an expansile osteolytic process involving the first cervical vertebral body on the right side, with involvement of the occipital condyle and also the adjacent second cervical vertebra (Figs. 1 and 2). The margins of the lesion were somewhat sclerotic, and scattered calcifications were present. The brachial angiogram revealed that the lesion was supplied by branches of the right external carotid artery and the right vertebral artery (Fig. 3). The preoperative differential diagnosis included aneurysmal bone cyst, chordoma, and osteochondroma.

Operation. An incision was made under the line of the right mandible and directed between the carotid sheath and the pharynx, sparing all the structures but the common facial and the superior thyroid veins. To expose the mass at C-1, the longus capitis muscle was detached from its prevertebral insertion and retracted laterally. The anterior arch of C-1 was ballooned by the tumor, which was relatively avascular and covered

Fig. 2. Frontal tomograms of the C-1 area. Left: View at the level of the dens showing destruction of the lateral mass of C-1 on the right with involvement of the adjacent C-2 and the occipital condyle (arrowheads). The dens is clearly eroded on the right (arrow). Right: View anterior to the dens showing a large calcific density with dense outer margins (arrowheads) crossing the midline to the left (arrow). The right lateral border of the mass is not calcified.

Fig. 3. Lateral view of retrograde brachial angiogram showing the presence of many vessels around the mass. In stereoangiography, no clear-cut arterial supply was seen within the tumor. No tumor blush was noted in the venous phase (not shown).
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**FIG. 4.** Typical microscopic field showing plump spindle cells within the chondroid matrix on the left with a more cellular area containing several giant cells on the lower right. H & E, X 100.

by a thin layer of cortical bone. Under a Zeiss surgical microscope at 10× magnification, the cortical shell was opened and the tumor curetted in all directions.

**Pathological Examination.** The specimen consisted of multiple small pieces of whitish cartilaginous material weighing 8 gm in aggregate. Histological examination showed cartilaginous cells with varying degrees of maturation. Areas of dense cellularity alternated with regions of looser texture that contained an extensive intercellular chondroid matrix (Fig. 4) and resembled fetal cartilage. The chondroblasts were varied; some had large ovoid, cuboid, or round cells with eosinophilic cytoplasm and large nuclei, frequently containing distinct nucleoli, and others had spindle-shaped cells, particularly those in the chondroid matrix (Fig. 5 left). Mitoses were not seen. Giant cells varying in size and containing from two to several nuclei occurred frequently. The two types of giant cells described by Jaffe and Lichtenstein were present, although they could not always be distinguished with certainty. Numerous areas of necrosis with calcification characteristic of this lesion were found within the tumor (Fig. 5 right).

**Discussion**

A cystic lesion in the vertebral column of a young person presents a wide range of diagnostic possibilities. Aneurysmal bone

**FIG. 5.** Left: Photomicrograph showing the dual morphology of the chondroblasts as well as giant cells. H & E, X 100. Right: Photomicrograph showing extensive areas of necrosis and calcification with multinucleated giant cells adjacent to the necrotic region. H & E, X 100.
cysts occur frequently in vertebrae, and were found in this location in 53 of 193 cases (27%) by Linscheid and Dahlin.\textsuperscript{10} Osteoblastoma, a benign osteoid-producing tumor, although rare, has a predilection for vertebrae and long bones.\textsuperscript{3,8,10,12} Osteoid osteoma is known to occur in vertebrae, although less commonly than in other locations.\textsuperscript{15} In a series of 98 enchondromas, three were located in the spine.\textsuperscript{8} Giant cell tumor is certainly rare in the vertebral column; the highest incidence in a single series was five of 85 cases.\textsuperscript{11} In five larger series\textsuperscript{15} there were 11 such cases out of a total of 419. Two cases of vertebral chondromyxoid fibroma were seen in a series of 40 cases.\textsuperscript{15} Hemangiomas have occasionally been encountered in the spine, although clinically asymptomatic and insignificant. In a radiological study, one was seen in a cervical vertebra, five in the thoracic spine, and eight in the lumbar spine.\textsuperscript{14} Chordoma is most common in the sacrococcygeal region, base of the skull, and the cervical vertebrae.\textsuperscript{15}

Chondroblastomas located in the vertebrae may be mistaken for tuberculosis or a malignant tumor, as in two thoracic cases described by Buraczewski, \textit{et al.},\textsuperscript{1} and Witwicki and Dziak.\textsuperscript{16} The other reported case of vertebral chondroblastoma\textsuperscript{4} occurred in the cervical spine and was characterized by recurrences over many years. The case of vertebral chondroblastoma mentioned in the AFIP report\textsuperscript{15} recurred on four occasions.

It is difficult to speculate on the prognosis of our patient, since the available information about chondroblastoma of the spine is sparse. Although benign in nature, a tendency to local recurrence is a well-recognized feature of this tumor in any location.

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